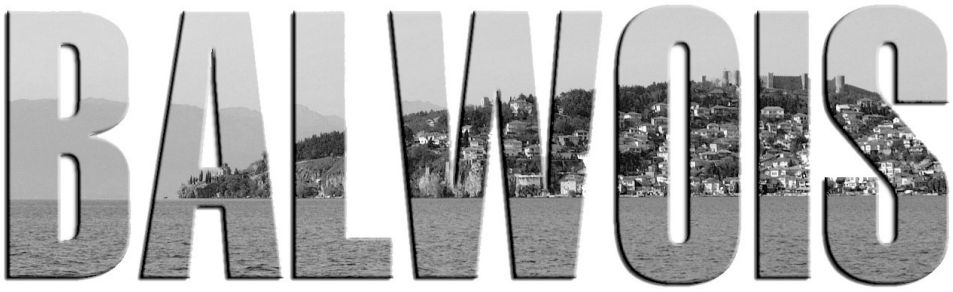
“When the well is dry, we know the worth of water.”

Benjamin Franklin

Balkan Institute for Water and Environment, Montpellier, France
Faculty of Civil Engineering, University "Sts. Cyril and Methodius", Skopje, Macedonia
University "St.Kliment Ohridski" Bitola, Macedonia
Hydrobiological Institute, Ohrid, Macedonia
Meteorological Association of Macedonia, Skopje, Macedonia

CONFERENCE

ON WATER OBSERVATION AND INFORMATION SYSTEM FOR DECISION SUPPORT



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ABSTRACTS

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Marc Morell, Institut de Recherche pour le Développement, France
Cvetanka Popovska, Faculty of Civil Engineering,
Sts. Cyril and Methodius University, Republic of Macedonia
Olivija Morell, Meteo Mak, Republic of Macedonia
Vasko Stojov, Hydrometeorological Service, Republic of Macedonia

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BALWOIS

Welcome to BALWOIS 2010 !

On behalf of Organising Committees, it is our privilege and honour to invite you to participate in the Fourth International Scientific Conference on Water Observation and Information System for Decision Support which is held in Ohrid, Republic of Macedonia, from 25 to 29 May 2010 (Hotel Bellevue).

The primary focus of the Conference, built on the success of the previous conferences – Ohrid, 2004, 2006 and 2008 - is to further enhance the knowledge in the following fields:

Topic 1 : Climate and Hydrology
Topic 2 : Environment and Human Activities
Topic 3 : Water Related Risks
Topic 4 : Integrated Water Resources Management
Topic 5 : Ecohydrology and Hydrobiology
Topic 6 : Computing and Technologies

A specific session is organised by Drought Management Centre for Southeastern Europe (DMCSEE) focusing on drought monitoring and related risks mitigation. However, other fields of research are investigated during the conference in order to favour exchanges with researchers focused on water related issues and those working in other environment fields.

Thus, BALWOIS is a platform for creating partnerships in solving water scarcity problems, floods, droughts, environmental degradation and risk affecting not only at the Balkan scale, but wider. Oral presentations, exhibitions and poster sessions are all designed to facilitate contacts and interactions between participants.

BALWOIS 2010 is patronized by Ministry of Environment and Physical Planning of Republic of Macedonia and by the French Embassy in Skopje.

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Please join us at the conference and enjoy the beauty of the town of Ohrid and of its fabulous lake!

Marc Morell,
IB2E President, BALWOIS Coordinator

Cvetanka Popovska,
Sts. Cyril and Methodius University, Scientific Committee

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IMPROVING OUR KNOWLEDGE TO RESPECT THE WATER AS A NATURAL POWER AND DEVELOPING SKILLS IN ITS GENUINE MANAGEMENT, IS THE GOAL WE SHOULD ALL PUT OUR ENDEAVORS IN STAKE.

THE BALWOIS CONFERENCE, PROVIDES US WITH OPPORTUNITY NOT ONLY TO SHARE EXPERIENCES, BUT ALSO TO BUILD KNOWLEDGE ASSETS AND TO ANTICIPATE WHAT IS AHEAD OF US.

Sonja LEPITKOVA

Dep. MINISTER,

MOEPP of Rep. of Macedonia

CONTENTS VOLUME II

TOPIC 5

ECOHYDROLOGY AND HYDROBIOLOGY

003 An Approach to Modeling Nutrient/Food-Chain Interactions with Application to Lake Shkodra

Spiro Grazhdani, Adriana Zyfi

Agricultural University of Tirana, Albania

spiro.grazhdani@yahoo.com

This research presents an approach to modeling nutrient/food-chain interactions, which gives a general picture of the eutrophication level for Lake Shkodra and shows general trends of the trophic state of this aquatic ecosystem. Man - made eutrophication, in absence of control measures, provides much faster than the natural phenomenon and is the major reason for pollution of Lake Shkodra. The model presented provides information on temporal resolution of eutrophication effects that is extremely useful to water quality managers. This study also provides a means to identify nutrient and light limitation, which is a critical step in controlling eutrophication. The specific nature of the lake has been taken account and embodied in the model. The results taken are encouraging.

Keywords: nutrient/food-chain, eutrophication, algae, phytoplankton, zooplankton, non -living organic carbon

006 Effect of Refinery Effluents on Water Quality in Niger Delta, Nigeria

Prof Orish Ebere Orisakwe 1, John Kanayochukwu Nduka 2

1 Toxicology Unit, Department of Pharmacology, Nnamdi Azikiwe University, Nigeria
2 Pure & Industrial Chemistry Dept, Nnamdi Azikiwe University, Awka, Nigeria

eorish@aol.com

Oil exploration, exploitation, refining and other related economic activities in the oil-rich Nigeria's Niger Delta region, has led to widespread contamination of air, soil and water bodies (rivers, streams, creeks) due to spillages and gas flaring. In addition the increase in population and rapidly growing urbanization due to oil-related economic activities, stretched the limited public water supplies and waste disposal system to complete collapse in many urban and suburban centres. The

failure of the public water supply scheme has led to the exploitation of hand-dug wells from near surface aquifers for domestic use by those unable to afford the cost of sinking boreholes in deep aquifers. Hospital records in this area, is replete with cases of diarrhoea and typhoid fever diseases both of which can be water-borne. This study investigated the effect of refinery effluents on different sources of potable water in two areas of Niger Delta "contiguous host" and "impacted on communities" in Warri Niger Delta, Nigeria (surface water, shallow well water and borehole water) in Ekpan, its adjoining communities and creeks. Since open and underground water bodies are regarded as final recipient of most environmental pollutant, we sought through the study to provide data on pollutant load of potable water supply of the study area. Method: Cadmiun, chromium, lead and manganese were determined using Atomic Absorption spectrophotometer, physcio-chemical parameters such as nitrate,nitrite, pH, Biological oxygen demand BOD, Total hardness TH, salinity and electrical conductivity EC were all determined using their standard methods. Novel aspect: Surface water of Aja-Etan and Ijala had highest levels of cadmiun (1.45 - 0.01 and 1.20 - 0.0(mg/l), that of ifie-kporo and Ekpan has highest lead (1.00 - 0.01mg/l). Ekpan borehole water is more acidic (4.79 - 0.01) than others. Agigba and Ajamimogha surface water has highest level of manganese (2.40 - 0.03 and 2.20 - 0.03mg/l). With the exception of Ekpan shallow well, BOD and hardness were in highest concentration in surface water. Some of the parameter were above WHO standards and USEPA maximum contaminant level (MCL).

008 Influence of Water and Sewage Treatment Processes on Decreasing Water - Related Diseases in Marsh Community of Iraq

Dr. Hussein Al-Nasrawi

Foundation of Technical Education- IRAQ

halnasrawi2@hotmail.com

Water contaminated by sewage or human excrement presents the greatest danger to public health associated with drinking water, and pathogens present in water are usually greatly outnumbered by normal intestinal bacteria, which are easier to isolate and identify. Samples of drinking water were collected during 2003 and 2004 from containers in villagers of rural area in Al-Kahla`a district , whreas waste water and sewage disposals samples were drained from efluents of sewage treatment plant in Al-Mudatharah locality in Al-Kahla`a distict during 2003, 2004 and 2005. Marsh Arabs are a population lives in southern areas of Iraq ,they face shortages and lack of safe drinking water, with low sanitation facilities .Due to discharging waste water and sewage disposals directly into the rivers without any treatment processes , marsh residents suffer from decline of community health.

Health case of water borne diseases in Abo-Khasaf village after providing the villagers with safe drinking water revealed low rate of diarrhoeal cases from 139 to 49 during 3 months , whereas chemical and biological parameters changed via improvement of water quality due to rehabilitation of sewage treatment plant. Results of our present study shows that diahrreal cases among marsh community children have been decreaced from 139 to 49 case after construction new water facility and MPN of E.coli decreased from 5.1 colonies per 100ml.water to zero colonies as a result of chlorination.Waste water test which discharged to the river refered to decrease of E.coli numbers from >10 colonies per 100 ml. to < 10 colonies per 100ml which led to decrease diarrheal cases fro 688 to 250. Conclusions of present study confirmed that untreated sewage influents consider the main key factor for possibility of spreading E.Coli in untreated drinking water which contribute in increasing of morbidity cases among children under 5years of age. Key words - Diahrrea, water quality, rehabilitation, sewage treatment plant.

Keywords: Diahrrea, water quality, rehabilitation, sewage treatment

010 Technical Elements and Biological for Evaluation of Debits Protection

Dascalita Dan

Water Directorate Siret River Cuza Voda street, No. 1, Bacafu City, Romania

dan_dsclt@yahoo.com

Modern concepts of integrated management and sustainable development of water resources that are provided in the European Directives on water and in the Romanian legislation, combines aspects of rational use of water resources with the protection of aquatic ecosystems. The main objectives of these concepts, is part of the ecological reconstruction and rivers to:

-optimization (improvement) and ensure appropriate habitat biodiversity conservation,

-ensuring appropriate flow rates of water for protection of aquatic ecosystems,

-providing longitudinal and lateral connectivity of the flow rates water circulation to ensure optimal upstream and downstream-upstream-downstream fisheries fund.

A very important step in the complex process of environmental reconstruction, is to ensure the flow of environmental protection along water courses (flow protection of aquatic ecosystems) and the minimum flow required in any section

of a watercourse river, to ensure natural conditions of life of existing ecosystems and future. In this context, the paper aims to present some of hydromorphological requirements, including compliance flow protection of aquatic ecosystems, the water courses must meet in order to achieve established by the Framework Directive 60/2000/CEE the good ecological status of water bodies.

Keywords: debits by protection of aquatic ecosystems,hydromorphological indicators, ecological reconstruction, good ecological status.

012 Ecological Status of Wetland "Atanasovsko Lake"

Georgi Zhelezov 1, Neli Hristova 2

1 Institute of Geography, Acad. Bonchev str., bl. 3, 1113 Sofia, Bulgaria
2 Sofia University, Bulgaria

gzhelezov@abv.bg

The presentation analyzed the transformations in morphografical and hydrological peculiarities of Atanasovsko lake - one of the Bulgarian wetlands with international importance. The general part of investigations are connected with development of spatial models based on aerial photo from different periods.

Keywords: wetland, dynamic, ecology

018 Changes in Conductance in the Waters of Lagoons of a Sea with no Tides

Roman Cieslinski, Jan Drwal

University of Gdansk, Department of Hydrology, Gdansk, Poland

georc@univ.gda.pl

The southern Baltic Sea coast is a place where early water relationships were formed by the action of the Scandinavian ice cap and its meltwaters followed by further changes due to climate and hydrologic factors. One of the effects of these changes have been changes in the chemical composition of water in the region, which can be detected via the measurement of specific conductance reflecting both short and long term changes. A number of geographic factors are clearly

having an effect on the aforementioned changes. The paper is designed to answer the following questions: 1) How did the specific conductance of selected lake water samples vary when measured in one hour time intervals? 2) How do these results compare to measurements performed over a longer period of time? The purpose of such a high sampling frequency is to detect the presence of saltwater intrusions. Two lakes on the Polish seacoast were selected for research purposes: Lake Gardno and Lake Lebsko. Specific conductance was measured every hour using an automatic probe made by YSI Sontek (6920V2). In addition to measuring specific conductance, the probe recorded lake water levels. The paper is also based on Baltic Sea water level data. Lakes Gardno and Lebsko are hydrologically different to a rather substantial degree compared to other lakes on the Polish seacoast. The water in both lakes is subject to very large fluctuations in specific conductance with a peak fluctuation range of 11,509µS cm-1. Despite the magnitude of such fluctuations, differences can be observed between the two lakes. While Lake Lebsko is characterized by continuously elevated values of specific conductance, Lake Gardno may experience periods of potamic influence with specific conductance dropping below 1,000µS cm-1. Specific conductance values vary all the time, not just over the course of several days but daily and even hourly. Such dynamic changes are not only the result of hydrometeorological conditions but are also driven by the magnitude of runoff in a lake's basin. It is basin runoff that pushes seawater out of a lake and does not allow it to stagnate over longer periods of time. Another factor that is quite important in this case is the occurrence of brackish water intrusions that are not necessarily associated with stormy weather but may occur in normal weather.

Keywords: Lagoons, sporadic and periodic changes, conductance, Baltic Sea

019 Hydrochemical and Isotopic Evaluation of Water Recharge Quality in Karst

Abdulrahman Kassem

Syrian Atomic Energy Commission, Damascus, Syria

akassem@aec.org.sy

In this study, water sources in natural wetland and karst complex aquifers were investigated using isotopes and chemistry of water. Several earlier hydrochemical and environmental isotopic studies were devoted to natural water resources in the coastal region of Syria (Dubertret, 1963 and Selkhozpromexpor,1979). The essential groundwater supply in Syria is usually found in karstified limestone and dolomite systems. Moreover, stable isotopes were shown to be effective tools for investigating wetlands that could not easily obtained using other non-isotopic

techniques (Hunt, R J, et al., 1998). The goal of this study was to characterize the fate and transport paths of chemical contaminants in the surface water, karst and natural wetland systems. Water quality can be affected when runoff water carries sediments and other pollutants into streams, wetlands, dams, and marine environment or into ground water (Kassem, A, 2008).Using geochemistry of major and some other trace elements in addition to environmental isotopes such as 18O, 2H and 3H. This study concentrated on (1) the recharge of the karst and natural wetland shallow aquifers, (2) the pollution and mixing of seawater and saltwater intrusion to groundwater, (3) the estimation of mean residence time of groundwater, (4) the circulation of some trace elements from surface to groundwater, (5) the effects of no treated sewages of municipal and industrial with the agricultural pollutants on the surface and groundwater quality. METHODS 55 water samples were collected in three bottles for isotopic and chemical analyses (Figure 1).The temperature, PH, electrical conductivity (EC) were measured in the field by international electrodes. The chemical and isotopes analyses were carried out in the laboratories of the Department of geology in the Syrian Atomic Energy Commission (AECS).The d18O, d2 H analyses were performed by the mass spectrometer (Delta plus) while the tritium was measured by liquid scintillation counter (Quantulus 1220).The chemical analyses of major anions and cations were determined by an ion chromatograph (Dionex 120) and some other heavy metals were measured by an atomic absorption. Figure(1):hydrograph map of the study area with the water samples location (A) with its isotopic and chemical data(B), piper diagram (C), and geological section (D) RESULTS AND DISCUSSION Isotope data show quick infiltration of rainwater to groundwater in the most water samples analysis. The tritium values of this water samples seem to be that equals to their values in rainwater (about 2.6 -5.2TU).We noted that the chemistry of groundwater's belonging to the Cenomanian-Tuoronian and Jurassic aquifers is characterized by low solute content (0.4 gl-1). The groundwater chemistry of wetland shallow Quaternary aquifer (Figure1) shows a higher solute content within the range of 450-5000 mgl-1 at the north of Lattakieh and to the south of Tartous cities. The evolution of total dissolved solid (TDS) shows a progressive increase from the coastal range of mountainous area (Figure 1D) towards the Al-Ghab wetland depression in the east and towards the shoreline in the west (Kassem, A 2008). We evaluated the effect of municipal, agricultural and the industrial sewage effluents of atmospheric emissions, by the high concentration of F-,NO3-, Cl-, SO42-, Pb++, Zn++, Cu++ etc., in ground water of some springs and wells water. In the wetland and shallow groundwater near the sea shoreline and rivers catchments the chemical and organic pollution with an importance PH value and T degree due to many mechanisms of water recharge and pollutants circulation with the storm water of Mediterranean sea, irrigation or floods water intrusion and infiltration. This water type, of calcium-magnesium and bicarbonate (Figure1-C), a reflection of the carbonate rooks predominate in the area of investigation. But in wetland and shallow aquifers water, we can see the opposite because the pollution by sea and saline water intrusion and the geological effects. The figure (2) shows that there are several groups of water differenced by there isotopic compositions due to different kinds

of process that control the groundwater flow. The first group is represented by the more depleted isotope value, which can be interpret as direct infiltration of rainfall above the karst systems of Cenomanian outcrop in the study area. The second and third groups are representing by the shallow and natural wetland system and the surface water. In fact, these two groups represent by moderate values of isotopic composition with slightly evaporated. Two processes are controlled the water systems in this tow groups: Mixing water between shallow and rivers and the evaporation from surface and shallow water. Al-hafieh dam represented by enrichment value, however the Al-Abrash dam represents by moderate isotopic value this is due to different volume reservoir of the dams. Figure (2) Relationship between d18O and d2 H values for ground, wetland and surface water samples collected from various site in the study area . CONCLUSIONS This Work deals with the chemistry and quality of surface and groundwater in the coastal basin of Syria. 2H , 3H, 18O, Major, and some other trace elements such as Ca++, Mg++, Na+, K+, Fe++,+, Cu++, HCO3 -, SO4 --, Cl-, PO43-, NO3-, NH4+ and F- along with physical properties including pH, temperature, and electric conductivity were determined in 55 water samples of surface and groundwater in the study region. The evaporation of groundwater in some recharging zones was increase in the surface and natural wetland shallow aquifer by the depilated of 2H and 18O values. The quality and chemical types of groundwater samples indicate the nature of aquifer rocks and the groundwater contamination or the sea water intrusion e.g. north Lattakieh and south Tartous cities. The pollution of surface and some karst and major wetland shallow aquifer due to the lack of treatment of no point source of pollution with high concentration of nitrate and some heavy metals from municipal, industrial and agricultural remains in this region. For that we look to constructed many wetland systems in the coastal basin of Syria and in other parts of the country for removing the pollutants and protecting the soil and groundwater quality. Keywords Karst .Wetland, Pollution, Seawater intrusion, Coastal basin, Syria. Acknowledgements The author would like to thank professor I. Othman, Director General of AECS for use facilities during this study. I am also grateful to the staff laboratories of Geology Department at the AECS, for their cooperation in performing the isotopic and chemical analyses or field samplings. References: Dubertret,L(1966)Liban , Syrie et bordure des pays voisins. Premиre partie:Tableau stratigraphique avec carte gйologique au millioniиme. -Notes Mйm. Moyen-Orient,8,pp.249-358,Paris 1966. Kassem, A(2008) Hydrochemical evaluation of irrigation water, wetland and groundwater pollution in the Orontes basin of Syria, II International Conference on Wetland Systems for Water Pollution Control,1-7/11/2008 Indore (India),p.1032-1039. Hunt, R J, Bullen, T D, Krabbenhoft, D P, and Kendall, C(1998) Using Stable Isotopes of Water and Strontium to Investigate the Hydrology of a Natural and a Constructed Wetland.Ground-Water. 36: 3 pp.434-443 (May/June 1998). Selkhozpromexport (1979)Hydrogeological and Hydrological Surveys and investigations in four areas of Syria,Orontes area,and,Costal area,Volume I.

Keywords: Karst .Wetland, Pollution, Seawater intrusion, Coastal basin, Syria

027 Comparative Spatial and Temporal Analysis of Ecology of Ponds with Varying Management Practices

Kannan Doraipandian, Arun raja Thangasamy

Thiagarajar College (Autonomous),India

dekan_c@rediffmail.com

Man-made ponds are among the important entity of wetland ecosystem and have different utilization potential and adapted with varying management practices. The present work is envisaged with the objective of comparing the ecological nature of the ponds. The two ponds selected for this study are located in close vicinity in Sivagangai District of southern India and differ from each other in utilization as the first pond supports migratory birds visits and the other pond has no such migratory birds inhabitation and both the pond water is used for irrigation. Environmental nature of soil, sediments, water and vegetation biodiversity in the ponds was studied in different season at those ponds. Data acquisition on resources utilization by the indigenous community was also studied. Results of the present study would be useful in making proper management guidelines for the sustained nature of the ponds.

Keywords: Pond ecology, Migratory birds, Sivagangai District, Southern India

029 Evalution of Potential Pollution of Natural Water by Trace Elements Originating from Power Plants Ashes

Slobodanka Marinkovic, Prvoslav Trifunovic, Rade Tokalic, Aleksandra Kostic-Pulek

Faculty of Mining and Geology, Belgrade, Serbia

slobodankamarinkovic@gmail.com

Coal ashes (flay ash and bottom ash) from pawer plants contain trace elements that can be possible pollutants of surface and ground waters. Some of trace elements in coal ashes are naturally radioactive and make possible risk of radiation. Because of that, the examination of leaching of trace elements from coal ashes and determination of radioactivity of coal ashes are very important information for safe disposal of them, without harmful impact to environment (water, soil). In this work, the extracts of fly ash and bottom ash from the Serbian «Nicola Tesla» power plant was analyzed by atomic absorption spectroscopy to determine the concentration of Cu, Zn, Cd, Pb, Ni, Mn, Cr, Sb, Fe and Al in them.

Also, it was determined the radioactive contamination of the mentioned ashes (the specific activity of the radioactive nuclides: 238U, 235U, 40K, 226Ra). The results obtained by atomic absorption spectroscopy have shown that the concentrations of Cd and Pb in the extracts of flay ash and bottom ashes from the «Nicola Tesla» power plant were higher than it was limited in Italian and German lows for safe disposal of coal ashes (there is no Serbian low about it). Consequently, potential pollution of natural water by Cd and Pb from disposal sites of the “Nicola Tesla” power plant could be possible (according to the mentioned lows). The results of the determination of the radioactive contamination of the ashes from the «Nicola Tesla» power plant showed that it did not exceed the permissible limits, according to Serbian regulation. On this way, these results indicate that eventually dissolution of radioactive nuclides from disposal sites of the “Nicola Tesla” power plant in natural water could not be harmful, very probably.

Keywords: Pollution of natural water, fly ash, bottom ash

031 Fluoride Leaching in Groundwater Cripples Life in Parts of India

Surendra Sharma

Carman Residential and Day School, India

sks105@rediffmail.com

Fluoride problems are wide spread in India especially in nine States covering almost the entire country. In order to assess the water quality and the related health problems due to high fluoride content, water samples from nine States across India have been collected and analyzed. Analyses from surface, subsurface and thermal water samples had fluoride concentration that range from < 0.2 to 13.2 ppm. The probable source of high fluoride relates to the water-rock interaction within the sedimentary basins. During rock weathering and subsequent circulation of pore water through the soil and rock matrix, fluorine is leached out, mainly from the mineral fluorite (CaF2) and calcium difluoride, and dissolved in the ground water. Human health affects of high fluoride content in water are manifested in the form of "endemic fluorosis" causing tooth mottling and inducing the prevalence of osteoporosis and collapsed vertebrae. Fluorosis has no known treatment other than early detection and limiting the amount of fluoride ingested. The concentration of fluoride below 1.5 ppm according to World Health Organization (WHO) is helpful in the prevention of tooth decay, and such level of fluoride also assists in the development of perfect bone structure in human and animals but long term ingestion of drinking water having fluoride concentration above 1.5 ppm leads to dental and skeletal fluorosis as well as

non skeletal manifestations. High fluoride consumption leads to the fluorosis of the bones which is generally found in Asian region but it is particularly acute in India. Reducing the high fluorine content of groundwater is done by dilution or by defluorination process. Dilution with the surface water is one very simple technique but not very practical in water scarce India. In-situ treatment is now receiving more attention. Alkaline soils can be remedied through the application of gypsum, pyrite and sulfuric acid. Gypsum treatment is the classical method of alleviating the soil alkalinity but makes the water harder. However, this may be an advantage of getting a higher intake of Ca++ which can mitigate the effect of F-. Encouraging results have been obtained for lowering fluoride content in water using turmeric and planting the poplar trees (populus deltoids) trees in affected to alleviate sodicity in soils. But the addition of Ca++ ions to the fluoride rich groundwater causes an appreciable decrease in fluoride concentration which appears to be the potential cost effective solution to high fluoride problem in an otherwise water scarce India.

Keywords: groundwater, fluoride, endemic fluorosis, tooth decay

035 Bottom Natural Complexes Regionalization with Application of Quantitative Methods (on an Example of the Northern Region of the Caspian Sea)

Natalia Mitina, Boris Malashenkow

Water Problems Institute of the Russian Academy of Sciences, Russia

natalia_mitina@mail.ru

The aim of this work is studying features of modern structure of bottom natural complexes of northern region of Caspian sea, a substantiation of their classification and division into districts of water area. The technique of classification BNC of northern region of Caspian sea is developed. The analysis of the natural data processed by quantitative methods in a combination with traditional, has revealed the number of laws allowing soundly to group natural complexes on presence of sets of significant correlation communications and to carry out their typology, i.e. reveal groups homogeneous BNC a large rank - from physical - geographical areas up to facies. As the main classification attributes coastal landscapes along a coastal line, a relief of a bottom, particle size structure, hydrological and hydrodynamical parameters of water weights, phytoplankton, zooplankton and zoobenthos biomass are chosen. The substantiation hierarchical subordination the personal computer from areas up to districts is lead with application of quantitative methods. It is received, that each of the allocated areas and subareas has the natural features expressed in significant correlation communications, to

notice which without attraction of numerical methods it is practically impossible. The following lower on a rank of unit of physical-geographical division into districts (from district up to facies) were allocated with a traditional method of complex use of results of researches of the components presented in the form of a set of cards and the description of revealed laws. Within the limits of investigated water area of Caspian sea (the Physical -geographical country) two physical-geographical areas - North Caspian sea and Middle Caspian sea are allocated; five subareas - North Caspian coastal, North Caspian near shore, Middle Caspian continental shallow, Middle Caspian continental slope, Middle Caspian abyssal plain; three districts - Sulak -Terec-Kuma accumulative plain, Volga-Ural accumulative plain, Northern Mangyshlak; 23 landscapes - Sulak river deltoid alluvial-accumulative boggy plain, Terec river accumulative deltoid plain, Tersko-Kumsky interstream accumulative sea plain, Kizlyar estuaries accumulative sea plain, Kuma river deltoid accumulative plain, Chernie zemli sea accumulative plain, Volga river accumulative deltoid plain, Volga-Ural interstream accumulative sea boggy plain with lagoons, Ural river deltoid alluvial-accumulative plain, Ural-Emba interstream accumulative sea plain, Near-Caspian Caracum, Mertvij Kultuk sors, sea sors accumulative plain, sea accumulative plain Buzachi, Gulf of Mangyshlak, Volgo-Caspian plain, Uralskaya deep trench, Ural-Emba plain, Abrasion terrace of the North Caucasian foothills, Denudation-erosive structural coastal plain Tjub-Karagan peninsula, Agrahanskaja terrace, Continental slope of the North Caucasian foothills; eight districts and 40 complex natural boundaries. This research was funded by Russian Found for Basic Research project 09-05-00893-a.

Keywords: natural complexes, Caspian sea, classification

057 Diatom (Bacillariophyceae) Flora of Karavasta Lagoon

Skerdilaid Xhulaj 1, Doriana Bode 2

1 Museum of Natural Sciences, Faculty of Natural Sciences, University of Tirana, Albania
2 Faculty of Agriculture and Environment, Agriculture University of Tirana, Albania

toxarium@gmail.com

Interesting lagoons and other wetlands with a total surface of 150km2 extend along the Albanian coast, distinguished for the richness of breeding and refuge habitats for flora and fauna. Actually, the coastal zone and especially wetlands are considered of high economic values, which make the zone to be under the continuous pressure of tourism, aquaculture and fishing, especially Adriatic coast in the other side is affected by the intense activities of agriculture and industry, urban pollution, sand extraction from the rivers, etc. Recently studies on ecology

and taxonomy of brackish water diatoms have been intensified and supported by integrated environmental programs. Karavasta lagoon (surface area of 43 km2), situated between the Semani and Shkumbini deltas, is the largest of Albania. It is connected with the see through three short channels. The lagoon is shallow and fluvial in origin. A total of 200 taxa were recorded in planktonic and epiphytic samples taken in different habitats of the lagoon. Pennate diatoms were dominant in all samples. Most abundant species were: Cyclotella choctawhatcheeana, C. ocellata, Melosira nummuloides, Achnanthes amoena, A. brevipes, Amphora copulata, A. pediculus, Cocconeis scutellum, Fragilaria capucina var. vaucheriae, Navicula tripunctata, Neosynedra provincialis, Nitzschia closterium, Planothidium delicatulum, Striatella unipunctata, Thalassiosira weissflogii etc. Some of them are illustrated with micrographs in plates.

Keywords: diatoms, diversity, salinity, Karavasta lagoon

058 Cost- Effective Remediation of High Fluoride Rich Groundwater: a Case Study from India

S.K.Sharma

Carman Residential and Day School, Shyampur, Dehradun, India

sks105@rediffmail.com

India suffers greatly from the presence of large amounts of fluoride in its water supply especially in nine States covering almost the entire country. In order to assess the water quality and the related health problems due to high fluoride content, water samples from nine States across India have been collected and analyzed. Analyses from surface, subsurface and thermal water samples had fluoride concentration that range from < 0.2 to 13 ppm. The probable source of high fluoride relates to the water-rock interaction within the sedimentary basins. During rock weathering and subsequent circulation of pore water through the soil and rock matrix, fluorine is leached out, mainly from the mineral fluorite (CaF2) and calcium difluoride, and dissolved in the ground water. Human health affects of high fluoride content in water are manifested in the form of 'endemic fluorosis' which has no known treatment other than early detection and limiting the amount of fluoride ingested. High fluorine consumption leads to the fluorosis of the bones which is generally found in Asian region but it is more acute in India. Hence, possibilities of reducing the high fluorine content of groundwater by defluorination process / dilution with the surface water is one very simple technique but addition of Ca++ ions to solution in contact with fluorite when experimented in distilled water caused appreciable decrease in fluoride concentration which appears to be

more suitable solution to high fluoride problem in an otherwise water scarce India. In areas of high concentration. easily available local raw materials, such as clay, serpentine and marble can he used to reduce the fluoride content if geological and geochemical investigations be carried out prior to the implementation of water supply schemes.

Key words: groundwater, fluoride, endemic fluorosis, defluorination, raw material

059 Techirghiol Lake - Europe Present, Past and Future

Gina Raluca Kerkmann

Museum Complex of Natural Sciences of Constanta, Romania

ginaraluca@yahoo.com

Paralittoral Techirghiol lake (Dobrogea Region, Romania) constitutes an ecosystem with a special structure and an interesting geological past. Located at 15 km south-east of Constanta city, with a surface of 1270 ha and a maximum length of 11 m, Techirghiol lake has developed in a lacunal system after the communication suspension with the Black Sea 2-300 years ago (TUCULESCU, 1965).

Techirghiol lake has a hiperhaline system, the salinity real value varies today between 57-61 g/l. The lake is not only a tourist attraction but also a balneary centre, the presence of sapropel mud of whom composition contribute the Artemia salina filopod and the Cladophora eurihaline algae - extracted from 3 places located at a distance of 4-6 m length from the central lake area, represents the remedy of rheumatism of who wishes to enjoy a holiday in these historical places.

The first documentary certification of the Techirghiol locality and lake was in year 1560, under the Ottoman Empire (LAPUSAN Aurelia & LAPUSAN S., 1999). The Techirghiol lake constitutes an interest ecosystem for biologists through its special qualitative composition, characterized by the endemic species presence.

The strong antropical impact of last decades brought changes in abiotic factors values, especially the salinity, consequence being the changes in qualitative and quantitative composition of Techirghiol lake fauna. Nowdays solutions are necessary for the purpose of port water ecological equilibrium restoration.

Keywords: lake ecosystem, salinity water, abiotic factors, Artemia salina, Cladophora

064 Urban Sediments and Metals Distribution in Areas with Different Types of Soil Use

Leidy Luz Garcia Martinez 1, Cristiano Poleto 2

1 Hydraulic Research Institute - IPH/UFRGS, Brazil
2 State University of Maringa - UEM, Brazil

luxgm@yahoo.es

Urban environments may be considered as sources of pollution and, consequently, important agents in degradation of bodies of water due to the input of a large quantity of substances, principally heavy metals, which are transported from the drainage basin through surface run-off. Heavy metals like lead (Pb), cadmium (Cd), nickel (Ni) and zinc (Zn) are subproducts of industrial activities; however, in recent years, studies have shown that even in residential areas results indicate high concentrations of these elements. This study measured the concentrations of these four elements in 20 composed samples of urban sediments collected from an urban basin of 5 km² with 3 residential, commercial and industrial areas located in the city of Porto Alegre, Brazil. Concentrations of metals were determined by acid digestion, in accordance with the methodology of the U. S. Environment Protection Agency (EPA 3050) of the fraction <63 µm followed by atomic emission spectrophotometry with inductively coupled plasma. Mean values of 612.5 (± 179.5); 1.1 (± 1.5); 68.3 (± 25.36) and 272.4 (± 497.3) µg.g-1 were obtained for Zn, Cd, Ni, and Pb, respectively. Concentrations of the metals studied were interpolated (Inverse Distance Weight) and represented geographically using the software Idrisi - Andes. The results of the interpolations show that the greatest concentrations are located in the commercial and residential part of the study area, characterized by a high flow of vehicles most of the day, considered to be a potential source of heavy metals. This study is important for both socioeconomic questions and environmental questions, because it allows the establishment of control objectives within sustainable management of water resources, allowing inferences regarding future pollution scenarios of local water resources.

Keywords: urban basin, sediments, metals

067 Concentrations of Zn and Ni Contained in Urban Sediments in 30 Cities in the South of Brazil and their Influence on the Management of Water Resources

Cristiano Poleto

State University of Maringa - UEM, Brazil

cristiano_poleto@hotmail.com

The growing increase in metal concentrations in urban areas has been documented in innumerable scientific studies. In a general way, urban sediments end up being their transporting agent and upon entering into bodies of water, they release these loads constituted of innumerable pollutants, principally metals like zinc and nickel. For that reason, the present study made a survey in 30 cities of the state of Rio Grande do Sul, Brazil, collecting and analyzing composed samples (100 m² per sample) of urban sediments obtained in impermeable areas of the central regions. Concentrations of the metals was obtained through acid digestions (HCl-HF-HClO4-HNO3), which resulted in mean values of 299 µg.g-1 for Zn and 48 µg.g-1 for Ni. As in previous mobility research it was shown that local sediments have a large pre-disposition of being easily released in aquatic environments, the results suggest that the degradation of bodies of water is constant, and if management efforts developed in these basins do not consider these sources of pollutants, their water resource management model will have an important methodological fault.

Keywords: urban basin, urban sediments, metals

071 Assessing the Ecological Status of Lumebardhi I Pejes River (Drini I Bardhe River Basin, Kosovo) Using Fish Assemblages

Linda Grapci - Kotori, Ferdije Zhushi - Etemi, Hazbije Sahiti, Agim Gashi, Halil Ibrahimi

University of Prishtina, Faculty of Mathematical and Natural Sciences, Kosovo

linda_grapci@yahoo.com

The implementation of the Water Framework Directive of the European Union among others requires future routine assessment of the ecological status of rivers. Among the latter, fish communities referring to their species compositions, abundances, and age structure have to be considered as biological indicators. As the WFD requires carrying out regular quality assessment of fish population, in

the frame of this study it is sampled in 3 sites along Lumebardhi I Pejes river (1 in June and 2 in September 2008). The electrofishing is used as sampling method. The sites were fished by wading using electrofishing equipment (Hans Grassl GmbH). The qualitative and semi-quantities data are obtained. A list of species composition is completed. Altogether 9 fish species and lamprey (Eudontomyzon stankokaramani) were present in catch. Within each sampling site the amount of species present varied between 1 species (in Sampling site 1), to 5 and 8 species in other two sampling sites.Sampling site 3 which is electrofished during month September had the highest fish density of the entire electrofished river. This was mainly due to high density of Phoxinus lumaireul (59 samples) and Barbatula barbatula (22 samples). The classification of the ecological status is done by using EFI index. To implement the WFD definitions for ecological status classes must be set at high, good, moderate, poor and bad. In our study we have reach the following EFI index; 0.50 in sampling station 1 which refer to good ecological status, 0.51 in sampling station 2 which refer also good ecological status and 0,42 in sampling point 3 which refer to moderate ecological status. Based on complex research we can conclude that the Lumebardhi I Pejes River is an ecosystem with relatively favorable ecological conditions for the development of ichthyofauna but because of direct negative anthropogenic impact in different forms, the development of ichthyofaunae is on the decline.

Keywords: WFD, Lumebardhi i Pejes River, fish composition

074 Sustainable Urban Development: a Case Study on Goksu Delta

Ilknur Akiner 1, Ernur Akiner 2

1 Mersin University, Architecture Faculty, Department of Architecture, Turkey
2 Bogazici University, Department of Civil Engineering, Turkey

ilknurakiner@gmail.com

Goksu Delta exists in Silike district of Mersin province in Mediterranean Region of Turkey. Delta has 260 km long Goksu River and a watershed that has a 10,069 km2 area. Hence, it is one of the most important watersheds of Turkey. In comparison with the agricultural areas, urban settlement areas are smaller in size. However, settlements are concentrated around the Goksu River. This situation affects the sustainable urban development in a bad way. In addition to these, fishery in Akgol and Paradeniz Lagoons is another reason for the pollution. Rich flora and fauna species live in Delta. Unfortunately there is a great pollution potential in Delta due to the uncontrolled agriculture and unplanned constructions. Pollution threatens survival of living species. In order to prevent the increasing pollution in the region, Goksu Delta is accepted as a special protection area. In this study, pollution

parameters will be analyzed in a statistical manner by using data obtained from published reports and current pollution status will be identified. Reasons of the environmental pollution will be investigated. Resources that are responsible of the pollution will be displayed. Against the current pollution, nature and watershed protection methods will be shown within the results.

Keywords: Goksu Delta, Sustainability, Urban development, Pollution, Water resources management

076 Polychlorinated Biphenyls in Sediments of North Albania (Shkodra Lake, Buna River, Velipoja-Adriatik Sea)

Aurel Nuro, Elda Marku

Tirana University, Faculty of Natural Sciences, Chemistry Department, Tirana, Albania

nuroaurel@yahoo.co.uk

Data reported here are parts of a study to determine the concentration and distribution of polychlorinated biphenyls in sediments of Velipoja (Adriatic Sea), Buna River to Shkodra Lake. Sediments were sampled in May 2009. PCBs and other chlorinated pollutants, particularly the highly chlorinated ones, have been known to persist in soils, water, sediments and biota for long periods of time. The deposition of particle-bound PCBs from the atmosphere and the sedimentation of them from water are largely responsible for their accumulation in sediments and soils. Ultrasonic extraction was used for extracting polychlorinated biphenyls from sediment samples. Clean-up procedure for sediment samples was performing using metallic mercury following an open florisil column. Analysis of PCBs was based on the determination of the seven PCB markers (IUPAC Nr. 28, 52, 101, 118, 138, 153 and 180) measured by gas chromatography electron capture detection. Results of surveillance on polychlorinated biphenyls markers was in levels comparable within sediments of these three water resources, because their same origin.

Keywords: Adriatic Sea, Shkodra Lake, PCBs, Buna River, Gas Chromatography

077 The Water Quality of Shkumbni River Albania Based on the Diversity of Macro-Invertebrates During the Period 2007-2009

Anila Paparisto, Bledar Pepa, Eltjon Halimi, Etleva Hamzaraj, Odeta Laknori

Faculty of Natural Sciences, Tirana, Albania

anila_paparisto@yahoo.com

Based on the water framework directive and on the different studies of water systems especially river systems, macro-invertebrates represent an important key for a fast and exact water quality assessments. The results of this study are taking in consideration the data collected between 2007-2009 The water macro-invertebrates are parts of water ecosystems during different stages of their lives being in this way a great indicator of water quality. The goal of this research is the evaluation of water quality for Shkumbini River during 2009 and the comparison of those data's with the data of 2007. During our study we identify 1134 individuals. Based on our results of EPT (Station 1 EPT 11 (very good), Station 2 EPT 8 (good); Station 3 EPT 4 (Fair); Station 4 EPT 4 (Fair)) we conclude that the quality of Shkumbini River water is still very good on the upper part and good on the central and lower part

Keywords: Shkumbini River, Water quality, macro invertebrates, biotic index, bio-indicator

082 Evaluation of Konya Urban Macroform as Part of Water Sensitive Urban Design

Fadim Yavuz Ozdemir 1, Ayla Bozdag 2

1 Selcuk University, Department of Urban and Regional Planning, Campus of Alaaddin Keykubad, Konya, Turkey
2 Selcuk University, Department of Geological Engineering, Campus of Alaaddin Keykubad, Konya, Turkey

fyavuz@selcuk.edu.tr

Land use decisions are also water consumption decisions. Planning activity at each level (region / watershed / urban) directs spatial development with land choice decisions equally determines urban water demand with density (population and/ or building) decisions. Consequently all types of unplanned urban development affects city folk's living quality by creating unhealthy environments also threat water resources for the purposes of rising water consumption pressure and

pollution. Water related problems not only result from limited and unequal distribution of fresh waters, but also result from pollution with increasing demands and conflicting needs. Urbanization and population growth present a challenge to urban water resources planning. Urban water supplies are under increasing pressure to meet the demands of growing populations in the face of extended drought and a changing climate. To ensure water supply into the future, cities must become 'water sensitive' by minimizing waste, recycling and looking after the environment. The basis for creating water sensitive cities is integrated water cycle management and water sensitive urban design. Konya Closed Basin (KCB) is extremely important for Turkey and the world in terms of wetlands, large salty steps and plant & animal diversity. Despite having limited water resources KCB is one of the Turkey basins intensive water usage exists in. Accordingly KCB has a serious water shortage. This problem is also a result of wrong land use decisions and policies. In this study Konya metropolitan city KCB population is concentrated in is assessed. Using hydrogeological data, the amount of water use and upper-scale planning works statistical and spatial analyses will be employed to examine the Konya Urban Macroform development's suitability as a part of Water Sensitive Urban Design Principles. Experienced problems along with increasing water use in the city will be discussed in the framework of development plan- water consumption relationship and recommendations will be developed.

Keywords: Konya Closed Basin, Water Sensitive Urban Design, Konya Urban Macroform

085 The Vertical and Seasonal Variations of Temperature and Dissolved Oxygen in the Water of Strezevo Reservoir

Belinda Sipkoska-Gastarova 1, Blagoj Vrzovski 1, Antoaneta Stojanova 2

1 JP Strezevo, Bitola, Macedonia
2 JP Lisice, Macedonia

bsipkoska@yahoo.com

We studied vertical and seasonal variations of temperature and dissolved oxygen in the water of Strezevo reservoir for 9 months from May 2005 to January 2006. The aim of this study was to explain how temperature affects reservoir and dissolved oxygen contcentrations and to classify the reservoir, because they are two most important fundamental variables in reservoirs. Water samples were collected at monthly intervals, from seven sample points. Temperature was measured with thermometer and the Winkler titration method was used as standard method for measuring dissolved oxygen content. Measurments of the water temperatures showed that Strezevo reservoir is monomictic, and it stratify once per year, in

summer. Measurments of dissolved oxigen concentration showed that Strezevo reservoir water can be framed in first quality class in almost all samples, and only in 11% of examined waters in second quality class, according to operative legislation.

Keywords: Strezevo reservoir, temperature, dissolved oxygen

087 Rapd Analysis of Genetic Variations in Barbus Peloponnesius (Pisces, Cyprinidae) from River Vardar

Lidija Velkova-Jordanoska 1, Vasil Kostov 2, Goce Kostoski 1, Stojmir Stojanovski 1

1 SI Hydrobiological Institute-Ohrid, Macedonia
2 Institut of Animal Science, Skopje

lidvejo@yahoo.com

The spring barbel Barbus peloponnesius today is considered as a species which inhabites the waters in the Balkan Peninsula.The name differs from its older name Barbus meridionalis petenyi (for spring barbel of the Danube watershed) and Barbus meridionalis rebeli (for spring barbel of the watershed of the Adriatic and Ionic Sea). In this paper the molecular RAPD method was used for investigation of the population structure of the species Barbus peloponnesius from River Vardar and its tributaries. A total of ten oligonucleotide primers was used to obtain various RAPD profiles. Certain interspecies differences among the investigated population were evidenced.

Keywords: RAPD-PCR, genetic variations, Barbus peloponnesius

088 The Impact of Environmental Conditions on the Biodiversity of Aquatic Insects, Odonata, from Aquatic Ecosystems of Karavasta and Spillea in Albania

Halimi Eltjon 1, Paparisto Antila 1, Topi Ddritan 2, Kastriot Misja 1

1 University of Tirana; Faculty of Natural Science; Department of Biology, Albania
2 University of Tirana; Faculty of Natural Science; Department of chemistry, Albania

tonni_75@hotmail.com

Aquatic insects show a high interest due to their feature to serve like environmental bio-indictors. In that study, by analyzing the biodiversity of dragonfly Odonata (Order Odonata; Class Insecta; Type Arthopoda) through the comparison of the

data on quantity and quality related to these aquatic insects, we have evaluated the actual environmental situation of aquatic ecosystems for the Karavasta lagoon, aquatic ecosystems around the Spillea Area and delta of Shkumbini River.

The period of time when the biological material was collected was 2007-2008. By this study are defined for Odonata Order was 26 species, 18 genera and 8 families of. The most represented group was Anisoptera by 13 species and a frequency of 50%. The Libellulidae is the most represented family by 10 species and a frequency of 38.46%.

The ecosystems around the Karavasta lagoon are presented by a frequency slightly higher of species compared to these of Shkumbini Delta River. The Odonata in the environment of Karavasta are more represented by 20 species and a frequency of 76.92% while the frequency were lower with 18 species and a frequency of 69.23% to Shkumbini river delta. It is an indicator of the quality considerably better of the Karavasta area. In both areas are encountered 12 common species and the "Jaccard index" of similarity coefficient" was 46.15%, which is an indication of small difference among the conditions of environmental quality for these bio-indicator species.

Keywords: Odonata, domination, aquatic insect

222 Biomass of the Pelagic Crustacea from Lake Ohrid for the Period December 2007 - June 2009

Dafina Guseska, Goce Kostoski, Orhideja Tasevska

Hydrobiological Institute of Ohrid, Macedonia

guseska@yahoo.com

The freshwater zooplankton is important constituent in the food chains in the pelagic zones of the aquatic ecosystems. The Cladocera and Copepoda representatives as primary consumers in the food chain with the greatest part participate in the seconadary production of continental waters. In the last several decades the oligothrophic Lake Ohrid has been exposed to great pressure from anthropogenic pollution. The presence of allochthonous species Cladocera: Diaphanosoma birgei lacustris and Leptodora kindtii in the pelagic region of the lake indicates certain structural changes in the composition of its zooplankton. In this article is presented the seasonal dynamic of the total biomass of pelagic cladocerans and copepods in Lake Ohrid, for the period December 2007 - June 2009. During the investigated period, certain changes were registered in the total crustacean biomass. The participation of the Copepoda representatives was

prominent, especially of the copepodid stages. In the total zooplankton biomass, they participated with 64%, which confirms that the Lake Ohrid zooplankton has copepodid character. The Cladocera representatives participated with 36%. However, in the summer and autumn period, when in the zooplankton are present and allochtonous species, in the total zooplankton biomass both groups Copepoda and Cladocera participated with same percent (50%). In comparison with the previous investigations (period 2002 - 2005), the Copepoda participation in the total zooplankton biomass in this investigated period (2007-2009) was significantly smaller. The stated changes in the total zooplankton biomass, which are, among other things, result of the presence of two allochtonous Cladocera species, point out to certain changes in the zooplankton community, certainly negative for the oligotrophic character of the Lake Ohrid.

Keywords: Lake Ohrid, pelagic zone, zooplankton, crustacea, biomass

095 Comparative Study of Degradation of Herbicide Diuron Residues in Water by Various Fenton's Reaction-Based Advanced Oxidation Processes

Jean-Jacques Aaron 1, Mehmet Oturan 1, Nihal Oturan 1, Mohamed Edelahi 1, Kacem El Karem 2, Fetah Podvorica 3

1 Laboratoire LGE, Univ.Paris-Est Marne-la-Vallee, France

2 Univ Mohammed V, Morocco
3 University of Prishtina, Kosovo

jeanjacquesaaron@yahoo.fr

The efficiency of chemical, photochemical and electrochemical advanced oxidation processes (AOPs), based on catalytic generation of hydroxyl radicals through Fenton's reagent, for removing the phenylurea herbicide diuron from water was compared. In order to enhance the Fenton's reagent (H2O2 + Fe2+) oxidation power, and to accelerate the degradation kinetics, the system was coupled either with UV irradiation (photo-Fenton) or electrochemistry (electro-Fenton). For the photochemical processes, the quantum yields were found to be significantly higher for the photo-Fenton process than for H2O2 photolysis and direct photolysis. The apparent rate constant values and mineralization degrees for the different photochemical processes also demonstrated the superiority of the photo-Fenton process. The electro-Fenton process exhibited very fast degradation kinetics, achieving complete removal of diuron in less than 10 min. The apparent current efficiency reached a maximum value of 28% for an electrolysis time of 0.6 h, and decreased to 11% for a 3-h electrolysis time,

corresponding to 90% of mineralization. Several oxidation by-products were identified by HPLC and LC-MS analyses, indicating the existence of two attack sites by hydroxyl radicals, the first one being located on the aromatic ring, and the second one on the dimethylurea group. Based on the identification of aromatic intermediates, formed carboxylic acids and released chloride ions, a plausible degradation pathway was proposed.

Keywords: Phenylurea herbicides; Fenton's reagent; hydroxyl radicals; electro-Fenton; photo-Fenton; AOPs; mineralization

108 Evaluation of Microbiological Water Situation from 2004 to 2008 in Shkumbin River, Albania

Mirela Lika (Cekani) 1, Erida Neljaj 2, Valbona Gjoni 2

1 Department of Biology, Faculty of Natural Science, University of Tirana, Albania
2 Institute of Public Health, Tirana, Albania

mirela2422@yahoo.com

Microorganisms are found everywhere in our environment. They are common in the air, soil, water and in the habitats of our daily lives. A number of bacteria occur naturally in river water. The water pollution on river ecosystems could cause health problems through water contamination and in a direct contact, when used for recreation aims, or in indirect way, by the negative impacts to river ecosystems and by consuming of polluted river products. The aim of this study has been the compare of the different components, chemical and biological parameters of the waters of river Shkumbin, during five years.

The samplings of river water are taken from some locations and these samples are examined in laboratory for determination of two micro organisms indicators excrements pollution Faecal coliform (FC) (ISO 9803) and Faecal coliform, probably (Streptococcus faecal FS) with Filtrate Membrane Method's in specific areas (ISO 7899-2). The results and monitored results discussion are carried out by the WHO/UNEP recommendations (Interim Criteria 1985). Some significant contaminating indicators, namely, total coli form, Fecal coliform, pathogenic parasites have been identified and measured along with the related usual parameters, namely, dissolved oxygen (ppm), pH, temperature (^{o}C), total dissolved solids (ppm), etc.

Keywords: evaluation, microbiological pollution, river water, E. coli, etc.

109 Determination of the Wells Microflora According to the Classic Method of Mpn and Filtration Method Mf

Mirela Lika (Cekani), Adela Kullaj

Department of Biology, Faculty of Natural Science, University of Tirana, Albania

mirela2422@yahoo.com

The water is one of the most important products in the people life. The water is important for people in order to release their activities and especially for drinking. Safe fresh water access is the most important problem in the protection of public health. The microorganisms of natural waters are extremely diverse. Environmental problems in lakes, rivers and coastal waters are often a result of human pollution of nutrients or toxic substances. The numbers and types of bacteria present will depend on the amounts of organic matter present, the presence of toxic substances, its saline content, and environmental factors such as pH, temperature, and aeration. Open water in the center of large bodies of water, free of floating debris, will have small numbers of bacteria. Many species of atrophic types are present, however, that require only the dissolved inorganic salts and minerals that are present. The Escherichia coli, Streprococcus faecal and other coliform bacteria were analyzed according to ISO 1988 and ISO 2000. Most probable number (MPN) method was employed for quantitative analysis. Additionally, membrane filtration method (MF), (incubation temperature 37^{o}C and 44^{o}C for 48 hours) was used (AWWA 1992). Results obtained up to now show fluctuations of concentrations of Escherichia coli, Streptococcus faecal and other coliform bacteria in different sampling points.

Keywords: bacteriological examination, water quality indicators, pathogens, Escherichia coli, Streptococcus faecal

110 Quality of Life and Environmental Function Trade-off in the Floodplain

Ahmadul Hassan

Center for Environmental and Geographic Information Services (CEGIS), Bangladesh

ahassan@cegisbd.com

The world's largest delta, Bangladesh, is formed by three mighty rivers: Ganges, Brahmaputra and Meghna. About 80% of the country is made out of rivers and their floodplains. Land and water are the essential natural resources for the

livelihood in the floodplain. These interdependent resources coexist and should be considered jointly for their utilization to ensure economic development, social well being and a sustainable environment. Nutrient-rich and food rich floodplains provide nursery and feeding grounds for hatchlings, fry and juveniles. Frequent floods in Bangladesh, cause destruction of lives and properties. To improve the quality of life of floodplain dwellers, growing more food is one of the measures considered for development and hence undertaken mitigation measures like flood control structures. Upto1990s water resources management in Bangladesh was focused on flood management rather than low flow management for fish habitats. The flood control measures are targeted to protect the crops and ensure increase in production. But, the measures impacted on the regulatory, connectivity and storage functions of the floodplains. As a result, the water extent and duration are reduced and the habitat's productivity and condition to support aquatic lives have also been deteriorated. Hence it needs balanced trade off between floodplain functions and quality of life in utilizing the floodplain resources for sustainable development. In this paper a computation framework has been described to regulate the water level to reduce management conflict (environment and quality of life) in the floodplains and tested in a part of the Brahmaputra floodplain. Utilizing the opportunities and constraints of land and water use activity, fish and rice production trade off curves have been generated under different hydrological management options, where fish and rice represent environment and quality of life respectively.

Keywords: Trade off, management conflict, natural resource management, floodplain

114 Valuation of Hygienic Security at the Packaged Water During a Period of One Year (2006)

Lindita Molla 1, Donika Bocari 1, Gezim Bocari 2, Lindita Tafaj 1

1 Institute of Public Health, Albania
2 Faculty of Medicine, Albania

lindimolla2002@yahoo.com

One of the most used drinking water during the last few years in Albania, had been the packaged one. This study is based on the evaluation of the packaged water in some enterprises of water production in Albania during a period of three months (2006). We have investigated the drinking water circle from its natural source up to the consumer, for the estimation of microbiological pollution, and the chemical examination for 10 parameters. The evaluation of the HACCP during the

water production in the enterprise was estimated also. Before bottling, the single treatment has been done, was the filtration of water through the bacteriological filters and disinfecting by UV. Four bacteriological parameters are controlled with membrane filtering methods (Total Coliforms, E. coli, Fecal streptococci, Sulfito-reducting microorganisms, probably Clostridium perfringens. The highest bacteriological contamination (E. Coli in 90% and S. Fecal in 10% of samples) were found in the water bottled in 6 l, the mean bacteriological contamination (E. Coli in 25% and S. Fecal in 0% of samples) was found in the water bottled in 0.5 l, and the low bacteriological contamination (E. Coli in 20% and S. Fecal in 0% of samples) was found in the water bottled in 1.5 l, This bacteriological contamination originates from the lack of HACCP (Hazard Critical Control Point System) and the pour conditions of hygiene and sanitation.

Keywords: Packaged water, E. Coli, contamination, HACCP

116 Bioidentification of Xenobiotics in Fresh Water as a Part of Water Management

Valerii Tonkopii

Institute of Limnology Rus.Acad.Sci. Russia

tonkopi@hotmail.com

We have been developing non-traditional methods of the identification of pollutants, using various hydrobionts as biological objects and the study of the mechanism of toxic action of xenobiotics. The experiments were carried out with using of Daphnia magna. Daphnia magna is a Crustacean in the order of Cladocera. This aquatic animal extensively used as a test organism in aquatic toxicology due to their small size, short life cycle and amenability to lab culture. Daphnia magna is the most sensitive test-object in relation of different pollutants among all known biological objects including experimental animals. Experiments were performed with a 2-days old culture of Daphnia magna. The toxicity of xenobiotics was determined by the value of LC50, a concentration of the compounds causing death to 50% of hydrobionts during incubation with toxicants for 24 hours. In the first stage of the work, toxicity of organophosphates (Dipterex, DFP, DDVP, Paraoxon, Malathion, Malaoxon), carbamates (Aminostigmine, Physostigmine, Sevine), heavy metals (Hg, Pb, Cu, Co, Cd, Cr, As, Al), organochlorines (Aldrin, Dieldrin, Endrin, Aroclor, DDT, Lindane, PCBs etc.) and pyrethroids (Cypermethrin, Fenvalerate, Deltamethrin, Permethrin, Allethrin, Resmethrin, Phenothrin,

Kadethrin, Cyphenothrin) was determined. The effects of a number of antagonists on the toxicity of xenobiotics were studied. At the first time we discovered that in experiments to Daphnia magna some muscarinic cholinoreceptor blockers (atropine, glipine, pediphen etc.) reduced the toxic effect of organophosphates and carbamates. In the case of heavy metals the chelating agents (EDTA, Dithioethylcarbamate, Unithiolum, Sodium thiosulphuricum, L-Aspartic acid) were effective, for certain organochlorine poisonings - anticonvulsive drugs (diazepam, phenobarbital). In the case of pyrethroid's poisonings the antagonist of glutamate receptor (ketamine), DOPA receptors (haloperidole) and blocker of calcium channel (nimodipine) reduced the toxicity of xenobiotics. As far as these antidotes have a specific treatment action only against definite classes of pollutants, we have elaborated the sensitive express-methods of bioidentification of pollutants.

Keywords: xenobiotics, bioidentification, water management

130 Determination of a-Cypermethrin Insecticide Residues in Senegal Waters by a Flow Injection Analysis-Photochemically Induced Fluorescence (Fia-Pif) Method

Jean-Jacques Aaron 1, Moussa Mbaye 2, Mame Diabou Gaye Seye 2

1 Laboratoire LGE, Univ.Paris-Est Marne-la-Vallee, France
2 Universite C.A. Diop, Dakar, Senegal

jeanjacquesaaron@yahoo.fr

A number of pesticides such as alpha-cypermethrin, a relatively toxic, synthetic pyrethroid insecticide, are very frequently utilized in Senegal to control moth pests of fruit and vegetable crops. As a consequence, pesticide residues can be found in natural waters in the Senegal agricultural regions. In this work, we have developed a method, based on flow injection analysis combined to photo-induced fluorescence detection (FIA-PIF method), to determine low levels of a-cypermethrin in waters. a-cypermethrin naturally displays very low fluorescence, but can be converted in strongly fluorescent photoproduct(s) by direct UV irradiation. We found that the use of cyclodextrins (Я-CD and HB-Я-CD) improved considerably the FIA-PIF signal. FIA parameters, including flow rate, injected volume and reactor length, were optimized. The FIA-PIF analytical performances were good, with low limit of detection (LOD) and quantification (LOQ) values, respectively comprised between 41 and 126 ng mL-1 and between 138 and 420 ng mL-1, and

relative standard deviation (RSD) in the 1.2-3.8% range. Application of FIA-PIF to the quantification of a-cypermethrin residues in tap water and Senegal natural water fortified samples yielded satisfactory recovery percentages (84 - 108%). Because of a high sampling rate (more than 15 samples h-1), FIA-PIF constitutes a fast analytical method, useful for the determination of a-cypermethrin residues in the Senegal natural waters, close to agricultural areas.

Keywords: Flow injection analysis (FIA); photochemically-induced fluorescence (PIF); a-cypermethrin insecticide; cyclodextrins; water analysis.

132 Importance of Water Quality for Irrigation in Organic Food Production in View of Chemical and Microbiological Safety

Svetimir Dragovic 1, Veljko Radojevic 2, Milinko Cicmil 1, Milenko Uscumlic 3

1 Promont group Novi Sad, Serbia
2 Faculty of Management in Business, Serbia
3 Erste Bank, Serbia

svetodragovic@eunet.rs

Water quality in Irrigation on organic food production plays a very important role in maintaining and protecting the environment on which the product quality often depends. It requires a careful approach because of the adverse effects that can be manifested both in the soil and in the plant products. Intensive technical and technological development in all branches of the economy is a major cause of pollution of the environment, primarily of water. The most frequent polluter of soil, i.e. of the medium from which plants take up nutrients, is irrigation water. In that way, plant products which are used for food production become polluted. Water that can contaminate plant products with harmful substances can come from various sources, especially from surface waters contaminated with waste industrial and communal waters or from agricultural farms. The analysis of water quality in some irrigation systems in Serbia found that in 25% of system, water quality does not meet the requirements, which affected the increase in concentration of salt in the soil above the allowable level, precluding the organic agriculture. Besides the total amount and the content of certain pollutants from the salt, harmful and dangerous substances in the irrigation water often come from chemicals which are used in agriculture as pesticides and nutrients, and from the waste waters, or wastes deposited in the watercourses, as well as by the presence of certain microorganisms. Water quality and its hygienic safety exceptionally in vegetable irrigation is extremely important due to the increased demand for healthy safe food, and water can transfer microorganisms to the plant

products, which cause diseases in people, such as: salmonella, Escherichia coli 0157:H7, Cryptosporidium parvum and others. Water from surface sources is more prone to be contaminated in respect to the water from the underground sources.

Keywords: Irrigation, water quality, environment, organic production, microbiological safety

135 Ultrastructural Characterization of Sertoli Cells of Salmonidae from Ohrid Lake During the Spermatogenetic Cycle

Katerina Rebok, Irena Tavchiovska-Vasileva

Institute of Biology, Faculty of Natural Sciences and Mathematics, Macedonia

katerinarebok@yahoo.com

Ultrastructural characteristics of Sertoli cells of Salmonidae from Ohrid Lake during the spermatogenetic cycle have been analysed. Sertoli cells being an integral part of the seminiferous lobules underwent considerable changes, which influenced their cytomorphological features. The cells with squamous form, characreristic for the period before spawning, gradually increase their dimensions. Lipid vacuoles of different size were noticed in their cytoplasm, while the nuclei acquired a polymorphic appearance. In the seminiferous lobules with rare sperm residues Sertoli cells underwent further changes, which caused their involution. The degenerative changes of Sertoli cells were manifested by an extreme vacuolisation, mitochondria with disintegrated crysts or mitochondria in degeneration, with widened crysts and thickened matrix, by desorganised ER, digestive vacuoles, i. e. autophagosomes, "myeline-like" structures and lysed cytoplasmic regions. The above mentioned changes were followed by karyopycnisis, comlete degeneration and delamination of cells from the wall of the seminiferous lobules, lysis and detritus formations, i. e. Sertoli necrotic material in the lumen of the lobules. The degeneration of Sertoli cells was followed by destruction of the basal membrane of the lobules.

Keywords: Sertoli cells, testes, Salmonidae, Ohrid Lake, spermatogenesis, ultrastructural characteristics

136 Degenerative Procceses in the Sertoli Cells of the Two Ohrid Salmons - Ultrastructural Analysis

Katerina Rebok, Irena Tavchiovska-Vasileva

Institute of Biology, Faculty of Natural Sciences and Mathematics, Macedonia

katerinarebok@yahoo.com

In this article the ultrastructural changes of Sertoli cells of two salmons from Ohrid Lake has been analysed. The aim of this work is to represent the cytomorphological aspect of Sertoli cells of Ohrid trout and Ohrid belvica on ultrastructural level durind the reproductive sysle. Testes of sexualy mature Ohrid trout and Ohrid belvica males caught in Ohrid Lake have been analysed. The ultrastructural analysis of the material has been done on the ultrathin section which have been preparated on Reichert-Yung "Ultracut" ultramicrotome, contrasted with uranil acetate and lead cytrate. The cytological analysis based on ultrastructural findings contains some regions of testes of these two salmons during the reproductive sycle, with a special empasis of Sertoli cells. Sertoli cells, as an integral part of the seminiferous lobules suffer considerable changes, which influence their cytomorphological aspect. Namely, out of cells with endoteliomorphic appearance, characteristic for the prespawning period, they gradually increase their dimensions. Lipid vacuoles of different size can be noticed in their cytoplasm, while the nuclei get polymorphic appearance. In the seminiferous lobules with rare sperm residues Sertoli cells undergo further changes which cause their involution. The degenerative changes of Sertoli cells manifest with extreme vacuolosation, mitochondria with desintegrated crysts or mitochondria in degeneration (with widened crysts and thickened matrix), with desorganised ER, digestive vacuoles (autophagosomes), "myelin like" structures and lysed cytoplasmatic regions. The above mentioned changes are followed by karyopycnosis, complete degeneration and delamination of the cells from the wall of the seminiferous lobules, their detritus (Sertoli necrotic material) in the lumen of the lobules and its lysis. The degeneration of Sertoli cells is followed by destruction of the basal membrane of the lobules.

Keywords: Sertoli cells, degenerative procceses, Ohrid salmons, ulrastructural analysis

137 Can Rodlet Cells Changes in Barbel (Barbus Peloponnesius) from the River Bregalnica be Used as Biomarkers of Environmental Contamination?

Katerina Rebok 1, Vasil Kostov 2, Eduardo Rocha 3, Maja Jordanova 1

1 Institute of Biology, Faculty of Natural Sciences and Mathematics, Macedonia
2 Institute of Animal Science, Fishery Department, Macedonia
3 Institute of Biomedical Sciences Abel Salazar (ICBAS), University of Porto, and Centre for Marine and Environmental Research (CIIMAR), Portugal

katerinarebok@yahoo.com

For evaluating pollution impacts on aquatic ecosystems there is a need to establish early-warning signals (biomarkers) using bioindicator organisms. Some studies suggested that rodlet cells (RCs) changes in fish can be used as pollution biomarkers. Looking for supporting evidence, we analysed 136 barbel from the River Bregalnica, caught from October 2007 until March 2008, at a reference site and two sites suspected to be under pollution impact: A (near Kocani) - from aquaculture and mining; and B (near Stip) - from household water discharges. Quantitative microscopy tools were used to estimate the RCs amounts in liver. As general fish health indicators at polluted and reference sites, the condition factor (CF) and hepato-somatic index (HSI) were also recorded. As to results, the CF and HSI were lower at site A ($p<0.01$) when compared with both reference and B sites. Fish from site A also showed the highest average amount of RCs, being both the relative and total volumes of RCs significantly different from those found at site B ($p<0.05$). However, the amount of RCs in fish of either site A or B was not statistically different from the reference site. Data analysis per sex is under way. The gross indicators are suggestive of pollution impacts at site A. The microscopy data, however, is only partially indicative of stress effects at site A, as so it was not able to clearly distinguish the reference from the site where gross indicators were poorer. Even if our data indicate that pollution may raise the RCs pool, its accumulation, at least in our context, resulted in a non-efficient bio-monitoring tool, due to its apparent insensitivity. However, this potential biomarker merits further scrutiny, as its behaviour may depend on the type of pollutants. Also, RCs exist in diverse organs and organ-specific responses can thus occur. Finally, from this study we suggest that RCs changes must not be viewed alone but rather as part of multi-biomarker approaches, a fact that we will further explore.

Kew words: barbel, rodlet cells, biomarker, pollution

139 The Relaxation of Water - Ecological Problems of the Central Asia

Anvar Kodirov

Institute of Water Problems, Hydropower and Ecology,
Academy of Sciences of the Republic of Tajikistan

Tajikistan is rich in water resources. It is necessary to note that having occupied a little more 20% of the area of the Aral sea basin (350 thousand km2) the mountain zone given about 90% of the total surface runoff. The Aral - one is of large midland reservoir of globe. Into Aral run two rivers of Central Asian - Amudaria and Sirdaria, which waters traditionally used on irrigation. The Amudaria and Sirdaria - major of rivers and the Aral - largest reservoir of the Central Asian region. The general of middle-annual flow of all rivers in basin of the Aral Sea make 116km3. This volume include 79,4km3 a flow of Amudaria and 36,6km3 a flow of Sirdaria. According to the likelihood distribution of a flow, the 5% (the year abounding water) and 95% (the year of droughty), for Amudaria of the annual flow changes from 109,9 to 58,6km3 and for Sirdaria accordingly from 51,1 to 23,6km3. In 1913 irrigated territories of basin of the Aral Sea made all about 2 million hectares, the expansion of these areas in region has begun only in the Soviet authority. Approximately to 60th years, the volume sea remained in relative balance: evaporation of a moisture with a surface was compensated for the account of water inflow from the rivers, underground waters and precipitation.

Keywords: Aral Sea, total surface runoff.

142 Parasitic Contamination of the Mint and Turnip Irrigated by Untreated Wastewater in Sidi Yahia Gharb (Morocco)

Sylla Idrissa 1, Driss Belghyti 1, Khadija El Kharrim 1, Clement Yoro 2

1 Ibn Tofail University, Morocco
2 Gateway Alliance Medical, Morocco

syllabg200@hotmail.com

The purpose of this study is to assess the parasites load of contamination of two vegetable crops (turnips and mint) irrigated with wastewater in Sidi Yahia through qualitative and quantitative parasitological analysis. Samples of mint and turnips have respective average concentrations of 4.71 eggs/100g and 4.3 eggs/100g. The main parasites identified are: Capillaria sp. Nematodirus sp. Ankylostoma sp. Toxocara sp., Enterobius vermicularis, Ascaridia galli, Uncinaria stenocephala,

Eimeria sp., Entamoeba coli, and strongyles. Parasitological concentrations of the irrigation effluent are higher compared to World Health Organization (WHO) and Moroccan Standard Committee values for irrigation waters.

Keywords: wastewater, vegetables, parasites, Sidi Yahia of Gharb, Morocco

147 Role of Ippc Permit in the Process of Reduction of Pollution Caused by Waste Water in two Pilot Plants in the Municipality of Prilep

Svetlana Petrovska, Natalija Aceska, Marina Petrovska

CeProSARD, Skopje, Macedonia

svetlana.petrovska@ceprosard.org.mk

Policy for sustainable development according to EU legislation, impose the process of integral approach, by gaining A or B IPPC permit to include and regulate environment influence, which is result from industrial activity. Integrated prevention and pollution control (IPPC) is regime for editing ecological permits for specific industrial activities (metallurgy, energetic, mineral industry, chemical industry, etc) including activities in intensive agriculture and waste managing domain. In the preparation of the application for IPPC permit, one of the prime prepositions in operative plans for waste water treatment is the construction of collector systems. Positive model for this trend of positive solutions and their implementation are two plants in Prilep (Klaneks and Roni Kolant - Prilep) which are in IPPC preparation phase and realization of the proposed operative plan.

Keywords: IPPC permit, collector systems, operative plan, pilot plants, Prilep

154 Biochemical Indication of Mercury Accumulation in Fish

Nina Nemova

Institute of Biology, Karelian Research Centre of Russian Academy of Sciences, Russia

nemova@krc.karelia.ru

Among factors affecting biota mercury takes a special place because of its wide distribution in the environment as well as it is a highly toxic substance for any life forms. Over 90% of the total mercury accumulated in fish tissues is present

as MeHg (Spry and Wiener, 1991). This experimental field study was initiated to evaluate cell metabolic response reactions on mercury accumulation in P. fluviatilis (freshwater lakes of Karelia Republic, Russia) exposed to chronic combine effect of mercury and associated environmental factors (water pH and color). Total mercury concentrations in samples were determined by conventional technique (FAO/SIDA, 1983). The status of an aquatic organism may be estimated by a complex of appropriate methods or biomarkers. Combined with suitable models, biochemical parameters allow revealing metabolic disturbances, which occur as a rule before visible abnormality in organism functioning. Following biochemical indices of fish was studied: tissue protein level, total sulfhydryl group and oxyproline contents, qualitative and quantitative composition of SH-containing low-molecular weight peptides, intracellular proteolytic enzymes (cathepsin B and calpains) activity, energetic metabolism enzymes (LDH, MDH, GPDH, aldolase, cytochrome oxidase) activity; nuclease (acid DNAase) activity; reserve and membrane lipids (triacylglycerols, cholesterol, and phospholipids) content and their fatty acid composition. Biochemical alterations due to mercury uptake adversely affect a range of metabolic pathways in the organism. Thus, obtained results allow to suggest an indicated complex of biochemical parameters as supplementary biomarker set at biochemical monitoring of the environment at mercury contamination, organic pollution level and lake acidification.Thus, obtained results allow to suggest an indicated complex of biochemical parameters as supplementary biomarker set at biochemical monitoring of the environment at mercury contamination, organic pollution level and lake acidification. The present study was supported by the RFBR, project 08-04-01140-a.

Keywords: organic pollution, aquatic organism.

155 Eutrophication in Sea Water of the Montenegrian Coast at Adriatic Sea in 2005-2007

Danijela Joksimovic

Institute of Marine Biology, Montenegro

djoksimovic@ibmk.org

The fact is that in the world today water and land represents limited life resource which are more and more degrade and disturbed, mostly by anthropogenic influence. In common with the other areas, this system is also under a great impact of anthropogenic factors and the activities on the shore. The rivers weighted by sewage, canalization and industrial waters bring large quantities of pollutants through the system of Skadar Lake and river Bojana into the sea, which can be natural, or more frequently anthropogenic. The aim of this work was to determine the content of nutrients and phisical-chemical caracteristic in sea water samples

collected in fall 2005 / spring 2007 at ten locations of Montenegrin cost at Adriatic Sea. Content of nutrients in the samples of sea water was determined by using the standard spectrophotometry method (using UV/VIS, Perkin Elmer λ2) and physical-chemical parameters were determined using a MultiLine 4 labs. The obtained results of examined nutrients in samples of sea water were compared depending on seasons, fall-spring, and locations, at cost of the open sea-Boka Kotor Bay.

Keywords: Eutrophication, nutrients, sea water, spectrophotometry

156 Geoenvironmental Implications in the Ecosystem of Industrial Zones

Fatbardha Cara 1, Artan Tashko 2, Jakup Hoxha 1

1 Institute of Geosciences, Polytechnic University of Tirana, Albania
2 Polytechnic University of Tirana, Albania

bardhac@yahoo.com

Pollution concerns, caused from the industry, are very often subject of many researchers of different science fields and institutions. As the first initiative in the geoenvironmental fields, this study is carried out in collaboration with Institute of Mineralogy and Geochemistry in Aachen, Germany. The aim of presented paper is to provide information about the presence, origin and mobility of the heavy metal in the different soils and their impact on the human chain. Samples are analyzed by AAS and XRF methods. High contents of heavy metal are due to the activity of the metallurgy, mainly by the dust emission. The results of the study generates important data about changes of the different compartments of the environment. Such results obtained by this approach suggest there is a need for a further monitoring plan and improvement interventions in the area.

Keywords: environmental analyses, emission inventory, heavy metals

157 Regional Analysis:Differences in Emission-Intensity due to Differences in Economic Structure or Environmental Efficiency?

Maarten van Rossum, Marije van de Grift

Statistics Netherlands, The Netherlands

m.vanrossum@cbs.nl

The economy is a complex system with many aspects having different interrelated dimensions. Many of these different aspects of the economy may have consequences for the quality of water. Therefore a clear but complex link exists between the economy and the quality of water. This relationship is currently an important issue in estimating the costs of implementing the Water Framework Directive. There are many mechanisms by which the Water Framework Directive affects water quality and the economy. The Water Framework Directive sets water quality targets at river basin level. This is partly explained by the fact that water pollution is very much a local environmental problem. Between river basins large differences in emissions to water and economic activity exist. As a result, the emission-intensity, here defined as the ratio between emissions and value added, differs between river basins. This paper tries to give an answer to why there are differences in emission-intensity between river basins in The Netherlands. In doing so, we will focus on differences in economic structure and environmental efficiency.

Keywords: Water pollution, Water accounts, Emission-intensity, Economic structure, Environmental efficiency

160 Ecoremediation in Protected Areas

Maja Mitic, Gordana Drazic, Ana Djordjevic

Faculty for Applied Ecology, Futura, Belgrade, Serbia

maja.mitic@futura.edu.rs

Ecoremediation integrates application of designed ecosystems in protection of natural values and remediation of the media (soil, water, air) environmentally sensitive natural ecosystems through the management of circulation materials processes. The main technological unit used is the ecosystem processor constructed on the basis of fundamental biological processes. Concept of ecosystem processor is shown in the example of filtering waste waters of visitor center Ludos - Special Nature Reserve (Republic of Serbia). Special Nature

Reserve "Ludas Lake" includes the shore of the lake and settlements Ludas / Supljak, Hajdukovo and Nose. Beauty of the lakes landscapes with high reeds is special value of this reserve. The aim of this project is determination of optimal environmental and economic technology for wastewater treatment of visitor center designed for 50 visitors in protected areas. Method that has been applied is SWOT analyses. Results obtained by analysis indicates that ecosystem processor is a water treatment facility. Duplicating the processes occurring in natural wetlands, constructed wetlands are complex, integrated systems in which water, plants, animals, microorganisms and the environment--sun, soil, air--interact to improve water quality. The most important advantage of the ecosystem processor is its absolute fitting into the existing ecosystem. The weakness, is modest experience in applying the ecosystem designed for water purification in the Republic of Serbia. The most important opportunity is the development of models that can be applied in almost all environmentally sensitive areas; the threat: technology - a high level of groundwater and regulatory laws in which ecoremediation doesn't exists. In conclusion: in the integrated management of protected natural resources, especially under high protection, ecosystem processors based on plant waste water purifiers are ecologically effective, but for their wider application there are necessary actions in education, research and development, regulation and policy.

Keywords: Ecoremediation, ecosystem processor, waste water

161 Heavy and Toxic Metal Accumulation in Six Macrophyte Species from Fish Pond Ecka, Republic of Serbia

Nada Babovic 1, Gordana Drazic 1, Ana Dordevic 1, Nevena Mihailovic 2

1 Faculty of Applied Ecology, Serbia
2 Institute for Application of Nuclear Energy, Serbia

gdrazic@singidunum.ac.rs

A phytoremediation study was carried out at the fish pond Ecka, Republic of Serbia. The bioaccumulation of Cd, Zn, Cu, Pb, Fe, Mn and Ni, and distribution between the organs of the macrophytes (Typha latifolia, Phragmites communis, Nuphar lutea, Ceratophyllum demersum, Salvinia natans and Hydrocharis morsus-ranae) grow in the Ecka fish pond was investigated. The aim of the present study was to determine the capacity of bioaccumulation of metals due to the selection of indigenous macrophyte species suitable for the process of phytoremediation. Heavy metal content was determined using AAS in dry samples of plants which were sampled at the time of their maximum growth. The highest concentrations

of Cd (10 ppm) were found in shoots and whole plants except Salvinia natans, while the highest concentrations of Zn and Mn were found in the Nuphar lutea rhizome The highest accumulation capacity was established in Typha latifolia and Nuphar lutea rhizomes. According to results of analysis there was no significant pollution of aquatic biotopes so the ecosystem and human risk were low. The presence of investigated metals in macrophytes indicates their good indicator and remediant properties, as well as the possible impact of pollution originating from the Tisza river or the air. Macrophytes are important components of aquatic ecosystems as primary organic producers and also as usable species for bioaccumulation of xenobiotics, and for their efficiently removing from aquatic ecosystems. This feature makes them as essential element in constructed aquatic ecosystems, ecosystem processors, for purification and conditioning of surface water. Therefore, recommendation for the management procedure to surface aquatic ecosystems is that instead randomly removing of macrophyte species, it provides their planting in accordance with water depth and then their removing at the phase of maximum growth and bioaccumulation of heavy metals.

091 Influence of Uv Radiation on Srg Extra Fluorescence in Water Samples

Liljana Kola 1, Pranvera Lazo 2

1 Center of Applied Nuclear Physics, University of Tirana, FNS, Tirana, Albania
2 Departement of Chemistry, University of Tirana, FNS, Tirana, Albania

kolaliljana@yahoo.it

The fluorescence ability of Sulphorhodamine G (SRG) Extra enables its using as artificial tracer in the water system studies. The problem is dealt with in relation to applying SRG Extra to trace and determine water movements within the karstic system and underground waters. The fluorescence intensity of fluorescent dyes in water samples depends on their physical and chemical properties, such as pH, temperature, presence of oxidants, etc. Besides that, UV radiation may induce photochemical decomposition of the dyes which can cause large measurement errors. This paper presents the obtained results in our lab studying the influence of UV radiation on SRG Extra fluorescence intensity in water samples in different conditions so-called: 'in the light' and 'in the shadow'. We have studied this influence putting water samples containing SRG Extra in colorless glass bottle and brown glass bottle in each situation mentioned above. The concentration and synchronous scan methods were used for the measurement of SRG Extra fluorescence by the means of a Perkin Elmer LS 55 Luminescence Spectrometer.

The photodecomposition results help us to determine if the dye can be used or not in a water system study with tracing experiment. According to these results we can decide the conditions of the transport and storing of the water samples, too.

Keywords: Spectral Determination, Uranine, Fluorescence Intensity (IF), synchronous scan, artificial tracer

173 Methodologic Approach to Determine the Environmental Flow in Rivers

Lina Castro 1, Yesid Carvajal 2

1 Universidad Catolica de Chile, Chile
2 Universidad del Valle, Colombia

lecastro@uc.cl

Human society has made use of the water resources in rivers, lakes, underground and in different types of swamps for agriculture, urban consumption and industry, among others. Water resources have been the driver of economic development of nations at the expense of the aquatic ecosystems. The short-term benefits of the use of water are high; but seen from a long-term perspective; they could be higher under a sustainable use of the resources. A long-term perspective could guarantee goods and services as well as the adaptability of the ecosystems to future environmental changes (Global Climate Change). Environmental flow forms part of the sustainable management of water resources, which is based on keeping a good ecological balance. In this work a methodology for the determination of the environmental regimen flow (EFR) in the Dagua watershed is developed (Colombia). The proposal is based in a holistic approach towards the establishing of the EFR in rivers. The development of the methodology comprised field measurements of hydrological and hydraulic variables as well as biological and physicochemical characterization of water quality. Field data were gathered along the dry and the rainy periods in the watershed, covering the seasonal variation for flow regime and the other variables mentioned above. A strong influence of flow variation over the physicochemical patterns associate to water quality and the biological index of the ecosystem were observed. The type of correlation between the different variables was also established. Historical information of hydrological data for the watershed was employed in the determinations of the natural regimen flow and its range of variation for inter- and

intrannual periods. The EFR should fall within the range of natural variability due to the importance of hydrological changes in the livelihood of native biodiversity and the integrity of aquatic ecosystems.

Keywords: environmental regimen flow, natural regimen flow, intra- and interannual variability

175 Commonly Used Pesticides in Konya Endorheic Basin and Tempering their Detrimental Effects

Erkan Kalipci 1, Haydar Oztaz 1, Celalettin Ozdemir 2

1 Selcuk University, Ahmet Kelesoglu Education Faculty, Department of Biology, Konya, Turkey
2 Selcuk University, Faculty of Eng. & Arch., Environmental Engineering Department, Konya, Turkey

ekalipci@hotmail.com

Unaware usage of agricultural pesticides leads to some environmental problems and the residuals of these chemicals threaten all living things by causing environmental pollution. The agricultural products include pesticide residuals above allowable limits after harvesting due to unaware usage of pesticides. As a result of this, it's a known fact that the producers are sometimes up against it because of some health problems. Therefore, it's necessary to follow the chemicals used in agricultural products from the stage of production till they are used by the consumers.

In this study, it was aimed to analyze the rates of using agricultural pesticide groups in Konya Plain, being the wheat store of Turkey, between 1996 and 2006 depending on the data of Ministry of Agriculture and Rural Affairs Konya Provincial Directorate. As a result of this research, when total chemical groups used between 1996 and 2006 are considered, it was determined that the chemical groups are used in the following descending order: Herbicides are the most commonly used one with 8.579.722kg, then Fungucides are used with 7.424.272kg, Insecticides are used with 5.614.550kg, Acaricides with 248.483kg and finally Fumigants with 100.943kg. The necessary precautions that should be taken in order to minimize the detrimental effects of pesticide usage on human beings and the environment in Konya Region were discussed.

Keywords: Pesticides, Human and environmental health, Konya Basin, Turkey.

176 Evaluation of Bacteriological and Chemical Analysis of Drinking Water Used in Konya

Celalettin Ozdemir 1, Erkan Kalipci 2, Serkan Sahinkaya 1

1 Selcuk University, Faculty of Eng. & Arch., Environmental Engineering Department, Konya, Turkey
2 Selcuk University, Ahmet KELESOGLU Education Faculty, Department of Biology, Konya, Turkey

celozdemir@selcuk.edu.tr

In this study, the results of bacteriological and chemical analysis (Ca, Mg, Fr, Cl, NO3, NO2, NH3, Organic Materials) carried out in Konya Public Health Laboratories for water samples (mains water and fresh water) collected from various regions of Konya in 2000 by Local Health Authority and Health Centers were evaluated in terms of drinking water standarts (TSE 266, WHO, EPA and EU).

As a result of chemical analysis evaluation of totally 93 drinking water samples collected from 9 different regions in Konya city center in 2000, it was determined that the values of calcium (Ca), magnesium (Mg), total hardness and ammonium (NH3) in 3 samples exceeded the suggested levels according to TSE 266 standarts. As a result of bacteriological analysis evaluation of 166 fresh water and 1042 mains water from 9 different regions in city center; it was observed that 240 MPN and >240 MPN values were exceeded in 20 samples of city water supply (1.9% contamination rate). In drinking water available for the public, on the other hand, it was observed that appropriate values were satisfied.

As a result of chemical analysis evaluation of totally 191 drinking water samples collected from 23 different regions of 23 Konya districts; it was determined that the values of calcium (Ca), magnesium (Mg), and chloride (Cl) in 2 samples (Sumra and Sarayn districts) exceeded the suggested levels according to TSE 266 standarts. As a result of bacteriological analysis evaluation of total 2039 mains water samples collected from 31 different regions in 31 districts of Konya, it was observed that 240 MPN and >240 MPN values were exceeded in 108 samples (5.3% contamination rate).

Keywords: Drinking water, Chemical analysis, Bacteriological analysis, Konya

180 Application of Geoinformation Techniques for Quantifying the Complex Biophysical Information of Wetlands in Northeast China

Demin Zhou 1, 2, 3, Huili Gong 1, 2

1 Key Lab of 3D Information Acquisition and Application, Ministry of Education of China, Beijing, China
2 College of Resources, Environment and Tourism, Capital Normal University, Beijing, China
3 Key Lab of Wetland Ecology and Environment, Northeast Institute of Geography and Agricultural Ecology, Chinese Academy of Sciences, Changchun, China

zhoudemin@neigae.ac.cn

Wetland indicates a highly correlation between the spatial pattern of the natural ecological system with the habitat hydrological process and regime. Hence it is a good ecological indicator to study the impacts of global climate change and regional human disturbances. It is a key research field for ecologists, hydrologists and wetland investigators to quantify the relationship between wetland ecological patterns and hydrological mechanisms, because the existence and functioning of wetlands is crucial for adjacent terrestrial and aquatic ecosystems, and hydro-ecological researches promote both protection and restoration of healthy natural wetlands by further understanding the biophysical characteristics of wetland habitats. The research demands the generation of large amount of environmental variables quantitatively. However, marsh wetlands are hard to access for providing both regular ecological and hydrological observations, which hinders the further study on the crucial ecosystems. In this study, the High-Resolution Digital Camera (HRDC) carried by an aircraft is used for marsh wetlands mapping at the scale of the dominant plant species in an international wetland in the Northeast China. Three key biophysical indicators are also generated such as the wetness index generated from Topmodel, the hydrological regime indicator generated from an integrated method of hydrological monitoring data and spatial analysis of GIS, and the digital definition of micro-geomorphologic types generated by spatial delineation on the finer DEM in a sample area within our study site. Further technological details have been discussed in this paper from uncertainty characteristics of these qualified spatial variables to the scale characteristics of the geoinformation technological application as well as their limitations. In conclusion, wetlands study needs the support from the modern geoinformation observation techs integrated with computer simulation techs. Ecohydrology as a new trans-disciplinary need to integrate with these updated information techniques. Some key issues such as uncertainty, scale exchange and benchmark need to be studied further in the future.

Keywords: Ecohydrology, Geoinformation, Marsh Wetland

226 Environmental Assessment of Water Quality of the River Strumica During the Last Ten Years with Overview on 2008

Sheriban Ramani 1, Kole Pavlov 2, Radmila Bojkovska 1

1 Hydrometeorological Service of Macedonia
2 Sts Cyril and Methodius University, Faculty of Natural Science, Institute of Geography, Macedonia

sheriban@meteo.gov.mk

Water is a finite resource, essential for human existence, agriculture, and even industry. Environmental study of the water physical-chemical parameters is presented and the assessment of water quality of the river Strumica is made based on the monitoring data. Water quality parameters, heavy metals and biological parameters were monitored during 2000 to 2009 in the sample point Novo Selo. Samples of water monthly are analyzed for physical-chemical parameters (temperature, pH, conductivity, turbidity, alkalinity, TSS, COD, BOD, DO, hardness, Cl-, SO42-, Na+, K+, Ca2+, Mg2+) concentration of nutrients (NO3-N, NO2-N, NH4-N, P-PO4), concentration of heavy metals (Fe, Mn, Cu, Zn, Pb, Cd, Cr, Co, Ni).

In the first part are presented annual average data of physical-chemical parameters during 1999-2009, and in the second part variability of monthly data of physical-chemical parameters during 2008.

Based on biological parameters (saprobic index, level of biological productivity) and most of physical-chemical parametrs of river Strumica water is 2nd and 3rd class of quality. The most critical parameters during this period has been found nutrients level and TSS indicating IV and V class of quality, according to the Macedonian regulation for classification of water, Official Gazette of Republic of Macedonia (No 18-99) .

Keywords: water quality, physical-chemical parameters, nutrients, heavy metals, biological parameters, river Strumica.

224 Water Quality State in the Hydro–System Danube – Tisa – Danube

Dragana Milijasevic, Jovana Brankov, Ana Milanovic

Geographical institute "Jovan Cvijic" SASA, Belgrad, Serbia

d.milijasevic@gi.sanu.ac.rs

Hydro - system Danube - Tisa - Danube is a unique system of channels for drainage, irrigation, fishing, transport, tourism, water supply of settlements and industry. Channel system runs on about 12 700km2 between the rivers Danube and Tisa in the north of Serbia (Vojvodina). Total length of channel is 929km. Water quality examines the Republic Hydrometeorological Service of Serbia. The problem of pollution and protection of surface water must be specially treated, since it is one of the most valuable water resources in the area. The aim of this paper is to analyze existing state of water quality in the Danube - Tisa - Danube hydro-system and suggest measures of protection.

Keywords: Water quality, Danube-Tisa-Danube hydro-system

223 Chlorophyll a Content as Indicator of Eutrophication of Lake Prespa

Suzana Patceva, Vasa Mitic

Hydrobiological Institute of Ohrid, Macedonia

spatceva@hio.edu.mk

Lake Prespa, one of the few ancient, long-lived lakes on earth is located in South-East Europe on the border between Macedonia, Albania and Greece. Although the upstream Lake Prespa has no surface outflow, its waters reach the 160m lower Lake Ohrid through underground hydraulic connections. In this paper, we present results of chlorophyll a content in Lake Prespa as a measurable parameter for all phytoplankton production and a very sensitive indicator of eutrophication in the lakes. The investigative period of this study took place over the years 2001, 2002, 2003 and then five years later in 2008. The investigations in this period indicated that once oligotrophic Lake Prespa is in a process of eutrophication and its trophic state worsened additionally in recent five years. The values of chlorophyll a concentration in 2008 belong to the boundary values for eutrophic lakes. The water level declination of Lake Prespa, along with increased nutrient input, has a large effect on its trophic state.

Keywords: Lake Prespa, trophic state, chlorophyll a content, eutrophication.

117 Tivat Sewerage Project

Stjepan Kordek 1, Bojana Gobovic 2, Jasminka Busatto 1, Dejan Kovacevic 1

1 Institut IGH, Sector IGH Design, Water Engineering Design Department, Croatia
2 Vodacom-Joint Service and Coordination Company for the Water and Waste, Montenegro

stjepan.kordek@igh.hr

The city of Tivat has approximately 13 630 inhabitants and is one of the three cities located in the Boka Kotorska Bay. In recent two years, Tivat has become the subject of growing interest to large foreign investors particularly due to its position in Boka Bay, and the capacity for tourism development. The number of approximately 10 000 tourists visiting Tivat each year until 2008 is expected to grow in the next several years and even become triple. The greatest problem the Municipality of Tivat faces with is exactly underdeveloped infrastructure, and this primarily refers to hydro-technical systems, for all future development plans and the expected growth in the number of tourists. In early 2006, there were only two smaller settlements in the urban area of the Municipality of Tivat covered by sewage system. The existing sewage system, apart from being over 25 years old, was operating as a general system. In the remaining parts of the municipality wastewaters were disposed of through septic tanks which overflow waters were carried off in the rainwater channels discharging into the bay. There was enormous pollution of this part of Boka Bay due to lack of wastewater collection and untreated discharge of wastewater directly into the sea. Over the past three years the Municipality of Tivat constructed approximately 17km of primary, secondary and tertiary sewerage system whereby covered approximately 40% of the city by sewerage network and enabled approximately 6000 inhabitants to connect to it. Implementation of the phase II of Tivat Sewerage project encompassing construction of additional 19 km of sewerage network that will enable connection of additional approximately 5000 inhabitants is in progress. Having a good strategy and by careful financial planning the Municipality of Tivat, from being the city with the least sewerage infrastructure coverage on the Montenegrin coast, very rapidly reached an equal or even better position in comparison with the other coastal cities. The Institute IGH in Croatia, as a designer of the complete network, and Vodacom, the project executing agency that managed the investment from its planning stage to commissioning of works played a critical role in this process. This paper presents evolution of a city sewerage system in a very short time period from designing, investment planning, implementation, and putting the system into operation. It draws special attention to basis, approach and problems in designing of a city complete sewage system, and comparison of the designed system with the ultimately constructed one. In addition, the paper encompasses description of the methods to solve problems being anticipated still in the designing stage, in the implementation stage; the problems being impossible to anticipate during the design process; as well as of the organization of project implementation that

has been successfully carried out by a small city such as Tivat over the past three years. Moreover, the implementation of Tivat Sewerage Project, Phase I is the first infrastructure project in Montenegro implemented in accordance with European standards for civil works contracts, and in this case the issue is about FIDIC Red Book contract. Thus the paper contains a review of problems resulted from the incompatibility of Montenegrin Construction Law with provisions provided for in FIDIC contracts with regard to some very significant segments.

Keywords: Sewerage system, Tivat, designig, investment planning, implementation

312 Water Quality of the Lisice Reservoir From Microbiological Aspect

Lence Lokoska 1, Simon Lokoski 2, Kristijana Lokoska 2

1 Hydrobiological Institute, Ohrid, Macedonia
2 Medical Faculty, Univerzitet St. Ciryl and Methodius, Skopje, Macedonia

llokoska@yahoo.com

The Lisice reservoir, together with the complementary objects had been build mainly for resolving of the water supply of the town of Veles and the surrounding inhabited settlements with both quantity and quality of drinking water. The microbiological researches were conducted with the goal of determination of the state and quality of the water (from sanitary and ecological aspect) of the hydro-system and the rivers (Vranovska and Topolka) which are its tributaries. The researches were done in 2008 when the dam was in a phase of filling (19m) and in 2009 when the reservoir was full (47m) in the following points: vertical profile of the dam near the water-collecting tower (6 depths), near the inflows of the rivers, from the exit of the reservoir and from the rivers Topolka and Vranovska. With the method of membrane filtration there were researched total number of coliform bacteria and Escherichia coli on selective chromogenic media. The total number of heterotrophic bacteria and some of physiological groups of bacteria are determined on standard limnological methods. The results indicate that the all investigation groups of bacteria are more present in the phase of filling of the hydro-system when it is not stabilized, compared to the phase when the hydro-system is full. During 2009, the water quality from the reservoir is increased, but that is not case with the water from the rivers. The results from the researches indicate on fecal pollution of the water from the rivers. The potential danger for the quality of the water are the villages located near the rivers Topolka and Vranovska because their waste water from the households and farms directly flows into the rivers while they transport it to the Lisice reservoir. In order to prevent

further eutrophication processes, certain measures of river water protection and conservation should be undertaken. Also, the regular monitoring of water quality should be established.

Keywords: Lisice reservoir, water quality, microbiological parameters

232 Distribution of the Cellulolytic Bacteria in the Lake Ohrid

Lence Lokoska

Hydrobiological Institute, Ohrid, Macedonia

llokoska@yahoo.com

In the water ecosystems the cellulose is to be especially taken into consideration because it is produced during the process of photosynthesis of the phytoplankton and the aquatic macrophytes and its quantity depends on the primary production. The biogenetic transformation of the cellulose from the remaining of the water plants is possible with the enzyme cellulose from some mushrooms and cellulolytic bacteria. The distribution of the cellulolytic bacteria in the Lake Ohrid has been researched in the waters and the sediment of several localities in the littoral zone and of the central part of the Lake. The obtained results indicate that the sediment of the littoral of Lake Ohrid consist more cellulolytic bacteria (7980000 bact.ml-1) than the lake's water (19480 bact.ml-1). In the pelagial of the Lake the cellulolytic bacteria are evidenced in rather low and neglectable values which are in tight correlation to the low phytoplankton productivity, i.e. the low composition of chlorophyll. The vertical distribution follows an increase in the values in accordance to the depths and it is with the highest value in the contact layers of the water and the sediment. This is enabled with the presence of the cellulose on natural processes of dilapidation which with sedimentation due to the slow polymerization reaches the lowest layers of the waters and the sediment. The source of cellulolytic subtract in the littoral of the lake are the macrophytes, the loads of phytoplankton, as well as the different allochtone influences from the cost. The cellulose, a component of the cellular walls of the phytoplankton and the macrophytes is component part of the allochtone polymer carbohydrates which are abundant in the lakes. That is why in the carbohydrates (lakes with cellulose tailings) the cellulolytic bacteria are to be found in great quantity and could be used as indicators for determination of the pollution with this kind of waste.

Keywords: Lake Ohrid, cellulolytic bacteria, water, sediment

233 Interactions Between Areal Hypolimnetic Oxygen Depletion Rate and Trophic State of Lakes in Northern Poland

Dariusz Borowiak 1, Kamil Nowinski 1, Jacek Branczuk 1, Rajmund Skowron 2, Adam Solarczyk 2

1 University of Gdansk, Department of Limnology, Poland
2 Nicolaus Copernicus University, Department of Hydrology and Water Management, Poland

geodb@univ.gda.pl

The oxygen content in lake is a fundamental factor of the lake ecology. In stratified lakes their deep waters are permanently isolated from the atmosphere for several months during the summer, so the oxygen (substantially consumed by biological and chemical processes in this time) can not be replaced again before the autumnal mixing. From the early beginning of the twenty century hypolimnetic oxygen depletion has been considered as an indicator of lake productivity. Many recent studies are in opposition to this statement and have shown that areal hypolimnetic oxygen depletion rate (AHOD) is poorly correlated with seston biomass and/or phosphorus concentration. The objective of this work was an attempt to relating of the mean values of total phosphorus, total nitrogen, chlorophyll a, and transparency of water (Secchi disk depth) in the period of thermal stratification formation to the hypolimnetic dissolved oxygen depletion rates. Hypolimnetic oxygen conditions in five dimictic lakes of northern Poland were examined during the year 2009. Two of them were also studied the year before. Monthly oxygen profiles taken from April to August, midsummer temperature profiles, and morphological data of the lakes were used to determine the AHOD. Standard water quality parameters related to chlorophyll a, total phosphorus and nitrogen concentrations as well as transparency measured at the same time were used in calculating of the trophic state indices (TSI) according to Carlson's type formulas. On the basis of collected data is shown that AHOD is highly correlated with separate TSI value for chlorophyll a, and poorly correlated with TSI for transparency, and phosphorus. The best correlation between AHOD and TSI has been found for chlorophyll a ($r^2=0,85$; $p<0,05$), and for the overall TSI, determined by averaging a separate component indices ($r^2=0,92$; $p<0,002$). There was no correlation between AHOD and the total nitrogen concentration.

Keywords: Areal Hypolimnetic Oxygen Depletion, Trophic State Index, lakes, northern Poland

234 Composition and Dynamics of Microbial Community in the Lake Ohrid

Lence Lokoska

Hydrobiological Institute, Ohrid, Macedonia

llokoska@yahoo.com

The microorganisms in the water environment have the chief role in the process of transformation of the organic material, and in the functioning of the ecosystem as a whole. Knowing the composition and the dynamics of their population is a realistic indicator for determination and forecast of the condition in the aquatic ecosystem. The bacteria are very important indicators for a determination of the level of cleanliness of the analyzed water. As first pointers for eutrophication, they have primary importance within the frames of the hydrobiological research. The composition and dynamics of the microorganisms in the Lake Ohrid have been monitored for longer period of time (1996-2006). The research included parameters of ecological (the presence and quantity of more important physiological groups of bacteria which indicate on the specificity of the organic pollutants) and sanitary aspects of the conditions of the water (coliform bacteria, fecal indicators) for determination of its hygiene status. The retained results from the research revealed that the presence and the composition of the microorganisms is space and season variable, depending on the abiotic and biotic factors, the level of eutrophication and anthropogenic influence. Generally, the lake is in the category of clean waters with a domination of oligotropic bacteria. The relatively low and unimportant quantity of all analyzed groups of bacteria in the pelagic zone and the majority of the localities in the littoral, indicate that the process of transformation of the organic material is rather slow. The peladic zone is still oligotropic balanced as a result of the ability for self-purification; it is still not under the influence of communal, industrial and waste waters of the cost rich of pollutants and nutrients which can result in rapid eutrophication of some parts (low-level) of the littoral zone, such as the areas before the river's delta and settlements.

Keywords: Lake Ohrid, microbiological research

162 Biological Effects of Black Sea Sediments on Sea Urchin Embryonic Development and Relationship Between Toxicity and Hydrocarbon Measurements

Rahime Oral 1, H.Baha Buyukisik 1, E.Yesim Ozkan 1, Filiz Kucuksezgin 2, Enis Darilmaz 2,

1 Ege University, Faculty of Fisheries, 35100 Izmir, Turkey
2 Dokuz Eylul University, Institute of Marine Sciences and Technology, 35340 Izmir, Turkey

rahime.oral@ege.edu.tr

This work describes the toxicological evaluation of marine surface sediments (0-2cm) collected from six sites along Turkish coast of Black Sea. Sediment toxicity to sea urchin early development was evaluated with whole sediment specimens. Bioassays were carried out in Paracentrotus lividus embryos, by evaluating the following endpoints: a) normal (N) pluteus larvae; b) retarded (R) plutei, with size <1/2 N, yet no evident abnormalities; c) malformed plutei (P1) exhibiting a number of skeletal or other abnormalities; d) developmentally arrested embryos (P2), i.e. unable to undergo larval differentiation (blastulae or gastrulae), and e) dead (D) plutei (D1) or early embryonic death (D2). Six sediment specimens from Black Sea were tested at a 1% dilution (dry wt/vol) showing a dramatically higher toxicity in IST (Istanbul), moderate toxicity in ZNG (Zonguldak) and toxicity in INB (Inebolu) an SNP (Sinop). Other two specimens, ORD and TRB (Ordu and Trabzon respectively) failed to show any significant differences compared to controls and we classified these as a non-toxic. In addition to, sediment specimens were analyzed for their content in total organic carbon (TOC) and petroleum hydrocarbons. The investigations concentrated on 16 dominating non-alkylated polycyclic aromatic hydrocarbons (PAHs) and 15 aliphatic hydrocarbons (AHCs). The relationship between the toxicity of analysed sediments and their organic content was examined. The results demonstrated that AHCs were good correlated (r2:0,84) with toxicity data and possible to responsible for toxicity at these sites. TOC and PAHs contents of sediment specimens poorly correlated with toxicity data obtained from experiments which were carried out with sea urchins.

Keywords: sea urchin, sediment, toxicity, hydrocarbon

235 Bacteria as an Index of Water Pollution of the River Golema and Lake Prespa

Lence Lokoska

Hydrobiological Institute, Ohrid, Macedonia

llokoska@yahoo.com

The changes of the space and time distribution of the total number of heterotrophic bacteria and of some physiological groups of bacteria, as well as of the total number of coliform bacteria and the presence of Escherichia coli were monitored in the period 2008-2009 in the waters of the river Golema and Lake Prespa.. There have been determined important differences in the quality of the waters from the analyzed localities, as well as in regard to the composition of the communities. In the rivers there have been registered rather higher values of all analyzed groups of bacteria, with maximums in the Golema River. During the summer period it has been observed that the riverbed of the locality at Carev Dvor is dry. The samples were taken in the town of Resen and it has been indicated that in that moment in the river waste communal and industrial water was present. The results from the bacterial researches indicate the same, with substantial mass presence of coliform bacteria and E. coli. The relatively high values of the other bacteria groups in the waters of the river and in the coastal zone of the lake near Asamati can be explained with the large quantities of deposited apples which the producers were unable to sell. The large surfaces of the coastline where the water is retrieving are entirely covered with macrophytes (entire meadows) which definitely contribute to the increased bacterial presence, especially increasing the presence of the cellulolytic bacteria in all analyzed localities. Substantial organic encumbrance is registered in the pelagic zone of the Lake. For prevention of the ongoing process of eutrophication of the Prespa Lake and to enable its revitalization certain measures have to be undertaken, such as increased control of the waters that flow into the lake, to be cautious of the biological minimum of the water in the rivers, which also during the summer period are used for irrigation without any control. The present pollutants should be eliminated, or at least decreased and a proper regime for prevention from alohtone pollutants should be implemented. Finally, a constant monitoring of the quality of the water should be conducted.

Keywords: river Golema, Lake Prespa, pollution, bacteria

187 A Method for Macrophyte-Based Assessment of the Ecological Status of Lakes, Developed and Implemented for the Purpose of Environmental Protection in Poland

Hanna Ciecierska 1, Agnieszka Kolada 2, Hanna Soszka 2

1 Department of Botany and Nature Protection, University of Warmia and Mazury, Poland
2 Department of Freshwater Assessment Methods and Monitoring, Poland

makrof@uwm.edu.pl

In order to solve problems related to water resources protection, each country has to develop methods for the assessment of the ecological status of water bodies. Such evaluation schemes have to comply with the requirements of the EU WATER FRAMEWORK DIRECTIVE (2000) in all member states. This study presents a method for macrophyte-based assessment of the ecological status of lakes, developed and implemented for the purpose of environmental protection in Poland, and the results of the conducted evaluation. Method Field investigations were carried out based on data on the entire lake vegetation (hydrophytes + helophytes). Vegetation samples were also collected along transects, as recommended in CEN 230 (2003). Assessment was based on the values of the Ecological State Macrophyte Index (ESMI) - according to the macrophytoindication method developed in Poland (MPhI - REJEWSKI 1981). Preliminary data A total of 13 abiotic types of lakes were determined in view of the environmental (including climatic) conditions in Poland. In 2006, a macrophyte-based classification was proposed for two types of lakes (charophyte-colonized stratified and non-stratified lakes). A classification for oligohumus lobelian lakes was not developed due to a too low number of such lakes in the available database. Novel aspect The method for the assessment and classification of the ecological status of lakes is based on the modified Ecological State Macrophyte Index (ESMI_L). New ranges of this index were proposed in view of the threshold values for individual groups determining the ecological status of lakes based on macrophytes. The correctness of the classification system was verified using different environmental parameters, including water quality (TN, TP, chlorophyll a, SD), as well as Carlson's trophic state index (1977) and the biodiversity index. The following statistical analyses were performed: PCA, RDA and cluster analysis with the use of statistical significance tests.

238 Renaturation, Rehabilitation and Ecological Reconstruction of a Changed Water Course by Anthropical Activities

Erika Beilicci 1, Robert Beilicci 1, Cristian Girbaciu 1, Iosif Bisztriczki 2

1 Politehnica University of Timisoara, Faculty of Hydrotechnical Engineering, Romania
2 Romanian water Authority, Somes - Tisa Branch, Romania

beilicci_erika@yahoo.com

Any water course is not just a matter of hydraulics flow with free surface but also a highly complex ecosystem that provides habitat for a very rich specific flora and fauna. If the most important function of minor riverbed is to ensure the flow of small and medium flow of a watercourse, specific role of the major riverbed, in addition to providing water leakage during floods, is to increase the fish productivity and to ensure refuges for aquatic fauna during floods and accidentally pollution and the most appreciate function of ecosystems watercourses is their contribution to maintaining biodiversity.

Keywords: water course anthropical changes, renaturation, rehabilitation, ecological reconstruction

194 The Tendency on the Increase of the Coliform Pollution Level in Belshi and Merhoja Lakes as an Expression of a Continuous Negative Impact Human Activity on them

Sotir Mali 1, Liljana Bekteshi 1, Margarita Hysko 2, Naxhie Hila 1

1 University "Aleksander Xhuvani" Faculty of Natural Sciences, Elbasan, Albania
2 University of Tirana, Faculty of Natural Sciences, Tirana, Albania

sotirmali@hotmail.com

The Dumre-Darsia plateau is situated in central part of Albania, with a total surface of 420km2. This is a very important area from the biological and economical point of view. The Dumre-Darsia plateau is about 20km on the south west side of Elbasan city. Among 94 carstic lakes which are in Albania, 80 of them are situated in Dumre-Darsia plateau with a total surface of 770 hectares. These lakes are very important water bodies from the hydrological and ecosystem point of view. The number of the inhabitants in the areas surrounding the lakes is increased in these two last decades, followed by the increase of the number of buildings, restaurants and coffee-bars. These processes are followed by the damages of the vegetation around the lakes, the discharge of sewage water, and many different

kinds of organic and inorganic remains into the lakes. Because of the use of them for fishing, swimming, and irrigation they are also very important in the economical development of Belshi town and villages around it. Many studies are carried out about the bacteriological and physic-chemical parameters in some of these lakes. The purpose of this paper is to present some new bacteriological and physic-chemical data measured in Belshi and Merhoja Lakes during the year 2009. Also the comparison of these data with those taken in four last years is object of this study. The data show a very high level of the fecal pollution as a main cause of the biological pollution in Belshi Lake. The comparison of the coliform pollution levels in both lakes and with those taken before, clearly shows the negative impact of human activity in the ecosystem lakes in this area and a tendency on the increase of the level of this kind of pollution.

Keywords: Dumre-Darsia plateau, Belshi Lake, Merhoja Lake, water quality, littoral, oligotrophic, coliform bacteria, coliform pollution, wastewater, fecal pollution, heterotrophic bacteria.

207 Floodplain Declaration - Translation of Floodplain Ecohydrology Into a Policy Framework

Maciej Zalewski

European Regional Centre for Ecohydrology u/a,UNESCO Polish Academy of Sciences, Poland

mzal@biol.uni.lodz.pl

River valleys and floodplains which occupy lower elevations in the landscape are highly exposed to this cumulative and still increasing human impacts from the surrounding catchment. At the same time, floodplains, as dynamic wetlands and integral part of river basins, have high potential to mitigate environmental change and resulting threats for humans. This is due to their exceptional capacity for water retention, stabilization of hydrological patters and flood mitigation, biological production and biodiversity maintenance, groundwater recharge, river purification and regulation of nutrients exchange between land and water, high compensatory food production, CO2 sequestration and production of bio-fuels, and other ecosystem services, all maintained by the pulse-regulated hydrology of running waters. This makes them important components of global environmental security and resilience. In order to reverse floodplain degradation and increase the ecological resilience and economic benefits in catchments, a shift in strategy from floodplain exploitation to floodplain sustainable use is necessary. Accordingly we need a change of public perception from sectoral, structural and reactive responses to integrated, process-regulation-oriented and proactive approach. Achieving of

this goal may be possible by implementation ecohydrology - a holistic problem-solving concept using: i) "dual regulation" (regulation hydrology by shaping biota and vice versa) and harmonization of biodiversity conservation with human needs, such as flood mitigation, food and energy production, transport and recreation; ii) harmonization of hydrotechnical infrastructure operational instructions with catchment scale ecosystem processes; iii) consideration of the cultural heritage of the catchment as an important element for spatial reconnection of floodplains to the adjacent landscape, as well as restoration of links to social, economic and cultural values; and iv) shaping people's perception and attitudes to the changing environment based on integrative science which depend on development of programs and methodologies for education and communication.

Keywords: ecohydrology, IWRM, floodplain

197 Management-Oriented Research to Reduce the Impact of the Combined Sewer Overflows on the Quality of the Surface Water Bodies

Sara Todeschini 1, Papiri Sergio 1, Viviano G.2, Ricchiuti M.2, Tartari G.2, Carraro E.2, Manfredi E. C.2, Sardi B.2, Salerno F. 2

1 Department of hydraulic and environmental engineering, University of Pavia, Italy
2 Water research institute IRSA - CNR - Brugherio (MB), Italy

sara.todeschini@unipv.it

The agriculture is traditionally the main non-point source of pollution in Europe, however the management of urban wet-weather discharges (point sources) is assuming a more and more relevance in defining the quality of surface water bodies. Moreover the presence of numerous combined sewer overflows (CSOs) drives to the reclassification of the urban sources, subjecting this kind of pressure to a sort of diffuse pollution with spatial and temporal heterogeneity of pollution contribution and consequent difficulties of control and management. On the other hand, typical features of point sources are preserved, such as the diffusion of pathogens and the potential sanitary risks. This paper presents a case-study suitable to define how the efforts of the research must be directed to define a range of management proposals able to reduce the impact of the CSOs on the surface water quality. The basin of the Lake of Pusiano is manly a forest territory with a negligible agricultural pressure, the urbanized area represents the 12% of the total surface. This is an ideal situation for the evaluation of the impact related to the 74 CSOs. First results show that frequent urban wet-weather discharges through CSOs have a relevant negative impact on the Lake of Pusiano. This

paper shows how the efforts of the research and the monitoring activities must be directed to the knowledge priorities of decision-makers in order to furnish support information for the choices aiming at a better quality of surface water bodies.

Keywords: combined sewer overflows, case-study, support information

243 Evaluation of Water Temperature and Dissolved Oxygen Regimes in River Neretva

Lejla Ridanovic, Sanel Ridanovic, Damir Jurica, Pavle Spasojevic

Teacher Training Faculty, Dzemal Bijedic University of Mostar, Bosnia and Herzegovina

lejla.ridjanovic@unmo.ba

Neretva is the longest karst river (230 m) in the Dinaric Alps, and the largest river draining the eastern part of the Adriatic basin. It is of great economic importance for Bosnia and Herzegovina. Neretva river basin is internationally recognised for its ecological value and outstandingly rich biodiversity, including numerous endemic and relict species. Being one of the most picturesque rivers in Europe, Neretva is becoming increasingly popular tourist destination, offering various recreational activities, and cultural/historic sights, such as the UNESCO heritage site - the Old Bridge of Mostar. However urban growth and industrial, agricultural and power development have had a negative impact on the ecology of Neretva basin. The amount of dissolved oxygen (DO) and water temperature are two fundamental parametres of river productivity, and important indication of the overall river health. They are limiting factors for functioning of the ecosystem and are often used as indicators of water quality. A stream's oxygen and temperature patterns not only influence the physical and chemical qualities of a stream but the sources and quantities of nutrients, as well as the types of organisms that inhabit it. The present study aimed to monitor and characterise the water temperature and DO patterns upstream, downstream, and at selected sites, within, the city of Mostar. The annual data was collected with measurements conducted at monthly intervals, from September 2008 to September 2009. The main findings of the study suggest that Neretva is well oxygenated at the assessed sites. Consistently high DO values and percentual oxygen saturation were obtained accross the sites, with insignificant flux values. DO levels follow cyclical oscillations and seasonal variations in water temperature. The peak DO values coincide with troughs in temperature. Neretva is a stable ecosystem capable of supporting abundant aquatic biota.

Keywords: dissolved oxygen, Neretva, biodiversity, oxygen saturation, ecosystem

200 Spatio-Temporal Microbial Water Quality Assessment of Selected Streams of Islamabad, Pakistan

Waqar Jadoon 1, Masood Arshad 1, Zafeer Saqib 2

1 Pakistan Wetlands Programme (WWF-P), Pakistan
2 International Islamic University Islamabad, Pakistan

waqar.jadoon@gmail.com

The study was conducted to examine the water quality of natural streams of Islamabad district in selected sites viz. urban, semi urban and natural by using Total coliform (TC), Fecal coliform (FC) and Escherichia coli (E. coli) as indicator bacteria. The objective of the study was to find out the influence of municipal waste on the FC density in natural streams of Islamabad, Pakistan. Sampling was carried out for three seasons (pre-monsoon, monsoon, and post-monsoon) and samples were collected three days in a week and a total of 43 samples per season from all sites were collected. The results revealed that almost all surveyed sites were contaminated if not all but at least in one season. Presence of FC in natural sites was due to wildlife activities in the stream in Margallah Hills National Park (MHNP). Wildlife frequently visit stream in the park area for drinking purposes. During this time they shed their feces containing fecal bacteria in stream water. The results indicated that highest fecal concentration occurred in urban and semi urban areas compared to natural sites in MHNP during all seasons. It was observed that 67% urban, 61% semi urban and 40% MHNP samples have presence of E. coli for all seasons, TC and FC exceeded the 1600MPN/100ml of water sample. Significant positive correlation was observed between E. coli and FC (r= 0.538) and FC with TC (r= 0.437) indicating same source. The possible source of fecal contamination includes municipal waste, septic tanks in urban areas while runoff from agriculture and grazing lands, domestic animals and poultry waste in semi urban areas are additional sources. The temporal changes of fecal pollution illustrated high concentration during monsoon season compared to pre-monsoon and post-monsoon seasons. It was concluded that significantly elevated concentration of fecal contamination may be associated with high occurrence of rain fall during monsoon. Present study recommends the proper monitoring system to and application of constructed wetlands to reduce the fecal contamination in these streams. It is of immense importance to treat water of these natural streams because these are the feeding source of Rawal Dam reservoir supplying water to residents of Rawalpindi city.

Keywords: Stream, Water quality, Fecal contamination, Spatio-temporal variation, Islamabad

206 Methods Development for Determination of Transuranic zadionuclides in Low Activity Waste and their Application in Intercomparison Exercise

Bojidar Slavchev 1, Blagorodka Veleva 2, Lyuben Dobrev 3, Antonina Nikiforova 3, Lidia Kinova 3,

1 Institute for Nuclear Research and Nuclear Energy - BAS, Bulgaria
2 NIMH-BAS, Bulgaria
3 INRNE-BAS, Bulgaria

bobislavchev@inrne.bas.bg

Man-made transuranic elements have been released into the environment since the use of nuclear weapons and nuclear tests. Other releases into the environment have been associated with nuclear fuel cycles and some accidents but also through the active dumping of wastes into oceansBrief description and classification of the Radioactive Waste produced in the nuclear electricity generation chain is given. A procedure for determination of Plutonium, Americium and Curium isotopes in Low Level Radioactive Waste (LL LRAW) was developed and applied on alkaline waste from Nuclear Power Plant (NPP) Kozloduy in Bulgaria. he proposed procedure was part of inventory waste characterization of 15 storage tanks that involved determination of eighteen isotopes. The modification of the radiochemical procedure developed for the sludge fraction of the waste was applied for determination of plutonium and americium alpha emitting radionuclides in the river bottom sediment sample. The sampling campaign was organized in the frame of the EU international project by "Joint Research Centre" (JRC) -Karlsruhe, Germany. About 60 kg bottom sediments from the river affected by accidental radioactive releases were collected by the Ministry of Health of Slovakia Republic and distributed among the 10 participants by JRC-Karlsruhe for analyses of α-, β- and γ-radionuclides. In the present paper the radiochemical procedures for Plutonium and Americium (Curium) radionuclides separation and their determination is described. Preliminary sample treatment consists of drying and homogenizing. After assuring samples homogeneity by 137Cs measurements in different sub-samples the sediment is ashed at 600°C. Wet ashing by H3NO3, HCl and HF acids is performed to achieve dissolution of the matrix and full isotopic dilution of tracers added. To separate plutonium and americium fractions from the matrix elements ion-exchange resin AG-1x8 100-200 (Cl-form, Bio-Rad Laboratories) is used. Further the fractions are purified by highly selective chromatographic materials TRU for americium and TEVA (Eichrom Technologies) for plutonium. The thin source needed for alpha-spectrometry was prepared by electro-deposition by (NH4)2SO4 electrolyte or co-precipitation with NdF3 as fluoride. Alpha spectrometry of the samples was performed by ORTEC Octete Alpha Spectrometric system equipped with 8 Ortec ULTRA-SATM low background ion implanted detectors with 300mm2 active area and energy resolution of 20 keV (FWHM) at the 5.486 MeV ($_{241}$Am peak). The

results of this inter-laboratories comparison show the adequacy of the developed and applied methods and the difference in activity concentration in the frame of 1σ uncertainty. The results for determined other alpha emitting radionuclides in the sediment are also given.

Keywords: transuranic elements, radioactive waste, radiochemical separation, environment

259 Evaluation of Reed Resources in Lubanas Lake in Latvia and Influence of its Harvesting on Water Quality

Edgars Cubars

Rezekne Higher Education Institution, Rezekne, Latvia

gitaedgars@inbox.lv

Increasing demand for energy, limited resources of fossil fuel, as well as pollution of the environment and changes of the global climate have raised more interest about the renewable resources. Support to the use of renewable resources has become a very important part of European Union policy. The use of reeds like a renewable energy resource allows economizing fossil fuels. Paper present the results of research of reed resources and its harvesting impact on water quality in Latgale (region in Latvia) Lakes. The investigation of reed resources shows that resources in region are spotty situated, and rational using of them is connected with water quality in Lakes. The greatest amounts of reed resources are concentrated in biggest lake in Latvia-Lubana Lake and near to it. Using direct measurement methods and metering in the distance, it was stated that the total reed resources of Lubana Lake are 6921 - 1887 tons, take place of 882 hectares and are situated in 429 reed blocks. Summary resources of Latgale region are 19 248 - 5247 tons. Water monitoring in Rivers shows that there are more biogenic stuffs in waters, which flow in Lubanas Lake, like in waters, which flow out of Lake. It means that these stuffs accumulate in lake. Reeds for growing use biogenic stuffs (nitrogen and phosphorus compounds), which pollute the Lakes and stimulate it eutrophication. Harvesting of Reed gives positive influence on Water quality in Lakes.

Keywords: renewable energy resources, water quality, reed resources, biogenic stuffs

211 The Auto Purification Level of Water in Watercourse of Nerodime River, Kosovo

Milazim Shabani 1, Dritan Topi 1, Makfire Sadiku 2, Tahir Arbneshi 2

1 Department of Chemistry, Faculty of Natural Sciences, University of Tirana, Albania
2 Department of Chemistry, Faculty of Natural Sciences, University of Prishtina, Kosovo

milazimshabani@hotmail.com

Water pollution in our country is an important problem because the wastewaters from inhabited areas are discharged in the nearest rivers without any previous treatment. This occurrence of non-treated wastewater discharges is also true for the Nerodime River, causing a lot of undesirable effects, such as: lack of oxygen, reduction in the pH value, increase of heavy metal complexion capacity, increase of toxicity and hazardous substances accumulated in the food chain, eutrophication of water etc. The aim of this paper is to evaluate the ecological state of water at the Nerodime River. For this purpose within a period of one year we have been carrying out the physicochemical analysis of the water samples taken at the due sample places. The sample places have been chosen in such manner as to follow the change the river water quality at the areas where the human factor has or does not have its impact. The experimental results show that wastewater discharged from the municipality of Ferizaj to the Nerodime River causes a lower pollution during the spring time when the river water flow is higher, compared to summer time, when the water flow of the river is small, and the pollution is also much bigger. The auto purification capability of the river is tightly related of the level pollution. Stemming from this fact the auto purification level of the river is not only tightly related to the chemical properties of the wastewater discharged in watercourse, but also from time of discharge and amount of water in the river flow. Experimental results indicate variable results of auto purification of the river according as its pollution scale and the season of the year.

Keywords: Nerodime River, water discharged, auto purification capacity, water quality, eutrophication and Kosovo

218 Removal of Metal-Cyanide Complexes from Aqueous Solutions With Raw and Acid Activated Sepiolite

Vildan Onen 1, Esra Yel 2

1 Selcuk University, Mining Engineering Department, Kampus-Konya, Turkey
2 Selcuk University, Environmental Engineering Department, Kampus-Konya, Turkey

vonen@selcuk.edu.tr

Metal-cyanide complexes generated from industrial and mineral processing wastes have potential hazards and toxic effects in the environment. These complexes can be removed through several chemical and biological methods but each of these methods have either some economical drawbacks or difficulties in aplication with insufficient process efficiency. Easily applicable and efficient treatment systems for these substances are under research. Hence, in this study, the effectiveness of Eskisehir-Sivrihisar (Turkey) sepiolite in raw and acid-activated form in the removal of metal-cyanide complexes from aqueous solutions was investigated. Metal-cyanide complexes of three different weakness, [Zn(CN)4]2-, [Cu(CN)3]2- and [Fe(CN)6]3- were studied. Initial concentration, mineral particle size, detention time and acid activation condition were selected as variables affecting the system performance. In the removal of the complex, particle size and acid activation has not a significant effect on the system performance. In all complexes, CN ion reduction was more efficient than metal ion reduction therefore the complexes were found to be adsorbed as metal and CN ions separately. Overall performances were in the order of the weakest complex [Zn(CN)4]2- to the strongest one, [Fe(CN)6]3- . Maximum metal removal capacities achieved were 1, 22 and 18 meq/g and maximum CN removal capacities achieved were 23, 15 and 38 meq/g for [Zn(CN)4]2-, [Cu(CN)3]2- and [Fe(CN)6]3- respectively. Isotherm studies supported the findings about the mechanisms and capacities.

Keywords: Metal-cyanide complexes, Adsorption, acid activation, Sepiolite

247 Diversity in Oxygen Depletion Rate in the Eutrophic Lakes of the Brodnica Lakeland, Poland

Wlodzimierz Marszelewski 1, Rajmund Skowron 1, Adam Solarczyk 1, Dariusz Borowiak 2, Kamil Nowinski 2

1 Nicolaus Copernicus University in Torun, Poland
2 University of Gdansk

marszel@umk.pl

Oxygen depletion in the lakes is not widely discussed in literature. This refers particularly to the lakes located in the European Lowland. It is, however, of great importance to the appropriate functioning of lake ecosystems. The occurrence of anoxic conditions causes among others the release of phosphates from the bottom deposits as well as determines fish farming. The examinations were conducted every 2 weeks in the spring-summer season (March - June 2008) and in the winter season (December 2008 - February 2009). There was an ice cover on the lake from December to February. The measurements were taken in five lakes of diverse morphometric properties (their areas ranged from 49.8 to 211ha, and their maximum depths varied from 12 to 40m). The examinations included the vertical distribution of water temperature and concentration of dissolved oxygen in the intervals of 1m. The thermal and oxygen meter Oxi 197 (WTW) was used. All the examined lakes revealed fast depletion of dissolved oxygen. However, the rate of oxygen depletion varied considerably. Taking into account the fact that all the studied lakes belong to a similar trophic type, this diversity depended upon morphometric parameters of the lake. Volumetric hypolimnetic depletion rate (VHDR) ranged from 0.08 to 0.15 mg O2 m-3 day-1 in the summer season. In the particular lakes the values of oxygen concentration in the hypolimnion declined in the spring-summer season from approx. 13-14 to 0 mg O2 dm-3 within 40 to over 80 days. Oxygen depletion in the winter season from approx. 11-12 to 0 mg O2 dm-3 occurred considerably faster (from 14 to about 25 days). A new aspect of the above studies lies in the determination of VHDR in the lakes of relatively small areas that are located near one another, and that remain under the influence of the same atmospheric conditions. Moreover, the studies showed the occurrence of maximum extents of anoxia in the particular lakes in various seasons: from mid July to early October.

Keywords: oxygen, volumetric hypolimnetic depletion rate, lakes, Poland

249 The Contribution of the Micro - and Macrophytes to the Genesis of the Therapeutic Mud From Lake Techirghiol, Romania

Liana Manuela Gheorghievici

National Institute of Rehabilitation, Physical Medicine and Balneoclimatology, Bucharest, Romania

lianabios@yahoo.com

Techirghiol is the most extended salted lake from Romania; because this lake is a major therapeutic mud producer from our country and even in Europe, the updating of the biomass resources from this lake, which gives value to its peloidogen potential, and the conservation of this ecosystem are strongly necessary.

Samples have been collected, from Lake Techirghiol in the years 2004-2009 from a number of representative sampling stations, and thus they offer a general image of the special and temporal diversity of the micro- and macrophytes.

The algological material was analysed on Fuchs-Rosenthal counting chamber using a microscope with a light source.

For the determination, macrophytes were also collected and introduced in plastic bags. In the lab they were dried out on filter paper, weighed out, and the results were extrapolated for 1m2.

A number of 109 taxonomic units have been identified in the phytoplankton. Most of the algae species belong to the diatomees group, followed in descending order by representatives of Chlorophyta, Dinophyta, Euglenophyta and Chrysophyta. Because of the microscopic dimensions microalgae bring a small but constant contribution of organic material to the forming process of the therapeutic mud from Lake Techirghiol.

Among macrophytes, species of Cladophora (Cladophora crystallina L., C. vagabunda (L.) Hoek, C. fracta (O.F. Mull. Ex Vall) Kutzing) were found to play an important role in the productivity of Lake Techirghiol.

The study of the micro - and macrophytes allows the gathering of information regarding the composition of the plankton from Lake Techirghiol, for it has been observed a difference between the plankton, microbentos, macrophytes present in the pelagenous lakes (usually therapeutic) and the non-pelogenous ones.

Keywords: therapeutic, mud, microphytes, macrophytes, productivity.

300 River Water Pollutants Uptake by Edible Part of Vegetables

Kovacs Melinda 1, Ristoiu Dumitru 1, Ristoiu Tania 2

1 University Babes-Bolyai Cluj-Napoca,Faculty of Environmental Science, Romania2 Technical University Cluj-Napoca, Romania

haydee_kovacs@yahoo.com

Somes river is one of the most longer and significant river of Transylvania, Romania. Pollutants such as hydrocarbons and chlorinated solvents were detected in almost all of the 117 sampling points in the last two years after GC-MS analysis. Average level of chlorinated solvents in river water was 53 µg L^{-1} and for hydrocarbons 38 µg L^{-1}.

Once with sampling the water, also oil samples were taken in order to establish a potential adsorption of these pollutants in soil. The results shows that hydrocarbon like benzene, toluene, naphthalene were in higher percent adsorbed onto soil than chlorinated solvents.

The range of chlorinated solvents and hydrocarbons in soil were between 1 – 28 µg·kg^{-1} and 0.5 – 31 µg·kg^{-1}, respectively. Based on these results, the main consumed and cultivated vegetables (maize, potato, carrot and wheat) from these regions were analyzed.

All vegetables were cute in different pieces like root, leaf, bole and edible part and analyzed as like on GC-MS. Hydrocarbons shown a higher bioavailability in these vegetables samples than chlorinated solvents. The average of hydrocarbons in vegetables sample was 18 µg kg^{-1}. Usually the higher level of these pollutants was detected in the root zone of vegetables.

Keywords: hydrocarbons, chlorinated solvents, vegetables, GC-MS

303 Effects of Climate Change on Zooplankton Community Structure of the Middle Daugava over the Last 50 Years

Rasma Deksne 1, Arturs Skute 2, Davis Gruberts 2, Andris Linuzs 3

1 Rezekne Higher Education Institution Latgale Sustainable Development Research Institute, Latvia
2 Institute of Ecology, Daugavpils University, Latvia
3 SC Latvian Shipping Company, Latvia

rasmamisina@navigator.lv

In the spring, summer and autumn of 2008 in expeditions on the river Daugava in a leg from Suro as in Belorussia to Dunava in Latvia, all in all in 21 placeson the right and left banks of the river, as well asi n the middle of the river, were gathered samples of zooplankton. The APHA 10200 method was used for quality and quantity analyses of zooplankton. The results were compared with the Daugava zooplankton findings of the researches carried out by R. kute in 1962 - 1966 and N.Sloka in 1956 in the similar legs of the river. The total number of zooplankton species in 2005 - 2008 has decreased by 38 species comparing with the researches in 1956 - 1963. There are relevant changes in the structure of species. In order to reveal major hydrological functions of the Middle Daugava, historic hydrological data sources were analysed. Selected data series included the highest observed water level of the year above the reference height at 7 hydrological posts during the first 100 years of hydrological observations; the annual amplitude of water level fluctuation and the dates of the highest observed water levels at 7 hydrological posts during 1931 - 1980; the daily runoff of the Daugava River at Daugavpils and J ekabpils posts in 1931. According to this study, the mean annual discharge of the Daugava River at Daugavpils remained almost the same since beginning of hydrological records in 1881. Meanwhile, the highest annual discharge has obviously decreased whereas the lowest annual discharge - increased. Such changes could be explained by a decrease in the winter's duration as well as by an increased discharge in the winter's low water period during the last decades.

Keywords: river Daugava, zooplankton, hydrologic regime

254 The Stage of the Physical, Chemical, Biological and Microbiological Equilibrium after the Conservation Period of Lake Negru, Sovata, Romania

Gheorghievici Gheorghe, Ana Munteanu, Iulia Pompei, Iosif Tanase

National Institute of Rehabilitation, Physical Medicine and Balneoclimatology, Romania

g_gheorghievici@yahoo.com

The study presents the reevaluation of the physical, chemical, biological and microbiological parameters of the water and mud from Lake Negru- Sovata-Romania after the conservation period which lasted more than 20 years, time in which the lake has not been exploited. The samples from Lake Negru have been taken in the years 2007-2009 and for each sampling point there have been realized:

-physical and chemical analysis of the anions, cations, non dissociable compounds, utilizing standardized methods, that use analytical techniques: gravimetrics, volumetrics, electrochemistry, spectrophotometry of visible molecular absorption, flam photometry;

-physical and chemical analysis which characterize the therapeutic mud: the humidification degree, the organic substance content, mineral substances dissolved into water and clorhydric acid;

-biological analysis in order to identify the quantitative and qualitative composition of the phyto and zooplankton (biomass, relative abundance);

- microbiological analysis that quantifies the presence of the quality indicator bacteria from the water and mud.

The results of the analysis of the water and mud from Lake Negru have evidenced the returning of the studied physical and chemical parameters into the limits of the natural growing condition of the organic material. The executed biological studies have identified the groups of flora and fauna that are existing in the lake, and have appreciated the dynamics of the plankton which is dominated by the characteristic species of the salted lakes, generators of mud. It has also been evidenced the role of the bacterial population in the evolution of the maintaining process of the peloid and the absence of the pathogen microorganisms in both water and mud. By evaluating the physical, chemical, biological and microbiological parameters that characterize Lake Negru, there have been drawn the evolution and functionality mechanisms of the water ecosystems, producers of therapeutic mud.

Keywords: conservation, therapeutic, equilibrium, lake.

766 Preliminary Results on WFD Based Monitoring System Installed in the Prespa Lake Watershed and Focused on Cyanobacteria

Zdravevski Nikola, Lesoski Jovica, Krstic Svetislav

Institute of Biology, Faculty of Natural Sciences and Mathematics,
"St.Ciril and Methodius" University, Skopje, Macedonia

skrstic@pmf.ukim.mk

In the course of the project "Development Prespa Lake Watershed Management Plan" a full WFD monitoring system is installed on a total of 7 sampling stations in the Prespa Lake watershed, includes delineation of waterbodies and principal surveillance monitoring during 12 month period.

The monitoring system covers all the basic physic-chemical parameters including the priority substances, plankton and benthic algae, macro invertebrates, macrophytes and fish.

Apart of the long tradition for scientific research on Prespa Lake and its catchment, the obtained results are very scattered, inconsistent and very rarely fundamentally comprehensive to support the building of a prolonged data base or management decision making.

Here we present the starting results of the most elaborated monitoring system so far in the watershed based on WFD principles and the very first results on cyanobacterial community structure and dynamics, including the possible release of toxic compounds (hepatotoxin microcystin) in the water, sediment and biota (fish).

Keywords: Watershed Management, monitoring system

763 Low Water Transport in Fractal Microstructure of Tropical Soils: Application to Pesticides Trapping

Thierry Woignier 1,2 , Marc Morell 3, Olivija Morell 3, Laurent Duffours 4

1.UR Seqbio IRD-PRAM, Le Lamentin, Martinique ,France
2. CNRS-Universit- de Montpellier, France
3. IRD Cara-bes, Fort-de-France, Martinique, France
4. Prime Verre, avenue A. Einstein, Montpellier, France

woignier@univ-montp2.fr

The scientific and economic context of this study is related to the pollution of the soils, water and marine bay by a persistent chlorinated hydrocarbon pesticide (chlordecone) in a tropical context (French West Indies). Chlordecone is a very though pesticide which was used in the 1970's mainly for the protection of banana plantation (control of the banana root borer). Chlordecone is at the origin of the diffuse pollution in agricultural soils becoming new sources of contamination for water and cultivated roots. It is thus necessary to know what content of chlordecone is able to migrate from polluted soils through environment, by water diffusion.

Volcanic soils contain amorphous clays (allophanes), issued from the transformation of volcanic materials. These amorphous clays present completely different structures and physical properties compared to usual clays: large pore volume and pore size distribution, a high specific surface area and very large water content. Moreover these soils have been strongly polluted but surprisingly allophanic soils are less contaminant than usual clay soils. Thus, the peculiar allophane microstructure should be an important physical characteristic governing the fate of the pesticide in the environment by water transport.

In this study we characterize the allophane and we demonstrate the fractal structure of the allophane aggregates, at the nano scale. We propose that the fractal features and associated transport properties (low permeability and diffusion) could explain why these soils are able to retain pesticides. The peculiar fractal structure of the allophane aggregates plays the role of a labyrinth which traps the pesticides. Allophanic soils could be highly polluted but less contaminant because of this microstructure trapping effect.

Key words: Soils, Pesticides, Chlordecone

252 Biosorption of Copper(II) from Aqueous Solutions by Pleurotus Cornucopiae

Ummuhan Danis

Ondokuz may Uni Engineering Faculty, Department of Chemical Engineering, Samsun, Turkey

The biosorption of Cu(II) from aqueous solutions by Pleurotus cornucopiae was investigated as a function of initial pH, contact time, initial metal ion concentration and biosorbent concentration. The aim of this study was to understand the mechanism that govern Cu(II) removal and find a suitable equilibrium isotherm and kinetic model for Cu(II) removal in a batch reactor. The removal percentage of Cu(II) was increased with an increase in pH, biomass concentration and a decrease in Cu(II). Pleurotus cornucopiae exhibited the highest Cu(II) uptake of 25, 25 mgg-1 of biomass at pH 5 in the presence of 100 mgL-1 Cu(II) at 298 oK.

The experimental isotherm data were analysed using the Langmuir, Freundlich and Temkin equations. It was observed that Langmuir model exhibited the best fit to experimental data. The experimental data were analysed using four sorption kinetic models the pseudo first and second order equations, and the Elovich and the Intraparticle diffusion equation to determine the best fit equation for the biosorption of Cu(II) ions onto Pleurotus cornicopiae. Pseudo second order model described well the sorption kinetic of Cu(II) ions in comparison to pseudo first order, Elovich equation and Intra-particle diffusion kinetic model.

Copper, a widely used metal in industry, is an essential trace element for human health and play an important role in carbohydrate and lipid metabolism and in the maintenance of heart and blood vessel activity. The adult human body contains 100- 150 mg of Cu(II), but excess amounts in the body can betoxic[Gupta et al., 2006]. In aqueous environments, the speciation of the metal is dependent both on ligant concentration and pH. While the cupric ion (Cu(II)) is the metallic form most toxic to flora and fauna, it is also a nutrient necessary for algal growth[Murphy et al., 2007].

Keywords: Biosorption, Copper, Equilibrium studies, Kinetic studies

334 The Presence of Heavy Elements, Namely Pb, Zn and Fe in the Village Wells Stanterg

Bahri Sinani 1, Sabri Avdullahi 2, Imer Preteni 3, Sami Preteni 2, Berat Sinani 1

1 Faculty of Mines and Minerals, Kosovo
2 ICMM - Kosovo, Kosovo
3 Ministry of Education, Science and Technology, Kosovo

bahri_s81@hotmail.com

In Kosovo as rare in any other country, are concentrated major natural assets as reserves of lead, zinc, silver, manganese, magnesium, etc. In the northern part of Kosovo, exactly in North-Eastern part of Mitrovica are Melenica Zijaca Vllahia villages, etc., and found villages where we present the Trepca ore, (in which there is deposits of Trepca, Melenica, Mazhiq and Zijaq), etc. The 14 kilometer northeast of Mitrovica have Stan Terg village, where water wells present in their village is almost unusable and normal values in terms of presence of heavy metals both in its pollution. The research of this problem I am focusing on the elements of Pb, Zn, and Fe, where I got 3 reference points for sampling and analysis and to issue a conclusion on this problem which prevents many residents Stan Terg, and residents of the villages mentioned above. as a result of geological and mining construction of this village and the villages around where all these wells are wells become dead as a result of the presence of these elements. All samples taken, have their tests done in "AgroVet" laboratory in Fushe Kosovo city, where we encountered high presence of these elements presented with what has become the permanent pollution of the river so Trepca.

Keywords: Trepca mines, wells water, Heavy metals, AgroVet laboratory, Pollution

318 The Strategy and the Results of the Ex Situ Conservation of the Hydro - Bionates in the Aquarium of the Institute for Biology and Ecology, Kragujevac - Serbia

Vladica Simic 1, Ana Petrovic 1, Momir Paunovic 2, Jelena Tomovic 2

1 Faculty of Natural Sciences,Institue of biology and ecology, Serbia
2 Institute for Biological Research, Serbia

The National Center for the ex situ conservation of the biodiversity of the freshwaters of the Institute for Biology and Ecology of the Faculty of Science in Kragujevac, has been dealing with the problems of conservation of the endangered hydro bionates in the artificial, ex situ conditions for ten years. The special attention

has been paid to mollusks, decapods, fish, amphibians and reptiles. The ex situ strategy of conservation that is applied consists of the following: the formed data base (http://baes.pmf.kg.ac.rs) can be applied and is used in an assessment of the degree of endangerment of taxons based on the International and regional IUCN criteria (IUCN, 2001, 2003) and the ESHIPPO-PP (Simic et al 2007) model. It's the key model in the assessment and choice of the taxons that must be conserved. Parts of the populations of the endangered taxons, for which, according to the model, the ex situ conservation was planned, move first to the quarantine and then to the proper aquarium conditions for the ex situ treatment. For the ex situ treatment some protocols with a point scale were developed, for the following indices: sensitivity to transport, speed of acclimatization, nutrition, tempo of growth, breeding, upbringing and growth of young individuals, illness and the rate of death. The species that, during the ex situ treatment collect the biggest number of points, are put in the group - possible complete ex situ conservation, whereas the species with the smallest number of points are put in the group - demanding (hard) ex situ conservation. The results of the complete ex situ conservation are shown in the example of the conservation of the crayfish (crustacean) Astacus astacus, salamander (Salamandra salamandra), and Triturus spp.

Keywords: ex situ conservation, freshwater, crayfish, fish

319 Anthropogenic Influence and Conservation Status of Autochthonous Fish Fauna From Lake Ohrid

Trajce Talevski 1, Dragana Milosevic 2, Aleksandra Talevska 3

1 Hydrobiological Institute, Macedonia
2 Department of biology, Faculty of Science and Mathematics, University of Montenegro, Montenegro
3 Faculty of Science and Mathematics, Institute for biology, University St. Kiril and Metodij, Macedonia

Lake Ohrid is transboundary lake between R.Macedonia and R.Albania. It is the deepest lake of the Balkan, with a maximum depth of 297 and a mean depth of 155 m. Lake Ohrid is special as such, by far the most spectacular quality is its impressive endemism from cyprinid and salmonid fish. This paper is result of long-term researches of ichthyofauna from Lake Ohrid. The materials for researches were collected by day and nighttime's experimental fishing with various fishing gill net. Conservation status of autochthonous fish fauna from Lake Ohrid was determinate according to IUCN (2001) and Kotellat and Freyhof (2007). In Lake Ohrid considerate of the IUCN Red list Anguilla anguilla (Linnaeus, 1758) is critically endangered (CE) species. Salmo aphelios, Kottelat,1997 is potential endangered (EN) species. Alburnoides ohridanus (Karaman, 1928), Cyprinis carpio Linnaeus, 1758, Gobio ohridanus, Karaman, 1924, Salmo ohridanus Steindachner 1892 and Scardinius knezevici (Bianco & Kottelat,

2005) are vulnerable (VU) species. Eudontomyzon stankokaramani, Alburnus scoranza (Heckel et Kner, 1858), Barbatula sturanyi (Steindachner, 1892), Barbus rebeli K?ller, 1926, Chondrostoma ohridanus Karaman, 1924, Cobitis ohridana Karaman, 1928, Pachychilon pictum (Heckel et Kner, 1858), Phoxinus limaireul Schinz, 1840, Rutilus karamani (Karaman, 1924) and Rutilus ohridanus (Karaman, 1924) are least concern (LC) species. Pelasgus minutus Karaman, 1924, Salmo balcanicus Karaman, 1928, Salmo letnica Karaman, 1924 and Salmo lumi Poljakov, Filip&&Basho 1958 are data deficient (DD) species. In past period because of human negative impact in Lake Ohrid are introduced folowing species: Alosa falax La Capede, 1803, Carassius gibelio Bloch, 1782, Gambusia holbrooki Girard, 1859, Lepomis gibbosus Linnaeus, 1758, Oncorhynchus mykiss Walbaum, 1792, Pseudorasbora parva Temmini&Schlegel, 1846 and Rhodeus amarus (Bloch, 1782) are introduced species in Lake Ohrid.

Keywords: anthropogenic influence, autochthonous fish fauna, conservation status, Lake Ohrid

320 Anthropogenic Influence and Conservation Status of Autochthonous Fish Fauna from Lake Prespa

Trajce Talevski 1, Dragana Milosevic 2, Aleksandra Talevska 3

1 Hydrobiological Institute, Macedonia,
2 Department of biology, Faculty of Science and Mathematics, University of Montenegro, Montenegro
3 Faculty of Science and Mathematics, Institute for biology, University St. Kiril and Metodij, Macedonia

tratal2001@yahoo.com

Lake Prespa is transboundary lake between R.Macedonia, R.Greece and R.Albania, and it is second largest lake in Macedonia. The lake is settled in the south-western part of the Republic of Macedonia. The Lake Prespa is contained from Golema Prespa and Mala Prespa. This paper is result of long-term researches of ichthyofauna from Lake Prespa. The materials for researches were collected by day and nighttime's experimental fishing with various fishing gill net. Conservation status of autochthonous fish fauna from Lake Prespa was determinate according to IUCN (2001) and Kotellat and Freyhof (2007). In Lake Prespa considerate to the IUCN Red list Anguilla anguilla (Linnaeus, 1758) is critically endangered (CE) species. Pelasgus prespensis Karaman, 1924 and Salmo peristericus Karaman, 1938 are endangered (EN) species. Alburnoides prespensis Karaman, 1924, Alburnus belvica Karaman, 1924, Barbus prespensis Karaman, 1924, Chondrostoma prespense Karaman, 1924, Cobitis meridionalis Karaman, 1924, Cyprinis carpio Linnaeu, 1758, Rutilus prespensis Karaman, 1924 and Squalius prespensis Fowler, 1977 are vulnerable (VU) species. In past period because

of human negative impact in Lake Prespa are introduced folowing species: Carassius gibelio Bloch, 1782, Ctenopharyngodon idella Valenciennes 1844, Gambusia holbrooki Girard, 1859, Hypophthalmichthys molitrix Valenciennes 1844, Lepomis gibbosus Linnaeus, 1758, Oncorhynchus mykiss Walbaum, 1792, Parabramis pekinensis, (Basilewsky, 1855), Pseudorasbora parva Temmini &Schlegel, 1846, Rhodeus amarus (Bloch, 1782), Salmo letnica Karaman, 1924, Silurus glanis Linnaeus, 1758 and Tinca tinca Linnaeus, 1758.

Keywords: anthropogenic influence, autochthonous fish fauna, conservation status, Lake Prespa

321 Nitrogen and Phosphorus Amounts in the Ledava River Before and After its Outflow Into Lake Ledava

Darijo Ilic 1, J. Panjan 2

1 JKP SALOVCI, Salovci, Slovenia,
2 University of Ljubljana, Faculty of civil and geodetic engeneering, Slovenia

jkp@salovci.si

In the text, we are presenting the results of the research done on the Ledava river upstream and downstream from the lake Ledava artificial reservoir. Between May 2008 and May 2009, 13 samples were taken from each side of the lake. We have established nitrate, nitrite, ammonium, total phosphorus, orthophosphate as the main parameters. Besides the key parameters, potassium, COD, BOD5, undissolved matter, oxygen conditions, electroconductibility, redox potential, temperature, pH, turbidness, and flow have also been determined. The results show that there are reduction processes going on in the lake, since the ammonium contents after the outflow are higher than before the river's entrance into the lake. The nitrate contents before the entrance into the lake are higher than after it. The combined findings show that there are denitrification processes going on in the lake, which is proven by the negative correlation [NH4]/[NO3], r2 = - 0.31. The results of the total phosphorus and orthophosphate imply that a significant amount of nutrients are being transported into the lake and that they are accumulating in the lake. The authors gratefully acknowledge the financial support of the European Union: "Operation part financed by the European Union, European Social Fund".

Keywords: Ledava river, nitrogen, phosphorus

326 Organic Matter Contents in Selected Peatlands and Wetlands of Pakistan: the Role of Water Level

Imran Ullah, Ahmad Khan

Pakistan Wetlands Programme, Pakistan

imranhu@yahoo.com

Pakistan is home to different wetland types including lacustrine wetlands and alpine peatlands. To our knowledge, very little and/or nothing is known about the amount of organic matter (OM) stored in soils of these ecosystems, and the role of groundwater level in OM accumulation rates, which could be playing a significant role in atmospheric CO2 sequestration. The key aim of this research was to quantify the amount of soil organic matter stored above and below the water table in northern and southern wetlands and peatlands of Pakistan. A total of 84 soil samples taken above and below the water table from five lacustrine wetlands in southern Pakistan, (32°33'29.1"N - 072°01'30.3"E - Elevation 761m), five northern alpine lacustrine wetlands (36°51'39.8"N - 073°24'49.8"E - Elevation - 3588m) and four northern peatlands,(36°50'35.9"N - 073°30'51.7"E - Elevation 3650 m). The samples were analyzed for the determination of soil OM by using the sequential loss-on ignition technique. According to the results northern peatlands contained significantly larger amounts of OM than northern and southern lacustrine wetlands. In peatlands, OM averaged 47% above the water table compared to 59% below the water table. Even though most of the biomass is produced by surface peat moss, the amount of OM stored in layers below the water table is larger due to saturated water conditions. Compared to peatlands, OM in alpine lacustrine wetlands was lower averaging 41% and 44% in surface and sub-surface sediments, respectively. The net amount of OM stored in northern lacustrine wetlands was about 7 times larger than those stored in southern lacustrine wetlands. OM averaged 6.3% and 5.6% in surface and sub-surface sediments of southern lacustrine wetlands, respectively. Although growing season is significantly larger in southern wetland areas than in northern environments, the net amount of OM stored in southern wetlands is low due to faster decomposition rates triggered by higher soil temperatures. These results demonstrate that peatlands and northern lacustrine wetlands are significant sinks of atmospheric carbon and any raise in temperature or lowering of water level in peatlands due to predicted climate change, and drainage of peatlands for peat harvest/livestock grazing could results in loss of the stored OM.

Keywords: Organic matter, peatlands, wetlands, water level, Pakistan

361 Anthropogenic Pressures on the Ecosystems of the Vlasina Peat Islands

Ana Momcilovic 1, Slavisa Trajkovic 1, Vladimir Randjelovic 2

1 Faculty of Civil Engineering and Architecture, Serbia
2 Faculty of Science, Serbia

momcilovicanact@yahoo.com

In the past period, the numerous companies have forever destroyed over 70 hectares of peat islands. Contrary to the national and international protection, destruction of peat islands continues. By reduction and change of the habitat of plant and animal species, the survival of their communities is so endangered that they tend to completely disappear from the lake. Some species become extinct, at some the populations are reduced, and in the vegetative succession occurs degradation and regression. The goal of this research is to draw attention on the pernicious anthropogenic effects on the ecosystems of the Vlasina peat islands.

Keywords: peat islands, Vlasina Lake, anthropogenic pressures

331 Arsenic Cycling in a Sulphide Rich Area - a Field Study from Sweden

Gunnar Jacks 1, Magnus M. 2, Zdenka Slejkovec 3

1 Dept. of geology and mineralogy, Finland
2 Dept of geochemistry, Stockholm University, Sweden
3 Josef Strefan Institute, Slovenia

In Northern Sweden there are areas rich in sulphides in the form of sulphide orebodies and sulphide rich country-rock. Proterozoic metasediments covering about 4000km2 have an influence on the water environment. The metasediments contain about 1% S and up to a couple of 100 mg/kg of As along with Zn. The investigation have been centred to wetlands where Fe and As is mobilised in groundwater under reducing conditions. In springs, drains and streams Fe is pricipitated, readsorbing most of the As. Fe-precipitates contain up to 0,5% As and sandy sediments 200-400mg/kg. The concern in this investigation has been for uptake by wetland plants threatening grazing wild animals and accumulation of As in fish. Only silica rich Equisetum spp have elevated As contents. They are not palatable to reindeers and mooses. As and silica are probably taken up by the same mechanism. The fish show elevated contents but in the form of methylated species and arsenobetaine which are less toxic than inorganic species. In

lakes the As is elevated but correlated to Fe and organic matter indicating low bioavailability. Concluding, As seems not to pose a large risk despite its abundance in the wetland and water environment.

Keywords: arsenic, wetland, plant, fish, toxicity

335 Stock-Saving Fishing on Estonian Small Inland Lakes

Anu Palm, Teet Krause, Ain Jarvalt

Centre for Limnology at the Estonian University of Life Sciences, Estonia

Anu.Palm@emu.ee

Estonian inland waters are characterized as hard/soft, dark/bright and shallow/stratified. Our survey by multimesh Nordic gill-nets in 1996-2009 showed the highest values of species richness, abundance and catch in moderately hard waters inhabited also by those species that trait the lakes in better connextion with other waters in the watershed. Perch (Perca fluviatilis) outweighed other species in dark waters while bleak (Alburnus alburnus) avoided this type of water. White bream (Blicca bjoerkna) was never caught in soft waters. Three piscivorous species - pike (Esox lucius), perch and pikeperch (Sander lucioperca) cut the numbers of fish to range between 2 to 426 (average 63) individuals per Nordic gill-net - and are the main target for recreational fishermen, whereas other species are less frequently fished. As a concession of proponents and opponents recreational gill-netting was allowed in 2009 on 110 lakes. To economize fish stocks we developed a formula to calculate the marginal stosk-saving number of gill-nets per lake area by comparing the survey data on the catch of Nordic gill-nets (EU Standard 14757) and towed nets gathered on relevant larger small lakes. This limit is used to adjust fishing loads, entitle the rights to different fishing gear, and improve the control-raids carried out by the Environmental Inspectorate (at the Ministry of the Environment) while cutting the costs at lowered budget. The main prospective in recreational fishing are: a) reduction in gill-netting (only on lakes more than 100 ha in area); b) the introduction, updating, and propagation of traditional fishing gear such as long line and the towed nets 'kuurits' and 'liiv', the sustainable use of which would be achieved by fair taxation and license-issuing in accordance with the training of young people without forgetting the alternative facility for the purchase of fishing license over a phone.

Keywords: recreational fishing, EU Standard 14757, towed nets, lake types

337 Rotifers Based Assessment of the Lake Dojran Water Quality

Orhideja Tasevska, Goce Kostoski, Dafina Guseska

Hydrobiological Institute, Macedonia

orhidejat@hio.edu.mk

Rotifers are usually considered to be useful indicators of water quality. Due to high population turnover rates, rotifers are particularly sensitive to changes in water quality. Their community structure not only allows estimates of the level of pollution, but also can indicate the trend of general conditions over time. This study was conducted by investigating rotifer species composition and abundance, as indicators of lake trophic status. The qualitative and quantitative analysis of the rotifers of Lake Dojran, are based on materials collected in the period 2004-2006. In total, 56 species were identified. 44,6% are betą and beta-alpha mesosaprobic and 16% are oligosaprobic. Rotifer species assemblage was dominated by Brachionus spp. Brachionus diversicornis f. homoceros and Brachionus calyciflorus f. amphiceros were the most abundant species, comprising 31% and 25% of the total rotifer density. The density of rotifers significantly increased with increasing nutrient concentration. Total average densities ranged from 71,45 ind.l-1 to 126 ind.l-1. According to these results, and the low values for the Shannon diversity index, this lake should be classified as eutrophic.

Keywords: Lake Dojran, rotifers, trophic status, eutrophic

340 Association Hydrochari-Nymphoidetum Peltatae Slavnic 1956 in the Ramsar Area of Bardaca

Zlatan Kovacevic,

University of Banja Luka - Faculty of Agriculture, Bosnia and Herzegovina

zlaja2005@blic.net

This paper present forms and floristic composition, biologic spectrum and arealtypes spectrum of association Hydrochari-Nymphoidetum peltatae Slavnic 1956 in the seven fishponds of Ramsar area of Bardaca. Floristic structure of association Hydrochari-Nymphoidetum peltatae Slavnic 1956 association represent specific attribute to this area. Sesonal dinamic is characterized by two aspects: green aspect (Jun - July) and yellow aspect that occurs during flowering period of association Nymphoides peltata (Gmel.) Ktze. (July - September). Those aggregations cover edges toward emerse vegetation and depending of

water depth they could be found along side of association Trapetum natantis Miller et Gors 1960. In the terms of time during successional processes they stay along side to association Nymphaeetum albo-luteae Nowinski 1928. Floristic composition of those associations are poor and consist of 15 plant species, where their number in some cases can be between 5 and 7 species. Beside apsolute dominantion of edifactor Nymphoides peltata (Gmel.) Ktze. main floristic attribute in floating layer is characterized by Hydrocharis morsus-ranae L. and Trapa natans L. Submersion layer is consist of: Ceratophyllum demersum L., Myriophyllum spicatum L. and Najas marina L. Criptophytes are dominant life form of this assotiation. Initial stage of this association in shallow water indicate their relation with pond vegetation. It could be initial stage in contaminated waters where they present constant stage addopted to specific local conditions without possibilities for further development.

Keywords: Floating vegetation, sinmorphology, sinecology, Bardaca

341 Water Quality of Varna Lake (Bulgaria)

Boryana Dzhurova, Galina Shtereva

Institute of Oceanology, Bulgaria

dzhurova@abv.bg

Varna Lake is important Black Sea coastal lake which is linked by navy canal with Varna Bay and Beloslav Lake. Hidrochemistry of Varna Lake is determined by the link with the other lake because Beloslav Lake receives contaminated waste waters. The lake is affected by human activities (industry, agriculture, transport and urbanisation). An estimation of water quality (WQ) and anthropogenic impact on the lake is of the first importance for a sustainable management and for establishment of lake sea interactions. The study is based on seasonal monitoring of nutrients, oxygen, BOD and pH in surface and bottom waters in the lake during 2005 2007 period. Hypoxia conditions in bottom waters were initiated in summer period. A total dissolved oxygen depletion and hydrogen sulphide existence was established. The surface water oxygen saturation exceeded 100% almost during the most seasons. The lake could be considered as a high eutrophicated area. The results reveal higher nutrients concentrations in winter-spring period. A decreasing trend of nutrients in lake sea direction in entire water system was observed. The most affected part of Varna Lake is the west one and canal-lake aquatory due to transport of nutrients and organic matter from more eutrophicated Beloslav Lake. The lakes play an important buffer role for protection of marine

environment due to receiving the load of nutrients and other pollutants from rivers discharge. Varna Lake is categorized as modified water body in context of EU Water Framework Directive/60/2000 as consequence of long-term anthropogenic impact.

Keywords: Varna Lake, Water quality, nutrients, eutrophication

347 Investigation on Physicochemical and Microbiological of the Parameters of Lake Shkodra Water

Nevila Bushati 1, Anila Neziri 1, Margarita Hysko2

1 University of Shkodra, Albania
2 University of Tirana, Albania

nevilabushati@yahoo.com

The lake Shkodra is situated on the border between Albania and Montenegro (42°21`N; 19°30`E). The lake water is exposed on anthropogenic pollution which is connected to the sewage, waste outfall, agricultural activity etc. Generally, the water quality depends on its chemical and microbiological condition. The microbiological and physico-chemical analyses are performed in accordance with the European Standard Methods and Standard Method WHO. The parameters were examined for a number of samples from four selected sampling sites at regular intervals during the year 2007. The analyses were carried out in the Laboratory of Microbiological Investigations, University of Shkodra and University of Tirana. The nutrients concentrations were in relatively stable during the monitoring period. The microbiological parameters as Total Coliforms and Faecal Coliforms were higher during the summer time. Both microbiological and physico-chemical parameters were within permitted European Water Quality Standards.

Keywords: Quality, Monitoring, Lake Water

348 Health Risk Assessment of Stable Strontium and Fluoride Content in Pipe Water

Irina Polyakova, Boris Synzynys

State University for Nuclear Power Engineering, Russian Federation

irinaamchenkina@mail.ru

Introduction. Increased content of stable strontium in pipe water is typical of the central and east Russia settlements and other regions of the globe. With the hygienic standard 7mg/l of strontium in drinking water its content in some water sources amounts to 20mg/l. Strontium is quickly accumulated in children organisms till the age of 4. Strontium rachitis may arise even in case of a full diet and is not treated with vitamin D as strontium affects metabolism of vitamin D itself. Groundwater used for drinking also involves great amounts of other elements, for example fluorine. Methods. Cytogenetic effect of Sr and F was determined in Allium test (according to WHO recommendations). A model is developed to assess a combined risk in case of antagonistic Sr and F impact. The model is based on quantitative data on Sr and F accumulation in human bone tissue (Knizhnikov,1967). Results. Model experiments with Allium test have shown that at 7 mg/l strontium content in water a fraction increases of cells with cell division disturbances. Fluoride available in water notably reduces the hazardous strontium effect : the antagonism coefficient is 0.07. Experimental data and hygienic observations allowed a health risk assessment model to be developed for pipe water with Sr and F. Health risk was assessed from a danger index. The highest non-carcinogenic health risk in the earliest manifestations will be observed when drinking pipe water (DI = 1.21). Such risk is inadmissible for people. With allowance for the antagonistic effect of fluoride the danger index is reduced to 0.76 and becomes admissible. Novel aspect. A model is developed to assess a combined risk in case of antagonistic Sr and F impact.

Keywords: stable strontium, pipe water, health risk assessment model

350 Contribution to the Introduction of Wetlands Biodiversity and the Importance for its Conservation in Kosovo

Ylber Sherifi 1, Behxhet Mustafa 2, Ferdije Etemi 2, Zeqir Veselaj 2

1 Kosovo Environmental Protection Agency, Kosovo
2 University of Prishtina, Kosovo

ylsherifi@hotmail.com

Water ecosystem`s in Kosovo are represented with rivers, lakes and wetlands. There's no study and inventory of wetlands yet in Kosovo, even though there's existence of a number of them. One of the most important wetland is the one in Henc village, in the central part of Kosovo, with the surface of 50ha. It's was artificially created on the late sixties, aiming cultivation of the common carp (Carpinus cyprio). This wetland was created by the conflux of Magura and Vrella water flows, which are branches of Sitnica River and according to the ecological processes, achieved the full ecological succession of a natural wetland. This paper represents the first scientific findings about wetland biodiversity in Kosovo. The wetland biodiversity and the area around it are researched with well known methods in the field work, followed by work in as laboratories. During this research, 40 species of migrating birds, 26 species of vascular plants, and 3 groups of kelps are registered. From the zooplankton, the group Copepoda has been identified, whereas from benthonic animals so far have been identified the representatives of insects such as Ephemeroptera, Trichoptera, and Coleoptera, as well as Mollusks, 3 species of fishes, 2 species of reptilians, and one kind of amphibians. A special research was done regarding the order composition of Odonata in this wetland. Due to the high importance of this area, considered as a transitory habitat for a great number of birds during their peregrination through Kosovo, this area should be protected by law as a protected area as well as managed by the requirements of Ramsar Convention.

Keywords: ecosystem, biodiversity.

351 Threats to a Coastal Aquifer - a Case Study from Albania

Sonila Marku 1, Xhume Kumanova 1, Nazmie Puca 1,
Arben Pambuku 1, Gunnar Jacks 2, Soren Frojdo 3

1 Albanian Geological Survey, Albania
2 Dept. of Land & Water Resources Eng., KTH, Sweden
3 Abo Akademi, Turku, Finland

sonila_s7@hotmail.com

The Mati river in Northern Albania forms a coastal plain from which the groundwater is utilized for water supply of two larger towns. Three major threats have been visualized, sea water intrusion, heavy metal pollution from upstream mines and smelters and gravel extraction in the alluvial cone at the entrance of the river into the coastal plain. The groundwater in the inner portion of the plain is fresh while brackish groundwater is met with at depth and close to the coast. The brackish water has been found to be old with ages between 2800 to 7000 BP. 180 analyses indicate that the salinity in the brackish water is not mixing in of sea water but rather due to diffusion from intercalated clays layers. The groundwater close to the coast is artesian indicating that at present extraction rate there is no risk for sea water intrusion. There is more than 10 million tons of mine waste deposits upstream and leaching from a chromium smelter. The sediments in the alluvial cone show elevated contents of copper and chromium but the presence of calcareous bedrock, limestone and dolomite, provides buffering of the river and immobilization of the heavy metals. Thus metal pollution does not pose an immediate threat but the major waste sites should be investigated and possibly remediated. The sand and gravel extraction in the alluvial cone lower the head of the recharge area and there is a risk of clogging the sediments decreasing the recharge. In addition oil pollution could be caused by the digging machines and lorries trafficking the alluvial cone. 34S analysis shows that the two major well fields are more or less completely fed by the river water. Out of the three threats vizualised, the gravel extraction poses the highest risk to future water supply.

Keywords: groundwater, coastal, intrusion, pollution, heavy metals

367 A Comparative Study of Glutation Transgerase Activity in White-Fish (Coregonus lavaretus l.) Captured in an Iron Mining Area

Ekaterina Borvinskaya, Lev Smirnov, Nina Nemova, Irina Sukhovskaja

Institute of biology of Karelian Research Center of Russian Academy of Sciences, Russia

katsu@inbox.ru

Glutathione transferases (GST) are key enzymes of cellular detoxification systems that defend cells against oxidative stress and are involved in xenobiotics biotransformation. Measurement of GSTs activity has been shown to be useful for detecting sublethal disturbance in fish. Although many studies were conducted on fresh-water fish GSTs, little is known about this enzyme from typical northern ecosystems inhabitants, such as white-fish (Coregonus lavaretus L.). This data may be of importance for ecological monitoring in this region which is constantly under the pressure of rising anthropogenic contamination. Comparative studies on the GST activity were performed in the liver, muscle, gill, gonad and kidney of white-fish from inland waters with known pollution gradients. The fish were collected from lake near a Kostomuksha mining factory in the north-west of Russia and from reference lake regarded as relatively free of anthropogenic input. Mining factory release in the lake ore-dressing sewage leading to enriched level of potassium (K+) ions, abnormally high mineralization (500 mg/l) and pH level (8,5) and presence of suspended particles in the water. The bottom of this lake is totally anthropogenic origin, and the water is industrial product, multitudinously gets through technological cycle. GST activity were found lower in white-fish kidneys from polluted area, but there was no significant alterations in the gill, liver, muscles and gonad between reference and contaminated sites. We supposed that the altered GST activity in kidney is probably a metabolic adaptation of these tissues to the primarily mineral contamination. The absent of GST response in other tissues point to low effect of chemical stress on white-fish detoxification system. Obtained data may be applied for assessment of toxicological status of water and organisms well-being under mixed pollution in the industrial areas.

Keywords: glutathione transferase, fish, mixed pollution, ecological monitoring

366 Factors Threatening the Habitats of Rare Species of Rhodophyta in Serbia

Snezana Simic 1, Nevena Pantovic 1, Bozica Vasiljevic 2

1 Faculty of Natural Sciences, Institute of Biology and Ecology, University of Kragujevac, Serbia
2 Institute for Biological Research, Serbia

snezasi@kg.ac.rs

Based on the red algae data published in the works from 1889 to 2008 and downloaded into the electronic database titled Biodiversity of the aquatic ecosystems of Serbia, ex situ protection (BAES-ex situ) (http://baes.pmf.kg.ac.rs), it was established that in the mouths of the rivers, springs and rivers (at about 70 localities), 16 taxsons of the red algae of the classes Bangiophyceae (Bangia) and Florideophyceae (Hildenbrandia, Batrachospermum, Chantransia, Lemanea, Paralemanea and Thorea) were recorded. The largest number of habitats of the red algae in Serbia were mainly within the bountaries of the protected natural goods. Protection - wise, the most important habitats are the ones where the following species were found: Thorea hyspida (The White Timok near Zajecar, The Sava near Sabac), Bangia atropurpurea (The Trgovicki Timok - Gornja Kamenica, The Raska River - near the monastery of Sopocani, The Nisava River) and Paralemanea annulata (The Masuricka River). These habitats were not recorded as special importnace habitats, and therefore they were not protected. The highly endangered habitats were the ones with Thorea hyspida (The White Timok - near Zajecar and Sava River - near Sabac). Sandy terrains are located in the vicinity of these habitats. - In order to protect the red algae, which are known to be stenovalent by the large number of the abiotic and biotic parameters, it's necessary to properly respect the legal measures that determine the way of managing the protected areas of nature. This especially includes: planned tourism activities, the activities in the area of forestry, waterpower engineering, traffic and etc. that could lead to changes in the ecological status of the habitats. - It's suggested that these listed habitats should get protected and proper legal measures should be carried out in order to allow for the separated endangered taxons, which are known to be endangered or extinct in the waters of some European countries, to continue living there.

Keywords: endangered habitats, freshwater, algae, Serbia

369 Principal Elements Limniological Regime of Scutary Lake

Niko Pano 1, Pandi Stratoberda 2, Alfred Frasheri 3

1 Institute of Water and Energy, Polytechnic University of Tirana, Albania
2 Albanian Association of Inland and Coastal Water Conservation and Protection, Tirana, Albania
3 Faculty of Geology and Mining, Polytechnic University of Tirana, Albania

frasherialfred@yahoo.com

Evaluation of the principal elements of Scutary Lake limnological regime in this paper is presented. Scutary Lake is the biggest and the most interesting lake of Balkan hydrographical network. Its catchments area is, and the average altitude. Scutary Lake basin is one of the most complicated natural area, in Europe, as a result of its specific physic-geographical condition: mountainous region, particular land cover with small vegetation and important flysch formation presence, typical Mediterranean climatic regime with intensive precipitation, a hydrogeological with powerful ground water flow, etc. Many different affluent, such as Moraca, Zeta, Ceni, Ziveri, etc discharge into Scutary Lake. The only emissary of this lake is Buna River, 43 km long. In its flow, about 1.5 km away from the lake, this river gathers the plenty water of Drini river and they together discharge into Adriatic Sea. Drini River discharge into Buna riverbed not only obstructs the free discharge of this lake water into the Adriatic Sea, but also it causes opposite direction discharge. In these conditions Buna River, being a typical emissary of Scutary Lake, turns into its affluent. In this conditions, the hydrographic system: "Scutary Lake" Buna River - Drini River is distinguished for its specific very complicated hydraulic nature that determine in reality the nature of the limnological regime of this lake. Many particular hydro-meteorological studies are made for the hydrographical Scutary complex (Pano N. - 1963, 1984, 1995, 1996). This paper is an attempt to evaluate the principal limnological elements of Scutary Lake. The climatic change impact in the water potential processes of the Scutary Lake network is a component part of this paper. Lake level, water temperature, water physico-chemical characteristics, etc. are principal elements of the limnological regime are considered in this paper.

Keywords: Scutary Lake, limniological regime

374 Temporal Variability of Nutrients and Chlorophyll a in Boka Kotorska Bay, Eastern Adriatic Sea

Sladjana Krivokapic 1, Branka Pestoric 2, Dragana Drakulovic 2

1 Department Of Biology, Faculty Of Science, University Of Montenegro, Montenegro
2 Institute Of Marine Biology, Montenegro

sladjana69@yahoo.com

The Boka Kotorska Bay is semi-enclosed Bay located in the southeastern part of the Adriatic Sea, comprising a part of the Montenegrin coast. The Bay is influenced by great influx of fresh waters from numerous water streams and submarine springs. Seawater samples were taken from five depths (0, 2, 5, 10 and 15 m) weekly, at one station in Kotor Bay, from March 2008 to February 2009. Temperature, salinity and oxygen were measured in situ. Transparency was determined with Secchi disk. Nutrients (Strickland and Parsons, 1972) and chlorophyll a (Jeffrey et al., 1997) were determined according to standard oceanographic methods. Nutrient salts varied widely, with maximum values 23.91 µmol L-1 for nitrates, 1.52 µmol L-1 nitrites and 1.53 µmol L-1 for phosphate. Chlorophyll a concentration ranged from 0.12 to 11.13 mg m-3 and the highest value was measured in winter period of year (February). It seems that reason for this is the land - based nutrient input into the coastal area. Chlorophyll a is positively correlated with temperature, salinity, oxygen, nitrite and nitrate, and negatively correlated with transparency and phosphate. According to chlorophyll a concentration and criteria by Wetzel (1983) and according to nitrates, nitrites and phosphates concentrations by Ignatiades et al. (1992), the area could be mesotrophic. The scope of this paper is to present temporal changes in physicochemical parameters and phytoplankton biomass (chlorophyll a concentrations) in the inner part of Boka Kotorska Bay.

Keywords: chlorophyll a

379 Evaluation of Trophic State of Drini Delta Lagoons

Fatbardha Babani, Efigjeni Kongjika, Arjola Bacu

University of Tirana, Faculty of Natural Sciences, Department of Biotechnology, Albania

fbabani@yahoo.com

The lagoons of the Drini Delta represent one of the most important ecosystems in Albania. Two lagoons of this wetland system, Kune and Vain, are monitored during a year from March to October. Evaluation of trophic state is based on phytoplankton chlorophyll a, distribution of photosynthetic pigments, turbidity of

water and phosphate content in water. The relationship between chlorophyll and nucleic acid content is analysed too. The monitored lagoons can be characterized by different trophic state based on the trophic state classification by Hakanson and Carlson. Trophic level of Kune lagoon is much lower than of Vain lagoon. All selected stations of Kune lagoon represented low trophic level characterized as oligotrophic. Whereas Vain lagoon can be characterized by a very high trophic state evaluated as eutrophic level. Variations on trophic level of the selected stations on each lagoon are observed. The distribution of chlorophyll a and accessory pigments, Chl b and Chl c, as well as the relative chlorophylls content also showed differences between lagoons. The observed differences on the trophic state of selected stations of each lagoon especially their eutrophication can be explain by the communication sea-lagoon, fresh water supply as well as by the pollution near the urban areas.

Keywords: Chlorophyll a, nucleic acid, phosphate content, photosynthetic pigments, phytoplankton, trophic state

267 Water of Permeti Area (South Albania)

Selfo Oruci

University of Gjirokastra, Albania

oruciselfo@yahoo.com

Thermal waters in the region of Permeti are located near Benja village, along the low watercourse of Lengarica River, about 4.5 kilometers from its joint with Vjosa River. In this study we have taken into consideration four thermal sources due to their chemical, physical and variety peculiarities. All bio-ecological data gathered from these habitats is compared to other similar data gathered from different check points along the river situated before and after these thermal sources. The Benja thermal waters are used for curative purposes (esp. medical ones), so changing the eco-hydrology of these sources; transforming them from sources into ponds, which has a great impact over the thermal water regimes and all living organisms including here and amphibians. All the data collected from these sources and check points show that these changes are more visible when they are under the influence of temperature changes and sulfur quantity of the water. In three different sources, the water temperature is higher than the river temperature, whereas in the last one, the temperature is lower. The most distributed genus is Rana genus. We have recorded as the most common species of the thermal waters Rana balcanica, as a species of high ecological valence.

Keywords: thermal waters, amphibians, Rana balcanica, water eco-hydrology

343 Preliminary Results on the Presence of Cyanobacteria Synecoccocus in the Lagoon Waters of Northwestern Albania and Lake of Shkodra

Ariola Bacu 1, Fatbardha Babani 1, Laura Gjyli 2

1 Dept. of Biotechnology, Faculty of Natural Sciences, University of Tirana, Albania
2 University Aleksander Moisiu, Durres, Albania

a_bacu@yahoo.com

Cyanobacteria are the main component of small phytoplankton found in marine and freshwater systems. Two common types of them, Prochlorococcus, and Synechococcus are distributed the first in open ocean, where dominates the largest percent of the total photosynthetic biomass, and the second in nutrient rich waters. In the present study molecular tools were used to determine for the first time the presence of cyanobacterial picophytoplankton in the waters of the lagoons of Kune and Vain, and in the Lake of Shkodra, the three located in North Western Albania. The molecular analysis to verify the existence of cyanobacteria Synechococcus was based on the amplification of 16S-23S cyanobacterial ribosomal DNA, which is reported to be successful on the identification of cyanobacteria in different locations in the world. DNA collection and extraction was completed according to John Paul, 2008. PCR was run on Eppendorf Master Cycler machine. Primers used to amplify cyanobacterial rDNA were 16S-1247F and 16S-241R acc to Rocap et al.2002. PCR was run in a 20 ml solution acc to the following program: 94^{o}C for 4 min, followed by 40 cycles of 94^{o}C for 1 min, 52^{o}C for 1min, and 72C for 3minutes. Final step was a 10 min stretch at 72^{o}C. DNA was checked by a 1% agarose gel. The preliminary results on the presence of this species in the lagoon and lake waters were discussed in the terms of the variable environmental conditions included nutrient content and level of trophy during the period March-October 2009.

Keywords: cyanobacteria, PCR, ribosomal DNA, level of trophy

382 Recent State of Kamchia River (Down Stream) (Bulgaria)

Galina Shtereva, Anton Krastev, Boryana Dzhurova, Ognyana Hristova

Institute of Oceanology, Bulgarian Academy of Sciences, Varna, Bulgaria

g.shtereva@io-bas.bg

Kamchia River is the biggest Bulgarian river flowing into the Black Sea. The total catchment area of the river is 5358 square km, covering about 40% of the Bulgarian Black Sea watershed. According to conceptual framework DPSIR the

main drivers in Kamchia River region are agriculture, industry and urbanisation which cause a significant pressure on the aquatic system. The goal of the paper is to estimate the recent chemical status of the river.

The study is based on monthly monitoring of Kamchia River down stream during the 2005 2007 period on the base of following parameters: dissolved oxygen, pH, BOD and nutrients as dissolved phosphorus (P), nitrogen (N) and silica (Si). The interannual distribution of hydrochemical parameters is characterized with nutrients maximums in autumn winter period corresponding to high values of water quantity of river discharge. The maximum of inorganic nitrogen (2005) exeeds average annual value about 2 times. The minimum nutrients content corresponds to monthly discharges during summer low flow period, mostly in July September. The annual average N:P ratio in 2005 and 2006 was 25.8 and 17.4, resp.

Kamchia River discharge impacts the coastal zone in an area located about 1 navy mile eastern and southern from the river mouth. Most significant river influence is established in the upper surface layer.

Keywords: Kamchia River, nutrients, water quality, Black Sea

390 Influence of Human Activities on Submerged Vascular Macrophytes Alongside Crn Drim River

Marina Talevska

Hydrobiological Institute, Macedonia

mtalevska2000@yahoo.com

In this paper are presented the results from the investigations of human activities influence on submerged vascular macrophytes present along the river Crn Drim. The researches were performed in 8 localities alongside the river Crn Drim (from town of Struga to village Tasmarunista) at the time of maximum development of the submerged vascular vegetation (August). The sampling was executed by application of the standard lymnological methods. A Van - Veen grab and a "spider" grab were used for sampling. The collected materials were determined according to respective floras and keys in Department of hydrobotany from Hydrobiological Institute-Ohrid. Results of investigations shows that in these 8 localities were evidenced: Read Head Grass (Potamogeton perfoliatus L), Sago pondweed (Potamogeton pectinatus L.), Floating pondweed (Potamogeton natans L.), Curly pondweed (Potamogeton crispus L), Sharp leaved pondweed (Potamogeton acutifolius Link.), Horned pondweed (Zannichellia palustris L), Eurasian water milfoil (Myriophyllum spicatum L.), Whorled water milfoil (Myriophyllum verticilatum

L.), Common (rigid) hornwort (Ceratophyllum demersum L.), Tape Grass - eelgrass (Vallisneria spiralis L.), and American Waterweed (Elodea canadensis Rich&Michx.). The result shows that in investigated localities alongside the river Crn Drim there are differences in qualitative composition of submerged vascular macrophytes. These differences are the results of the different ecological conditions and different anthropogenic influence in the researched localities.

Keywords: human activities, influence, river Crn Drim, submerged vascular macrophytes

391 Anthropogenic Influence on Ichthyofauna and Macrophyte Diversity in the Crn Drim Ecosystem

Trajce Talevski 1, Marina Talevska 1, Dragana Milosevic 2, Aleksandra Talevska 3

1 Hydrobiological Institute, Macedonia
2 Department of biology, Faculty of Science and Mathematics, University of Montenegro, Montenegro
3 Faculty of Science and Mathematics, Institute for biology, Macedonia

tratal2001@yahoo.com

The Crn Drim water ecosystem appertains to the Adriatic Watershed. Its Macedonian part also includes Lake Prespa, Lake Ohrid, the Crn Drim River with the reservoirs Globocica and Spilje, as well as Radika River. What is characteristic of the Crn Drim water ecosystem is that the transboundary Lake Prespa, divided among the Republic of Albania, Greece and Macedonia, is situated between the two national parks (Galicica and Pelister). A part of Lake Prespa (Ezerani) has been declared a Ramsar site. Lake Ohrid is also a transboundary one, divided between the Republic of Albania and Macedonia. Lake Ohrid was included on the UNESCO list as a world heritage site in 1979. The Crn Drim River flows out of Lake Ohrid in the vicinity of Struga and 17km further it creates the reservoir Globicica, followed by the reservoir Spilje. The Radika River flows entirely through the Mavrovo National Park. The Crn Drim River abandons the territory of Republic of Macedonia and enters Albania proximately after the reservoir Spilje. Eleven indigenous and twelve introduced fish species were determined in Lake Prespa. Nine fish species (82%) in this lake are endemic. Twenty-one indigenous and seven introduced fish species were ascertained in Lake Ohrid. Seven fish species (33,3%) in this lake are endemics. The qualitative composition of ichthyofauna in the Crn Drim River and the reservoirs Globicica and Spilje is almost identical with the Lake Ohrid composition, whereas the Radika River ichthyofauna displays certain divergence. The biodiversity of macrophytes is different in natural lakes, rivers and reservoirs alongside the Drim system. What should be implied is that ichthyofauna biodiversity of macrophytes enriches throughout the entire course

of the Crn Drim River in the Republic of Albania, as well as prior to its entering the Adriatic Sea, namely the Bojana River, and fish biodiversity is more abundant with species which are also found in the Bel Drim River and Lake Skadar.

Keywords: anthropogenic influence, crn drim ecosystem , diversity, ichthyofauna, macrophytes

297 Biocenological Investigation of Fish Fauna from Kriva Reka and Pcinja Rivers, Macedonia

Vasil Kostov 1, Milica Ristovska 2, Valentina Slavevska-Stamenkovic 2, Donka Petrova 2, Daniela Hristovska 2, Mirkovska Marija 2

1 Institute of Animal Science, Fisheries Department, Skopje, Macedonia
2 Faculty of Natural Science and Mathematics, Institute of Biology, Skopje, Macedonia

vasilkostov@yahoo.com

Researches on the state of ecosystems of small rivers and brooks is becoming especially relevant, as increasing anthropogenic pressure may soon cause considerable changes in the structure of their biological communities. Studies on the species composition of fish populations in small rivers undergoing anthropogenic transformation contribute to the accomplishment of various tasks in the field of nature conservation. However, actions to conserve fish biodiversity in the rivers in Republic of Macedonia are unsatisfied because there is still not complete data about composition of fish communities inhabiting in our flowing waters. The purpose of this study was to reveal species composition of the ichthyofauna and the structure of fish communities in two rivers in R. Macedonia - Kriva Reka and Pcinja River. The fishes were collected in July and September 2009, on the 13 sampling points (7 on the river Pcinja and on 6 on the Kriva Reka). The fish samples were collected using electro fisher Samus 725G according the FAME methodology. During the investigated period more than 3000 specimens were collected. The basic morphometric parameters (length, weight) were measured directly on the field. Further, the fishes were released in to the water on the same sampling place where they were caught. The results of this survey, showed presence of 16 fish species from 4 families (13 of them autochthonous and 3 alochthonous) at river Pcinja and slightly lower richness (9 species from 4 families) at river Kriva Reka. In addition, regional differences and upstream-downstream changes on the fish's community for both river courses have been analysed.

Keywords: monitoring, fish fauna, river ecosystems

394 Ecohydrology of Dynamic Wetlands in an Australian Agricultural Landscape: a Whole of System Approach for Understanding Climate Change Impacts

Jarrod Kath 1, Andrew Le Brocque 1, Craig Miller 2

1 Australian Centre for Sustainable Catchments / Faculty of Sciences, University of Southern Queensland, Toowoomba, Queensland, Australia
2 Biodiversity Conservation, Management and Implementation, CSIRO Sustainable Ecosystems, Brisbane, Queensland, Australia

kathj@usq.edu.au

Increasing rates of water extraction and regulation of hydrologic processes, coupled with destruction of natural vegetation, pollution and climate change, are jeopardizing the future persistence of wetlands and the ecological and socio-economic functions they support. Globally, it is estimated that 50% of wetlands have been lost since the 1900's, with agricultural change being the main cause. In some agricultural areas of Australia, losses as high as 98% have occurred. Wetlands remaining in agricultural landscapes suffer significant degradation and their resilience and ability to continue functioning under hydrologic and land use changes resulting from climate change may be significantly inhibited as a result. However, information on floodplain wetlands in agricultural landscapes is poor and knowledge of how ecological functioning and resilience may change under future land use intensification and climate change is lacking. These knowledge gaps pose significant problems for the future sustainable management of biodiversity and agricultural activities which rely on the important services supplied by wetland ecosystems. This research evaluates the impact that hydrology and land use have on the perennial vegetation associated with wetlands in an agricultural landscape in south-east Queensland, Australia. A range of hydrological and land use variables were collated using a GIS and used in a bayesian modeling averaging approach to generate generalised linear models for vegetation response variables. Connectivity with the river and hydrological variability had consistently significant positive relationships with vegetation cover and abundance. Land use practices, such as irrigated agriculture and grazing, had consistently significant negative impacts. Consequently, to understand how climate change will impact on the eco-hydrological functioning of wetlands, both hydrological and land use changes need to be considered. Results from this research will now be used to investigate how resilient these systems will be to different potential scenarios of climate change.

Keywords: wetlands, vegetation, hydrology, agriculture

395 Assessment of the Surface Water Quality in Juzna Morava River Basin, Southern Serbia

Bozidar Stojanovic 1, Dragica Vulic 1, Branislav Gavric 2

1 Institute for Water resources development, Serbia
2 Republic Hyrometheorogical service of Serbia, Serbia

bmst@ptt.rs

This paper presents preliminary results of assessment the surface water quality in Juza Morava River basin, related to the spatial and temporal variations of representative parameters. In this study 25 sampling sites were selected from the monitoring regular network in the the area of Southern Serbia. Water quality trends for all sites were examined for twelve parameters - flow rate (Q), temperature, pH, conductivity, dissolved oxygen, biochemical oxygen demand (BOD), chemical oxygen demand (COD), suspended sediment, ammonia (NH4), total phosphorus (TP), total nitrogen (TN), and total Coliforms.This study is based upon long term data collected during ten years period, between1999 and 2008. Assessment methodology was based on the water quality classification according to the existing Serbian regulations. Results show variations and trends in water quality depending on the sampling site, the hydrological situations, and temporal period.

Keywords: surface water quality, Juzna Morava River basin, Serbia

396 Drivers of Wetland Hydrology at the Landscape Scale: Implications for Biodiversity

Jarrod Kath 1, Andrew Le Brocque 1, Craig Miller 2

1 Australian Centre for Sustainable Catchments / Faculty of Sciences,
University of Southern Queensland, Toowoomba, Queensland, Australia
2 Biodiversity Conservation, Management and Implementation,
CSIRO Sustainable Ecosystems, Brisbane, Queensland, Australia

kathj@usq.edu.au

Throughout a landscape a hydrological variability between and within wetlands is important for water dependent biota, as it maintains a wide range of habitats. Species require different hydrological conditions at different stages in their life history in order to reproduce and survive in a landscape. However, intensification of agricultural practices, such as groundwater extraction, stream flow regulation and vegetation clearing often leads to a reduction in both the number and hydrological

diversity of wetland types in a landscape, essentially reducing the amount of habitat available for many species. Remaining wetlands in the landscape are often hydrologically homogenized and far less variable than under natural conditions and as consequence many species are no longer able to persist in the landscape over the long term. However, many studies only observe wetland hydrology at relatively small spatial and temporal scales. Consequently, there is little knowledge about processes important for maintaining wetland hydrological variability at the landscape scale. To help address this knowledge gap we examined the hydrological characteristics of wetlands in an agricultural landscape of south-east Queensland Australia. Wetland hydrology metrics, relating to annual variability and inundation frequency, were derived from remote data for 255 wetlands throughout the region and modeled with spatially derived explanatory variables. Hydrological metrics relating to surface water flows, catchment characteristics, groundwater and extraction activities (i.e. groundwater bores) were modeled with wetland hydrology metrics to determine significant landscape scale drivers of wetland hydrology. The results of the study will be used in future research to help understand the impact that climate change and future agriculture activities will have on wetland hydrology and biota in agricultural landscapes.

397 Endangered Groundwater Quality at the Kuzmin Wells, Kosovo

Albana Veseli, Muje Rugova, Arsim Maloku, Tahir Arbneshi

University of Prishtina, Kosovo

albana.veseli@fshmn.uni-pr.edu

The groundwater of Kuzmin wells are used to supply the inhabitants of Prishtina with drinking water. The fields of Kuzmin wells are located in north-west of Prishtina part, on the left side of Sitnica River. Even there are sanitary protected zones of wells the legal requirements foreseen by law are not applied as much as it should be. Due to porous land, hydrological condition and numerous pollution of sources the groundwater quality is seriously imperiled. Consequently of high concentration of total amount of mineral oil, iron, manganese as well as nitrites have been recorded in groundwater. In this paper is presented their trends during the last three years. Based on obtained results for underground water quality of Kuzmini wells in 2008, high concentrations of some water quality indicators have been observed. Iron concentration level above AAV (average allowed value), 300 g/L in most wells was recorded. Usually manganese was below AAV 50µg/L, excluding some cases in June and August 2008. Iron and manganese concentration values have increasing tendencies in wells in vicinity of Sitnica River flow. Nitrates in Kuzmini wells do not exceed AAV for drinkable water. Higher nitrates concentration in water wells being found in vicinity of

urban areas have been recorded. Performed research enabled on evaluation of impact of industrial pollutants of water quality, using these data as the basis for prioritization of their remediation. Considering that is noticed a trend of non-reduction of above-mentioned chemical components content in water, it should be ensured the continuation of the water monitoring in the future as well. If the parameters indicate an attempt of increasing, the water has to be treated in order to obtain the desirable quality requested by the regulations applying for potable water.

Keywords: Kuzmin wells, groundwater quality, aquifer and Kosovo

398 Assessment of Heavy Metal Pollution in Iber River Sediment, Kosovo

Fatos Rexhepi, Ardian Rugova, Tahir Arbneshi

University of Prishtina, Kosovo

fatos-rexhepi239@hotmail.com

Natural environment which is polluting by heavy elements is considered as a universal problem. The heavy metals released in the environment as the result of human activities, atmospheric depositions and erosions would finally enter in to the aqua systems. Since, heavy metals are toxic, stable in the environment and potential to combine with the nutritive continuum. Thus, they are considered as one of the most significant pollutant in aqua systems. The aim of this study was the monitoring of heavy metal levels in sediment samples from Iber River. Sediment samples were chemically analyzed in order to determine the concentration, and origin of heavy metals (Pb, Cd, Cu, and Zn). Concentrations of lead, cadmium, copper, and zinc were determined in sediment samples collected in 2008 at four sites places in the Iber River between Montenegro and Serbia. The concentration of these elements was determined by using Differential Pulse Anodic Striping Voltammetry (DPASV) in universal cell three electrode systems with HDME. All the determined parameters with DPASV are compared with the results of ICP/MS method. Concentrations of metals generally decreased with distance downstream, with highest values occurring in the industrial upper stream of Iber River. Concentrations of cadmium, copper, and zinc in 2008 were lower at most sites than those in previous years. Unlike, the lead concentration was generally higher in 2008. The most probably reasons of these results are soil geological composition of north Kosovo, the existence of the considered number of mines of lead and zinc (Pb-Zn-mining), smelting and chemical industry at Zvecan and Mitrovica, located very close to Iber river.

Keywords: Iber River, Sediment, Heavy metals, DPASV, ICP/MS and Kosovo

399 The Influence of Kosovo Power Plants on the Water Quality of Sitnica River, Kosovo

Muje Rugova, Skender Demaku, Ilir Shehu, Selim Jusufi, Tahir Arbneshi

University of Prishtina, Kosovo

mujrugova@yahoo.com

The Sitnica River is one of the main rivers in Republic of Kosovo. Progressing deterioration is mainly due to direct discharge of urban and industrial wastewater into the river. The main load of pollution is coming from Thermo Power Plants (TPP) Kosovo "A" and Kosovo "B". The main objective of this work was study the environmental impact of wastewater discharged by Kosovo TPP (Kosovo "A" and Kosovo "B") on the overall water quality of Sitnica River. The main discharge channels from the plants were mapped, and samples were collected from four points within of Kosovo "A" TPP, four points within of Kosovo "B" TPP area, in channels that flow into the Sitnica River and five samples were taken directly from Sitnica River; in joint point of water channels of Kosovo "A" and Kosovo "B" with Sitnica River, and up-stream before water of Sitnica River flows to the potential zone of influence of TPP (referent point). The evaluation of the quality of discharged wastewater, the quality of receiving water near discharge points, and in the impact zones was done based on complete physic-chemical analysis of collected water samples. Analysis also included measurements of heavy metals (Pb, Cd, Cu, Zn, and Cr), sulphates, nitrogen compounds, total phosphorus and phenols. Results have shown that water was polluted by various organic and inorganic matters, but among the most hazardous substances that exceeded standards for surface water have been registered phenols and heavy metals. Evaluation of ecological condition infers that water of Sitnica River in potential zone of influence by wastewater discharged of Kosovo TPP it belongs to the fourth category of surface water.

Keywords: Sitnica River, Water quality, Heavy metals, Thermal Power Plant and Kosovo

400 The Level of Manganese Concentration in Water of Accumulative Lake of Badovci, Kosovo

Liridon Berisha, Agim Hasani, Naser Troni, Tahir Arbneshi

University of Prishtina, Kosovo

lira092000@hotmail.com

The intention of this research was to determine the mass concentration of manganese in water of accumulative Lake of Badovci. The water from the Lake of Badovci is used to supply the inhabitants of Prishina region with potable water. To compare the level of mass concentration of manganese, which is transported through natural flows of watercourses into the basin of the accumulative Lake of Badovci, the samples of water resources were taken in the flows of watercourses and in the water of the accumulative lake. The sampling was done in two main feedings (watercourse flowing to the direction of Gjilan and watercourse flowing to the direction of Mramor) and in the ten sampling points in the lake of Badovci. Experimental results show that the level of mass concentration of manganese in water samples of Badovci Lake are in range from 0.008mg/L to 0.35mg/L. Higher level of mass concentration of manganese was found into the samples of watercourses flowing to the direction of Mramor (0.048mg/L to 0.085mg/L). The lower mass concentration of manganese was found in the samples of watercourses flowing to Gjilane direction(0.005mg/L - 0.008mg/L, which well corresponds to terrain configuration of ground. Measurements have shown that the level of concentration of manganese in lake water of Badovci were increasing with increasing sampling depth, so in the depth of 25 meters it was 0.35 mg/L. Therefore, it is necessary to monitor and determine the amount of manganese even after water is subjected to processing treatment for potable water. The maximum allowed amount of manganese for potable water is 0.005mg/L according to standards of Republic of Kosovo.

Keywords: Badovci Lake, manganese, drinking water quality, and Kosovo

298 Nutrition Status of Chub (Squalius Vardarensis Karaman, 1928) from Pcinja River During Summer Season. Preliminary Results

Vasil Kostov 1, Donka Petrova 2, Daniela Hristovska 2, Marija Mirkovska 2, Milica Ristovska 2, Slavevska-Stamenkovic 2

1 Institute of Animal Science, Fisheries Department, Skopje, Macedonia
2 Faculty of Natural Science and Mathematics, Institute of Biology, Skopje, Macedonia

vasilkostov@yahoo.com

Knowledge of the regime intensity of fish diet is very important information about fish ecology and behaviour. S. vardarensis is one of the most spread fishes in flowing waters in Republic of Macedonia. In addition, the purpose of this study was to quantify the rate of food consumption of S. vardarensis in River Pcinja during summer period and to compared to performance data obtained from other regions of the species range. Fish specimens were collected from the upper, middle and lower part of the River Pcinja by electrofishing. It is generally known that chub is omnivorous species, consumes zooplankton, macrozoobentos, macrophytes and small fishes. During the investigation period, analyses of the digestive tract showed presence of the macrozoobenthos fraction (Ephemeroptera, Trichoptera and Diptera), as well as, detritus. Among Ephemeroptera, Oligoneuriella rhenana. is the most dominant food sources which correspondents with its massive appearance in the investigated river ecosystem.

Keywords: nutrition, chub, river ecosystems, feeding ecology

402 Runoff Pollution in Central India

Khageshwar Singh Patel 1, Balram Ambade 2, Jose Nicolais 3, Eduardo Yubero 3

1 Pt. Ravishankar Shukla University, India
2 School of Studies in Chemistry, Pt. Ravishankar Shukla University, India
3 Atmospheric Pollution Laboratory, Applied Physics Department, Miguel Hernandez University, Spain

patelks_55@hotmail.com

Runoff water is an important transporting medium for various land pollutants to surface water. Several metal industries and thermal power plants are running with burning of a huge amount of coal in central India. The runoff water quality in most polluted cities of central India i.e. Raipur and Korba during rainy season (i.e. May

- September, 08) is described. The loading of common ions and heavy metals i.e. Fe, Mn, Cu, Zn, Pb and Hg in the runoff water is described. The variations, correlations and sources of the pollutants in the runoff water are discussed.

Keywords: Runoff water, quality, India

403 Biosorption of Zinc by Chlorella Vulgaris and Scenedesmus Subspicatus Isolated from Penang Rivers, Malaysia

Abdullah Al-Fawwaz 1, Wan Maznah Wan Omar 2

1 Uneversity Science, Malaysia
2 USM, Malaysia

al_fawwaz974@yahoo.com

Living biomass of Chlorella vulgaris and Scenedesmus subspicatus was used as a potential biosorbent for removal of zinc ions from aqueous solution under laboratory conditions as a function of pH, initial zinc and biomass concentrations. At the optimal pH conditions (pH7) for equilibrium studies, zinc ions uptake increased with increasing initial zinc ion concentration up to 80 mg.L-1. The kinetic studies revealed that maximum biosorption capacities and metal efficiency for zinc were achieved during 0-30 min of contact time. The maximum uptake of zinc and percentage of zinc removal from solution was significantly increased ($p < 0.05$) from pH 4 to 7. As the initial zinc concentration increased from 5 to 80 mg.L-1, the adsorption capacities of zinc also significantly increased ($p < 0.05$). When the biomass concentrations were increased from 0.25 to 1.0 mg.L-1, the uptake of zinc per unit biomass was significantly decreased ($p < 0.05$). The equilibrium data fitted well to the Freundlich models in the studied range of zinc concentration and pH. The maximum capacity of Chlorella vulgaris and Scenedesmus subspicatus was 85.4% and 87.6% respectively obtained at pH7. The Langmuir constant (KL value), which indicates the affinity of algae for zinc ions increased as the pH of solution increased. The magnitude of Freundlich constants (KF and n) showed easy uptake of zinc ions from aqueous solution with high adsorptive capacity of Chlorella vulgaris, especially at pH7. Kinetic studies suggested that the sorption of zinc follows the Lagergren second-order kinetic model.

Keywords: Heavy metals, Green algae, Biosorption

404 Preliminary Data on Macrozoobenthos from the Albanian Part of Ohrid Lake

Sajmir Beqiraj 1, Lefter Kashta 2, Albert Cupi 1, Dorina Percini 1, Ina Nasto 1

1 Department of Biology, Faculty of Natural Sciences, University of Tirana, Albania
2 Museum of Natural Sciences, Faculty of Natural Sciences, University of Tirana, Albania

Existing information on macrozoobenthos from the Albanian part of Ohrid Lake is very scarce. Most of existing data are species lists mainly for mollusks and insects, but there are no previous studies on taxonomy and ecology of the whole macrozoobenthic community. The present paper shows the results of a study on benthic macroinvertebrates from the littoral of the southern and south-western part of the lake (Albania), carried out in 2009. The samples were taken in April, July and October in five stations, according to a transect line in 1m, 5m, 10m, 15m and 20m depth in each station, using an Ekman grab. Collected species belong to Turbellaria, Nematoda, Gastropoda, Bivalvia, Oligochaeta, Hirudinea, Ostracoda, Amphipoda, Isopoda, Decapoda and Insecta. Species composition and abundance show differences between substrate type: mud, sand, gravel and macrovegetation, as well as between different depths. Differences are also evident between sampling seasons, especially among insects, crustaceans and annelids. Some species, especially among gastropods and crustaceans seems to be closely related to the presence of macrovegetation, especially to the Characeae. This study is a first attempt to study the whole macrozoobenthic community in the Albanian part of Ohrid Lake in a taxonomic and ecological approach. These results could be considered as preliminary and the study should continue, in order to provide a more detailed picture of species composition, abundance, population dynamics and ecological characteristics of the macrozoobenthic community from the Albanian part of the lake.

Keywords: Macrozoobenthos, lake littoral, Ohrid Lake, Albania

407 Evaluation of Shallow Groundwater Quality for Irrigation Purposes in the Koprubasi Uranium Area (Manisa, Turkey)

Hulya Kacmaz, M. Eran Nakoman

Dokuz Eylul University, Faculty of Engineering, Dept. of Geological Engineering, Tinaztepe Campus, Buca-Izmir, Turkey

hulya.kacmaz@deu.edu.tr

Koprubasi is a district of Manisa Province in the Aegean region of Turkey. Shallow groundwater located in this area is generally used for irrigation purpose by village inhabitants.

The main objective of this study is to evaluate the quality of shallow ground water collected from the U mineralization area in Koprubasi. In order to achieve this objective, physicochemical parameters (pH, EC, Ca2+, Mg2+, Na+, HCO3-, Cl-,SO42-, NO3-,and PO42-), were analyzed. Based on these analyses, parameters like Sodium adsorption ratio (SAR), % Sodium (Na), Residual sodium carbonate (RSC), Kelley's ratio (KR) and Magnesium hazard (MH) were calculated.

pH, the electrical conductivity (EC) and calcium, magnesium, sodium, bicarbonate, chloride, sulfate, nitrate and phosphate concentrations in the shallow groundwater are usually below the usual range set by the Ayers and Wescot, 1985 for irrigation water. In addition, the calculated values of SAR, RSC, % Na, KR and MH indicate good to permissible use of ground water for irrigation.

Keywords: Groundwater, Irrigation, Koprubasi, Uranium

412 Viola Eximia, a Globally Endangered Species, New for the Albanian Flora

Lulazim Shuka
University of Tirana, Albania
gjsnea@yahoo.com

The genus Viola L, comrises ca. 27 species in the flora of Albania together with two species recorded in the last years. Viola eximia Form. sec. Melanium were registered with endangered status R (rare) from IUCN. It is a local endemic species of the Prespa region, grows so far in south Macedonia and north-central Greece. It is described also for the first time in this paper from the Dry Mountain in the Prespa National Park, within Albanian territory. The habitat of occurrence and its protected status in the new locality is reported also. The new site enlarge its area of distribution and represent a new contribution for the flora of Albania and Prespa Park.

Keywords: Viola eximia, endangered specie, local endemic, Prespa region, Albania

413 A New Rapid Field Test Kit to Screen for Paralytic Shellfish Poisoning (PSP) Toxins from Bivalve Molluscs in Albanian Seashore

Rigerta Sadikaj 1, Edmond Panariti 2, Dritan Arapi 3

1 University of Tirana Faculty of natural sciences, Albania
2 Agricultural University of Tirana, Faculty of Veterinary, Albania
3 Ministry of Environment, Forestry and Water Administration, Albania

rsadikaj@hotmail.com

A new rapid field test kit to screen for paralytic shellfish poisoning (PSP) toxins has been used in the present study. The new test, called MIST Alert, provides a qualitative (positive/negative) indication of the presence of PSP toxins in less than 20 min. It is designed as a screening method for regulatory labs to eliminate negative samples, thereby leaving a smaller number of positive samples to be tested with more sophisticated and time-consuming quantitative methods. The test is based on easy-to-use lateral flow immuno-chromatographic (LFI) test strips. The sensitivity of the test to several analogues of saxitoxin STX was investigated. The toxin analogues were detectable at concentrations of approximately 200 nM. All toxins were detectable within or close to the regulatory limit of 80 µg saxitoxin dihydrochloride equivalents per 100 g of tissue (1075 nM STX) using the AOAC extraction procedure.

Keywords: toxisn, aquatic ecosystem,molluscs

414 Phytoplankton Community as Indicator of Eutrophication in the Boka Kotorska Bay

Dragana Drakulovic 1, Nenad Vuksanovic 1, Sladjana Krivokapic 2, Branka Pestoric 1

1 Institute of Marine Biology, Montenegro
2 Department of Biology, Faculty of Science, Montenegro

ddragana@t-com.me

In Boka Kotorska Bay as a semi-enclosed Bay and part of Montenegrin Coast anthropogenic impact is very visible. That relate to changes in waters discharge, sewage waters, agriculture run-off etc. So the increase of eutrophication during last years has been noticed in this Bay. Material for sampling was taken in inner (Kotor Bay and Risan Bay), middle (Tivat Bay) and outer (Herceg Novi Bay) part of Boka Kotorska Bay. Sampling were performed from April to September 2009 in monthly intervals on six positions and three depths: surface, middle and

bottom. Maximum mean value of microplankton was in July (8.4 x 105 cells L-1) on central position in Kotor. Values of microplankton were up to 106 cells L-1 on surface in few stations during summer. Diatoms were dominant phytoplankton group through the investigated period. Dinoflagellates were showed less abundance than diatoms, with increased in cells number in summer period. Some species were appeared frequently during all investigated period. Some of them are: Skeletonema spp., Thalassionema nitzschioides, Pseudonitzschia spp., Prorocentrum micans, Gymnodinium spp., Protoperidinium crassipes. Concentration of chlorophyll a was showed maximum mean value in April (3.06 mg/m3). This maximum concentration of chlorophyll a was appeared during low abundance of microplankton (7.53 x 103 cells L-1). Probably that due to different photosynthetic activities in different cell size fractions, different composition of phytoplankton and the different physiological state of cells. The scope of this work is with new data and results to give insight on situation of phytoplankton community and possible negative changes that can cause serious problem, especially increasing of eutrophication level. So only with permanent monitoring we can noticed all these changes.

Keywords: Phytoplankton, Eutrophication

429 The Monitoring of Some Physical-Chemical Water Parameters in the River Ishem and Shkumbin

Ariola Devolli 1, Naxhije Hila 2, Nikolin Geaga 2, Ahmed Mohamed 3

1 University Department of Biology and Chemistry, Albania
2 University, Albania
3 University, Egypt

a.devolli@yahoo.com

We have realised in this research the monitoring of superficial water's quality of the river Ishem and Shkumbin. The monitoring is done by analysing some of its physical-chemical parameters. To have a right procedure, according to the standards, we have respected rigorously the sample taking methodology. The best place where samples are taken is there, where waters are better mixed and the movement of water is nearly smoothed. The samples in both rivers are taken by plastic bottles. The conservation of the sample is made according to the tested parameters and the treatment of it is done according to the tested parameters in laboratory conditions. The water control of such rivers and the comparison of chemical parameters with the norms is rather difficult because in our country lack the superficial water norms. We arrive into some conclusions relied on the results acquired by such controls. - In general the values of water temperature have an

annual distribution according to the seasons and with the same course with air temperature. - The alkalinity in both rivers is rather high and it differs according to the quantity and the season when the control is done. - The high electricity of both rivers is the result of a continuous urban and industrial liquid discharging. - The water of the river Ishem has bad physical-chemical qualities. - The waters of the river Shkumbin have high presence of NO3

Keywords: physical-chemical parametres, water, river, monitoring

296 Water Quality Assessment Based on Fish Fauna and Macroinvertebrates. Case Study on Pcinja River

Vasil Kostov 1, Milica Ristovska 2, Valentina Slavevska-Stamenkovic 2, Branko Miljanovic 3, Momir Paunovic 3

1 Institute of Animal Science, Fisheries Department, Skopje, Macedonia
2 Faculty of Natural Science and Mathematics, Institute of Biology, Skopje, Macedonia
3 Faculty of Natural Science and Mathematics, Institute of Biology, Novi Sad, Serbia

vasilkostov@yahoo.com

Last decades, a lot of effort has been focused on the design of the efficient system of water monitoring, as an integral part of the management system. Effective monitoring system aims to evaluate water status that reflects the degree of human influence. Based on monitoring results, methods for protection of ecosystems and improvement of water status should be proposed. Water Framework Directive 2000 points up the meaning of biological parameters in the monitoring of the aquatic ecosystems. Despite this European trend, biological parameters such as macrozoobenthos and fishes have been unjustifiably neglected in the water quality monitoring system in many countries, including Macedonia. This study is focused on the rapid assessment of the ecological status of the river Pcinja. Hydrobiological research on macrozoobenthos and fish fauna of the Pcinja River was conducted during summer period 2009, along the entire river course. Eight sampling points were selected before and after the mouths of the tributaries polluted by communal and industrial waste water and near bigger settlements. Standard methodology for collection of bottom and fish fauna (ISO and CEN standards) was used. ASPT, BMWP indices for macroinvertebrates and EFI index for fish fauna were applied. In compare to other sites, the deterioration of water quality of the mouth of the Kumanovka River (right tributari of the Pcinja River) was detected. Presented approach (using a standardised sampling methodology and selected indices) represents an attempt aimed to contribute to the upgrading of the water quality monitoring practice in the Republic of Macedonia.

Keywords: water quality, monitoring, fish, macroinvertebrates, river ecosystems

294 The Presence of Organochlorine Pesticides in the System Sediment -Water in Lake Dojran

Elizabeta Veljanoska-Sarafiloska, Momcula Jordanoski, Melika Semo-Zace

Hydrobiological Institute, Ohrid, Macedonia

betisaraf@yahoo.com

Lake Dojran is located in the Balkan Peninsula in South-eastern Europe (41°23' N 22°45' E). It is a remaining of the ancient Lake (Again) Paionia, and was formed by intense seismic activity. It is the third-largest lake in the Republic of Macedonia and it is situated in the deepest part of the valley Dojran. The Lake Dojran is located on an altitude of 148 meters, while its total area is estimated at 42,5km2. The lake is shared between the Republic of Macedonia with 26,58km2 (or 62,54% percentagewise) of the total lake's area and the rest of 15,92km2 (or 37,46%) belongs to the Republic of Greece. The Lake Dojran is a significant natural resource and it has a great natural and economic value for the local population on both sides of its shore. In the period 2004 - 2006, researches of the water and the sediment from the littoral and pelagic zone of the Lake Dojran have been conducted. There have been defined five researching points in the littoral zone and that is how the entire shore of the lake (in the Macedonian side) was taken into consideration, while the vertical point of the pelagic zone was defined with three different depths. The conducted analysis included qualitative and quantitative determination of the organochlorine pesticides in the water and in the sediment of the respective points in the Lake. The Karlson method for determination of the trophic state of the surface waters, with an analysis of the physical and chemical parameters (concentration of the total phosphor and transparency) and the biological parameters (contains of the chlorophyll a), was also applied. The results of the researches indicate a huge anthropogenic influence on the littoral as well as on the pelagic zone of the Lake Dojran.Based on the research of the organochlorine pesticides, their presence is evident in both, water and sediment. The presence of DDT and its metabolites of disintegration are especially marked. This state verifies the intensive and extended usage of the pesticides as prevention method in our country, as well as in the neighboring Republic of Greece. Despite the fact that the usage of these compounds was terminated in the seventies of the previous century, the main reason for their detection even today, presumably is due to the key characteristics of this group of compounds, i.e. their persistence, long-term duration in half-life, or the slow degradation and certainly their sorption on the sediment particulars. In regard to the numeric values retained for the index of the tropic state, the Lake Dojran is classified in the group of lakes with a eutrophic character. Generally, the research indicate to the fact that the Lake Dojran is to be considered as one of the most endangered lakes in the Republic of Macedonia, for which the main reason is

the variation of the level of the lake's water. These conditions bring the lake into a critical state, which, on the other hand is encouraging concern mainly for the alteration of the natural balance of this lake's eco-system.

Keywords: Lake Dojran, organochlorine pesticides, DDT, trophic state

293 Fish Fauna of River Bregalnica in Republic of Macedonia

Vasil Kostov 1, Katerina Rebok 2, Valentina Slavevska-Stamenkovic 2, Milica Ristovska 2

1 Institute of Animal Science, Fisheries Department, Skopje, Macedonia
2 Faculty of Natural Science and Mathematics, Institute of Biology, Skopje, Macedonia

vasilkostov@yahoo.com

Natural perturbations and increased anthropogenic influences (water abstraction, canalization, damming, introductions of exotic species, agricultural and industrial waste waters) on freshwater resources have become more intense over the last few decades in the R.Macedonia. These alterations had direct and indirect influence on fish communities. River Bregalnica, the biggest left tributary of the river Vardar (Macedonia) is a good example of the strong human induced influences potentially affecting native fish communities, so in this study we focused on it. Qualitative and quantitative analyses of fish fauna on 32 sampling points, located on Bregalnica and tributaries were care out. During investigated period 2007 - 2009, more than 8000 specimens were collected using electro fishing. Twenty tree fish species from 7 families were identified, 18 of them as autochthonous and the other 5 as alochthonous. Longitudinal changes of fish communities were noticed, both in quantitative and qualitative terms. The influence of the environmental factors to the structure of fish communities was discussed, too.

Keywords: fish, abundance, composition, fish population, river ecosystems

292 Intra-Annual Dynamics of Water Quality Changes in Plitvice Lakes Spring Zone

Maja Vurnek 1, Andrijana Brozinevic 1, Gordana Buselic 2, Gordana Zwicker Kompar 3, Josip Rubinic 4

1 Plitvice Lakes National Park, Croatia
2 Meteorological and Hydrological Service, Croatia
3 State Institute for Nature Protection, Croatia
4 Faculty of Civil Engineering University of Rijeka, Croatia

The Plitvice Lakes National Park, inscripted on the UNESCO World Heritage List, is a natural phenomenon consisting of 16 lakes divided by tufa barriers. The majority of water for the aquatic system comes from karst springs of Black and White river. Due to its extraordinary sensitivity and based on the National Park Management Plan, this part is situated in the very strict conservation zone. This paper deals with the water quality research in Plitvice Lakes spring part. After their flow from the spring points, waters of Black and White river are joined into the river Matica which then flows into the first of the Plitvice Lakes - the lake Proce. These springs belong to the Black-Sea catchment area and their streams flow on carbonate bedrock from the Jurassic period. Although they show characteristics of typical karst springs, the differences in physico-chemical parameters and water quality are easily detectable and are probably caused by their catchment area geological structure, vegetation types, anthropogenic influences on watercourse and hydrological characteristics. The paper analyzes the recent three-year results obtained by monitoring the hydrological conditions and water quality (physico-chemical and microbiological parameters) on White and Black river and river Matica, as well as the results obtained from the biggest lake in aquatory - the lake Kozjak. The variability of water quality and hydrological regime among several sites have been established, as a consequence of intra-annual water cycle and antropogenic influence in the catchment area. Moreover, the differences between the analyzed indicators in the spring zone and the lake Kozjak have also been established. Those differences can be attributed to the influence of inertia of the lake Kozjak as well as periodical changes of this aquatic system on analyzed characteristics.

Keywords: Plitvice Lakes, karst springs, water quality, hydrological characteristics

416 Urban Ecohydrology - Paradigm Change for Sustainable Water, Ecosystems and Societies

Iwona Wagner 1, Maciej Zalewski 2

1 Department of Applied Ecology University of Lodz, Poland
2 European Regional Centre for Ecohydrology u/a UNESCO Polish Academy of Sciences, Poland

In the 20th century, the global development was to a great extent achieved by exploitation of nature without maintaining the integrity of ecosystems. The process resulted in 1) large scale landscape modifications, which by degrading catchments processes impaired the ability of water ecosystems to cope with the stress, and 2) highly concentrated activities in urban areas, resulting in severe local disruptions of energy, water and matter cycles and strong local impacts on water resources. According to ecohydrology concept, sustainable development of water resources depends on the ability to maintain the ecosystem processes which have been established by evolution. There is an increasing number of application of ecohydrology in the management of large scale processes degradation (e.g. demonstration projects of Ecohydrology Programme of the UNESCO IHP), however application of ecohydrology in urban areas is still a challenge. Concentrated impacts, overloaded and ageing infrastructure, limited space for ecohydrological management and old paradigm-based management strategies all contribute to this issue. The major goals of urban ecohydrology is improving health conditions and the quality of life of the urban inhabitants, together with minimising and reversing the negative impact of urbanisation on the environment. This is achieved by increasing the ability of the urban water-related systems to provide ecosystem services, lowering costs of management, improving the adaptability to climate change, and providing concepts for site-specific solutions for sustainable development and achievement of the MDG UN. The paper will present urban ecohydrology implementation in the City of Lodz (Poland) and the experiences gained within the EU Project SWITCH. The anticipated approach includes development of the scientific basis for urban ecohydrology, its implementation and development of system solution for the environmental cycles recovery, socio-ecological feedbacks and ecosystem services. Social and institutional aspects of urban ecohydrology implementation based on the multi-stakeholder platform (Learning Alliance) will be also addressed.

Keywords: urban ecohydrology, IWRM

417 Removal of Nutrients from Wastewater by Modified Bulgarian Clinoptilolite

Nadejda Taneva

University of Architecture, Civil Engineering and Geodesy, Bulgaria

nadejda_taneva@yahoo.com

Results from a laboratory investigation on the capability of activated and modified Bulgarian clinoptilolite samples from Beli plast deposit in Eastern Rhodopes to remove ammonia and phosphates (hydrogenphosphates) from aqueous solutions are presented in the report. A series of ion exchange batch experiments and column runs were carried out with synthetic water composed of NH4Cl and Na2HPO4.12H2O. Total ion exchange capacity was determined by batch experiments as a function of initial ammonia and phosphates concentration, solution pH and temperature. It was found that the adsorption and ion exchange activity of natural clinoptilolite towards phosphate ions can be increased by chemical activation and modification. The aim of the conducted experiments is to be analyzed the practical appliance of the modified samples clinoptilolite like a final polishing stage of the waste water treatment process and for what range of concentrations of ammonia and phosphates this is possible.

Keywords: wastewater, nutrients, clinoptilolite

426 Microbial and Chemical Water Pollution of Shkumbin River at Elbasan Region

Marsela Allushi 1, Margarita Hysko 2

1 High Schooll «Qemal Stafa», Elbasan, Albania
2 Biology Department, Faculty of Natural Sciences, University of Tirana, Albania

marselaallushi@yahoo.com

There are a lot of rivers in Albania; one of them is Shkumbin River that flows out of Pogradec and Librazhd areas. It runs for 181.4 km in Albania, joining 10 other small rivers; having a high degree of natural character; and it empties into the Adriatic Sea. Shkumbin river water is used by people of Elbasan and countryside for fishing, for swimming and for irrigation of plants. River conservation is threatened by pollution inflows from non modified west water, from farms and industrial activity, making the pollution of this river problematic. We have monitored Heterotrophs, microbial and chemical water pollution of Shkumbin River in Elbasan areas

during the 2008 year, according to the standarts that require their examination. We noticed a high water pollution level and calculated the relationship of the physical and chemical parameters with microbial ones,depends this by the flow during the four seasons.

Keywords: Shkumbin River, Heterotrophs, Total coliforms, Faecal coliforms, chemical pollution

286 Biological Water Quality of Lake Shkodra Based on the Bioindicator Species of the Cyanobacteria and Diatoms

Marash Rakaj

Department of Bio-chemistry, Faculty of Natural Sciences,
University of Shkodra «Luigj Gurakuqi», Albania

marashrakaj@yahoo.com

Diatoms species have a narrow optima and tolerances for many environmental variances, which make them exceptionally useful in quantifying environmental characteristics to a high degree of certainty. Regarding to the trophy valences of the bioindicator species of the Lake Shkodra diatoms, the highest number of them belong to oligo-mesotrophic and tolerant groups, which show a good situation of lake for life. Cyanobacteria are distributed in rich organic waters, wetlands and soils. In some shallower localities of the southern part of the Lake Shkodra, some large forms and water blooms filamentous of the cynobacteria species (Merismopedia, Microcystis, Oscillatoria) during summer were observed, but unpleasant odor or the harmful substances of Cyanobacteria during our investigation were not evidenced. During last six years a list of Microalgae of Lake Shkodra was compiled, which included 174 genera with 1069 taxa, 98 of which belong to Cyanophyta/Cyanobacteria and 590 to Bacillariophyta. In this paper phytoplankton diversity and biological water quality based on the bioindicator species of the Cyanobacteria and Diatoms for the Lake Shkodra is given.

Keywords: Phytoplankton, diatoms, cyanobacteria, Lake Shkodra, bioindicator, trophy valences, water blooms.

283 Monitoring of Cations and Anions in Bottled Waters of Kosovo During 2008-2009

Lirie Sefaja, Tahire Gjergji, Ergyl Bince, Aferdita Zuka, Kimete Krasniqi

National Institute of Public Health in Kosovo, Pristina, Kosovo

lirush_516@hotmail.com

Aim of this paper is to analyze water samples of 7 Kosovo producers of bottled water.The samples were taken from springs and from final product - bottled water.The study covers two years period 2008-2009.The bottled water producers are named with letters A,B,C,D,E,F and G.Different chemical parameters were determined but we were focused on:NH3, NO2, NO3 and Mn because values were variable.APHA Standard methods for examination of water and wastewater 20th edition were used during the study as well as WHO and Administration Instruction for Health JIAS 2/99 (UNMIK). Exceed of maximumal permitted levels (MPL) are found regarding NO2 and Mn concentration.In the samples of the bottled water producer named B we found exceeding of MPL for Mn with average 0.097 ppm. In the samples of the bottled water producer named F we found exceeding of MPL in concentration of NO2 and Mn.The average value for NO2 was 0.0101 ppm and MPL is 0.005ppm.The average value for Mn was 0.188ppm and MPL is 0.05ppm. Those high concentracions of Nitrites and Manganese are consequence of pollution during the technological processes of production.

Keywords: aniones, kationes, bottled waters

476 The Problem of Pollution with Heavy Metals and Possible Risks Related to that in Watersheds with the Developed Metallurgical Industry

Astghik Danielyan

Dep. of Ecology and Nature Protection of Faculty of Biology of Yerevan State University, Armenia

a.danielyan@hotmail.com

Today we are witnesses of the unprecedented sharp changes as global, as local scales. Pollution of surface waters, not complete management of water resources are really problems in the field of water resources management in Armenia. Debed river watershed basin is one of the important economical centers of Armenia and stands out with developed industry, especially metallurgical and agriculture. All of these cause serious ecological and environmental problems, especially when the waste management mainly absents in area of the watershed basin. The Debed

river is a transboundary river and has an also regional importance. The objectives of researches are to study the level of pollution with heavy metals and possible risks related to that in the Debed river watershed basin. Researches have been passed from 2004 to 2008. According to the researches in studied rivers of the Debed river watershed basin the exceeds of Maximum Permissible Concentrations have observe from heavy metals for iron, copper, manganese, lead, zinc and for chromium. It is distinctive that concentration of cooper has exceeded the MPC in the river Debed during all the months of researches, where is developed the metallurgical industry in area of the watershed basin. The passed researches have revealed that as for stream of the main rivers of the Debed river watershed basin in the waters observe two uneven raises of heavy metal concentrations after the cities Vanadzor and Alaverdy. On 2006 in all sampling points of the studied rivers were observed ecosystems' conditions deterioration especially after the cities Vanadzor and Alaverdi. According to results of the researches ecosystems of the studied rivers can not conquer the recent level of anthropogenic pressure in the Debed river watershed basin sufficiently, which causes also decrease of cleanoneself possibility of rivers.

Keywords: water pollution, heavy metals, watershed, ecosystem

433 Brewery's Waste Water Management

Ariola Devolli 1, Lauresha Shabani 2, Sotir Mali 2, Naxhije Hila 2

1 University Department of Biology and Chemistry, Albania

2 University, Albania

a.devolli@yahoo.com

The aim of this research is the improvement of water usage efficiency in a brewery and the reduction of waste water pollutants according to the standards. Brewery's waste water may contain organic components coming from the raw materials and a high level of acidity and alkalinity caused by detergents used in the cleaning process. The organic and inorganic contaminants can have unfavorable effects on the environment so that waste water needs to be treated before it is let into the open environment. The brewery's waste water should be monitored continuously, aiming on water efficiency improvement and waste water reduction. Water consumption depends on production so that the water's efficiency is calculated according to production levels. The implementation of cleaning process in the brewery's industry can reduce the pollution but can not eliminate it. The waste water requires appropriate treatment to reduce its pollutants according to the standards set by the government. The brewery's waste water is characterized

by low pH (about 6), moderately high COD, (from 1000mg/L to 5000mg/L) and significant concentration of dissolved solid materials (200mg/L to 400 mg/L). There is a relationship between the production output and the characteristics of waste water. Keywords: waste water, brewery, monitory, pollution.

Keywords: waste water, brewery, monitory, discharge

434 The Evaluation of Environmental Situation in the Operating Areas of the Oil Industry in Albania

Bujar Seiti 1, Dritan Topi 1, Spiro Drushku 2, Alketa Lame 1, Eduard Andoni 1

1 Department of Chemistry, Faculty of Natural Sciences, University of Tirana, Albania
2 Department of Chemical Engineering and Food Technology, Faculty of Natural Sciences, Abania

bujarseiti@yahoo.com

Among the Balkan countries Albania shows a high diversity for natural energetic sources. The intense use for some of them shows a high productivity. The geological structure of the area, geographical position, diversity of relief as well as presence of enormous hydrical systems, have brought to the combination of geological processes by guarantied formation of such raw materials, capable to shift on energetic sources. Based on the data production of crude oil in the past and the studies on the crude oil reserves, the future of this industry is promising. The prospective oil industry operation must have in focus the respecting of environmental guidelines and norms established by Environmental Protection Agency. The evaluation of environmental impact from the oil industry is the aim of that study. This study has analyzed the soil contamination of 1479 oil sludge pools with a combined area of 94.6ha. The environmental impact on soil is assessed as serious. And make an environmental risk and safety risk. The study on the surface waters indicates that nearly 117km of surface water features in the area along the Seman River to the coast are contaminated with oil. It is estimated that oil polluted sludge of 350,000m3 are present along these water courses. The Gjanica River is overpolluted with hydrocarbon concentrations of up to 16,000 µg/l and BTEX of up to 1,000 µg/l. Other streams and channels are also heavily polluted. The contamination has effects well beyond the area where the industry operates. The Groundwater quality in these locations is unaffected by the surface activities and meets WHO drinking water standards for the compounds analyzed. In these areas we also find groundwater used as potable water, which is polluted with petroleum hydrocarbons, i.e. benzene, all of which are below the WHO limits.

Keywords: environmental impact, Oil industry, soil contamination, surface waters, groundwater

278 Human Morbidity Induced by Contaminated Water

Anca Maria Moldoveanu

University of Medicine and Pharmacy «Carol Davila», Bucharest, Romania

anca.moldoveanu@gmanil.com

A lot of diseases can be transmitted through contaminated water when the water supply network of a town is damaged or the treatment and disinfection of the water are not correctly executed. In these situations, bacteriological, viral or parasitological diseases can result. This evaluation tries to present the situation of the morbidity through diseases like diarrhea, dysentery, typhoid fever or type A hepatitis in Romania using data starting from 1991. The highest incidence of diarrhea and type A hepatitis was registered in the year 2000, the highest incidence of dysentery was registered in 1993. For the typhoid fever the highest incidence was registered in 1991 and since 1994 there were zero cases in all regions. For Bucharest, the highest values of prevalence for common diarrhea and dysentery were found in 2002 and for type A hepatitis in the year 2000. The prevalence of typhoid fever was zero for Bucharest. All cases of illnesses transmitted by contaminated water had been registered in towns with populations up to 50 000 inhabitants. Several outbreaks had been registered during the investigated period. Outbreaks included diseases like diarrhea, dysentery, typhoid fever or type A hepatitis. A single epidemic outbreak of cholera, with 19 cases and 1 fatality, was registered, in 1993. The good quality, microbiological or chemical, of drinking water is of great importance to human health.

Keywords: water, infectious diseases, human health

435 The Toxic Evaluation of Pops in Edible Fishes from Ohrid Lake

Dritan Topi 1, Bujar Seiti 1, Eltjon Halimi 2

1 Department of Chemistry, Faculty of Natural Sciences, University of Tirana, Albania
2 Museum of Natural Sciences, Faculty of Natural Science, University of Tirana, Albania

topidr@yahoo.com

Persistent organic pollutants show serious hazard to both the environment and human health. Among them the polychlorobiphenyls (PCBs) are probable human carcinogens and can also pose non-cancer health hazard in nervous, immune and reproductive systems. The risks and hazards associated with POP residues in fish tissues are a function of the dioxine-like compound toxicity and

individual exposure. Fish consumption could become a serious problem due to the bioaccumulation phenomena as revealed in many scientific studies. We report data concerning the accumulation and pattern of hexachlorobenzene (HCB), p,p'-DDE and PCBs in edible tissues of freshwater fish species of Ohrid Lake: Ohrid trout Salmo letnica, belushka (belvica) Salmothimus ohridanus, carp Cyprinus carpio linnaeus, chub Leuciscus cephalus albus. The analyzed species are part of the human diet, hence to evaluate the toxic hazard for the inhabitants of surrounding area that have fishes part of their diet, were analyzed the 2,3,7,8-TCDD toxic equivalents (TEQ) and tolerable weekly intake (TWI). Analytical analyzes by GC-ECD revealed p,p'-DDE concentrations were 82.81 ± 0.76 and 82.81 ± 0.85 ng/g wet wt in Ohrid trout and belvica, respectively. While PCBs showed higher concentration and they were 94.01 ± 1.02 and 22.20 ± 0.67 ng/g wet wt in the muscle of Ohrid trout and belvica, respectively. The most abundant congeners were the most persistent PCB numbers 153, 138, 180, 118 and 170 which accounted for 41.4% of the total PCB residue in fish S.ohridanus and 47.4% in A.a.alborella. TEQs were 237 ng/g wet wt in Ohrid trout muscle and 325 ng/g wet wt in chub. The TWI weekly intake was calculated and values ranged 339pgTEQ/week when consuming of Ohrid trout fish and therefore lower than recommended TWI. Those values were higher (1358pgTEQ/week) than the recommended TWI, if 400 g of fish/week was consumed.

Keywords: Ohrid lake, edible fish, TEQ values, TWI values, PCBs, OCPs

272 Quality Control Methods ISO 9308 and ISO 7899 - 2 in Sanitary Microbiology in Center for Public Health - Bitola, Macedonia

Angela Delova 1, Vladimir Kakurinov 2, Olivera Jankova 1, Dijana Blazekovic 3, Vladimir Trajkovski 1

1 Center for public health, Bitola, Macedonia
2 Faculty of agriculture science and food, University "Sv. Kiril and Methodius", Skopje, Macedonia
3 Faculty of biotechnical sciences, University "Sv. Kliment Ohridski", Bitola, Macedonia

angela.delova@zzzbt.org.mk

Application of the standard ISO/IEC 17025 becomes imperative in ensuring system quality in laboratories. Among the other procedures required by this standard is the procedure for evaluation of vagueness in the microbiological laboratory testing. It defined procedures that are carried out in the introduction of new method, equipment or changing working conditions. Aim of this work is to display the vagueness in carrying out the measurements methods ISO 9308 (detection and counting the bacteria E. coli and coliforms with MF method and ISO 7899-2 (Detection and counting of intestinal enterococcus with MF method

in drinking water). The ISO method 9308 used bases: Lactose TTC Agar, Triptic soy Agar, DEV Tryptophan Broth, Oxydaza test and reference type E. coli ATCC 25922. The ISO 7899-2 method used bases: Slanetz and Bartley Agar, Bille Aesculine Agar and reference type Enterococcus faecalis ATCC 19433. As criteria for the verification method is selected the following parameters: 1. Quality control of bases which are used in the methods per stages with reference types; 2. Determination of method precision. In quantitative methods the precision is determined by the terms: standard deviation, relative standard deviation. For qualitative methods are defined other performance characteristics of accuracy (sensitivity, specificity), acordation, concordation. 10 samples of drinking water contaminated with reference type E. coli and 10 samples of water without the presence of bacteria (distilled water) were examined. Identical results were obtained between the two trials of the same sample in the same laboratory conditions as well as between laboratory comparisons. When enumerating colonies of E. coli (in 20 tests on packed samples), obtained values are within the available range ± 2 standard deviations (Shewart scheme) and the relative standard deviation 1,42% which indicates very little deviation from the average value. The same approach is shown for the method ISO 7899-2. Based on the results obtained from examinated parameters we noticed that with the methods described in our laboratory we obtain reliable results. ISO application methods used in daily routine examinations, does not exclude the need for constant application of internal quality control methods and the results obtained trials among laboratories. Standard ISO 17025 facilitates cooperation among laboratories in exchanging experience and harmonize standards and procedures.

Key words : quality control methods, drinking water,ISO 9308, ISO 7899

539 The Role of Hydrogeochemistry in Wetlands

Melis Somay, Unsal Gemici, Toygar Akar

Dokuz Eylul University, Tinaztepe Kampus, Buca-Izmir, Turkey

melis.somay@deu.edu.tr

Wetlands have increasing values for not only its ecological values, but also groundwater storage, groundwater treatment facilities. Especially, providing the fresh water, wetlands will become the alternative solution. For the WFD, wetlands are diverse, hydrologicallay complex, ecosystems, which tend to develop within a hydrological gradient going from terrestrial to mainly aquatic habitats. Balkan area that includes Turkey incorporates lots of valuable wetlands. Edremit-Dalyan coastal wetland that is located western part of Turkey were investigated by some hydrogeochemical tools as heavy metal concentrations. The hydrogeochemistry

play an important role to determine the surface and groundwater quality. According to analysis Al, B and Pb concentrations of the waters are exceeded the drinking water standards. Due to the mining activities, misapplication of the geothermal waters (Derman Geothermal Area) and disposal of the olive mill wastewater to the streams, Edremit-Dalyan coastal wetland is imperilment.

Keywords: wetlands, hydrogeochemistry

270 Physical Chemical Investigations of River Golema Water and its Influence on the Littoral of Asamati

Melika Semo-Zace, Momcula Jordanoski, Elizabeta Veljanoska-Sarafiloska

Hydrobiological Institute, Ohrid, Macedonia

melika_semo@yahoo.com

Second-largest lake in the Republic of Macedonia is the Lake Prespa . The total surface of the lake is 313,6 squared kilometers, 190km2 of which belong to the Republic of Macedonia, 84,8km2 to the Republic of Greece and 38,8km2 belong to the Republic of Albania. There is no surface connection between the Lake Prespa and Lake Ohrid, but the waters of Lake Prespa leaks to the Lake Ohrid through an underground flow. That is why the goal for prevention of the Lake Prespa is twofold, i.e. as a water ecosystem and as a source of water for the Lake Ohrid. There are no underwater sources registered in the Lake Prespa, and even if they do exist their influence is with no importance. This lake is usually supplied with water from surface inflows, the majority of which are located in the Macedonian part. The most important tributary to the lake is the inflow of water from the Golema River which is a valley river and flows from north. During the summer period the waters of this river are used for irrigation of the apple plantations - famous for the Prespa region. As a result in the lower flow of the river there is a minimal quantity of water - mainly communal and industrial waste water. The quality of the water of Golema River and the littoral zone Asamati, at the spot where the river water flows into the lake is going to be presented through physical and chemical parameters. The aim of this study is to present the quality of the water in the analyzed localities by tracking of the biochemical consumption of oxygen, the consumption of KMnO4 as well as the concentrations of the total nitrogen and total phosphorus. The samples are collected with seasonal dynamic in the period winter 2008 - spring 2009. For definition of the level of encumbrance of the water from the specific analyzed spots are used the OECD - regulations and the Regulation of Waters of the Republic of Macedonia.

Keywords: River Golema, nutrient encumbrance, anthropogenic influence.

439 The Level of Heavy Metals and Anthropogenic Pollution in Some Alternative Resources in the Area of Kastriot-Vushtrri-Drenas, Kosovo

Kimete Krasniqi 1, Islam Krasniqi 2, Majlinda Vasjari 3, Liria Sefaja 4, Aferdita Zuka 4

1 National Institute of Public Health, Pristina, Kosovo
2 FNST, Pristina, Kosovo
3 FNST, Tirana, Albania
4 NIPH, Pristina, Kosovo

kimete46@gmail.com

In this study were treated three alternative water sources in the area Kastriot-Vushtrri- Drenas, urgent be used in cases without prior treatment. Determined the levels of heavy metals(chemical-technological processes in the foundry «Feronikel» in Drenas and foundry «Trepca» in Mitrovica). The survey was conducted in two season's spring - summer of the year 2008-2009. During these research resources are applied methods APHA, Standard Methods for the examination of water and wastewater, «20» Edition, using SAA for metals Fe, Zn, Mn,Ni,Cd,Cu,Cr- exceed AVA(The average value allowed) by WHO that, while excess the average values for the drinking water we have: Pb (0,0172, 0.035,0.0514 and 0.0342mg / L,ppm) in all water resources alternative investigate. Higher value for Pb described the pollution and geological phonic.

Keywords: anthropogenic, alternative, heavy metals, atomic absorption spectroscopy, geological phonic

443 Distinctive Features of Distribution of Polychlorinated Biphenyls (Pcbs) in Freshwater Reservoirs

Grigorii Chuiko 1, Alexei Morozov 1, Vera Podgornaya 1, Efim Brodsky 2, Viktor Zakonnov 1

1 Institute for Biology of Inland Waters Russian Academy of Sciences (IBIW RAS), Russia
2 A.N. Severtsov Institute of Ecology and Evolution Russian Academy of Sciences (IEE RAS), Russia

gko@ibiw.yaroslavl.ru

Polychlorinated biphenyls (PCBs) are one of the abundant groups of environmental contaminants. Their persistent nature along with volatility has lead to global distribution of PCBs through atmospheric transport. There are local sources of

PCBs contamination too. Owing to their lipophilic character and stability, PCBs can entry freshwater bodies and accumulate in bottom sediment and biota, and cause adverse effects. Therefore the study of distinctive features of distribution of PCBs in freshwater reservoir is one of the important goals their monitoring in aquatic environment.

Keywords: PCBs, bottom sediments, benthic invertebrates, fish, freshwater reservoir

444 Modeling Leachate Contamination of a Wetland and Groundwater

Mohan S.

Indian Institute of Technology Madras, Chennai, India

smohan@iitm.ac.in

Solid municipal waste is one of the most pressing forms of pollution that society has created. The most prevalent form of disposal of solid waste in developing countries is the open dumping of wastes on the land, mostly the low lying lands. Unfortunately, these open dumping of solid wastes are not an ideal solution to the disposal problem of solid waste. The leachate can contaminate groundwater resources in the immediate vicinity of the dumpsite through the overland flow on the nearby water bodies or the underlying groundwater by diffusive transport or direct infiltration through the underlying soil strata. Leachate contamination of a wetland and subsequently an aquifer from an open dumping site was simulated using a groundwater flow and transport model. The model calibration was performed by spatially adjusting the hydraulic conductivity in order to capture the measured hydraulic head spatial variation and then by adjusting the dispersivity and porosity match the measured chloride plume. Based on the simulations it was found that without remedial action the contaminants in the existing leachate plume would remain above acceptable regulatory concentration levels for longer than 2020. The chloride, lead and other pollutants loading of an adjacent wetland exceed acceptable levels. Simulations indicate that a pump-and-treat system using purge wells could remediate the leachate contamination in the wetland within approximately 10 years from now.

Keywords: chloride and heavy metal loading, wetland Pollution modeling, Groundwater, leachate contamination, remediation

447 Applications of Various Diversity Indices to Benthic Macroinvertebrate Assemblages in Streams in a National Park in Turkey

Gencer Turkmen, Nilgun Kazanci

Hacettepe University, Turkey

gencerturkmen@gmail.com

The present work aims to find which benthic macroinvertebrate based-diversity indices can be used more effectively in undisturbed streams in a national park and to determine their correlations between number of species, individuals and between these indices. Samples were collected at 10 sites in Yedigcller National Park in June 2007. Benthic macroinvertebrate taxa were identified to species, genus and family levels. The benthic macroinvertebrate samples consisted of 137 taxa and 14184 individuals belonging to nine classes which were Turbellaria, Gastropoda, Bivalvia, Hirudinea, Gordioida, Arachnida, Malacostrata, Entognatha and Insecta. Species composition and quantitative characteristics of the benthic macroinvertebrates have been assessed by using Shannon Diversity Index, Simpson Diversity Index, Margalef Diversity Index and McIntosh Diversity Index and two evenness indices, which were Pielou Evenness Index and McIntosh Evenness Index. The water quality of these collecting sites and reference habitat conditions were determined by using benthic macroinvertebrate species and physico-chemical variables. As a result of this study, we found that each diversity indices had their own different purposes and it is not possible to determine which one has an effective usage in this kind of studies because each diversity indices based on different variables such as number of species, number of individuals etc. Margalef Diversity Index had the highest correlation (0.97) between number of species and individuals. McIntosh Diversity Index and Simpson Diversity Index had the highest correlation (0.81) in these diversity indices.

Keywords: benthic macroinvertebrate, diversity index, evenness index, national park, reference habitat conditions, Turkey, Yedigcller.

448 Assessment of Water Quality of Kelkit Stream (Turkey) with Application of Various Macroinvertebrate-Based Metrics

Nilgun Kazanci, Gencer Turkmen

Hacettepe University, Turkey

nilgunkazanci@gmail.com

Kelkit Stream is an important running water in the eastern Turkey and is one of the main tributary of Yesilirmak River. Important pollution sources of the stream are industries, sewage from urban areas and agricultural runoff . A survey of

benthic macroinvertebrates has been carried out in Kelkit Stream in July 2008. Benthic macroinvertebrate samples were collected at nine sites along the Stream. Various macro invertebrate-based metrics were used to assess water quality of Kelkit Stream. These metrics were Biological Monitoring Working Party, Average Score Per Taxon, Belgian Biotic Index, proportion of the community preferring a biocoenotical region, proportion of feeding types. According to results of this study, the polluted sites were concentrated in lower part of stream. Physical degradation of habitats and impact of dams are also a serious threat to water quality of Kelkit Stream.

Keywords: Kelkit Stream, Turkey, macroinvertebrates, indices, metrics, water quality

480 The Threatened and Rare Plant Species of the Lake Shkodra - Buna Delta Hydrological System

Marash Rakaj 1, Lefter Kashta 2

1 Department of Biology-chemistry, University of Shkodra, Albania
2 University of Tirana, Albania

marashrakaj@yahoo.com

The wetland ecosystem of Lake Shkodra - Buna Delta constitutes a habitat complex favorable for the development of high floristic diversity. Different ecologic forms of plants are evidenced in that region, included alluvial forests, hydrophytes, hygrophytes, halophytes, geophytes, psammo-halophytes and psammophytes etc. Based on number of threaten species, richness flora and threatened habitats both sites, Lake Shkodra and Buna Delta in Albanian IPAs (Important Plant Areas) were included. The flora of this region is characterised by a high number of the threatened and rare species as well as isolated endemic species. Eight globally and European threatened species and nine Balkan or local endemic species are evidenced. In the recent Red List of Albanian Flora (1995, 1997, 2007) of 330 species, 128 of them from Shkodra district are included, of which 28 species growing in the wetland ecosystem of the Lake Shkodra - Buna Delta. In this paper a list accompanied by their status and distribution of 28 threatened, rare and endemic plant species: 18 hydrophytes and hygrophytes, 5 geophytes, 4 trees and shrubs and 1 psamophytes, according to IUCN categories (1998) is given. Three species belong to ferns and 25 species belong to Angiosperms. All investigated species are mapped on 10 x 10 sq. km and shown in a UTM grid system.

Keywords: Threatened species, Rare species, hydrophytes, Wetland, Lake Shkodra, Buna/Bojana Delta

450 Uranium and Radium in Water Samples Around an Industrial Heap in Serbia

Dragica Kisic 1, Sanja Radanovic 2, Giancarlo Ciotoli 3, Jerzy Mietelski 4, Jugoslav Nikolic 4

1 Thermopowerplant, Serbia
2 Economic Association for Coal and Energy Production, Serbia
3 Department of Earth Sciences, University of Roma La Sapienza, Italy
4 The Henryk Niewodniczanski Institute of Nuclear Physics, Poland
5 Republic Hydro-metereological Institute of Serbia, Serbia

dragicakisic@tent.rs

The primary environmental concern associated with disposal field site containing radionuclides is the potential groundwater contamination. Hydrochemical data of waters from wells and springs collected during the field survey over thermopowerplant -Nikola Tesla -B (TENT B) in Serbia highlight high mineralisation (i.e. 1200mg/l) and a high content of SO42- (up to 450 mg/l) and Cl- (up to 70 mg/l) contributing to the hypothesis of a potential pollution from the fly ash deposit. The TENT B area is located on the bank of the Sava river, near the Obrenovac village, about 40 km upstream from the Belgrade city (Serbia). This plant is producing about 4.5-109 kg of coal-ash per year. Ash is transported to the dump after being suspended in the water taken from the Sava river, in the approximate ratio 1:10. The dump of the power plant «Nikola Tesla B» has an area of about 6 km2. and is 4.5 km far from termopowerplant. The paper deals with the analysis of radionuclide content in 29 samples of water, which were collected in the vicinity of TENT B. All samples were analyzed for 226Ra and uranium isotopes (238U, 234U) activity using radiochemical methods (LSC) followed by alpha spectrometry. Both results of alpha spectrometric measurements for 226Ra and results of additional 226Ra measurements by LSC show that there is no correlation observed between activity of radium and uranium isotopes. In general, activities for U and radium in water around TENT B are low when compared to those from area with enhanced natural U and Ra content.

Keywords: Uranium, Radium, Water, Thermopowerplant, Industrial Dump

481 Oligochaeta of River Bregalnica from the Source Region to the Dam Kalimanci

Valentina Slavevska Stamenkovic 1, Momir Paunovic 2, Ana Atanackovic 2, Stoe Smiljkov 1, Vasil Kostov 3, Danijela Mitic Kopanja 1

1 Faculty of Natural Science and Mathematics, Institute of Biology,Skopje, Macedonia
2 Institute for Biological Research, Belgrade, Serbia
3Institute of Animal Science - Fisheries Department, Macedonia

vstamen@yahoo.com

Within the investigation of aquatic macroinvertebrates of the Bregalnica River, oligochaetes (Annelida: Oligochaeta) were studied. Oligochaeta represents one of the principal components of the macroinvertebrate community of running waters, in regard to species richness and abundance. Further, selected representatives of this group of organisms are suitable indicator organisms for ecological status evaluation of aquatic ecosystems. The aim of this work is to present preliminary list of Oligochaeta of the River Bregalnica, from the source region to the dam Kalimaci and to evaluate the impact of environmental factors on the composition and structure of the community. Investigation was performed from September 2007 until June 2008 at six sampling sites. A total of 29 Oligochaeta species were identified, belonging to the seven families. Among them, Naididae (10) and Tubificidae (8) were found to be the most diversified. The work comprises the discussion on the habitat specialization and biogeography of identified taxa. According to available data from previous investigations, 21 species have been reported for the Bregalnica River up to now, thus our investigation represents the contribution to the knowledge on Oligochaeta fauna of the region, as well as contribution to the development of the system of ecological status evaluation in the Republic of Macedonia.

Keywords: ologochaeta fauna, river ecosystems, zoogeographical distribution

451 Assessment f Structural Components of Riparian Forest Vegetation of the Prespa Basin with the Means of the QBR Index

Yannis Kazoglou 1, George Fotiadis 2, Irene Koutseri 1, Michael Vrahnakis 3

1 Society for the protection of Prespa, Greece
2 School of Forestry and Management of Natural Environment, Technological Educational Institute of Kavala, Greece
3 School of Forestry and Management of Natural Environment, Technological Educational Institute of Larisa, Greece

y.kazoglou@spp.gr

The QBR index («Qualitat del Bosc de Ribera» or «Riparian Forest Quality») is a tool for field assessment of the habitat quality of riparian forests, often combined with the Riparian Macrophyte Protocol (RMP) to assess the structural (QBR-determined) and functional (RMP-determined) attributes of forest vegetation. The usefulness of the QBR index lays on its simplicity-to-apply, and its relatively low time-consuming application. Despite its fast-working mode in the field, the QBR index is of full scientific background, effectively recording both forest vegetation cover and river channel alterations. In this way, the most significant biotic and abiotic structural macro-components of rivers are assessed. Although originally designed for Mediterranean rivers, slight modifications adjusted to local conditions are allowed to evenly assess and monitor major hydrological basins characterized by a network of water courses - like the case of the Prespa basin. The aim of the present study was to qualitatively assess the structural components of forest riparian vegetation along the banks of Agios Germanos river, Brajcinska river, Kranska river, and Leva Reka stream, that outflow to Macro Prespa Lake, by using the QBR index. Sampling took place in July/September 2009. In order to fulfil the requirements for conservation measures proposed by the Prespa Trout Action Plan (Crivelli et al. 2008), and to potentially combine forest vegetation quality data with Prespa Trout (Salmo peristericus Kamaran 1938) population data, the index was applied in the fish sampling stations set by the relevant monitoring programme since 1998/2006, while additional assessment stations were set along the rivers, to apply a sampling design more systematic and homogenous in terms of spatial intervals. A total of 63 assessment stations were sampled; 26 in Brajcinska river, 20 in Agios Germanos, 11 in Kranska river, and 6 in Leva Reka stream. Data processing and analysis is ongoing.

Keywords: riparian forest quality, habitat assessment method, Prespa rivers and streams, Prespa Trout conservation

452 Antioxidant System in the Liver of Bream (Abramis Brama L.) from the Rybinsk Reservoir as Bioindicator of Environmental Pollution With Polychlorinated Biphenyls

Alexei Morozov 1, Grigorii Chuiko 1, Vera Podgornaya 1, Efim Brodsky 2

1 Institute for Biology of Inland Waters Russians Academy of Sciences (IBIW RAS), Russia
2 Severtsov Institute of Ecology and Evolution Russian Academy of Sciences (IEE RAS), Russia

morozov@ibiw.yaroslavl.ru

One of the priority groups of aquatic pollutants are polychlorinated biphenyls (PCBs). They can accumulate in fish tissues, staying there for a long time and affecting the most important physiological and biochemical processes in organism. Antioxidant system (AOS) protects cells against adverse action of reactive oxygen species (ROS). Parameters of AOS are changed in response to action of the different environmental factors including pollution. The parameters fish AOS should be as biomarkers of exposure to environmental pollutants. Therefore it is important to compare the AOS characteristics in fish from the locations with differences in PCBs contamination. The study was carried out on a bream (Abramis brama L.) caught by trawl in July 2008 at two reaches of Rybinsk reservoir (northwestern European Russia; 58°30'N, 38°30' E) which have different level of PCBs contamination. The biochemical parameters of AOS, and total PCBs and their congener's contents were determined in fish liver. The PCBs was analyzed with chromatomasspectrometry method. The following product of lipid peroxidation and AOS parameters were measured with colorimetric methods: contents of malondialdehyde (MDA), reduced glutathione (GSH) and total protein, and enzyme activities of glutathione-s-transferase (GST, EC 2.5.1.18), superoxide dismutase (SOD, EC 1.15.1.1), and catalase (EC 1.11.1.6). It is shown the total PCBs and individual congener's contents in the bream liver caught in more contaminated reach (site 1) are much higher in comparison with fish from less contaminated reach (site 2). At the same time fish liver from sampling site 1 has higher MDA content and lower level of GSH and enzyme activities of GST, catalase and SOD. The studied biochemical parameters are well correlated with liver PCBs content. Thus, the parameters of AOS and PLP in fish liver can be indicator of aquatic environment pollution with PCBs. This work was supported by RFBR grant # 08-05-00805.

Keywords: PCBs, freshwater ecosystem, fish liver, antioxidant system, biomarker

453 State of Water Quality of Thana Reservoir and its Influence on Irrigated Soils

Adrian Doko 1, Evan Rroco 2

1 ATTC Fushe Kruja, Albania
2 AUT, Albania

adriandoko@hotmail.com

Thana reservoir is the biggest artificial bilded up in Albania which is used for irrigation in agriculture. Its water is used to irrigate the most fertile land in Albania the «Myzeqe Plain». Water analysis to asses the pollution of the waters are conducted in during the period from 2005 to 2008. At the same time soil analysis of the agriculture land which are irrigated from Thana reservoir waters are performed. From the water analysis it was found that Sodium concentration was with 111,8 m.e./l up to 2,5 times higher than the higher limits permitted for irrigation waters. At the same time values over the permitted limits magnesium phosphates and potassium were registered. Soil analysis resulted in increased values of sodium during the time of the survey. At the same time the amount of exchangeable magnesium in the soil was more than doubled. The cropping systems during the time of the survey were also taken into consideration to judge if changes of phosphorus (slight decrease) and potassium (sharp increase) in the soil were due to irrigation ore due to soil management factors.

Keywords: Water quality, irrigation, soil

454 Assessment of Functional Components of Riparian Forest Vegetation of the Prespa Basin with the Means of the Modified Rmp Protocol

George Fotiadis 1, Yannis Kazoglou 2, Irene Koutseri 2, George Efthimiou 3, Michael Vrahnakis 3

1 School of Forestry and Management of Natural Environment, Technological Educational Institute of Kavala, Greece
2 Society for the protection of Prespa, Greece
3 School of Forestry and Management of Natural Environment, Technological Educational Institute of Larisa, Greece

gfotiad@for.auth.gr

The Riparian Macrophyte Protocol (RMP) is a valuable tool to inventory forests growing along river banks. It was originally designed in the framework of the STAR project which supported the 2000/60 EU Water Framework Directive. The protocol

was first applied in 2004 in Portuguese rivers, while in 2005-6 it was modified by the Institute of Inland Waters of the Hellenic Centre for Marine Research. The RMP is often applied in combination with other fast-working protocols that assess the quality of riparian forest vegetation (e.g. the QBR index), and acts complementally to the latter since it focuses on floristic composition. The aim of the present study was to determine, by applying the RMP, the components of forest riparian vegetation along the banks of Agios Germanos river (14.5km), Brajcinska river (15.8km), Kranska river (11.1km), and Leva Reka stream (9.4km) that outflow to Macro Prespa Lake. In order to enhance its interpretative ability, the protocol was further modified to offer insights to macrophyte functional groups, and the «components» of the uncovered by vegetation ground. The protocol was applied during field surveys conducted in July/September 2009. In order to fulfil the requirements of conservation actions proposed by the Prespa Trout Action Plan (Crivelli et al. 2008), and to potentially combine forest vegetation quality data with Prespa Trout (Salmo peristericus Kamaran 1938) population data, the protocol was applied in the fish sampling stations set by the relevant long-term monitoring programme since 1998/2006; additional assessment stations were set along the river courses, in order to apply a sampling design more systematic and homogenous in terms of spatial intervals. A total of 63 assessment stations were set; 26 in Brajcinska river, 20 in Agios Germanos, 11 in Kranska river, and 6 in Leva Reka stream. Data processing and analysis is ongoing.

Keywords: Riparian forest composition, macrophyte functional groups, Prespa rivers and streams, Prespa Trout conservation

455 Environmental Pollution of the Saranda City in Albania

Atoneta Polo 1, Evis Kushi 2, Enkela Caca 1, Etleva Peta 1

1 Department of Economy, Gjirokaster University, Albania
2 Department of Business Administration, Elbasan University, Albania

neta_polo@yahoo.com

After the fall of communism in 1990, many cities in Albania have been characterised by significant economic and social developments, which have influenced the environment situation. Recently, environmental pollution represents a major problem for these cities. Therefore, the main aim of this paper is to identify the main problems regarding the environmental pollution in Saranda, which is one of the main tourist destinations in Albania. The analysis indicates that some of these problems include: the overpopulation of the Saranda city within a short period of time; the insufficiency of the drinking water and the limitations of the sweage system, etc. More specifically, a new phenomenon of coastal urban development

is the internal migration, where many people from the north of the country have moved to the coastal regions. The currently fast urbanisation process is certainly having adverse effects on the natural resources and the environment around the coastal areas because in most cases it is not accompanied by planned housing development or the construction of appropriate infrastructure and services. Regrading the water supply, although constantly growing, it cannot provide good quality with the rising domestic demand as a result of improved living standards, the increased use of electrical equipment, and improved sanitary conditions and sewerage systems. In addition, as for all Albanian cities, currently, there is no wastewater treatment facility in Saranda. This is important for the urbanised areas in the coastal zone and particularly the newly built areas close to the beach, which have recently become overpopulated as a result of uncontrolled migration and illegal constructions. Finally, this paper provides some recommendations for the improvement of the environmental situation of Saranda city.

Keywords: environment, pollution, water supply, sewage system, Saranda

468 The Effects of Ultrasonic Power on the Disintegration of Waste Activated Sludge

Serkan Sahinkaya, Mehmet Faik Sevimli

Selcuk University, Department of Environmental Engineering, Turkey

sahinkaya@selcuk.edu.tr

Sonication is a new method for the disintegration of waste activated sludges (WAS), before digestion. During sonication, ultrasound (US) produces mechanical shear forces which disrupt the sludge flocs and the cells of sludge bacteria and release the extracellular and intracellular organic and inorganic components into aqueous phase of WAS. Thus, it can increase the effectiveness of the sludge digestion by shortening the hydrolysis phase which is the rate limiting step in aerobic and anaerobic sludge digestion. We investigated the effect of the US power density and sonication time on sludge disintegration. The WAS was supplied from Basarakavak domestic wastewater treatment plant, in Konya. The sludge sample was taken from the return activated sludge line connecting the clarifier to the aeration tank. Before ultrasonic treatment, pH, total chemical oxidation demand (COD), soluble COD, total suspensed solids (TSS), total solids (TS) and volatile solids (VS) were measured. All US experiments have been carried out in a batch reactor. US frequency was fixed at 20 kHz. Different US irradiation time lengths (1 - 30 minutes) were applied with fixed US frequency and different US densities at 0,50 and 0,75 w/ml. The immersion depths of US probe

was 2 cm. The temperature was not controlled throughout the experiments. After US disintegration, soluble COD and temperature were measured. The specific energy (Es) and the disintegration degree (DD) were determined. After US application, an increase in the soluble COD from 270 mg/l to about 4200 mg/l was achieved. Soluble COD concentrations at 0,50 and 0,75 w/ml US density were 755 and 1160 mg/l for the aplication time of 1 minute and 4000 and 4210 mg/l for 30 minutes, respectively. The increases in the duration and the power density of US application resulted in an increase in the soluble COD.

Keywords: activated sludge, sludge disintegration, sonication

460 Some Biological Properties of the Populations of Two Cyprinid Fishes Living in Shkodra Lake

Valbona Kolaneci 1, Celnike Shegani 2, Mariana Nikolla 1, Bledar Kuka 1

1 Agricultural University of Tirana, Albania
2 Fish Hatchery Station, Lin, Pogradec, Albania

valbona_kolaneci@yahoo.com

The present study quantitatively describes some biological characteristics such as age composition, growth and mortality rates of carp (Cyprinus carpio carpio, Linnaeus, 1758) and bleak (Alburnus alburnus alborella, de Filippi, 1844) population in Shkodra Lake. The samplings were made by catch from the local commercial fishery. The total length data were composed together as a single time collection and grouped into length classes. The length-frequency data were used for estimating the von Bertalanffy growth parameters and mortality. The population growth curve was estimated from the relative position of the modes in a single length frequency sample. The von Bertalanffy growth parameters were estimated as K=0.31 yr-1; L8=101.3 cm; t0=-0.04 yr and K=0.52 yr-1; L8=20.0 cm; t0=-0.03 yr. Based on the growth and mortality data of carp and bleak populations, some considerations on reduction of fishing effort are presented in order to conserve biodiversity and to exploit the species in a more sustainable manner.

Keywords: carp, bleak, growth parameters, mortality

462 Chemical Characterization of the Prokosko Lake's Sediments

Esma Velagic Habul 1, Enisa Omanovic Miklicanin 1, Josip Jurkovic 1, Walter Dorfler 2

1 Faculty of Agriculture and Food Sciences, Bosnia and Herzegovina
2 Institut fur Ur-u.Fruhjeschuhte University of Kiel, Germany

esma.velagic.habul@gmail.com

The glacial lake Prokosko is situated at the mountain Vranica, Central Bosnia, on 1630m a.s.l. It is surrounded by shepherds' huts, many still used today as they have been for centuries, to house shepherds and their flocks during summer period. Today it is attracting public and tourists that have negative impact to its very sensitive biodiversity and accelerates its eutrophication. Some microbiological and chemical water analysis has been done but never any analysis of sediments. The sediments coring had been undertaken in summer 2007 aimed at getting some inside to the geology and chemistry of the lake. The alumina platform had been constructed on the spot, founded as the deepest one (11,7m), by sonar investigation. The coring was performed up to the geological basis 23,7m deep, resulting in cores of some 12 m long. The first cores investigations were made on spot (color, photos), after properly marked, packed and transported to the lab. In the lab the cores had been divided in 95 samples, in accordance to the color and visible layers distribution. The samples were weighed, dried (determination of water content) and subjected to the elemental analysis by AAS, after aqua regia digestion.

Keywords: sediment, AAS, aqua regia digestion, mountain lake

472 Macrozoobenthos Investigation in Springs and Streams of Mountain Avala (Belgrade, Serbia)

Katarina Bjelanovic 1, Dalibor Stojanovic 1, Jelena Djuknic 1, Zoran Markovic 2, Ivana Zivic 3

1 BID Faculty of Biology, Serbia
2 Faculty of Agriculture, Serbia
3 Faculty of Biology, Serbia

k.bjelanovic@gmail.com

A research on macrozoobenthos of springs and streams of Mt. Avala near Belgrade, Serbia was carried out from October 2006 to November 2007. The aim of this study was to determine the presence of distinct macroinvertebrate

groups in small aquatic ecosystems and define the quality of water using these organisms as bioindicators. The mountain Avala, located in the vicinity of Belgrade, is intersected by first-order streams. These waters are either collected by the Topciderska river, finally joining the river Sava, or by the Zavojnicka river, joining the Danube. The fauna samples from three streambed bottoms were taken by qualitative methods during different seasons. The sites were the Sakinac stream, the Ladne Vode stream and the Vranovac stream, along with their springs, plus the Kamenac spring. The seasonal dynamics of macroinvertebrates were monitored in the Sakinac stream. Five to six sampling sites were chosen along each stream considering various ecological factors. A total of 39 taxons from 17 taxonomic groups were detected in all aquatic sites. The most varied groups were among the insect orders. A significant number of individuals was collected from the orders Trichoptera (Insecta) and Amphipoda (Crustacea), while the maximal diversity (though with a small number of collected individuals) was noticed in the Diptera (Insecta). In all of the analyzed stream's springs, the dominant form was the Gammarus balcanicus. The presence of Helicopsyche bacescui (Trichoptera) species was interesting, since its distribution in Serbia is discontinuous. The quality of water was assessed using the Puntle-Buck method and the Trent biotic index. The saprobiotical index values indicate the Я-mesosaprobiotical water type along the streams. The values of the Trent biotic index are mainly in correlation with the saprobiotical index values, indicating class II water quality.

Keywords: macrozoobenthos, Mt. Avala, Gammarus balcanicus, Helicopsyche bacescui, saprobiological analysis

466 The Influence of Ecological Factors Like Rainfall, Temperature, Moisture for Evaluating the Millipede Population in the Southern Region of Albania

Hajdar Kicaj 1, Mihallaq Qirjo 2

1 Universiteti i Vlores, Albania
2 Universiteti i Tiranes, Albnia

hkicaj@univlora.edu.al

Object of this study is the use of some ecological indicators used for assessing populations of diplopoda in the Southern Part of Albania. It is also studying the impact of climatic data in their distribution. Climate data are collected for several years in three main areas of study, Vlore, Gjirokaster, Sarande. Although the proliferation of diplopoda fauna depends on a combination of several factors as temperature, humidity, soil type, vegetation, etc. ecological indicators such as

frequency, constant and statistical processing of the data collected have a role as explain how ecological factors influence the spread these populations. In this article reported statistical data for three serious orders of class diplopoda in the study area (the Southern Part of Albania).

Keywords: Ecological factors, statistical marks, millipedes, diplopoda, julida, species, geographical spreading, gathering station

469 Ecological Survey of Macroinvertebrate Communities in the Vrelska Padinaand the Ivan-Tica Rivers (Eastern Serbia)

Jelena Djuknic 1, Katarina Bjelanovic 1, Alenka Durutovic, Vladimir Jovanovic 2

1 BID Faculty of Biology, Serbia
2 Petnica Science Center, Serbia

picolomedino@yahoo.com

The Vrelska padina and The Ivan?tica Rivers are located in Eastern Serbia, on the boundary of two European hydroecoregions (Dinaric Western Balkan and Eastern Balkan). The aim of this study was the survey of the distribution and diversity of macrozoobenthos in these rivers along their longitudinal gradients. During the period August 2008 - July 2009 the samples were collected from 14 study sites using Surber net, forceps and D-frame. The sites were chosen with respect to environmental factors: river position, bottom structure, river depth and width, flow velocity, water temperature, pH and conductivity. For each site ecological analysis of community structure was conducted and a-diversity indices of communities were calculated. Я-diversity was analysed along river course. The bottom fauna in studied rivers was composed of 21 groups of macroinvertebrates, which were unevenly distributed and abundant. Gammarus species and gastropods were omnipresent in both rivers. The most diverse groups, both taxonomically and ecologically, were larvae of the insect orders Trichoptera, Ephemeroptera and Diptera. Interesting patterns were found in The Ivanctica River in the distribution of some species of Ephemeroptera, as well as in the structure of spring bottom fauna (genus Eristalis indicated high level of organic pollution). Patterns of ecological and diversity differences between rivers are also discussed. Both rivers were found to be commonly Я-mesosaprobic.

Keywords: Eastern Serbia, macrozoobenthos, community structure, diversity

470 Influence of Pirot's Communal Waste Water on Water Quality of River Nisava

Dragoljub Miljojkovic 1, Slobodan Milenkovic 2, Djordje Djordjevic 2

1 Public water company, Serbia
2 Civil and Architectural Engineering, Serbia

dragoljub.miljojkovic@srbijavode.rs

The paper gives a number of inhabitants in the municipality of Pirot, which are grouped by size of the settlement. It is also given a review of existing industrial buildings and their functional status, as well as an overview of built sewerage and collecting systems of the settlements and in total. The total production of waste water treatment, load from it and the impact on the quality of river Nisava is calculated. Communal waste water of town Pirot is a great source of point pollution of river Nisava. In order to achieve environmental objectives of the Water Framework Directive, it is necessary to build the plant for the communal waste water treatment in Pirot. It is also recommended to build plant in Temska and Stanicenje.

Keywords: communal waste water, source of point pollution, environmental objectives, Water Framework Directive

473 Genetic Variation in Populations of Bosmina Crassicornis of Some Lakes in Latvia

Natalja Skute, Aija Brakovska

Institute of Ecology of Daugavpils University, Latvia

natalja.skute@du.lv

Cladocera is of great importance in aquatic food chains. Several aspects of their biology, population genetic have been studied. During the analysis of samples from investigated lakes in Latvia, which were take in 2007 and 2008 years aproximatelyn15-20 species were determined in Cladocera groups. In all localities of the sampling Daphnia coculate and Bosmina crassicornis were domined species in Cladocera group. The cosmopolitan cladoceran genus Bosmina is regarded as being taxonomically complex and mush of the difficult are due to phenotipical variability in morphological characters. In Bosmina species the reason for changes are less clean. Previous taxonomic studies on Bosmina species from some Latvian lakes has been based on morphological characters

alone. RAPD (Random Amplified Polymorphic DNA) have been applied to identify genetic measures linked to certain phenotype. The amplification products are separated by size electrophoretically on a gel where the presence/absence of a band of a specific molecular weight is used to assay genetic variation within and between species/populations. A genetic variation and structure of some Bosmina population from some lakes in Latvia were investigated. The genetic polymorphism and structure of this Bosmina population were evaluated in the work. RAPD revealed genetic difference among the tested individuals, suggesting several clones in studied populations.

Keywords: Cladocera, RAPD, genetic variation

484 Geochemical Tracers of Marine Influence in the Lower Yenisey and Pechora Landscapes

Elena Korobova 1, Natalia Ukraintseva 2, Vitaly Surkov 3

1 V.I. Vernadsky Institute of Geochemistry and Analytical Chemistry, Rus. Ac. of Sci. Russia
2 Institute of the Cryosphere of the Earth, Siberian Branch of the Rus. Ac. of Sci.Russia
3 M.V. Lomonosov Moscow State University Russia

Korobova@geokhi.ru

The main goal of the study was to reveal trends in cDetermination hemical elements' distribution in the arctic landscapes formed in the zones of the marine and river interaction. The selected study sites were located at different distance from the marine basin and characterized the flood plain and watershed areas of the lower reaches of the Yenisey (from Ust'Port to Cape Shaitansky) and Pechora (from Bol'shaya Sopka to Cape Bolvansky) rivers. Each site was characterized by 3 to 5 plots corresponding to different geomorphological position reflecting various hydrological regimes. Concentration of chemical elements in soil and the dominating plant species were determined with the help of XRF spectrometer ORTEC TEFA by S.E. Sorokin and A.T. Savichev. Standard chemical procedures were performed by R.G. Grishina to evaluate concentration of the major ions in ground and surface water samples and water extraction from the soil samples. error did not exceed 7%. Performed study revealed distinct seaward increase of chlorine and bromine in water, soil and plant (willow, horsetail species) samples and a considerably higher chlorine content in landscapes of the gulfs (Capes Shaitansky and Bolvansky). On the contrary, the (Ca»+Mg»)/(Na'+K') ratio in the soil water extraction increased with the remoteness from the marine basin and was remarkably higher in the upper estuary soil profiles. Soils and plants of the landscapes formed on the slopes with outcropping marine sediments were

pronouncedly enriched in chlorine and sodium or magnesium. Peculiarities of the hydrological regime was followed in accumulation of trace elements in soil profiles of the flood plain landscapes. The Yenisey study was performed in the framework of the INCO-Copernicus project ESTABLISH. The Pechora investigation was supported by the Department of the Earth Sciences, RAS. It is now continued under its Program 13 «Evolution of cryosphere under climatic change».

Keywords: landscape geochemistry, chlorine, marine impact, estuary

488 Hydrodynamics Modifications and the Functionalities of Ecosystems in the Lower Danube Corridor - the Sector Between Jiu and Olt River

Gheorghe Clota 1, Maria Patroescu 2, Ionut Eustatiu Marinescu 3

1. University of Bucharest, Doctoral School «Simion Mehedinti - Nature and durable development», Romania
2. University of Bucharest, «Centre for Environmental Research and Impact Studies», Romania
3. University of Craiova, Department of Geography, Romania

This study represent a short analysis of what means nowadays the concept of an ecological corridor related to the channel morphology and the ecosystems functionalities.

The Lower Danube Corridor represents a study case for how during this century all the hydrodynamics modifications altered the function of the main wet land and forest ecosystems between the sector Jiu and Olt confluences.

This assessment involves aspects related to alteration of natural flow dynamics, alteration of sediment balance and the impact upon the functionality of wet land ecosystems in this area.

Keywords: Hydrodynamics modifications, Lower Danube Corridor, ecosystem functionality

501 Implementation of the Eco-Hydrological Relationships in the Calculus Engineering of Hydrology

Codruta Badaluta Minda, Gheorghe Cretu

Politehnica University, Faculty of Hydrotechnical, Romania

badaluta_minda@yahoo.com

Beside the energy ecosystems are influenced by the water and the nutrients. At the same time the water and the nutrients are strongly influenced by the ecosystems of the upstream. The water resources at the scale of the drainage basin aren't only the result of the climatic conditions and the geomorphologic structures, but also of the biologic evolution and the successions that taking place in the system. As the ecology and hydrology are hard influenced one another, at the level of the biotic structures is necessary as the both field of the sciences to exist another approach (in which discoveries of the each field to contribute to the constitutive base of the other domain knowledge). In the paperwork are development some concepts based on the functional relationships between the hydrology and biota. It is noted in the paper the absorption potential of the ecosystems including the wetlands, the fighting the process of the eutrophication and the nutrients flux, the effect of the vegetation cover. In the last part of the paperwork are present some the case studies regarding the application of the eco-hydrological concepts in the study of the hydrology/water management (the rehabilitation of the reservoirs, the level fluctuations effects of accumulations on the dynamic of the fish populations, the improvement the quality of Bega water course by increasing the capacity of the self-purification and the custody of the balance of the ecosystem)

Keywords: the nutrients, the ecosystems , geomorphologic structures, the biota

505 Differences Between Natural and Created Desiccation in the Management of Temporary River Basins - Case Study the Evrotas River Basin, Greece

Nikolaos Skoulikidis, Alkiviades Economou, Leonidas Vardakas, Ioannis Karaouzas, Elias Dimitriou

Hellenic Centre for Marine Research - Institute of Inland Waters, Greece

nskoul@ath.hcmr.gr

Skoulikidis N., A. Economou, L. Vardakas, I, Karaouzas, E. Dimitriou, Y. Amaxidis and E. Colobari Hellenic Centre for Marine Research - Institute of Inland Waters Abstract Direct and indirect (climate change) anthropogenic activities

dramatically modified the flow regimes of Mediterranean rivers during the past decades,. Hence, former perennial rivers tend to adapt an artificial temporary regime especially during drought periods. In view of increased human demands, climate change, and ecosystem preservation aspects, temporary running waters are being increasingly considered in integrated management plans. The Evrotas River basin was studied for its hydrological, hydrochemical and biological quality during 2006-08. Work focused on the effects of drought on water quality and biotic elements (fish and macroinvertabrates) by comparing perennial and desiccated reaches. Historical data, hydrological time series and water balance studies point out that during dry years, the vast majority of Evrotas river network dries out in summer as a result of intense water abstractions. In general, biota are evolutionary adapted to natural desiccation. In contrast, human induced desiccation occurs abruptly, as in the case of Evrotas, and organisms may face conditions to which they are evolutionary inexperienced. This caused the extinction of fish from most of the river's tributaries in recent years. Moreover, during the 2007 drought massive fish deaths occurred in reaches along the river's main course that retained pools (due to the deterioration of aquatic quality) or dried out completely. In the sense of the Water Framework Directive, it is essential to recognise if a river dries out naturally or artificially. In artificially intermittent rivers, reference conditions require the presence of water and hence of aquatic biota. In absence of water, the ecological status will score bad, since e.g. fish are extinct. Therefore, one of the most important questions addressed when assessing the status of an intermittent river is to identify whether desiccation is due to natural or anthropogenic causes.

Keywords: Mediterranean, intermittent river, artificial desiccation, aquatic quality, fish, macroinvertebrates

507 Modeling of Contaminated Groundwater Flows by Ehda: a Case Study of Latvia

Janis Valters, Hileilis Segals, Inga Grinfelde, Einars Pundurs

Agency of Latvia University of Agriculture «Research Institute of Water and Land Management», Latvia

janis.valters@apollo.lv

In Latvia as a heritage from previous regime are many as source of contamination of ground waters. During past ten years there are many projects to protect ground waters from further contamination. However there is no solution how to manage territories near existing contaminated ground waters. The objective of present study is to research territory near by «Getlini» - largest dumping ground in Latvia.

There are used ground water monitoring data and electrohydrodynamic analogy (EHDA) method to find best solution for land management. The results of case study show that unwarranted use of land cause further contamination of nearest territories.

Keywords: electrohydrodynamic analogy (EHDA), groundwater contamination, hydrology

511 Viable But Unculturable Bacteria in Freshwater Oligothrophic Lakes of Siberia, Russia

Natalia Belkova 1, Irina Terkina 1, Evgeniya Matyugina 2, Nadezhda Dolgikh 3, Svetlana Voronova 3

1 Limnological Institute SD RAS, Russia
2 Institute of natural Resources, Ecology and Kriology SD RAS, Russia
3 Irkutsk State University, Russia

belkova@lin.irk.ru

Investigation of the functioning freshwater ecosystem is one of the first priority tasks because they are the main source of the drinking water. The peculiarities of cold oligothrophic freshwater lakes in Siberia, like low mineralization, low content of organic matter, saturation with oxygen, and low temperature, affect the diversity of microbial community. Low fraction of cultivable heterotrophic bacteria was determined in comparative investigation of water bacterial communities with cultivation-depended and molecular approaches. The aim of the research was to use a filtration-acclimation method for viable, but uncultivable bacteria cultivation and their phylogenetic identification. The water samples were collected during 2007 to 2009 years at the following sites: central station in the south basin of Lake Baikal (from the surface and depth of 600 m), five high mountain lakes (Eastern Sayan Mountains, from the surface), cold spring (Alkhanaj Mountain, from the surface). Heterotrophic bacteria were grown on TSA agar, enumerated after 10 days incubation at 25^{o}C, and isolated for identification by 16S rDNA sequencing. Up to 50 ml of water were filtered through bacterial 0.22 um filters, filtrate used in acclimatization experiment. Cultivation of 1 ml of filtered water on selective medium showed no bacterial growth. Cultivation after acclimatization procedure resulted in new strain isolation. They were identified by 16S rDNA sequencing. From Lake Baikal viable but nonculturable bacteria shown high homology to genera Acinetobacter, Arsenicicoccus, Bacillus, Bacteroides, Micrococcus, Pseudomonas, and Staphylococcus. Directly from lake water bacteria of genera Caulobacter, Brevundimonas, Flavobacterium, Methylobacterium, Microbacterium, Paenibacillus, Rhodococcus, and Rhodopseudomonas were

cultivated. Phylogenetic analysis of the sequences and sequences obtained in previous study revealed new cluster of baikalian microorganisms. So microorganisms could stay at the VBNC stage at environmental conditions and this stage might be their adaptation to survive in oligothrophic ecosystem at low temperature. This work was supported by RFBR - 09-04-00977a.

Keywords: oligothrophic ecosystem, molecular identification, heterothrophic bacteria

514 The Identification of the Level of Pollution in the Coastal Waters in the Laguna of Narta and Oricu Through Fizics, Chemistry and Microbiological Indicators

Muharrem Shehu 1, Laura Shabani 2

1 Universiteti Vlore, Fakulteti i Shkencave Teknike Universiteti, Albania
2 Fakulteti i Shkencave Natyrore Universiteti i Tiranes, Albania

mshehu@univlora.edu.al

This research represent data obout Narta and Oricum lagoon.Narta lagoon is situated in the south side of Vjosa river overflowing in Adriatik sea and Oricum lagoon is the next one,situated in the south side of Vlora bay.They represent very important habitats because of their turistical value and the use of them for fishing.Therefore it is important to know the quality of coastal water in order to ensure if they are safe to bathe,otherwise to evaluate the level of pollution: The microbiological examination of water samples is made to determinate the total charge of aerob mesofilic bacteria and the quantity of thermo-toerant coliforms as indicator of fecal pollution.This analyse is made by the multiple-tube fermentation method and the results are evaluatet as most probable number (MPN).As well as these characteristics the article contains data about the physic-chemical parameteres of these waters such as ,pH and temperature values ,the electric conduction, the content of some main inorganic ions,the quantity of oxygen soluble ect. The samples for analyses are collected from four stations by each lagoon in the months of autumn,and spring-summer season. According these data there are areas in these habitats where the pollution is evident.We think that the state and bad management of urban wastewater system is the main cause of environment pollution.

Keywords: lagoon,coastal,water,polution,coliforms bacteria,physical-chemical parameteres

515 Blidinje Lake - Some Chemical and Hydrobiological Characteristics

Anita Ivankovic 1, Esma Velagic Habul 2, Dubravka Hafner 3, Zrinka Knezovic 1

1 Faculty of Agronomy and Food Technology University of Mostar, Bosnia and Herzegovina
2 Faculty of Agriculture and Food Sciences University of Sarajevo, Bosnia and Herzegovina
3 Faculty of Science and Education, Department of Biology, University of Mostar, Bosnia and Herzegovina

anita.ivankovic@sve-mo.ba

Blidinje with area of some 380 ha, is the biggest mountain lake in B&H, issued as Natural Park in 1995. Its altitude (1185 m) and very small depth (in average 0,5 m) results in very changeable volume that has enormous impact to its chemistry and biology. Unfortunately, very few data exist for this beautiful lake, nowadays very important touristic area. The paper aims at providing more insight in its chemical and microbiological characteristics during the year, which could contribute to its protection and special prevention from its further degradation, and help in its sustainable management The paper presents some physical, chemical and biological properties of the lake's water. The water, sampled on 5 locations, were analysed on temperature, dissolved oxygen, oxygen saturation, pH, total dissolved solid (TDS), Secchi depth, turbidity, suspended matter, conductivity, hardness, alkalinity, acidity, NO2-,NO3-, NH4+, total nitrogen (TN), SO42-, Fe, SiO2, PO43-, total phosphorous (TP), Chl a and phytoplankton.

Keywords: mountain lake, physical-chemical properties of water, chlorophyll a, phytoplancton

516 Alien Mollusca in Serbian Waters

Jelena Tomovic, Katarina Stefanovic, Ana Atanackovic, Bojana Tubic, Momir Paunovic

Institute for Biological Research «Sinisa Stankovic», University of Belgrade, Serbia

jelenatomovic@ibiss.bg.ac.rs

Among non-indigenous taxa recorded in Serbian waters, Mollusca were found to be among the most prospective invaders. The aim of this work is to present alien Mollusca and to give information about their distribution within the most important waterways in Serbia (the Danube, the Sava and the Tisa Rivers), as well as to discuss vectors and pathways of distribution. The material was collected in period 2001 - 2007. Six alien mollusks taxa were recorded within the investigated waterways - five species of Bivalvia and one Gastropoda. According to results

obtained, Serbian part of the Danube River is under strong influence of biological invasions. Lower number of alien taxa was detected in investigated tributaries, which confirms fact that Danube represents the most important spreading route. Shipping is has been underlined as the most important activity connected with aquatic invasions. Vessels, channels, culture activities have been identified as important pathways.

Keywords: alien Mollusca, biological invasion, aquatic ecosystems, Serbia

517 Development of Multimetric Index Based on Aquatic Macroinvertebrates for Running Waters in Serbia

Momir Paunovic 1, Bozica Vasiljevic 1, Katarina Stefanovic 1, Dunja Jakovcev-Todorovic 1, Simic Snezana 2

1 Institute for Biological Research "Sinisa Stankovic", University of Belgrade, Serbia
2 Institute of Biology and Ecology, Faculty of Science, University of Kragujevac, Serbia

mpaunovi@ibiss.bg.ac.rs

A lot of effort has been done in order to develop type and stressor specific procedures for evaluation of the ecological quality status in Serbia, as required by EU Water Framework Directive (WFD). Aquatic macroinvertebrates were the target group of organisms in a lot of studies since they offer numerous advantages in biomonitoring, which explain their reputation as the most commonly used group in water quality/status assessment. The data collected during the Program of implementation of EU Water Framework Directive in Serbia and three longitudinal surveys along the Danube River (AquaTerra Danube Survey, Joint Danube Survey 1 and 2), were used to test different biological descriptors of water body status. A total of 38 biological parameters were tested which include taxa richness, diversity, BMWP and ASPT score, taxa richness (on the species, genus, family and group level), as well as number of taxa among selected taxa groups, relation among functional feeding groups (FFG), saprobic index and relative abundance of selected faunistic groups. One of the groups of stressors taken into account is organic pollution. Analysis of selected biological metrics showed that combination of ASPT, BMWP, SI, taxa richness and relative abundance of selected groups, could provide a basis for confident type specific multimetric index for evaluation of the level of organic pollution in aquatic ecosystems. Further investigation is needed to develop this method.

Keywords: biological monitoring, aquatic macroinvertebrates, biological traits, ecological status, Water Framework Directive, Serbia

518 The Intestinal Parasite Pomphorhynchus Laevis Muller, 1776 (Acanthocephala) from Barbel Barbus Barbus L. from the Danube River in the Area of Belgrade

Vesna Djikanovic 1, Vera Nikolic 2, Vladica Simic 3, Dunja Jakovcev-Todorovic 1, Predrag Cakic 1

1 Institute for Biological Research ?Sini?a Stankovic?, University of Belgrade, Serbia
2 Institute of Zoology, Faculty of Biology, University of Belgrade, Serbia
3 Institute of Biology and Ecology, Faculty of Science, University of Kragujevac, Serbia

djiki@ibiss.bg.ac.rs

In this work, the results of preliminary study of the intestinal acanthocephalan parasite Pomphorhynchus laevis in barbel (Barbus barbus) are presented. The fishes were collected during the period 2007 - 2009 at two sampling sites along the course of the Danube River through the Belgrade Region. A total of 61 fish specimens of different age (3+ to 7+) were examined. The presence of Pomphorhynchus laevis was identified in intestine with infestation intensity 6-207. Parasite specimens were found in all examined barbels represented participation of 100% of collected fish specimens. Number of parasites per fish specimen corresponds to fish conditional factor. Our investigation showed that the degree of barbel parasite infestation is high and the further examinations are necessary to determine the role of acanthocephalan parasites in regulation of barbel`s population density.

Keywords: Pomphorhynchus laevis, Barbus barbus, the Danube River, Belgrade Region, Serbia

521 A Comet Assay Applied on Freshwater Mussel Unio Tumidus Philipsson, 1788 as a Tool for Environmental Status Assessment

Jelena Tomovic 1, Jelena Vrankovic 1, Dragana Mitic-Culafic 2, Branka Vukovic-Gacic 2, Jelena Knezevic-Vukcevic 2 , Zoran Gacic 3, Momir Paunovic 1

1 Institute for Biological Research «Sinisa Stankovic», University of Belgrade, Belgrade, Serbia
2 Chair of Microbiology, Faculty of Biology, University of Belgrade, Belgrade, Serbia
3 Institute for Multidisciplinary Research, University of Belgrade, Belgrade, Serbia

jelenatomovic@ibiss.bg.ac.rs

The aim of this work is to present the results of using of the comet assay in the detection of environmental stress. According to our results, the test applied on

freshwater mussel Unio tumidus, one of the most frequent mollusks within large lowland rivers in the region (the Danube, the Sava and the Tisa Rivers) could be used as effective, additional (together with traditional bio-monitoring approach that use community level indicators) tool for assessment of the status of aquatic environment. Samples were collected by benthic hand nets benthological dredge and diving in the Danube River at site Bela Stena (Rkm 1158; 22.05.2009.). Animals were kept in captivity in a fresh-water aquarium, located in a dark and temperature -controlled room, at 15^{o}C. Experiments were performed after 7 and 45 days. Haemolymph of freshwater mussel was collected from the posterior adductor muscle sinus with a hypodermic syringe. Hemolymph cell suspension was soaked into physiological solution and subjected to standard alkaline Comet procedure described by Singh et al. Images of randomly selected cells/ one mussel were analyzed with fluorescence microscope and image analysis software (Comet IV, Perceptive Instruments). Fifty nuclei were analyzed per experimental point, and the percentage of the fluorescence in the comet tail was scored as a reflection of DNA damage. Statistically significant difference was recorded between the fluorescence in the comet tail sample after 7 days and after 45 days (p= 0.005173, T-test).

Keywords: Comet assay, Unio tumidus, haemolymph, environmental stress

519 Antioxidant Defense Enzymes Activity in the Freshwater Clam Corbicula Fluminea as Potential Biomarkers of Organic Pollution: a Preliminary Study

Jelena Vrankovic 1, Svetlana Labus Blagojevic 2, Jelena Tomovic 1, Ana Atanackovic 1, Momir Paunovic 1

1 Institute for Biological Research «Sinisa Stankovic», University of Belgrade, Serbia
2 Institute of Public Health of Serbia «Dr Milan Jovanovic Batut», Belgrade, Serbia

jeca.s@ibiss.bg.ac.rs

Bivalves play key role in cycling organic pollutants. Asiatic clam C. fluminea is non-indigenous species widely distributed in aquatic ecosystems in Serbia, and as such, appropriate target organism for assess of exposure to effects of organic pollutants on aquatic organisms. Persistent organic pollutants (POPs) are widely distributed xenobiotics that partially exert toxicity by the production of reactive oxygen species (ROS). In organisms, ROS are neutralized by antioxidant defense (AD) enzymes, mainly superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GSH-Px) and glutathione reductase (GR). In this work, AD enzymes activity, as well as glutathione-S-transferase (GST) as a phase II biotransformation

enzyme was measured and compared with the presence of POPs in the foot and visceral mass of C. fluminea. Clams were collected from the Danube River, near the city of Belgrade. Our results showed higher concentrations of bioaccumulated PCBs in the foot compared to the visceral mass (levels were under the limit of detection). PAH and organochlorine pesticides (OCPs) were under the limit of the detection in studied tissues. There was no obvious direct correlation between antioxidant defense enzymes activity and the presence and concentration of PCBs in the foot. There is a significant difference in AD enzyme activity in studied tissues. The CAT activity was 15 times higher in visceral mass compared to foot. This suggests different ROS metabolic profiles of studied tissues. Further investigation is needed for study the relation of selected physiological responses and environmental stress, which lead to defining of appropriate, stress specific biomarkers.

Keywords: POPs, ROS, AD enzymes, C. fluminea, biomarkers

520 Water Quality Assessment Based on Saprobiological Analyses of the Macroinvertebrate Communities in the Zapadna Morava River Basin

Momir Paunovic 1, Vladica Simic 2, Nevena Pantovic 2, Vesna Djikanovic 1, Valentina Slavevska-Stamenkovic 3

1 Institute for Biological Research "Sinisa Stankovic", University of Belgrade, Serbia
2 Institute of Biology and Ecology, Faculty of Science, University of Kragujevac, Serbia
3 Institute of Biology, Faculty of Natural Science and Mathematics, University of Skopje, Macedonia

mpaunovi@ibiss.bg.ac.rs

The aim of this paper is to present results on the assessment of the status/ quality of the selected watercourses within the Zapadna Morava River Basin. The investigation comprised 20 sampling sites. A total of 103 taxa were identified. Analysis was focused on the organic pollution and thus saprobic index (Zelinka-Marvan) and BMWP-ASPT scores were used for assessment of the level of environmental stress. Water quality status according to Zelinka-Marvan index varied from 1.40 to 2.70. Values of BMWP biotic index ranged from 10 to 105 and for ASPT index from 3.0 to 7.4, respectively. According to our results bad/poor water status was recorded on the main course of the Zapadna Morava River near the mouth of the Ibar River and on the Rasina River, upstream Celije Reservoir.

Keywords: macrozoobenthos, water quality, saprobiological analysis, BMWP-ASPT, Zapadna Morava River Basin, Serbia

531 Vertical and Horizontal Distribution of Species Temora Stylifera (Dana) and Temora Longicornis (Muller) in Southern Adriatic

Dusan Vukanic 1, Vera Vukanic 2, Nebojisa Zivic 3

1 University of Montenegro, Institute of marine biology-Kotor, Kotor, Montenegro
2 State University Novi Pazar, Department for bio-chemistry and medical sciences, Biology, Serbia
3 University of Pristina - Kosovska Mitrovica, Faculty of Sciences and Mathematic, Department of Biology, Serbia

v_vukanic@yahoo.com

In last several decades studies were performed on horizontal and vertical distribution of Copepoda in coastal and off-shore waters of Adriatic. This paper presents data on distribution and abundance of species Temora stylifera (Dana) and Temora longicornis (M?ller) at Boka Kotorska Bay, estuary of R Bojana and open waters of southern Adriatic. Data for Kotorska Bay were collected before the red tide (1971-1976) as well as during the most recent studies in 2002. Data for off-shore deep waters of Southern Adriatic and estuary of R Bojana were collected in studies in period 1983-1990.

Keywords: Adriatic sea, Copepoda, vertical migration, zooplankton

534 Sewage Effect on Physical and Chemical Parameters of Morna River in Akola City

Sushil Nagrale

Shri R.L.T.college of science, India

sushilnagrale@rediffmail.com

Water around the world is getting polluted due to human activities and availability of potable water in nature is becoming rare day by day, water is essential source for agriculture, domestic and industrial activities. As the rivers are the lifeline of the human beings study was conducted to asses the physical, chemical parameters of the Morna River in Akola city for a period of 12 month from October 2008 to September 2009.The physical and chemical parameters presented the complex pattern of variation indicating that river is severely affected by discharge of sewage effluent within the city which excessively eutrophicate the river. Keywords: Limnology; Sewage pollution; Eutrophication.

Keywords: Limnology, Sewage pollution, Eutrophication

535 Preliminary Investigations of Mutual Relations Between Rotifers and Organotrophic Bacteria in Lake Ohrid

Vera Novevska, Orhideja Tasevska

Hydrobiological Institute, Macedonia

vnovevska2001@yahoo.com

In the period of five months the preliminary investigations of mutual relations between Lake Ohrid pelagic rotifers and organotrophic bacteria were done. The samples were treated with standard limnological methods. The number of rotifers (ind. m-3) and the number of organotrophic bacteria on 10%MPA was compared. Obtained preliminary results showed predator-pray relations between rotifers and bacteria. In that term, in the most of the analyzed samples, the number of bacteria is in inverse relation with the number of rotifers. As we pointed out with our results, it is generally agreed that, as food, bacteria are important for rotifers. These investigations will be direction for the further investigations in which certain Rotifera species and organotrophic bacteria will be compared. In other words, the future task will be to identify Rotifera species that efficiently ingests bacteria.

Keywords: organotrophic bacteria, rotifers, predator-prey relations

536 Structural Characteristic of Benthic Macroinvertebrate in the Mantovo Reservoir (South-East Part of the R. Macedonia)

Valentina Slavevska Stamenkovic 1, Stoe Smiljkov 1, Dana Prelic 1, Momir Paunovic 2, Biljana Rimchevska 1

1 Faculty of Natural Science and Mathematics, Institute of Biology, Macedonia
2 Institute for Biological Research Belgrade, Serbia

vstamen@yahoo.com

Structural features of the macrozoobenthos community were assessed in the Mantovo Reservoir in south-east part of the R. of Macedonia. Sampling was performed monthly, from May 2003 to April 2004. Investigation comprised the following depth zones: littoral (2.8 m), sublitoral (6.8 m), upper profundal (10.2 m) and lower profundal (20.3 m). In general, seasonal variations of the community density were recorded. Namely, throughout spring-summer period (May-June 2003) the community density ranged from 2,936.88 to 2,740.05 ind•m^{-2}. During the summer-autumn period (July-November) the increasing total abundance was detected (4,632.36-4,636.57 ind•m^{-2}.), while the highest abundance of the

macroinvertebrate community (7,045.36-7,696.23 ind•m^{-2}.) was found during winter-spring (February - March). Seasonal changes in density of the total macrozoobenthos community were largely determined by dominant assemblages in the Mantovo Reservoir: Oligochaeta (Annelida), Chironomidae and Chaoboridae (Insecta: Diptera). Limnodrilus hoffmeisteri (Annelida: Oligochaeta: Tubificidae) was dominant species during the whole investigated year (annual average-2,288.03 ind•m^{-2}. or 50.09% of the whole zoocenosis) and the seasonal dynamics of this aquatic worm corresponds to seasonal rhythmic of total macrozoobenthos. The higher values of diversity-H, and homogeneity-J(e) indices were recorded in spring-summer period. In summer-autumn months lower values of diversity index were recorded, while the slight decreasing of the homogeneity was noticed. This condition was caused by high contribution (75.43%, 75.34%, 75.05%) of Limnodrilus hoffmeisteri in August, September, October, respectively. In general a evenness-J(e) shows slight variations during the investigated year, which illustrate a relative homogeneous and stable community, well adapted on ecological conditions occurred in investigated artificial lake.

Keywords: macrozoobenthos, seasonal dynamics, community structure, Limnodrilus hoffmeisteri

538 Phosphorus Speciation in Lake Sediments

Loreta Vallja, Alqi Cullaj

Department of Chemistry, Faculty of Natural Sciences, University of Tirana, Albania

lvallja@yahoo.com

Phosphorus is the key element in aquatic chemistry of lakes being a limiting nutrient in the growth of algae under many conditions. Exchange with bottom sediments place an important role in making P available for algae and contributes, therefore to eutrophication. Phosphorus is found in lakes in several forms other than orthophosphate, the most readily form consumed directly by algae. Because the forms of P are constantly changing and recycling, it is necessary to measure various forms of phosphorus besides the total content. Many extraction schemes have been developed to determine different forms (better indicated as operationally define fractions) of P in sediments. Our investigation aims: 1) to assess the total content and various forms of phosphorus in sediment and solid suspended particles in Bovilla Lake (a big reservoir furnishing Tirana with drinking water). 2) to compare various procedures for determination of P forms in sediment. We used several procedures to evaluate various forms of phosphate, notably: (1) Total extractable P using strong digestion by HNO3+H2SO4 mixture

and extraction by (NH4)2S2O8; (2) Harmonized protocol BCR (STM 1998) developed by the European Commission for determination of total P, Inorganic and Organic P, and NaOH extractable and acid (HCl) extractable P; (3) Troug`s (H2SO4, pH 3) extraction, (4) Olsen`s (0.5 M NaHCO3 pH 8.5) extraction and water extraction. A relatively high total phosphorus content of 455 mg/kg DW have been found in sediment samples taken from three sites of Bovilla Lake. This shows an important potential of sediments to release the P compounds, especially under anoxic conditions. Great part (about 87%) of phosphorus is inorganic (dissolved in HCl 1 M), around 93% of IP is Ca-bonded and is considered as non-available. Only a small part of total P is iron-bonded (2.5% NAIP), and is considered as bioavailable and around 4.3% is present as organic matter.

Keywords: Phosphorus, eutrophic, sediments, Bovilla lake, extraction

483 Variability of Physico-Chemical Composition of Surface Springs of Lake Ohrid

Biljana Jordanoska 1, Trajce Stafilov 2, Melika Shemo 3, Elizabeta Sarafilovska 3

1 unemployed, Macedonia
2 Institute of Chemistry, Faculty of Science SS. Cyril and Methodius University, Macedonia
3 Hidrobiological Institute- Ohrid, Macedonia

bi.jordanoska@hotmail.com

As one valuable lake system Lake Ohrid is endangered by anthropogenic impacts. It was shown that Lake Ohrid indeed undergoes eutrophication, so the goal of our protection is monitoring of sensitive parameters regularly following the tributaries that feed this basin. Supplying with nutrients, dissolved oxygen and constant living conditions surface springs are beneficial for lakes extraordinarity as a special boundary for many endemic species. In this paper we present an analytical approach to asses of surface springs that feed Lake Ohrid. Of interest was the quantification of basic physico-chemical spring properties in order to better understand how and what kind of groundwater is delivered to Lake Ohrid. For that purpose, seven sampling points were monitored around the Lake basin, examined between March 2006 and September 2008 counting at St. Naum area as Kaptaza of 8 individual springs, two spring sites were located on higher elevations relative to Lake Prespa (849 m asl) called El?ani, the other named Korita. Of particular attention were also Biljana's springs and at the north-west side of the Lake Kali?ta surface spring. All of them are used as sources of drinking water. Categorization of the water samples is according to OECD regulations, positive by law regulations of Republic of Macedonia. Investigations are done according to standard limnological methods. Water quality is presented through

following physico-chemical parameters: dissolved oxygen, biochemical oxygen demand, organic loading, concentration of nutrients (total phosphorus and total nitrogen). There were no major changes with springs intrusion and runoff.

Keywords: Lake Ohrid, surface springs, physico-chemical investigations, drinking water

576 From Research to Operational Biomonitoring of Freshwaters: Suggested Conceptual Framework and Practical Solutions

Michel Lafont 1, Celine Jezequel 1, Pascal Breil 1, Laurent Schmitt 2, Jiri Marsalek 3

1 Cemagref, France
2 Lyon 2 University, France
3 NWRI, Canada

michel.lafont@cemagref.fr

The contradictory demands of managers (quick relevant operational responses) and ecologists (need time for in-depth research) involved in freshwater biomonitoring are still relevant today. To contribute to solving this dilemma, we are proposing a novel biomonitoring approach, which among many others, could be used in this field and further developed in the future. Biomonitoring actions are integrated in conceptual schemes, in which hydrology, chemistry, hydrogeology and geomorphology bear as much importance as biology. Among biomonitoring tools, a harmonization system allows end-users to use a set of qualitative indicators (various biotic indices) and integrate the information given by individual biotic indices. Functional traits and calculation of an ecological potential in porous aquatic habitats (surficial coarse sediments and the hyporheic system) are regarded as a basis for assessing ecological functioning of streams and rivers. This last methodology takes into account the dynamics of water exchanges between surface water and groundwater. Objectives of ecological quality, ecological potentials and resilience capacity that need to be preserved or rehabilitated in aquatic habitats are established. In lakes, a similar approach was followed and a general typology of lake functioning was proposed, including that for urban lakes. All those biomonitoring tools are transferred to end-users and subject to further research. The final purpose is to promote practical high-tech tools which are continually and interactively connected with ongoing research.

Keywords: integrated biomonitoring, freshwater

532 Horizontal Distribution and Abundance of Copepoda in Bay of Kotor - Coastal Waters of Southern Adriatic

Vera Vukanic 1, Nebojisa Zivic 2

1 State University Novi Pazar, Serbia
2 University of Pristina/Kosovska Mitrovica, Serbia

v_vukanic@yahoo.com

The species composition and horizontal distribution of Copepoda were studied from January to December 2004 in the closed coastal waters of southern Adriatic (Boka Kotorska Bay). The research was done at 7 stations, three along the very shore, in the immediate vicinity of shellfish farms, and four in deeper water. 65 species of Copepoda were identified, and in the same time the main hydrographic parameters (T°C, ‰, pH, O2mL/L, O2%, transparency according to Secchi, color of the sea according to Forell) were measured and analyzed. The dominant species: Paracalanus parvus (Claus), Centropages kroyeri Giesbrecht, Acartia clausi Giesbrecht, Oithona nana (Giesbrecht), Microsetella norvegica (Boeck), Euterpina acutifrons (Dana), Oncaea media Giesbrecht and Oncaea subtilis Giesbrecht, participated with 39.6% in the total abundance of all Copepoda. After our data were compared with the results of previous studies, we concluded that the number of taxa decreases from the open sea to the inner waters of the bay, and that there are two characteristic maximums of abundance, in spring and summer. The first one was induced by the increased abundance of Copepoda, while the second one appears in August and is caused by the dominance of Cladocera, especially the species Penilia avirostris Dana. Similar data are cited by authors for the coastal zones of other seas in Mediterranean, as well as some similar regions of World's oceans situated in subtropical temperature zones.

Keywords: Copepoda, Adriatic, Boka Kotorska Bay, horizontal distribution, coastal waters

540 Environmental Assessment for Sustainable Development in the Areas Under Anthropogenic Pressure Searching to Reduce Negative Effects on Water

Nilton Cezar Pereira

UFSC, Depto. de Eng. Civil, Centro Tecnologico,
Universidade Federal de Santa Catarina - Trindade, Brazil

nico@ecv.ufsc.br

Water covers around 74% of the earth surface and in the universe, but only here in the earth, there is big bulk of liquid water. Almost 97% of the volume of Earth's water is present in the oceans salty and only 0,02% is in freshwater streams, rivers, lakes and reservoirs. The remaining water is contained in ground water (0,006%), in the ice cover (2,2%), and water vapors in the atmosphere (0,001%). Several experts seeking to understand the hydrological cycle monitoring by measuring and predicting the spatial distribution, bulk and movement. It is possible to obtain in situ measurements in specific locations of various hydrological parameters (water), such as precipitation, water depth, temperature, salinity, density, bulk, etc. In recent years the earth experienced a significant increase in his industrial activities which led to stress degradation in the natural environment, mainly on water. In Brazil we can see this phenomenon also in the remotest parts of the territory resulting in some cases, real ecological disasters on this true resource. Santa Catarina, in the south of Brazil, has suffered and suffers several impacts on water resources by economic activities, and we can to make mention some significantly interfered over the water, such as these are: the mining of coal, rice's farm, the planting of tobacco, pig's farms, the mining of clay. These activities played an important role in the contamination of water with substances considered harmful to living systems, because they have high toxicity. This work searches a way to solve problems with degradation of water, mainly sedimentation and contamination with harmful substances on rivers, by agriculture and mining's process, using engineering and management techniques.

Keywords: water, sustainable development

255 Spatial Distribution of Hydrological, Hydrochemical and Hydrobiological Characteristics in Kara Sea in 2007-2008

Anna Rozhkova

Russian State Hydrometeorological University, Russia

The hydrochemical mode of Kara sea is formed under the influence of complex of factors. On the one hand this is the influence of the Atlantic waters and the processes of continental flow interaction. On the other hand it is the hydrometeorological conditions, water circulation, bottom relief influence, ice formation and ice melting, hydrobiological conditions, biochemical, physical and chemical processes. The influence of various factors is interconnected and changes with well expressed recurrence.

Keywords: Kara Sea

548 Urbanization and Increase of Metals in Sediments

Alice Rodrigues Cardoso 1, Cristiano Poleto 2

1 Federal University of Rio Grande do Sul, Brazil
2 State University of Maringa - UEM, Brazil

alice_stofel@yahoo.com.br

Many studies have shown the problems caused by urbanization in watershed. There are many ones but the most studied one is the degradation of water quality. But many researches have presented the sediment as the main problem concerning the water quality, mainly because most of metals are adsorbed by the small fraction of these particles (silt and clay). This paper aims to present the study of some metals adsorbed in sediments correlated with the urbanization of a small watershed in southern Brazil. The samples were obtained in a small lake (outlet) with cores to get undisturbed samples. There were analyzed 5 aliquots of each samples and they showed the increasing of metals with the urbanization process. The results are very important because they show the influence of urban areas on the rivers'quality.

Keywords: Urban watershed, metals, sediments

549 Radiation Synthesis of Aam/Dmaema/Mba Hydrogels for Absorption of 2,4-D Herbicide

Naim Mahmudi 1, Stojan Rendevski 2

1 Faculty of Natural Sciences and Mathematics, State University of Tetovo, Macedonia
2 Faculty of Electrical Engineering, University «Goce Delcev», Macedonia

naim.mahmudi@unite.edu.mk

Environmental pollution was and still remains one of the major problems both on the national and international level. Hydrogels are materials with great potential for treatment of water pollutants. One of the great problem is the contamination of underground waters with toxic substances such as pesticides and herbicides during their uncontrolled application in agriculture. The contribution presented in this paper is in the developing of new, effective and cost-efficient AAm/DMAEMA/MBA hydrogels for removal of 2,4-D herbicides from contaminated waters. The absorption capacity for removal of the herbicide versus herbicide concentration is determined. The mechanical, elastic and release properties of the radiation crosslinked hydrogels promise a large number of sorption-desorption cycles at appiication.

Keywords: crosslink, hydrogel, absorption, 2,4-D herbicide

545 Infuence of Underground Water on Hidromorphic Soils in a Protected Area of Aluvial Plain in Middle Part of Danube Basin

Ljiljana Nesic 1, Sasa Pekec 2, Petar Ivanicievic 2, Milivoj Belic 1

1 Faculty of Agriculture University of Novi Sad, Serbia
2 Institut of Lowland Forestry and Environment, University of Novi Sad, Serbia

nesiclj@polj.uns.ac.rs

The soil genesis in the inundations of big rivers is closely associated with fluvial sedimentation. According to quantity and origin of deposite, the aluvial plain is consisted of folowing morphological forms: costal, central and near the terrace part. The objects of this work are hidromorphic soils of aluvial plains un the area of midle Danube basin. The pedological and hidrological characteristics of following four soil types are presented: fluvisol, humofluvisol, humogley, and eugley. During 2006 and 2007 the level of underground water during the growing period was measured for every soil type. Recorded data suggest the difference

among examined soil types in phisical and chemical properties, as well as in underground water level and quality, and ampitudes of their variatio.

Keywords: Hidromorphic soils, alluvial plain, groundwater, middle part of Danube basin

546 Data On Dependence and Spread of Abandonment of Coleopters and Hemipters of Sweet Waters to the Ecologic Factors in the Region of Mid Albania

Jakov Oga 1, Ziso Thomollari 1, Arjana Striniqi 2

1. Department of Biology and Chimistry, «A. Xhuvani» University, Elbasan, Albania
2. Departament of Biology and Chimistry, «L. Gurakuqi» University, Shkoder, Albania

jakovoga@yahoo.com

In the research region, the river Shkumbin and its affluents, affluents of Lake Ohrid and some other waters pouring into the Adriatic Sea, are part of it. The influence of pH, temperature, altitude above the sea level and amount of O2 in water dissolution are taken into consideration. Likewise, their relationship to the clarity of waters and the amount of organic mattes in decomposition are analyzed. We have drawn values of saprophytes and relationship of the studied living creatures to the waters bed and their depths. Based on these ecologic factors considerations are given on the spread and abandonment of water coleopters and hemipters.

Keywords: abundance, water beetles, true bugs, pH, saprobia, trophic level, thermal tolerance, zooplankton, species richness, population density, euphotic zone, benthos

547 Larvae of Odonata as Indicators of Water Pollution in Lake Shkodra

Arjana Striniqi 1, Kastriot Misja 2, Jakov Oga 3

1 Department of Biology and Chimistry, University «L.Gurakuqi»,Shkoder, Albania
2 Department of Biology and Chimistry, Tirana, Albania
3 Department of Biology and Chimistry, «A. Xhuvani» University. Elbasan, Albania

a.striniqi@yahoo.com

Water entomofauna consists of a whole species belonging to different orders and classes of insects. Odonata (dragonflies) are the most famous and have impressive images. Odonata and Trichopterat are indicators are truly aquatic environments. If Insect larvae order Trichoptera, has been recognised as indicators of environmental pollution, or Odonata dragonfly larvae are presenting now an interesting too in this area. This relates to the fact that the larvae of dragonflies (Odonata) to use their breath to the air dissolved in water. Branshite of these insects are at the end of abdomen or within the rectum, are very fragile and are affected more by the chemistry of the water. we are to explore several types of order that have accumulated in odonada shore of Shkodras' Lake and River Drin, near the bridge that Bacallekut. Our material consists from several species belonging to these families: calopterygidae family lestidae family Libellulidae family Libellulidae family Libellulidae family Comphidae family Coenagrionidae family For each type of data are: for the biology and ecology of species, grouping zoogjeografik, a brief description of the type, place and time where it is met. Also provided data for several endangered species of dragonfly for extinction. In Shkodra lake water flow coming from the land with chemical waste phosphoric, with Insecticides and pesticides that during spraying plants and trees fall in land and irrigation water or rainfall in the lake end. Composition of current lake water charge carries a damaging chemical elements vital activity of the larvae of odonata.

Keywords: Odonata water pollution,indicators, environmental pollution

550 Field Performance of Silicone Rods as Passive Samplers for Water Monitoring in Lake Shkodra

Anila Neziri 1, Albrecht Paschke 2

1 Department of Biochemistry, Faculty of Natural Sciences, University of Shkodra, Albania

2 Department of Ecological Chemistry,
UFZ-Helmholtz Centre for Environmental Research Leipzig, Germany

anilaneziri@yahoo.com

A number of alternative methods monitoring water quality has been developed to complement and/or replace «spot» sampling methods. These techniques allow the determination of time-weighted average (TWA) concentration of the bioavailable fraction of pollutants over several weeks. The bare silicone rods, which acting as hydrophobic organic receiving phase, were exposed as passive samplers in lake Shkodra during the year 2008. After retrieval, the silicone rods were directly analysed by thermo-desorption-GC/MS. The TWA concentrations of polyaromatic hydrocarbons (PAHs) were calculated using laboratory-derived sampling rates (Rs) for the bare silicone rod samplers. The estimated TWA concentrations of freely dissolved fractions of selected PAHs in lake Shkodra ranged from 0.07 to 0.855ng/L. Among the PAHs determied were Naphthalene, 1-Methylnaphthalene, 2-Methylnaphthalene, 2,6-Dimethylnaphthalene,1,4,6-Trimethylnaphthalene. Fluorene, Phenanthrene and Anthracene were the main compounds found. The highest concentrations among the three sampling points were found at site Zogaj.

Keywords: Polycyclic aromatic hydrocarbons, silicone rod, passive samplers, water monitoring

556 An Application of the Resilience Concept to Manage Combined Sewer Overflows in a Small Stream

Pascal Breil 1, Michel Lafont 1, Philippe Namour 1, Laurent Schmitt 2

1 Cemagref, Lyon, France
2 University of Lyon, France

pascal.breil@cemagref.fr

Ecohydrology management principle relies on the use of ecosystem resilience to increase their carrying capacity against human impacts. However the dynamic of the biota response to environmental regulators remains poorly documented,

although it seems essential for operational purposes. Aim of this paper is to present a method that considers both the level of response and the linked response time of the biota to habitat regulators. Time and duration of response are analysed to propose a metric for biota resilience to stressing conditions. The experimental site is a small seasonal stream exposed to combined sewer overflows (CSOs), part of the OTHU project. The overflows provide well identified water quantity and quality stressors in comparison to an upstream near natural site. Interstitial biota and water quality data are collected in the benthic and hyporheic layers at a two months time step. Natural and disturbed flow time series are recorded with a fine time step. The role of geomorphic units is also analysed. Correlations are calculated between functional habitat metrics derived from biotic material and varying memory hydrological indices derived from antecedent flow conditions. Results indicate that time of response of biota to hydrological indices is longer in hyporheic than in benthic layer. A faster response of biota to CSOs is detected in the pool-riffle dominated section. Conversely it takes longer time in the flat channel-bottom section. The median response duration to a range of stressing events gives a metrics of the system resilience: two and three months without CSOs are respectively required in the pool-riffle and flat bottom sections to recover the best local ecological quality level.

Keywords: Ecohydrology, Resilience, Management

557 On the Toxic Influence of Cyanotoxins in Carassius Carassius Embryo - Larval Development

Neira Medja 1, Edmond Panariti 2, Nefail Biba 2, Sokol Duro 2, Anila Neziri 1,

1 University of Shkodra, Albania
2 Agricultural University of Tirana, Albania

n_medja@yahoo.com

Cyanobacteria and their toxic products represent a serious problem in many waters. The aim of this study was to find out how crude extract of cyanobacteria can influence the embryonic and larval development of carassius on the basis of embryo-larval toxicity test. Crude extract of cyanobacteria containing the known amount of microcystins LR, YR and RR (90, 9.0 and 0.9 µg/L-1, i.e. high, medium and low concentration of the extract), was administered to carassius eggs. The experiments were finished after 8 and 30 days (short- and long-term exposure). Evaluation of the tests was based on the OECD guideline for testing chemicals, direction 210 from 1992. The extract with high concentration caused 94% ($p < 0.01$) embryonic mortality, prolonged hatching, increased numbers of malformed and dead larvae ($p < 0.01$) and a decrease in average total length ($p < 0.01$). Yolk

sac dropsy and abnormal behaviour were observed. The extract with medium concentration caused an increase in dead larvae after the short-term exposure ($p < 0.05$) and an increase in malformed ($p < 0.05$) and dead ($p < 0.01$) larvae after the long-term exposure. The extract with low concentration caused an increase in dead larvae only after the long-term exposure ($p < 0.05$). In general, we can conclude that the extract with high concentration results in acute toxicity for embryos of the carassius. The influence of the extract with medium and low concentrations was manifested after the long-term exposure.

Keywords: Cianotoxins, malformations, fish, embryo-larval toxicity test, hatch

558 Biofilter Vegetative Protection of Waters Against Pollution

Ekaterina Valcheva

Agricultural University, Bulgaria

katia_valcheva@abv.bg

Agriculture is a major sources pollution of surface waters. Proper use of pesticides is to maintain their effectiveness, but also to prevent the pollution of natural resources. Falling pesticides from treated agriculture areas in to surface waters can threaten not only human health but also the quality of water and the biodiversity therein. Where other measures can help reduce pollution, use of vegetative biofilters must be taken into account. Their primary objective is to « filter»- to capture and retain nutrients, sediment, pesticides and water, which could be exported from agricultural areas and fall in surface water systems. In this connection is examined the effect of grass mixture /Dactylis glomerata, Lotus corniculatus, Onobrychis viciifolia/ and Dactylis glomerata private seed to reduce the amount of Stomp /pendimethalin/. It was found that grass mixtures exhibit higher sorption effect.

Keywords: vegetative biofiltar, pesticides, surface waters, quality of water

559 The Impact of the Length of a River Section on the Diversity of the Hydromorphological Attributes Assessment

Mariusz Adynkiewicz-Piragas, Iwona Lejcus

Institute of Meteorology and Water Management, Poland

mariusz.adynkiewicz@imgw.wroc.pl

According to sustainable development rules as well as in the name of rational water management, the change in the way of assessment of a river quality was postulated since sever years. A great importance was put on indication of the ecologically valuable river sections (ecological corridors) together with the indication of profoundly transformed ones that should be re-naturalized in order to restore their ecological functions. With the aim of this it is not sufficient to carry out the standard monitoring of physical and chemical parameters. Ecological valorization should be based on the biological indicators in compilation with the hydromorphological state assessment. This kind of monitoring was recommended by the Water Framework Directive (WFD 2000/60/EC). In order to meet this requirement Institute of Meteorology and Water Management Wroclaw Branch have developed a terrain method for hydromorphological assessment complying with the WFD criteria. A pilot investigation of the hydromorphological state of the rivers was carried out for the Nysa Luzycka basin in the Lower Silesia Region. The research was done for the sections of the Nysa Luzycka river tributaries of the length of 1 km as well as of the length of 200m. Basing on the results of local terrain inventory, maps, aerial photos and archival materials, the hydromorphological attributes were evaluated in reference to three zones: river-bed (6 attributes), riparian zone (3 attributes), river-side zone (3 attributes). The obtained results were used to carry out hydromorphological valorization of the selected rivers and hence their hydromorphological assessment. In the paper the diversity of hydromorphological attributes assessment is presented in reference to the analyzed length of the selected Nysa Luzycka tributaries sections.

Keywords: river, hydromorphology, ecology

560 Water Pollution Induced by Rainfed and Irrigated Agriculture, at Basin Scale

Antonio Canatario Duarte

Escola Superior Agraria de Castelo Branco, Portugal

acduarte@esa.ipcb.pt

The pollution of the superficial and subsuperficial water occurred from the agricultural areas, can assume a great importance in the context of all sources of water pollution. In fact, the intensification of the agricultural activity, in particular the irrigated agriculture, increases the use of the agrochemical products, and the problems in the soil and water bodies. When the climatic conditions are favorable, or the irrigation systems are not well operated, this is an economic problem from the farmers and an environmental problem from the society. The study area is a small basin (190ha), located in centre of Portugal, near the Natural Park of International Tagus. It is well drained, and the agricultural activity is developed in two different seasons; the winter season where the farmers produce especially winter cereals, and the irrigation season where they produce typical crops in this region (corn, sorghum, tobacco), and recently bioenergetics crops like soybean. This study is focused in the water pollutants, nitrates and ammonium, sediments and total dissolved solids. Their dynamic in the basin, more or less dependent of the runoff, is different between pollutants and between both seasons. So, the nitrates load depends, all time, of the availability in the soil and the runoff volume, due to its solubility. The ammonium shows a different dynamic; when it is present in large amount in the soil, their load depends of the sediments load and the extremes peak flow, with high power to carry outside the basin. The total daily load of sediments not shows a direct relation with de runoff volume, except when it has a sufficient energy to detach and carry out, as in the extremes events. Therefore, the total daily load accumulated curve of this pollutant along the time, develops by levels related with each extreme event. Another aspect important to accentuate is the clear dependence of the amount of sediments to the conditions in the watershed, for similar intensity storms. For total dissolved solids, this study allows to conclude a very clear relation between the runoff volume and the load of this pollutant, in both seasons. In the other hand, this study not allows to conclude if the loss of this pollutant is higher in the winter or irrigation season.

Keywords: non point source, water pollution, rainfed agriculture, irrigated agriculture, watershed

563 Ecological Causality of Horizontal and Vertical Dynamics of Zooplankton Abundance in the Accumulation of Lake Celije, Serbia

Nebojsa Zivic 1, Slobodan Grasic 2, Tatjana Jaksic 1, Vera Vukanic 3

1 Faculty of Sciences and Matematics University of Pristina, Kosovska Mitrovica, Serbia
2 Institute of hydrology, Serbia
3 State University Novi Pazar, Department for bio-chemistry and medical sciences, Serbia

nebzivic@gmail.com

The zooplankton of Lake Celije includes seven genera of small crustaceans: five from the order Cladocera and two from the order Eucopepoda. Population densities for the macrozooplankton at LakeCCelije were within the ranges characteristic for eutrophic freshwater ecosystems. Within the total abundance of zooplankton, the most significant population numbers were those of taxa Daphnia sp., Bosmina sp. and Cyclops sp. The factor with the greatest influence on population dynamics in Cladocera and Copepoda crustaceans was temperature. The first maximum of abundance of zooplankton happened just after the maximum of phytoplankton in spring. In mid-summer there is the second abundance maximum for the zooplankton association, in the layer of epilimnion. The third increase in abundance was recorded in autumn and is correlated with the increase in concentration of oxygen. The zooplankton crustaceans may be recorded in the whole hypolimnion of Lake Celije throughout the year, as well as during the summer stagnation when due to the temperature stratification these is no oxygen under 7 m of depth. During the conditions of hypoxia, the crustaceans in hypolimnion do not reach some greater levels of abundance, but are larger than the crustaceans closer to the surface. The sudden change of water in March of 2006 had removed the plankton from the lake, reducing it to the pioneer stadium, particularly in the zone of river's mouth. After the elimination, the abundance of zooplankton showed a sudden increase. The zooplankton is more abundant in the epilimnion (due to the more favorable temperature and oxygen concentration values) than in the hypolimnion. The abundance of zooplankton was greater in the shallower parts of the lake closer to river mouths than in the localities in vicinity of the dam.

Keywords: zooplankton, vertical migration, Lake Celije

564 Fauna of Oligochaeta in the High-Mountain Lakes of Mt. Sistevica, Serbia

Nebojsa Zivic 1, Branko Miljanovic 2, Vera Vukanic 3

1 Faculty of Sciences and Matematics University of Pristina,Kosovska Mitrovica, Serbia
2 Faculty of Sciences and Matematics University of Novi Sad, Serbia
3 State University Novi Pazar, Department for bio-chemistry and medical sciences, Serbia

nebzivic@gmail.com

Sistevac mountain joins the Mt. Sar-planina massif at north-west. The lake is located at its southeastern side, in the foothills at 1720 m above sea level. The length of the lake is 25 m, width 15 m and water level 30 cm. There are no feeding rivers or streams, so the lake gets its water from thawed snow. The bottom of the lake is covered in peat. There were 5 recorded species of Oligochaeta. Stylodrilus lemani, Spirosperma velutinus, S. ferox, Psammoryctides albicola, Isochaetides michaelseni. Fauna Oligochaeta in investigations lake are characterized by low abundance.

Keywords: High-mountain lakes, Oligochaeta, Mt. Sistevica

565 Bacterial Indicators of Risk of Disease From Drinking Water

Najmul Hasan 1, Zulfiqar Ali Mirani 2, Seema Ismat 2

1 University of Karachi, Pakistan
2 Pakistan Council of Scientific and Industrial Research Laboratories Complex Karachi, Pakistan

najam.edu.pak@gmail.com

Introduction Microbial pathogens or contaminants in drinking water have been implicated in various gastrointestinal illnesses that have occurred in different parts of the country. Waterborne pathogens cause a whole range of diarrheal diseases. The occurrence of such outbreaks alerted people to the hazards of drinking contaminated water and prompted investigations into ways to prevent the occurrence of waterborne illnesses. Public health authorities still have not achieved success in controlling the most common waterborne diseases in Pakistan and other developing countries. Methods Bacteriological analysis of 358 water samples consisting of 225 bottled water, and 133 ground, river and well water being used for drinking purpose in different parts of country was done according to World Health Organization (WHO) Guidelines by membrane filtration techniques and Multiple Tube Method. Results A two year long study showed that most of Pakistanis are still using contaminated water which is not safe for human

health. Almost 90% of ground water and well water samples were found to be contaminated with coli forms and fecal coli forms. Whereas 37% of bottle water samples were showed the presence of coli forms and fecal coli forms. Overall 67% of total water samples were found to be contaminated with coli forms and fecal coli forms. Conclusion Water quality indicates that pollution of the water is increasing alarmingly and that it has created serious threat to human health and environment. According to the WHO, the lack of safe water supply and of adequate means of sanitation is blamed for as much as 80% of all diseases in developing countries. The result clearly showed that the quality of the water consumed by our local population is critical in controlling infectious diseases and other health problems.

Keywords: water, contamination, coliforms

568 Determination of Threshold Values and Chemical Status of Groundwater Bodies in Bulgaria

Pavel Pentchev 1, Marta Machkova 2

1 University of Mining and Geology, Bulgaria
2 National Institute of Meteorology and Hydrology, Bulgaria

dr.p.pentchev@gmail.com

The Water Framework Directive (2000/60/EC) requires the member states to assess the status of the groundwater bodies (GWB) for every six - year period as an essential part of the RBMP. The Groundwater Directive (2006/118/EC) requires the threshold values to be established obligatory for the following groundwater pollution indicators: NO3, As, Pb, Cd, Hg, NH4, Cl, SO4 and conductivity, and also for those pollutants, which are the reason GWB to be characterized at risk. In Bulgaria, there are 41 GWB at risk and the most common pollutants are NO3, Mn, Fe and HPO4. To be determined the threshold values and to assess the chemical status of the GWB in Bulgaria, a simplified methodology for practical use has been developed. It accords with the general methodological approach, given in the Guidance Document No.18/EC. The threshold values are defined by groups GWB, divided in five hydrogeological classes. For each of the four regions for basin management of water, the threshold values are different, depending on the background values, which are admitted for the specific hydrogeological classes. The procedure for determining the background values is based on the method of pre-selected chemical analysis with subsequent statistical data processing. As un input information is used hydrochemical data from the national ground water monitoring system. The representative sample was extracted by pre-selecting more than 10000 analysis made for the period 1998 - 2008. Given

the characteristics and the quality of the available hydrochemical information, the median value was chosen as the most appropriate and statistically representative for the background values. The chemical status of GWB is determined towards each indicator by comparing the so called «relevant values» with the corresponding threshold values, calculated at 0.75 threshold factor. The relevant values for each indicator are extracted from the average concentrations for the period 2007 - 2008, determined in all monitoring points of GWB. A simple statistical procedure was used. To ease the practical work in assessing the chemical status of GWB, a computer database was developed , using the MySQL platform and PHP.

Keywords: groundwater body, threshold value, chemical status, computer database, Bulgaria

575 Determination of Precipitation Limit of Zn(Ii) Ion with 2-Hydroxy-1,2,3-Propanetricarboxylic Acid

Fatmir Faiku, Haxhere Faiku, Arben Haziri, Sevdije Govori

University of Prishtina, Faculty of Natural Sciences, Department of Chemistry, Prishtina, Kosovo

f_faiku@hotmail.com

In this study we examined the precipitation of Zn(II) ion in water solutions of ZnSO4.7H2O (0.01 and 0.005 mol/L) with 2-hydroxy-1,2,3-propanetricarboxylic acid (0.1- 0.001 mol/L) in constant ionic strength of 0.6 mol/L NaCl. We have determined the concentration region where we have found the clear solution and solid phase. The solid phase is analyzed by IR spectroscopy.

From precipitation diagrams of zinc with 2-hydroxy-1,2,3-propanetricarboxylic acid in ionic force 0.6 mol/L NaCl, we have found that during decreasing the concentration 2-hydroxy-1,2,3-propanetricarboxylic acid in case of constant concentration of Zn(II) the limit of precipitation is shifted to lower values of pH. From the IR spectroscopic analysis we can conclude that Zn (II) ion has reacted with 2-hydroxy-1,2,3-propanetricarboxylic acid

Keywords: Precipitation, Zn(II) ion, 2-hydroxy-1,2,3-propanetricarboxylic acid, IR spectroscopy.

578 Aspects to the Life Extension of Old Dams as a Function of Ecology and Environmental Engineering

Marija Vukelic-Sutoska

Faculty of Agriculture and Food, Macedonia

vukelic@gf.ukim.edu.mk

Summary Plant renewal is more than just an internal reassessment. Dams are important to improve productivity and extent plant life. One onother problem is to extract the quantity of sediment from the reservoir. This building activity has provided us with many dams-many of which are in poor, or at best questionable, condition. Great strides have been made over the years in the practice of dam engineering, and it is now appropriate that we focus significant energies on ensuring that existing dams can continue undue risks to life and property. The civil engineering of dam life extension determines those civil works which do not meet the serviceability requirements and could disrupt plant operation, and then develops appropriate repair procedures to eliminate any deficiency.

Keywords: Old dams, life extension, additional uses, ecology, environmental engineering

583 The Heterogeneous Equilibrium of Zn(Ii) Ion With Glutamic Acid

Albert Maxhuni, Fatmir Faiku, Musaj Paqarizi, Melos Zeka, Arben Haziri

University of Prishtina, Faculty of Natural Sciences, Department of Chemistry, Kosovo

albert_maxhuni@yahoo.com

In this study we examined the precipitation of Zn(II) ion in water solutions of ZnSO4.7H2O (0.01, 0.005 and 0.003 mol/L) with glutamic acid (0.1, 0.01 and 0.001 mol/L) in constant ionic strength of 0.6 mol/L NaCl. We have determined the concentration region where we have found the clear solution and solid phase. The solid phase is analyzed by IR spectroscopy. From precipitation diagrams of zinc with glutamic acid in ionic force 0.6 mol/L NaCl, we have found that during decreasing the concentration glutamic acid in case of constant concentration of Zn(II) the limit of precipitation is shifted to lower values of pH. From the IR spectroscopic analysis we can conclude that Zn (II) ion has reacted with glutamic acid

Keywords: Precipitation, Zn(II) ion, glutamic acid, IR spectroscopy

589 Fauna of Monogenean Trematods - Parasites of Eel (Anguilla Anguilla Linnaeus, 1758) from Lake Ohrid, Macedonia

Stojmir Stojanovski 1, Nikola Hristovski 2, Dijana Blazekovic 2, Predrag Cakic 3, Aleksandar Cvetkovic 4

1 Hydrobiological Institute, Macedonia
2 Faculty of Biotechnical Sciences, Macedonia
3 Institute for Biological Researches, Serbia
4 Faculty of Veterinary Medicine, Macedonia

stojstoi@gmail.com

Parasitological examination from the Macedonian part of the Lake Ohrid showed that of 191 specimens of eel (Anguilla anguilla Linnaeus, 1758) 98 fishes (51.31%) were infested with gill monogeneans. In our case study the presence of 2 dactylogyrid species was found: Pseudodactylogyrus anguillae (Yin & Sproston, 1948) and Pseudodactylogyrus bini (Kikuchi, 1929). Both species are rather pathogenic to their hosts and can cause mortality of heavily infected eels in ell farms in both Asia and Europe. Pseudodactylogyrus species have hitherto been reported from eels in Central and North European countries. This is the first record of Pseudodactylogyrus anguillae and Pseudodactylogyrus bini for the fishes from Macedonia.

Keywords: Monogenea, eel, Lake Ohrid

592 Investigating the Water Quality of Small Lakes in Khorezm Region of Uzbekistan

Bahkriddin Nishonov 1,Dilorom Fayzieva 2, Maraget Shanafield 2, Michael R. Rosen 3, Julian Scott 3, Laurel Saito 4, John Lamers 5

1 Hydrometeorological Research Institute, Uzbekistan
2 Institute of Water Problems, U.S.A.
3 U.S. Geological Survey, U.S.A.
4 University of Nevada-Reno
5 ZEF-UNESCO German-Uzbek Khorezm Project

bnishonov@mail.ru

The Khorezm region in northwest Uzbekistan near the Aral Sea is a productive agricultural area that receives Amu Darya River water for irrigation. There are more than 450 small lakes in the Khorezm region with areas of 1-20 hectares that receive excess irrigation water from agricultural fields via collectors, direct runoff, or ground water discharge. Prior to this study, there were no data about water

quality of these small lakes. To characterize water quality, monthly water samples were collected from 13 small lakes from June 2006 to June 2007. Water samples at 3 sites on the Amu Darya River were also collected for comparison. Monthly sampling was continued for 4 selected lakes until October 2008. Temperature, pH, salinity, conductivity, and dissolved oxygen were measured for all lakes. Using standard methods, water samples were analyzed for nitrogen (ammonia, nitrate, nitrite), phosphorus (soluble reactive phosphorus, total dissolved phosphorus, total phosphorus), major ions (calcium, magnesium, sodium, potassium, sulfate, chloride, bicarbonate), total dissolved solids, organochlorine pesticides (DDT and its metabolites, HCH isomers) and trace metals.

Monthly water quality analysis showed average lake salinity ranged from 1 to over 15 g/L and salinity increased in fall and winter in most lakes. Only Eshanrabat Lake had very high salinity (up to 25g/L) for the some months. The average concentration of dissolved inorganic nitrogen was about 0.70 mg/L as N over all lakes. High ammonium concentrations (over 2 mg/L as N) were observed during winter and early spring. The average concentration of total phosphorus was about 0.12 mg/L as P over all lakes. The investigations showed that all lakes were mostly calcium-sodium and sulfate-chloride types. Concentrations of DDT and associated metabolites in lake water were between below detection (BD) to 0.01 µg/L. Concentrations of a-HCH in lake and river water were between BD to 0.02 µg/L, and γ-HCH were between BD to 0.027 µg/L. The observed concentrations of pesticides in lake water were much lower than the maximum allowable concentrations. The results of this research indicate that these small lakes in the Khorezm region are suitable for aquaculture, fisheries, and recreation.

Keywords: organochlorine pesticides, uzbekistan, lake water quality

595 Sustainable Use of Medicinal and Aromatic Plants and Preservation of Traditional Knowledge in Bosnia and Herzegovina

Dragana Pecanac

University of Banja Luka, Bosnia and Herzegovina

dragoljupce1@yahoo.com

The agro-industrial sub-sector of medicinal and aromatic plants in Bosnia and Herzegovina is dominated by wild-collection that has been important for centuries. At least 160 - 170 medicinal and aromatic plant (MAP) species are native to BiH, where most are still collected. Approximately 100 000 people are involved in the collection of medicinal and aromatic plants. The aim of this study is to explore the relationship between diversity of medicinal and aromatic plants

and sustainable use as well as to investigate and evaluate the perceptions of traditional practices and their implications on MAPs biodiversity in BiH, including the ways of its preservation. The study was conducted between July 2006 and November 2006 and covered the main collecting areas at northern part of Bosnia and region of Herzegovina as a survey where collectors and herbalists/buyers of medicinal and aromatic plants (MAPs) from these two regions were interviewed. From northern part of Bosnia are interviewed ten herbalists/buyers and 20 collectors from surroundings of following towns: Bihac, Bosanski Petrovac, Drvar, Kljuc, Prijedor, Banja Luka and Kotor Varos. From Herzegovina region were interviewed ten herbalists/buyers and 20 collectors from surroundings of Mostar, Ljubu?ki, Stolac, Ljubinje and Trebinje. Direct exploitation and poverty of local people become the main threat to sustainable use of MAPs including habitat loss, fragmentation and degradation, loss of genetic diversity and lack of knowledge. The study also shows that collectors with longer tradition in collection and longer personal experience are more likely to collect in more sustainable manner. Nevertheless, difficult economic situation of the collectors might force them to collect unsustainably. One of the possible solutions for the future is cultivation of some MAPs including conservation efforts, in situ and ex situ, and more state involvement in this issue.

Keywords: collectors, herbalists, medicinal and aromatic plants, sustainability, traditional knowledge

603 Some Biological Characteristics of Silurus Triostegus Heckel, 1843 from Ataturk Dam Lake (Turkey)

Seyit Ahmet Oymak 1, Kemal Solak 2, Erhan Unlu 3, Arif Parmaksiz 1

1 Harran University, Art-Science Fac. Biology Department, Sanliurfa, Turkey
2 Gazi University, Turkey
3 Dicle University, Turkey

ahmetoymak63@gmail.com

In this study, some biological characteristics such as age and sex composition, growth in length and weight, age-length, age-weight and length-weight relationships, condition factor spawning time, age of sexual maturity, and fecundity of Silurus triostegus in Ataturk Dam lake were investigated. The percentage of females was 48.3% and that of males 57.7% out of 623 specimens belonging to age groups I-XI. Isometric growth patterns were proved from the length-weight relationships. It was estimated that the females had higher L (202.85 cm) and lower low K (0.046871) values than males (L 113.98 cm and K = 0.101972). Mean condition factors of females and males were calculated to be 0.99055 and

0.95625 respectively. The highest condition factor values were found in April, and the lowest in December. The age of sexqual maturity IV in females and age III in males. The diameter of the egg was smallest in July, with a mean of 1.035 mm, while the mean egg diameter in May was greatest, at 1.937 mm. The fecundity ranged from 6.800 to 120.300. Fecundity was significantly correlated with fish length, fish weight and gonad weight.

Keywords: Silurus triostegus, growth, condition factor, reproduction, Ataturk Dam Lake

609 Species Action Plan for the Endemic Prespa Trout, Salmo Peristericus: a Conservation Tool

Irene Koutseri 1, Alain J. Crivelli 2, Svetozar Petkovski 3, Yannis Kazoglou 1

1 Society for the Protection of Prespa, Greece
2 Station Biologique de la Tour du Valat, France
3 BIOECO - Society for the Investigation and Conservation of Biodiversity and the Sustainable Development of Natural Ecosystems, Macedonia

i.koutseri@spp.gr

In 2006 the Prespa basin was characterized by the IUCN as one of the ten most important areas for endemic freshwater fish species in the Mediterranean, albeit with a high threatened status for most of these species. Nine endemic fish species have been identified and eight of them fall into «Endangered» or «Vulnerable» categories. The endemic Prespa Trout, Salmo peristericus, is classified as Endangered and its limited dispersal at the headwaters of few streams renders its conservation a priority for local stakeholders. Following long term research on the species populations in Greece and the R.of Macedonia, a Species Action Plan (SAP) has been developed, in order to set the priorities and describe the necessary actions towards the conservation of the species. The application of the SAP aims at (i) documenting the current ecological situation of the streams, (ii) documenting the health of the remaining populations of Prespa trout, (iii) developing a standardized long-term monitoring scheme, (iv) assessing the relative importance of suspected threats, (v) implementing first implementation measures for improving stream and trout population health and (vi) promoting sustainable development by integrating stakeholder participation and transboundary co-operation towards the conservation of the species. The Species Action Plan constitutes a useful tool, with specific guidelines for the conservation of the endemic Prespa Trout. The described necessary measures for its conservation that refer directly to the species are important, but more importantly several of the proposed management measures refer to ecosystem function and include

proposals towards integrated forest and river basin management. The expected results surpass the benefits to the species and are expected to support the conservation of several other species and habitats of the Prespa basin. Although the SAP is not a legally binding document, its endorsement by public, local and national stakeholders will promote its immediate implementation.

Keywords: Salmo peristericus, population research, threats, Species Action Plan, conservation measures

610 Lake Sediments Fingerprinting in the Danube Delta, using Composite Magneto- Lithological Signatures; an Environmental Approach

Sorin-Corneliu Radan 1, Silviu Radan 2

1 Geological Institute of Romania, Romania
2 GeoEcoMar, Romania

sc.radan@yahoo.com

The paper is focussed on the most recent results (2006 - 2009) concerning the bottom sediments fingerprinting in 10 main lakes of the Danube Delta (DD), using a composite magnetic susceptibility (MS; k)-lithological tracer. The bottom sediments were collected with "van Veen"-type grab samplers. "Confined" vs. "dynamic" vs. "intermediate" deltaic environments are compared and defined by particular magnetic fingerprints, recovered from lake sediments. The "dynamic environments", usually placed close to the influx points of the master canals or connected by relatively short canals to the main DD branches, are reflected by intermediate and high MS values, which are assigned to k classes III, IV and V of the MS scale achieved by the authors. The "confined environments", situated far from the Danubian supplies and from the direct riverine inputs, are characterized by a low intensity MS fingerprint, that is assigned to the lower k classes I and II, whereas the "intermediate" category is defined by k classes II and III. A distribution model points out the composition changes of the DD lake sediments, as the distance related to the Danubian source increases: the greater the distance to the source, the richer the sediments in organic substance and poorer in detrital mineral material. Several correlation coefficients (r) were calculated, e.g. related to k vs. TOC (Total Organic matter Content), k vs. CAR (Carbonate fraction), k vs. (TOC+CAR) and k vs. SIL (siliciclastic/mineral fraction). In addition to all these data, the diagrams showing the vertical distribution of the MS values for several sediment cores taken from three DD lakes are presented. The results

demonstrate the abilities of the magnetic susceptibility as a fingerprinting tool of the lake sediments used for integrated sedimentogenetic, lithological, environmental - geoecological studies in deltaic lakes.

Keywords: environmental magnetism, magnetic susceptibility, lithology, lacustrine recent sediments, Danube Delta

611 Magneto-Lithological Models for Recent Sediments: Examples from Deltaic, Lagoonal and Littoral Lakes

Sorin-Corneliu Radan 1, Silviu Radan 2, Camelia Cazacu 2, Consuela Milu 3

1 Geological Institute of Romania, Romania
2 GeoEcoMar, Romania
3 University of Bucharest, Romania

sc.radan@yahoo.com

Modern sediments have been sampled from the most important south-eastern Romania wetlands, i.e. Danube Delta, Razelm - Sinoie Lagoonal Complex and the Black Sea Littoral Zone. Composite models are illustrated and the correlations between the magnetic susceptibility (MS; k) values and the main lithological components (i.e. organic/TOC, carbonate/CAR and mineral-siliciclastic/SIL, respectively) are commented. Generally, positive (direct) correlations characterize the magnetic susceptibility (MS) vs mineral component (SIL), whereas negative (reverse) correlations define MS vs TOC, as well as MS vs (TOC+CAR). The MS regime recorded within the various sedimentary environments located in deltaic, lagoonal and littoral lakes and the ternary diagrams showing the lithological classification of the sampled bottom sediments are compared. Based on the MS values and the lithological contents, the models carried out for several deltaic lakes clearly emphasize the allochthonous sedimentation, predominantly detrital in the lacustrine ecosystems that are directly influenced by the River Danube, comparing with the dominantly autochthonous sedimentation in the distal zones, where the organic component is mostly present. As regards the lagoonal and the littoral lakes, the coincidence between the sedimentary areas characterized by higher MS values and those defined as dominantly siliciclastic, and by low MS intensity fingerprints and those rich in organic matter, respectively, is well reflected by corresponding maximum and minimum anomalies identified within the specific (k, SIL, TOC) maps. The quality of proxy parameter of the magnetic susceptibility to reveal distinguishing features for different lithological characters and the connection with the distinct position of the lakes related to the fluvial

supplies, to the hydrodynamic context or to the specific source-areas are reflected by the new data, and together with the previous results show that the recent sediments sampled in various aquatic ecosystems stand for high fidelity enviromagnetic archives.

Keywords: magnetic susceptibility, lake sediment, lithology, environmental magnetism, south-eastern Romania wetlands

612 Modern Sediments as Enviromagnetic Archives. a Case Study: Ddanube Delta and Northwestern Black Sea

Sorin-Corneliu Radan 1, Silviu Radan 2

1 Geological Institute of Romania, Romania
2 GeoEcoMar, Romania

sc.radan@yahoo.com

The Danube Delta and the Razelm - Sinoie Lagoonal Complex are two special units of the Danube - Black Sea hydrosedimentary geosystem, acting as a buffer interface between the Danube River water and sediment supplies collected from a large catchment area, and the Black Sea semi-enclosed marine basin. A vast enviromagnetic archive of modern sediments from this aquatic system was sampled along three decades. The magnetic signatures identified in the sediments are able to characterize and differentiate the depositional environments inside of an extended, diversified, and at the same time, unitary complex of fluvial, lacustrine, lagoonal, deltaic and marine ecosystems. The presence of the anthropogenic impact on the ecosystems is clearly demonstrated by the modified magnetic fingerprints recovered from Danube Delta lake sediments at different time intervals. Special cases are concerned with the harmful influence exerted by (artificial) canals crossing lacustrine areas or cutting Danube Delta Branch meanders. Much higher intensities were detetermined for the magnetic signatures of the fluvial-deltaic environments of the Danube Branches. With regard to the Razelm - Sinoie Lagoonal Complex, the magnetic susceptibility (MS) maps pointed out good connections between the (higher intensity) magnetic regime and the structure of the surrounding sand ridges. Concerning the fluvial-marine interaction zone, the MS maps of the sediments sampled in the northwestern Black Sea showed good connections with the main sedimentary environments. The magnetic signatures with a higher intensity reflect the area directly influenced by the Danube River sediment discharge, particularly the Danube Delta front area and the Danube prodelta area. To calibrate the modern sediments and to compare different magnetic fingerprints recovered from the various aquatic environments,

an original Magnetic Susceptibility Scale was conceived by the authors. The MS classes characterizing the recent sediments are used to define the sediment quality, which is commonly evaluated by geochemical and ecological scales.

Keywords: environmental magnetism, modern sediments, anthropogenic impact, Danube Delta, northwestern Black Sea

614 The Chlorophyll Scenario Comprising Values in Boka Kotorska Bay (Montenegro) and Durres Harbor (Albania) as a Strive Towards Different Eutrophication Rates

Elona Bahiti, Lelo Tesho, Marilda Osmani, Anila Gezhilli, Dorina Tesho

Faculty of Natural Sciences, University «A. Xhuvani» Elbasan, Albania

elona_bahiti@yahoo.com

The south eastern Adriatic coast after the years '90 has been a subject of various human and economic developments. To that fact the environmental sequences has been a phenomena that poorly were considered in the scientific and management practices. Even in many cases there is missing a real integrated coast management in the section in between Montenegro and Albania. The rapid development of the coastal area in Albania in the last two decades was a precondition of an increased rate of eutrophication. Based on that it is a process and not a state in our paper we try to assess the trends of development in this part of Adriatic coast. Based on our assessment the rate of chlorophyll was oscillating in between 6.3 mg/m3 - 5.6 mg/m3. The treatment of coastal rate of nutrient enrichment in many cases in Mediterranean was treated in both human and natural origin. In Albanian site we thought that there is a difference with Boka Kotorska bay due to very different hydrographic and social developments. So, in our case the main driver in nutrient enrichment is the urban enlargement and expansion.

Keywords: Adriatic coast, eutrophication, water quality, nutrients, chlorophyll

616 Radon and Radium-226 Content in Some Bulgarian Drinking Waters

Rositza Kamenova-Totzeva, Radostina Kotova

National Center of Radiobiology and Radiation Protection, Bulgaria

r.totzeva@ncrrp.org

Safe drinking water is essential to sustain life. The absence of any unpleasant by the meaning of consumers qualities does not guarantee that water is safe. The radioactivity does not have a taste, odour and colour and using water contained radioactivity above the limit can cause cancer or other health problems. Radon and Radium are some of the most important natural radionuclides impacted to public health. In the paper is presented a pilot study of the Radon-222 in Bulgarian drinking waters. Radon-222 and Radium-226 were determined in 40 Bulgarian drinking waters from South-West and South-East parts of Bulgaria. Sampling points were chosen randomly. For Radon-222 investigation was used ALPHA Guard with Aqua kit equipment and measurement was done on-site. Radium-226 was sampled at the same time as Radon, but radiochemical analysis and measurements was performed in the laboratory. The obtained results for radon vary between 1,17 - 0,40 Bq/l and 185,5 - 10,4 Bq/l. Concentrations of Radium-226 ranged from MDA to 0,15 Bq/l. We did not find strong relation between radium and radon content in investigated waters. All results are discussed in view of the EU Drinking Water Directive, WHO Guidelines, Euratom Treaty and Bulgarian rules.

Keywords: Radon, Radium, Bulgarian, drinking

617 Investigation of Environmental Pollution by Molecular

Neset Izairi, Muhamed Shehabi, Fadil Ajredini, Lutfi Istrefi

State University of Tetova, Macedonia

neset.izairi@unite.edu.mk

This paper contain the molecular absorption spectroscopic investigation on environmental pollution by many pollutants. For this purpose a laser absorption spectroscopy at 630 nm wavelength have been applied to excited the molecular spectra in order to identify the presence of main gas pollutants. The following vas the experimental procedure. Preliminary the presence of pollutants was identified. The gas champions were taken in leave environ, in the Tetova streets where cars

moved, and in some points in Tetova suburb, during different period of the day. A special civet, part of the apparatus, has been filled by environmental air, and latter, putted into the apparatus. A laser beam pulls pas throughout absorbing gas medium inter the civet to excite the gas, and the absorbing spectra were automatically registered. The molecular band spectra registration has been performed by an FT-IR Spectrometer (Spectrum BX FT-IR, Perkin Elmer). For this purpose the measurements were focused in spectral region of 2075 cm-1 to 2384 cm-1 for CO2 and CO bands investigation. The importance of such measurements are to investigate the spectral properties of absorption spectra and molecular structure, and for monitoring the environmental pollution.

Keywords: absorption, molecular spectra, pollution, monitoring

622 The Effects of Water Resource on Riparian Forest Growth

Emre Kuzugudenli, Kursad Ozkan, Kemal Saplioglu

Suleyman Demirel University, Turkey

emrekuzu@sdu.edu.tr

Nowadays, people who have been living especially in metropolitan areas use largely picnic areas, which are near streams, rivers, lakes and ponds, along the riparian forests for going away from city, crowded, noise and stress and for getting some fresh air. In this study, riparian forest growth, which are extremely important from the point of view of biodiversity, wildlife and erosion, are evaluated from the distance of the water resource. For that reason, normal closed, pure, even-aged, and undisturbed stand have been studied. Plot was taken from Turkish red pine (Pinus brutia Ten.) riparian plantation in Turkey-Isparta-Atabey. The number of selected sampling trees has 103 in sample plot. The trees distance of the water resource (Atabey Pond) and its diameter at breast height (1,3 meter) recorded. A significant negative correlation between the distance of the water resource and the sample trees diameter at breast height was found out (p=0.05). Competition index which is the other factor affecting on diameter increment. Sampling trees, that is, the subject tree and competitor trees have been mapped on x- y coordinate system and, diameter at breast height recorded for calculate competition index. A significant negative correlation between the competiton index and the sample trees diameter at breast height was found out (p=0.05).

Keywords: Riparian forest, Pinus brutia, Competition index

623 Heavy Metals in Water of Ohrid Lake and Juridical Mass for Protection of Waters from Pollutants

Suzana Aliu 1, Agni Aliu 2, Merime Mustafi 1, Lumturije Selmani 3, Behije Ibrahimi 3

1 State University of Tetova, Macedonia
2 South East European University, Macedonia
3 Kuvictory, Kosovo

zana.aliu@yahoo.com

Metals occur in different forms : as ions dissolved in water, as vapours, or as salts or minerals in rock, sand and soil. They can also be bound in organic or inorganic molecules, or attached to particles in the air. Both natural anthropogenic processes and sources emit metals into air and water. The effects of metals in the environment depend to a large extent on whether they occur in forms that can be taken up by plants or animals. Uptake of metals in an animal involves metal ions crossing a cell membrane. The aim of this paper was analysis and determination of heavy metals like Cu, Zn, Cd and Pb in water samples of different profiles from Ohrid Lake. Studied water samples were taken in different locations and different depths (0m, 20m, 40m, 75m, 100m and 150m). Determination of analysed heavy metals was done using Atomic Absorption spectroscopy using a Perkin Elmer 370 A and 370 flame aer acetylene and AAS Peyunicam 926 model. It is necessary to bring Juridical mass for protection the water of this lake.

624 Formation of Disinfection by-Products (Dbps) and Strategies to Reduce their Concentration in the Water Treatment Plants in Perlepnica and Velekince - Gjilan

Abedin Azizi 1, Kadri Berisha 1, Selim Jusufi 2, Shefqet Rashani 1

1 Faculty of Mines and Metallurgy, Department of Technology, University of Prishtina, Kosovo
2 Faculty of Natural Sciences and Mathematics, Department of Chemistry, University of Prishtina, Kosovo

abedinazizi@ipko.net

Chlorine is the most widely used disinfection agent in drinking water industry in the world. Chlorine is a strong oxidant, and has the ability to kill or inactivate most microorganisms commonly found in water. As such, chlorine used to disinfect drinking water reacts with natural organic matter NOM, and forms the so called disinfection by-products DBPs, of which trihalomethanes THMs and haloacetic

acids HAAs are the two main groups of disinfection by-products. It has been confirmed that exposure to aforementioned DBPs has various negative health effects in humans, therefore agencies dealing with public health have set rules for maximum concentration levels of the TTHMs and for the HAAs, based on the results obtained from experimental animals. Concentrations of THMs and HAAs and other halogenated substances can be reduced at the treatment plant, by utilizing following available alternatives such are: using an alternate disinfectant, reduce the free-chlorine contact time, reduce the concentration of NOM from the water before chlorine is added, remove bromide before chlorine addition and change of the pH of the water during chlorination. In this paper will be presented the concentration of total organic carbon TOC after each treatment step realized according to the method DIN EN 1484, the concentration of TTHMs in the town network realized in accordance to the method DIN EN ISO 10301 and the concentration of HAAs in the town network realized according to the method EN ISO 23631 for both treatment plants.

Keywords: chlorine, chlorinated disinfection by-products, trihalomethanes, haloacetic acids and natural organic matter

632 Environmental Effects of the Abandoned Mercury Mines in Western Turkey

Unsal Gemici, Gultekin Tarca, Melis Somay, Toygar Akar

Dokuz Eylul University, Turkey

unsal.gemici@deu.edu.tr

Aegean Region of Turkey consists of several Hg deposits in Karaburun, Halikoy, Tire, Odemis, Alasehir, Ulubey, and Banaz districts from which approximately 5500t of mercury have been produced. Due to the low prices, low demand and increasing environmental concerns of mercury, the mines were abandoned gradually until early 1990's. However acid mine drainage and mine wastes cause potential environmental problems near the Hg mines. This study focuses on the environmental effects of the abondoned mercury mines on soil, stream sediment and water. Some areas near the mines are still used for agricultural purposes. Soils are directly influenced by the contaminants transported by surface waters leaching the mine wastes especially in rainy seasons. The effects of Hg mining and the distribution of contaminants in soil and stream sediment were evaluated by calculation of enrichment factor's (EF's) and Pollution index (PI) which indicated enrichments for As, Hg, Sb and Pb in samples of stream sediment and soil. Other metals Cd, Co, Cr, Cu, Fe and Zn show moderate enrichment in soil close to the

mine areas. Mine waters are dominantly acidic with pH values of around 2.0-5.0 and are sulfate rich. The source of acidity is the oxidation Fe-sulfides (dominantly pyrite), which release Fe, SO42- and H+ forming acid in mine water runoff. Low pH values of the groundwater was observed close to the stream draining the mine. Concentrations of Hg are elevated (0.01-1.2 µg/L) in acidic mine water and groundwater exceeding the U.S. Environmental Protection Agency (USEPA) aquatic life Hg standard of 12 ng/L. Some mine waters have As, Fe, Mn, Ni, and Al with concentrations higher than drinking water standards.

Keywords: mercury, soil, water, contamination, Turkey

647 Evaluation of Chlorination Byproducts in Drinking Water in the Cities Shkoder, Vlore Dhe Lushnje

Adelina Manlliu

Public Health Institute, Albania

manlliu1@hotmail.com

Water is essential for life, and a satisfactory supply must be available to consumers. Every effort should be made to ensure drinking water quality as much as practicable. Protection of water reservoirs from pollution is the first line of defence. Maintaining of the sources is almost the best method to ensure safe drinking water and preferably where contaminated water is treated to make it suitable for use by the customer. Water source should be as far away as possible from populated centers, and should be saved from pollution and waste of human and animal, which may contain a variety of bacteria, viruses, pathogens and parasites. Failure of this treatment, the water will expose the population to epidemic outbreaks of intestinal and other infectious diseases. Part of the population that threatens more diseases originating from water pollution are infants and children, those with health problems or not living in good sanitary conditions, the sick and the elderly. For these categories doses for infection are more depressed than for the rest of the population. Health risk from toxic chemicals in drinking water differs from that caused by microbiological contaminants. Chemical ingredients of water that can lead to acute health problems but these are not mass poisoning dimensions. The fact that chemical pollutants have no acute effects places them in a category with lower risk than microbiological pollutants, whose effects are acute and very extended. Problems related to chemical components of drinking water arise primarily from their ability to cause health effects reverse after a period of prolonged exposure; including pollutants that have cumulative toxic characteristics such as heavy metals, and cancerous substances. It should be

noted that the use of chemical disinfectants in water treatment usually results in the formation of chemical products, some of which are a potential risk. However, health risks of these products are small compared to risks from inadequate disinfectants, and it is important that disinfection should not jeopardize the control of such byproducts. Disinfection is the most important step in addressing public water reservoirs.

641 Pollutant (Coal Ash) as Cleaner-Adsorbent for Heavy Metal Ions Ni Water Streams

Majlinda Daci-Ajvazi 1, Nexhat Daci 1, Salih Gashi 1, Dafina Hoxha 1, Lulzim Zeneli 2, Teuta Selimi 1

1 University of Prishtna, Kosovo
2 Biochemistry Institute, Faculty of Medicine, Kosovo

lindaajvazi@hotmail.com

Continuously increasing demand for raw materials and the limited availability of natural resources as well as extensively used lignite type coal for producing energy gave rice to the investigation of possible reuse of fly ash as adsorption material for heavy metals and organics as pollutants of river waters. Coals are one of the largest deposits of fossil organic matter where metal accumulations have been observed. Trace elements in coal that could have an undesirable environmental impact include Hg, Be, Se, As, Cd, Cu, Ni, Zn, Cr, Ge, Mn, Sb, V, Co. Whitemore (1973) studied the effect of a number of fly ashes on the process of removal of organic compounds that mainly affect BOD, COD and color parameters of industrial wastewaters. Daci (1991) studied the possible effects of Kosovo lignite fly ash as adsorbent for removal of heavy metal cations. Fly ash as adsorbent was used as «native» material or activated in different ways. The analysis of experimental results shows that the adsorption of metal ions was relatively fast and attained equilibrium in only a few minutes. Achieved results showed that 10 minutes of reaction time were appropriate for efficient adsorption of cations reaching the maximum removal to 99.89 wt%. Adsorption efficiency of ash in this case was: 99.89% for Cd, 93.60% for Zn, and 61.72% for Pb. Based on the results that were achieved during a period of time following conclusions can be summarized: Kosovo fly ash shows good sorption capacity toward heavy metal ions and other pollutants. The sorption rates were very high. Over 90% of the total adsorption can be obtained in ten minutes of reaction time.

Keywords: adsorbent, fly ash, adsorption, pollution

651 The Influence of Ecological Factors on Fish Population Dynamics in River Drenica

Qenan Maxhuni 1, Rifat Skrijelj 2, Linda Grapci - Kotori 3

1 Kosovo Environmental Protection Agency, Kosovo
2 University of Sarajevo, Faculty of Mathematical and Natural Sciences, Bosnia and Herzegovina
3 University of Prishtina, Faculty of Mathematical and Natural Sciences, Kosovo

qmaxhuni@yahoo.com

For the first time during the 2007/08 year descriptive qualitative and quantitative analysis of fish composition in the river Drenica (right tributary to the Sitnica river - Black Sea Basin) is done. During this time we follow up the impact of environmental factors on the dynamics of the fish population. The electrofishing is used as sampling method. This is particularly useful method because other techniques such as netting, were ineffective due to nature of habitat. The sites were fished by wading using back-up electrofishing equipment (Hans Grassl GmbH). Research was done and the fish specemens were collected in six separate sites along the river longitudinal profile (source, middle course and mouth). The results from one year research period in Drenica river show that the composition of fish fauna is very complex. In six selected sites of the river 17 taxa fish belonging to five families were found. The family Cyprinidae is the largest and is represented with 13 species, while the family Cobitidae, Percidae, Balitoridae and Siluridae represented by one species. The Shannon - Weaver index indicates a high degree of river pollution and the highest impact have the Drenas wastewater and sewage water from rural areas. The results of the research ichthyofaune river Drenica show the wealth of fish species, but which are under threat from anthropogenic pollution.

Keywords: river Drenica, ichthyofaune, qualitative and quantitative composition, Shannon - Weaver index

631 Selection of Chemicals and Optimization of the Dosage Rates for Drinking Water Treatment in Water Treatment Plant Pleshina - Ferizaj

Kadri Berisha 1, Abedin Azizi 1, Selim Jusufi 2

1 Faculty of Mines and Metallurgy, Department of Technology, Kosovo2 Faculty of Natural Sciences and Mathematics, Department of Chemistry, Kosovo

kadrushberisha@hotmail.com

Natural surface waters contain particulates of inorganic and organic origin. Inorganic particle constituents usually enter the surface waters by natural erosion processes, while the organic constituents include viruses, bacteria, algae and

various waste materials. In addition to that, surface waters contain colloidal and dissolved organic material, which is known as natural organic matter NOM. Removal of such kind of particulate and dissolved material is required because they cause turbidity, impart color to water, are infectious, have toxic compounds adsorbed to their surface, etc. Due to complexity of the reactions during the coagulation and flocculation processes, selection of treatment chemicals and its appropriate dosage rate is crucial, and it is usually determined experimentally by using the so called JAR Test method. JAR Testing is a method of simulating full-scale water treatment processes, which provides information on the way the chemicals are reacting with the specific type of water. This method serves to evaluate which treatment chemical will work best with specific raw water, serves to optimize the amount of the chemical/s to be added to the raw water, and asses impact of temperature and pH, and thus, improves the overall treatment plant's performance and reliability. In this paper will be presented results, where are evaluated different chemicals for different raw water turbidity scenarios and different temperatures.

Keywords: Natural organic matter, coagulation, flocculation, aluminium sulphate, polyelectrolyte, JAR Testing, optimal dosage rate

657 Constructed Wetland Application in Waste Water Treatment Processes in Serbia

Vladimir Nikolic 1, Dragan Milicevic 2, Slobodan Milenkovic 2

1 «Interprojekt» Nis, Serbia
2 University of Nis, The Faculty of Civil Engineering and Architecture, Nis, Serbia

vlada_urs@yahoo.com

Current tendencies related with problems of water protection and waste water purification imply manifold researches directed toward simplified, energetically rational, and economically acceptable technical solutions, primarily in terms of utilization of macro-biotical methods, especially in cases of favourable climate conditions, and existence of appropriate land surfaces. Special attention in small municipalities waste water treatment, due to relatively low construction expenses comparing with common treatment plants, low costs of purification, and high efficiency, is given to constructed wetlands. Construction wetlands, as a solution, are applicable in almost any environment, and are easy to fit into surrounding landscape. Special concern in constructed wetland designing process is given to appropriate plants selection and, pools and canals arrangement, in order to ensure and stress the constructed wetlands' function as recreational areas. This article presents the basic principles of constructed wetland exploitation in waste

water treatment processes, along with illustrated examples and experiences of constructed wetland technologies in Serbia. First constructed wetland in Serbia was constructed in Sokobanja in early eighties of the last century. In the first phase, the classical treatment plant line was applied (inlet, grid, sedimentation, oxidation basin). Surface flow wetland was used as experimental element of the system, with plants: Eichornia Crassipes and Pistia Stratiotes. Second phase includes Subsurface (horizontal flow, designed in 1990) flow wetlands, just after high efficiency settlement tank, and contains native plants (Rogoz, Serb - Thypa latifolia Lat., Trska, Serb. - Phragmites communalis Trin, Lat.). Second example discussed in this article has been undertaken in 2004, in village Glozane, Vojvodina. Experiences in constructed wetland performance in Serbia are limited, but having in mind two facts, first - the vast majority of municipalities in Serbia have less than 5000 inhabitants, and second - land availability, the application of suggested technologies, combined with traditional mechanical measures, have broad perspective.

Keywords: wastewater treatment, wetland

664 Industrial and Storm Water Treatment and Recirculation Reuse in Feni Industry - Kavadarci

Petko Pelivanoski 1, Zivko Veljanoski 1, Goce Taseski 1, Aleksandar Maletik 2

1 University of Ss Cyril and Methodius, Fac. of Civil Engineering;
Department of Water Supply, Sewerage, Treatment and Irrigation, Skopje, Macedonia
2 Graduate engineer, technologist

pelivanoski@gf.ukim.edu.mk

The appearance of longer droughts; intensive population growth in the arid parts; as well as continued scarcity of quality water, are problems, which occur more frequently lately. Therefore, the idea of finding a new reliable alternative water source is considered.

Reuse of industrial waste water is an important strategy for reducing freshwater consumption and waste water generation. From an economic perspective, industrial waste water reuse reduces the costs of fresh water supply and waste water disposal. Many industrial users of fresh water are under increasing pressure to reuse water within their facilities. Their goal is to minimize the amount of fresh water use and waste water that is discharged to a receiving stream.

The paper presents a method of industrial and storm waste water treatment from the ferro-nickel production of «Feni Industry» - Kavadarci and its recirculation water reuse in the technological process either. This way the both dual economic

and environmental benefits are achieved. First, with the industrial waste water treatment and its recirculation reuse significantly is reduced the use of fresh water. Second, more fresh water remains to the agriculture. And the last but not the least, by reducing the amount of waste water that is being discharged into recipient, an environmental benefit is achieved.

Keywords: Industrial waste water treatment, storm water, recirculation, reuse, economical and environmental benefits.

666 Biomonitoring of Surface Waters Using Duckweed (Lemna Minor L.)

Sandra Radic Brkanac 1, Drazenka Stipanicev 2, Sinisa Sirac 2, Katarina Glavas 1, Branka Pevalek-Kozlina 1

1 Faculty of Science, University of Zagreb, Croatia
2 Croatian Waters, Croatia

sandra@zg.biol.pmf.hr

Water pollution by toxic micropollutants, which is predominantly the consequence of human activities (industry, agriculture and urbanisation) is one of the most critical problems concerning drinking water resources and environmental protection of water bodies. Usage of plant test species has proven essential in investigation, detection and quantification of toxic activity in the natural environment. Toxic effects were investigated in several surface waters (Sava River basin, Croatia) collected monthly over a 3 month-monitoring period. Duckweed (Lemna minor L.) is often used as a plant model because it is a widely spread monocot which multiplies rapidly. Heavy metals were determinated by atomic absorption spectrometry, while nutrients determination was conducted using spectrometry and ionic chromatography. The fitotoxic indicators (relative frond number, relative fresh weight, chlorophyll and carotenoid contents) were monitored after seven days of exposure. All samples of tested waters caused growth inhibition and decrease of chlorophyll and carotenoid contents. The biological effects of water samples appeared related to the physicochemical characteristics. Therefore, bioassays should be included, along with conventional chemical analysis, in water quality monitoring programs. The results also suggest that duckweed should be used in the biomonitoring of water quality because of its simplicity, sensitivity and cost-effectiveness.

Keywords: aquatic plant, growth, chlorophyll, toxicity

669 Network Structure Analysis for Environmental Flow Toward Sustainable Water Use

Yuan Li, Zhifeng Yang

State Key Laboratory of Water Environment Simulation, China

doubleli117@yahoo.com.cn

With the consideration of complex relationship among multi water use activities both in behavior and benefit, ecological network analysis (ENA) as a systems-oriented methodology is introduced to study environmental flow toward sustainable water use. According to ENA, network efficiency and resilience are two equally essential but complementary network structure attributes and a crucial balance between these two factors is critical for ecosystem's long term sustainability. Based on this quantitative measure of sustainability that has been proposed, the current paper explores the competing relationship between environmental flow and socioeconomic water uses through network structure analysis. In this paper, the relationships among multi water use activities are investigated and explained in view of network structure, from which the sustainable network structure for environmental flow is defined as the value when efficiency and resilience are balanced. Through constructions of the presumed optimal water use network with the four sub-basins of the Haihe River in China in 1999-2002 and 2005-2007 as case studies, the optimal network structure value of each sub-basin's water use system for environmental flow is decided here. To analyze the sustainability of environmental flow for the Haihe River Basin, the comparisons between the optimal network structures and their corresponded actual ones are presented. This research can be served as the first attempt to investigate environmental flow and its competitive relationship with the other water use activities in view of network structure. These efforts will lay the foundation for future studies on optimal water allocation, regulation and management.

Keywords: Network structure, Environmental flow, Sustainability, Ecological network analysis, Water use systems

677 Treatment of Sewage and Industrial Effluents with Heterogeneous Reverse Osmosis Membranes

Salih Gashi 1, Teuta Selimi 1, Bashkim Thaci 1, Arta Dylhasi 1, Hamdije Memedi 2

1 University of Prishtina, Kosovo
2 University of Tetovo, Macedonia

salihtg@yahoo.com

One of the most interesting application of reverse osmosis in recent years is its use for treatment of sewage and industrial effluents. The reverse osmosis treatment of sewage water of Prishtina city and industrial effluents of Trepca flotation plants was the goal of this work. The CaO- FeSO4 was chosen as pretreating agents for sewage waters and the latter is treated directly by reverse osmosis membranes. In both cases the clear water was decanted and filtered. The pH of pretreated water was adjusted to pH 7 by addition of sulphuric acid. This pretreated water is used as feed in reverse osmosis experiments. The heterogeneous cellulose acetate-coal reverse osmosis membranes batch 317K [3] have been used. The experiments were carried out with referent system NaCl-H2O of concentration 6.86x10-3 mol/dm3 at 17.4 bar. The reverse osmosis separation of used sample under the same conditions as in permeability tests have been tested. The rejection of total dissolved solids, electrical conductivity, calcium, magnesium, chlorides, nitrates, sulphates and COD are reduced about 86.7 per cent and heavy metals (Pb, Zn, Cu, Cd) from industrial effluents till 98 per cent with these membranes. To summarized, it has been shown that the product water from reverse osmosis experiments was completely clarified, very low in dissolved solids, free from hardness components, nitrates and sulphates and very high rejection of heavy metals. References: 1. S.T. Gashi, N.M. Daci, Xh. Ahmeti, T.J. Selimi, E.Hoxha, Chemistry for protection of the environment 1987, Elsevier, Amsterdam, New York, Tokyo, Oxford, 91 (1988). 2. W.J.Cooper,Chemistry in water reuse,vol,1, Ann Arbor science, Michigaan 1981. 3. S.T.Gashi et all, Desalination, 240 (2009) 1-8.

Keywords: reverse osmosis membranes

679 Ecological State of Shkodra Lakes Water

Aurora Dibra, Fatbardh Sokoli

University of Shkodra, Faculty of Natural Sciences, Albania

adibra@yahoo.com

It will be identified the ecological state of water in Shkodra Lake. The scale of eutrofication and the water quality is evaluated with different methods and the biota presence. Plants, like Miryophyllum aqyaticum are used to evaluate the quality of light in the water of the lake. The impact of sewage waters and wastes deposition on the shores of the Lake was evaluated as a factor with a high impact in the water's quality.

Keywords: Shkodra lake, eutrofication, water quality, biota

680 Water Quality Service for Lakes

Saku Anttila 1, Timo Kairesalo 2, Timo Pyhalahti 1,
Pirjo Kuitunen 2, Sampsa Koponen 3

1 Finnish Environment Institute, Finland
2 University of Helsinki, Department of Ecological and Environmental Science, Finland
3 Helsinki University of Technology, Department of Radio Science and Engineering, Finland

saku.anttila@ymparisto.fi

Typical problems with environmental monitoring and research data are diverse data formats, archiving methods and lack of metadata. In past few years, standards to save and distribute data and metadata have started to emerge. Implementation of this common data management has been promoted by organizations and networks such as LTER-network, ALTER-Net, LifeWatch and GEOSS. The introduction of standardized data management methods and interfaces in public sector allows sustainable business opportunities also for the private sector. From this standpoint, Water Quality Service for Lakes -project develops a local database for environmental data that is interoperable with other standardized data bases. Information sources include traditional in situ measurements, automated monitoring platforms and remote sensing. All data will be tagged with XML-based metadata. Automated interpretation, combination and forecast tools that use this data bank are then developed, as well as a standardized interface for private service providers. A private IT-company develops the web-based Water Quality Service, which offers both free and chargeable environmental information for the local end users. The commercial side of the service provides water quality

information that is specifically tailored to users' needs. The public side of the service publishes general environmental information and encourages citizens to participate with discussion forums and 'blogs'. This project aims to develop an operations model for an environmental monitoring service that combines the functionality of public and private sector, as well as several monitoring data sources. The model provides business opportunities for private sector as a service provider, as an end user, or as a data provider. At the same time it allows standardized organization of local environmental data which is highly valuable for research organizations. General goal is that this operations model can be copied to other monitoring regimes. Furthermore, the project develops a cheap 'laymans' device for measuring water quality, which is based on the cameras in mobile phones. This creates new business possibilities for e.g. mobile service solutions, which are as well developed in the project.

Keywords: Lake water quality monitoring, public and private sector, standardization

684 Fish Hatchery in the Municipality of Bosanska Krupa in Northwestern Bosnia and Herzegovina: a Sustainable Development Project

Nedzad Ajanovic, Andras Peteri, Thomas MothPoulsen

Food and Agriculture Organization of the UN (FAO), Hungary

nedzad.ajanovic@fao.org

The Norwegian Government financed the project GCP/BIH/003/NOR «Support to Income Generation through establishment of a Fish Hatchery in Bosnia and Herzegovina», worth one million US dollars, that includes the construction of a fish hatchery on the banks of the River Krusnica in order to create jobs and incomes for people living with disability in Bosanska Krupa. The hatchery is dedicated to producing local strains of brown trout (Salmo trutta m. fario), grayling (Thymallus thymallus) and Danube salmon (Hucho hucho) for re-stocking the natural waters of the Krusnica/Una River catchments (and larger Bosnia and Herzegovina and Danube basin), support the rehabilitation of fish populations and to help revitalize local tourism. The Regional Office for Europe and Central Asia (REU) of the Food and Agricultural Organization of the United Nations (FAO), based in Budapest, Hungary implements the project in close collaboration with the Sport Fishermen's Association of Krusnica, which currently has 351 members. A fish hatchery, a pilot Recirculation Aquaculture System (RAS) in the valley of the River Krusnica, is the first of its kind in Bosnia and Herzegovina. It is suitable for production of 250,000

to 450,000 fingerlings annually. Five war invalids are employed at the hatchery continuously since fish production began in November of 2008. The production technology learned by the staff abroad was adapted to the local conditions. The hatchery is expected to be self-sustainable in its operation from sale of fingerlings. Since the hatchery activity has received wider publicity, anglers' interest in the River Krusnica and River Una has increased. Further increase in the number of visitors is expected after restocking the fish into the river, since the bigger fish populations will attract more and more anglers.

Keywords: Fish Hatchery, RAS, Rivers Krusnica and Una, Sustainable Development, Brown trout, Grayling, Danube Salmon, Fly fishing, Disabled

694 Methodology for Integral Water Pollution Assessment within Agricultural Area

Jasna Piperski, Pavel Benka, Atila Bezdan, Atila Salvai

University of Novi Sad, Faculty of Agriculture, Serbia

jasnap@polj.uns.ac.rs

The main economy branch in the Province of Vojvodina is agriculture which has significantly influenced water quality of canals and rivers within the hydrosystem, as well as groundwater. Both nonpoint and point source of pollution are present in the form of agricultural runoff from arable land and point sources from farm wastewater discharges. Pollution assessment stated by the EU Water Framework Directive requires application of integral approach. The paper presents a methodology for pollution assessment that includes precise determination of the pollution sources and GIS mapping, monitoring and quantification, modeling, and calculating Total Maximum Daily Load - TMDL values. Water quality model QUAL2K was employed, while developed models were used for simulation of possible scenarios. This kind of methodology was applied to the basin of drainage canal KC-III, a part of Vrbas's drainage system. The canal drains surrounding arable land and wastewater from the pig farm «Farmaccop» discharges strait from lagoons. The monitoring results as well as the modeling outputs of water quality parameters showed significant seasonal variations and TMDL has been calculated upon them. This methodology could be further applied on the management of freshwater water quality and the cadastre of polluters in the Province of Vojvodina.

Keywords: water quality, GIS, modeling, water resource management

689 Water Quality Index - WQI, as Tool of Water Quality Assessment

Pavle Djuraskovic

Hydrometeorological Institute, Montenegro

pavle.djuraskovic@meteo.co.me

This paper presents the analysis of water quality by WQI methodology for tributaries of Skadar Lake, Crnojevica rijeka, Moraca, Cijevna and its outflow, Bojana river. It is used data base of HMY of Montenegro, for analysis at period 2004-2008. The account of WQI for relevant water quality parameters (water temperature, total suspended solids, pH, conductivity, oxygen saturation, BOD5, N-ammonia, N-nitrates and nitrites (NO2+NO3), orto-phosphates and total faecal bacteria) from on-mouth measured profiles is done. The median WQI of the annual mean values at every sites is accounted. This value represents synthesized quality indicators 95th and 5th percentile, as indicators of increase or decrease of water quality, are accounted, too. Final result of this analysis shows a very good class of water quality at all measured places, with some changes into the classes. Comparison the classification of water quality by this method with another one by legal procedure is done.

Keywords: WQI index, water quality, monitoring, Skadar Lake tributaries water

709 Water Pollution Lignitit Mine in the Area of Basin of Kosovo

Raif Bytyci 1, Kadri Berisha 2, Shefqet Rashani 2,
Selim Jusufi 3, Luljeta Kastrati 1

1 Instituti «INKOS»sh.a, Sektori i Tokat -Rikultivimi, Kosovo
2 UP, FXM - Departamenti i Teknologjisa, Kosovo
3 UP, FSHMN - Departamenti i Kimisa, Kosovo

raifi5@hotmail.com

Kosovo is rich with lignite and as such more than 95% of energy produced in the country is based on lignite mines located in the so-called Kosovo Basin. Along with economical benefits there is also negative impact in the environment. Environmental sites attacked from the mining activities are obvious. Since the beginning of mining activities in the sixties the total amount of degraded land is 2700 ha. No rehabilitation measures were undertaken over the last five decades in this mining area. Consequently and due to mining activities exercised beyond any environmental criteria there are obvious environmental problems both from the open pit mines as well from the ash disposal areas as a by-product of lignite.

Current state strategy is focused in expanding mining and energy capacities, which means more pollution for the area concerned. Existing open pit mines are serious pollutants of water. The surface water, rainwater and the water flowing from the mines itself are usually collected at the depleted exploitation areas of the mine. This water being in contact with coal is polluted and as such is being discharged at the recipient areas via the pumps without any previous treatment. The recipients situated in the area concerned are the rivers of Sitnica and Drenica. The exploration works carried out for the purpose of this paper reveal that the water pollution in the most of analyzed parameters is obvious - there is an exceed of water pollution limits for more than one time. It is recommended to carry out the rehabilitation of depleted areas of the open pit mines while closing the industrial cycle from the exploitation to the rehabilitation of the mine - with positive effects for environment.

Keywords: environment, mines, lignite, water, pollution

723 Sulphate Effect on Load-Carrying Capacities of Pile Foundations Driven Into Soils Containing Sulphated Water - Konya Science Center Model (Turkey)

Mustafa Yildiz, Atilla Demiroz, Ali Sinan Soganci, Emine Yildiz Ozsahin

Selcuk University Eng. Arch. Faculty Dep. of civil Engineering Campus Konya, Turkey

musyildiz@selcuk.edu.tr

Sulphate effect is one of the most important chemical effects which causes damages on concrete or reinforced concrete structures. Sulphate is mostly present at soils, underground waters, waste waters, seawater, rainwater, contaminated air and concrete aggregates in the form of sodium, potassium, calcium or magnesium salts. The sulphate effect on concrete takes place during the chemical reactions between hydrated Portland Cement and sulphate ions by causing expansion in concrete and reduction in concrete strength in the course of time. The development of the reaction is affected by the factors such as the sulphate ratio of the medium, permeability of concrete, chemical structure of the cement used in concrete production and existence of water. The compounds threatening Portland Cement at most can be listed as ammonium, magnesium and sodium sulphates. The construction of a Science Center at 2nd Organized Industrial Zone of Konya was planned to be made on a gypsum containing soil where the underground water involves large amounts of sulphate. Due to weak load-carrying capacity of upper soil layers, the loads of the construction were designed to be carried using pile foundation driven through the soil to rest on a

hard clayey soil layer at 22m depth. Since the piles produced with Portland Cement would remain inside the sulphated water for a long period of time, the reduction amount in the load-carrying capacity of the piles was investigated considering the long-term usable concrete class. For this purpose, concrete specimens appropriate to ASTM C 1012 were prepared and the strength value reductions were determined after leaving them inside the sulphated water obtained from the construction site. The load-carrying capacity of pile foundation was re-evaluated depending on the strength reductions obtained by the tests, and additionally the amount of strength loss in case of using trans cement was also researched.

Keywords: Sulphate effect, Konya Science Center, Compression Strength, Pile Foundation in Sulphated Water

710 Chemical Monitoring of Ecotoxic Elements in Thermal Water Resources of Kllokoti and Peja

Merita Mehmeti 1, Naser Troni 1, Ramiz Hoti 1, A. Veseli 1, D. Omanovic 2

1 Department of Chemistry, Faculty of Natural Sciences, Kosovo
2 Departament of Physical Chemistry « Rudjer Boskovic» Zagreb, Croatia

meritame@gmail.com

Objective of this research was to analyze some environmental toxic elements in two thermal underground water resources of Kosovo: Thermal water of Kllokoti and Peja. For this purpose are used Differential Pulse Anodic Striping Voltammetry, DPASV, with HDME, and Multi Elementary Analyses with ICPMS. The considerable amounts of these environmental toxic elements are continuously emitted in environment from anthropogenic sources. Experimental results show that some parameters of water quality such as heavy metals concentration in the underground waters indicate tendency to increase, so we compare it with former experimental results. Eco toxic elements concentration in underground waters are compared with the results of surface waters, where anthropogenic effects aren't present. The main objective of this study could be also explained from the two important aspects: 1. Implementation of several methods with high technology equipments for detection of environmental toxic elements in traces working with extremily low concentrations. 2. Study guide (Data base) for our country in transition about the quality of natural water resources in Kosovo as human enrichment. Chemical monitoring of the water quality that exists in Kosovo underlines the necessity and importance of reliable potable water control to ensure that the tolerance limits for the various toxic elements are never exceeded and

are under control. In the end of whole project will be a message to authorities for preparing national waste management plan of hazardous waste and enforcement hazardous waste facilities.

Keywords: anthropogenic sources, DPASV, trace metals , monitoring, ICP/MS

712 Determination and the Chemical Characterization of Some Toxic Elements in the Water Resources of Lumbardhi River in Kosovo

Naser Troni, Hidajete Nikci, Fatbardh Gashi, Fatmir Faiku, Remzi Berisha

Departament of Chemistry, Faculty of Natural Sciences, Kosovo

naser_troni@yahoo.com

Generally, the surface waters in our country are permanent polluted and is the matter of fact that our cities are yet without any treating equipment program of urban and industrial wastewaters. The main goal of this research was to analyze some environmental toxic elements downstream the river were they end up as natural recipients. Development and modernization of new techniques of measurement are used successfully with very sensitive methods and new electrodes, to detect different chemical and physical forms of metal traces and distribution of their ionic species in the natural equilibrium of waters. Even these methods are based on chemical-physical treatment of champions by displacing certain metal concentrations of all forms through displacement equilibrium into free ionic metal statements, from analytical aspects determination of all active ionic chemical species in model systems is the real overview. The mass concentration of some eco-toxic elements of the river Lumbardhi are determined with DPASV and they are compared with the results of ICP/MS techniques. It is important to point the fact that also this river is permanent polluted from every kind of trash yard from urban centers, which are discharged in the river watercourse. The mass concentrations of lead, zinc and copper ions in the analyzed samples were evidently higher than their natural concentrations levels in these kind of water, while the cadmium ions were generally in their natural concentrations levels. Concentration of toxic elements which we received from surface waters are compared with the results received for the source where anthropogenic effects aren't present. (the part of river in the mountain).

Keywords: wastewaters, anthropogenic effects, trace, metals, river water, ICP/MS

728 Study of the Risk of Soil Pollution by Nitrates in the Irrigation of Orchards on Light Soils

Vladia Subkova 1, Evlogy Markov 2

1 Institute for Land Reclamation and Mechanization, Bulgaria
2 Institute of Soil Science, Bulgaria

vlpsubkova@mail.bg

The report examined the potential for contamination of soil and groundwater contamination by nitrates caused by agricultural sources, resulting from the application of mineral fertilizers in quantities exceeding the needs of the crops of nutrients. In the Bulgarian legislation, this problem is so regulated by the Nitrates Directive, implemented by Regulation - 2 of 16.10.2007, which the country is divided into zones with increased susceptibility to falling, and the Sofia field. Means the excess of nitrogen-execution of its plants, which is associated with economic losses for farmers and environmental risks. The high water solubility and weak retention of ammonium nitrate from soil to water washing and its removal in the groundwater. Experiments are conducted on fruit trees over cinnamon forest soils with FC = 21% to examine how the amount of absorbed N in the annual fertilizer application rate of two doses of 1 / 2 and compare with control in the general area in which it is submitted annually in late spring. The assessment was carried out by agrochemical analysis of soil samples. Depending on the size of the nitrogen amount NH4 + NO2 in the active soil layer 0-90 cm to judge the extent of absorption of the submitted amount of fertilizer solution and size of losses due to infiltration into the lower soil horizons. If any should be expected that nitrate contamination of not only soil but also the adjacent shallow groundwater, some of which are used for irrigation by drilling wells.

Keywords: Environment, nitrates pollution

726 A Modelling Approach to Assess the Lake Eutrophication Process: the Case-Study of Lake Pusiano (Italy)

Elisa Carraro, Diego Copetti, Franco Salerno, Gianni Tartari, Nicolas Guyennon, Lucia Valsecchi

Water Research Institute - Italian National Research Council (IRSA-CNR), Italia

carraro@irsa.cnr.it

This study is part of project called PIRoGA whose final goal is to understand the hydrological and trophic relationship between Lake Pusiano (Italy) and its catchment, supporting the restoration plan of the lake through field data analysis

and numerical models. In general the limnological evolution of this lake followed an increasing eutrophication process until 1980s, when the lake reached an hypertrophic condition (around 200 µg P l-1 at winter overturn). Subsequently the phosphorus concentrations continuously decreased, until reaching TP values close to 49 µg P l-1. Despite the nutrient reduction the Cyanobacteria contribution increased (Planktothrix rubescens). Our experimental evidences suggest the involvement of mechanisms already observed in other European lakes, such as the establishment of a metalimnetic niche. In particular this study describes the current lake conditions and the anthropic pressures determining its current ecological status. Through the application of the DYRESM model we predict the vertical profile of temperature, salinity and density, while CAEDYM model is used here to describe the ecological processes. The future aims of the project is to connect the in-lake and the catchment modelling in order to gain an integrated view of the lake-catchment ecosystem.

Keywords: Integrated watershed management, Eutrophication, Lake ecosystem model, External loading model, Lake Pusiano

733 Investigation of Waste Water Characteristics and Treatment Process for Coke Plant Wastewater of Steel Industry

Dunyamin Guclu, Nazan Sirin

Selcuk University, Department of Environmental Engineering, Turkey

bguclu@selcuk.edu.tr

The steel industries generate various waste waters during the manufacture and processing of iron. Cokes waste water is considered as the most toxic one to be treated before being discharged into the environment. During the coke production, a large quantity of waste water is discharged, making the coke industry one of the most serious polluting industries. The aim of this study is to investigate waste water characteristics and treatment process performance for Kardemir coke plant wastewater, which is one of the biggest steel industries in Turkey. By taking the conditions of current regulations and measures into account, the results were presented and discussed for comparison purposes.

Keywords: Cokes wastewater, Chemical oxygen demand (COD), Phenol, Waste water treatment plant

765 The Benthic Algal Flora of Sariyar Dam Lake, Ankara/Turkey

Sirin Dokcan, Cengiz Akkoz, Tahir Atici

Selcuk university, Science Faculty, Department of Biology, Campus-Konya, Turkey

cakkoz@selcuk.edu.tr

In this study the benthic algal flora of Sariyar Dam Lake were investigated in samples collected from different habitats (epipelic, epiphytic and epilytic), from seven chosen stations, between February 2009 and November 2009. The benthic algae of Sariyar Dam Lake composed of 66 algae species belong to Bacillariophyta, Chlorophyta, Cyanophyta and Euglenophyta divisions. It was identified that, in general, the members of Bacillariophyta division was dominant organism in Sariyar Dam Lake.

Keywords: Benthic algae, epilytic, epipelic, epiphytic,. Sariyar Dam Lake

736 Response of Phytoplankton Associations of Zavoj Reservoir (Serbia) to Seasonal Variation in Hydrochemical Parameters

Branko Miljanovic 1, Ivana Mijic 1, Vladimir Jovanovic 2, Sandor Sipos 1

1 Department of biology and ecology, Faculty of Sciences, Serbia
2 Petnica Science Center Valjevo, Serbia

branko.miljanovic@dbe.uns.ac.rs

The majority of lakes, ponds and reservoirs in Serbia is practically well investigated, yet a few studies deal with year-round variations of phytoplanktic associations, structure and dynamics. The aim of this research was to survey correlations between seasonal changes in physical/chemical parameters of water column in Zavoj Reservoir and the structure of phytoplanktic associations. Sampling of phytoplankton communities took place at four year-cycle points, some of which are usually neglected in analyses: October 2007 (autumnal mixing point), December 2007 (predicted ice-covered period, but there was no ice cover present), February 2008 (ice-covered period) and May 2008 (spring mixing period and predicted spring algal bloom period). Samples were taken with the plankton net, mesh size of 25 μm. The total number of phytoplanktic species obtained from samples was 49. The greatest species richness was found in December associations (27) and February associations (24). Seasonal dynamics of phytoplanktic functional groups was pronounced, with different ecological groups having dominance. Seasonal differentiation of phytoplanktic communities was correlated very significantly with

air and water temperature, which are most easily measurable and allegedly very important climatic seasonal differences. Very significant correlations of community structure were also observed with oxygen saturation and specific conductivity of water, and calcium concentration.

Keywords: phytoplankton, diversity, seasonal aspects, limnoecology

740 Water Quality of Mountain Springs and their Importance for the Construction of Local Water Supply

Bogoljub Antonic 1, Radoslav Grujic 2, Zoran Tegeltija 1, Bozana Odzakovic 3

1 University Apeiron Banja Luka, Bosnia and Herzegovina
2 University of East sarajevo, Bosnia and Herzegovina
3 University of Banja Luka, Bosnia and Herzegovina

antoni@blic.net

Water has priceless role for existence of human and entire vegetative and animal world, and it's necessarily to provide timely and permanent analyses of water quality from spring. Municipality of Sipovo with 180 registered springs and over the 50 local water supply systems represents exceptional quality of drinking water reach area. About 60% of population uses drinking water from main water supply system in municipality of Sipovo. According to results of physical, chemical and bacterial analyses, quality of this water isn't in order to strict international and local regulations. Currently 40% of population uses water from 12 local and 22 small individual water supply systems in Sipovo. Most of those local systems were built about 60 years ago, without project and technical documentation. Because of that it's very difficult to provide keeping of water supply network. Aim of this study is determining of prepositions and measures for improving existing state. In 2007. and 2008. samples of water were taken several times for bacterial, physical and chemical analyses. Samples were taken from 12 local water supply systems. It was found that 2/3 of samples were bacterial contaminated but samples were chemically correct according to actual regulative of hygienically safe drinking water. Neither, the conditioning of water and professional inspection of local water supply systems aren't ensured. There are several suggestions for improving water quality and water supply network. It's necessary to establish a proper function of water supply network, regular control of water safety and obligate consumers to pay for supplying water service.

Keywords: mountain springs, water quality

741 Characteristics of Deep Groundwater and Efficiency of Installed System for Drinking Water Treatment

Bogoljub Antonic 1, Slavica Grujic 2, Ljubica Vujicic 1, Bozana Odzakovic 2, Bozana Sovilj 1

1 University Apeiron Banja Luka, Bosnia and Herzegovina
2 University of Banja Luka, Bosnia and Herzegovina

antoni@blic.net

Hygieniclly safe drinking water, as vital component necessary for keeping personal and global hygiena, is an important precondition for good health. Most of towns in Vojvodina uses water from first underground layer. This water is chemically contaminated with organic materials such as Fe and Mg. Besides that, fresh water from wells has uncharacteristic color, smell and taste, and high concentration of ammoniac. According to actual regulations, this water isn't sanitary safe. Water supply system and drinking water quality of two towns in Vojvodina were analyzed. Water quality from springs is similar in both cases. In one case there is system of water cleaning - water treatment with KMnO4 and fluid Cl. After that, water goes through Kaligans' fast filters for Fe and Mg oxides removing from the water. In the other case, water doesn't have adequate treatment for cleaning and removing organic and inorganic materials. That causes problems of using water. Development of proper water supply system, building of system for cleaning underground water, phased reconstruction of existing and building of new distributive network have main priority in solving of this problem.

Keywords: deep groundwater, treatment system, drinking water

743 Rivers Pollution in Mitrovica City

Gezim Quna, Afrim Koliqi, Albana Kolioqi, Berat Sinani

Facutly of Mines and Minerals, Kosovo

albana_koliqi@hotmail.com

This scientific paper was worked in order to analyze the pollution of rivers in the municipality of Mitrovica. This scientific paper was worked in order to analyze the pollution of rivers in the municipality of Mitrovica. To get information for the current monitoring of water in the municipality and activities needed to be taken for an efficient monitoring of water pollution. The data from the National Public Health Institute in Pristina as well as water processing factory in Mitrovica Shipol-

show a concentration exceeding the highest permissible water pollution, not only for residential sites, but also in industrial parts. Values of items measuring pollutants in river Ibar, Sitnica, Lushta and Trepca exhibit the most polluted countries in the municipalities. Scientific research paper analysis has treated rivers: Ibri, Sitnica, Lushta and Trepca. The science paper includes three basic stages of study: a. Study field who had intended the definition of field points for water sampling for physico-chemical analysis of bacteriological from rivers Ibar, Sitnica, Lushta and Trepca. b. Preparation of physical-chemical analysis of bacteriological water samples in the laboratory. c. Interpretation and analysis study of field and laboratory study and relevant findings. d. Proposal safeguards the pollution of these rivers and water management in protecting gjeomjedisit factors in the Mitrovica region.

Keywords: Mitrovica river, chemical pollution, water pollution, physical, chemical, bacteriological analysis

745 Waste Management Strategies in Konya (Turkey)

Elif Gunduz 1, Ahmet Ziya Gunduz 2

1 Selcuk University Eng. and Arch. Faculty Department of City and Regional Planning, Campus-Konya, Turkey
2 Honorary Consul of Macedonia in Konya, Turkey

egunduz@selcuk.edu.tr

The pressure of human activities on the environment speedily increase with every passing day in the world and Turkey in parallel to rapid urbanization and population increases due to technological developments and industrialization. The increasing level of covering unlimited human needs by the aid of technology results in using natural sources more than usual and eventually producing more waste materials. Therefore, this situation considerably threatens the environmental and human health. The «sustainable development approach» formed by reducing the waste material production, preventing the extreme use of natural sources and recycling the wastes more efficiently has an accelerating progress on the world. In «sustainable development approach», the operations about having successful urban planning policies to develop local & urban planning abilities and increase the quality of the environment, the sharing of experiences related to tools and applied methods, the increase in using technology to protect the environment have great importance in considering the environmental and urban issues through an integrated point of view. Today, the industry in Konya City, one of the most important industrial and investment centers in Turkey, has nearly one billion dollars of exportation capacity to 106 countries with its huge industrial organizations and 32,000 small

and medium-size companies by making productions in machinery, chemistry, textile, automotive spare parts, electrics-electronics, foodstuffs, packing, casting, shoe making and glass industries. Despite this rapid industrial development, Konya Plain and underground waters are considerably contaminated due to the contaminating effect of industry. Unfortunately, required infrastructure facilities for the recycling or elimination of industrial wastes are not present. In this study, the waste management subject will be examined in private for Konya City in which the industrial intensity is growing up in every passing day, and the activities that should be performed on waste management will be evaluated among the integrated planning approaches.

Keywords: Konya, industrial waste material, sustainable development approach, Turkey

747 Distribution of a Stygobic Cructacean (Genus Metastenasellus) in the Underground Water of the Yaounde Area (Cameroun)

Tuekam Kayo R. P. 1, Zebaze Togouet S. H, 1, Nola M., 1
Foto Menbohan S. 1, Nzieleu Tchapgnouoj 1, Boutin C. 2

1 General Biolgy Laboratory, Fac. Sciences, University of Yaounde I. , Cameroon
2 Paul SabatierUniversity, Earth Ecology Laboratory, Toulouse, France

zebasehu@yahoo.fr

In order to determiner the distribution of Metastenasellus genus crustacean in the underground water of the Yaounde area, studies had been carried out from January to June 2007 on some wells and springs of two adjacent hydrological basin (Mfoundi and Mefou) in the Yaounde area. These studies were based on, the physicochemical charaterization of wells and springs water from the hydrological basin above mention, and the search of animals organisms living in those habitats. The physico-chemical analysis was done following the methodology described by APHA(1985) and Rodier (1996), where as the biological samples follow the techniques of Boutin & Boulanouar (1983).

The results revealed very low values of organic pollution and mineralization (BOD5, NH4+, PO43-, SS, dissolved O2 , TDS, Conductivity). It appears that underground water of the Mefou hydrological basin in less-polluted. This, because of the absence of domestic polluted sewage and wastes, stemming from anthropic activities, which get decompose and percolate biological analysis shows relatively high values of the abundance of Metastenasellus and the taxonomical richness. It has been noticed that the animal biodiversity is relatively high in the Mefou hydrogical basin.

It appears that ground water, which is more often the main source water for population should be control, and the physico-chemical parameters should de permanently monitored. The study of the aquatic fauna which can be obtained from wells and springs, could be a simple, cheap and efficient means to assess the quality of underground water.

Keys words: Stygobic, Crustacean, Metastenasellus, Underground water

748 Hydrological Alteration and Ecological Degradation of Wetlands in the Honghe Nature Reserve in the Sanjiang Plain, China

Luan Zhaoqing, Cao Huicong, Yan Baixing

Northeast Institute of Geography and Agricultural Ecology, Chinese Academy of Sciences, Changchun, China

luanzhaoqing@neigae.ac.cn

Due to the intense agricultural development in the surrounding area, the hydrological regime of wetlands in the Honghe Nature Reserve has been changed greatly. The original open hydrological cycle area has been changed into a closed hydrological area, and the original natural water resource from the Nongjiang River has been cut off. Therefore, the water budget components of the wetlands have been altered, and as a result, the degradation of ecological pattern of the wetlands occurred. This paper, based on the comparison analysis of the historical hydrological and climatic observation data and current monitored data, illustrated the alteration of the original hydrological regime from both human activities and globe change, and then explored the degradation trend of wetlands. Runoff data from a referenced river, Bielahong River, was used in the analysis as there was no long-term runoff observation in the Nongjiang River and a runoff model, IHACRES, was used to produce a natural runoff. It was found that human activity is the greatest factor that resulted in the hydrological alteration and ecological degradation of wetlands in this area. In the end, a hydrological restoration suggestion was put forward to eliminate the degradation of the wetlands in this reserve.

Keywords: Runoff, Evapotranspiration, IHACRES, Hydrological Alteration, Ecological Degradation

646 Impacts of Drilon Pump Station Water on Lake Ohrid

Arian Merolli 1, Robert Damo 2, Pirro Icka 2

1 KMPU bilateral Secretariat of the Lake Ohrid, Albania
2 Department of Agronomy, University Fan S. Noli, Albania

arianmeroli@yahoo.com

Improvement of water treatment systems to discharge on the Albanian side of Lake Ohrid, through implementation to be European Directive for the Treatment of Urban Water discharges (UEWWTD), is an objective to be realized up to 2010 to avoid eutrophication problems caused by human activity. In addition to numerous natural water sources which supplies the lake and improve its quality, is Drilon pomp station (hydrovor), built to remove the excess waters from the surrounding area peaty soils field. Besides this function, recently, was added hydrovor use for removal of water used to Pogradec city and surrounding villages after their treatment. Agricultural activity in the area of peaty soils, urban and industrial activity increase, and discharge of water used after its treatment are the main causes of water pollution left by hydrovor, which is a risk to water pollution of Lake Ohrid. In this paper will present some results of monitoring the level of various pollutants in water discharge by hydrovor and their impact on Lake Ohrid. This will help and to fulfill the obligations required by UNESCO for inclusion of the Albanian part of the lake under the Natural Heritage Monument Status.

Keywords: Water pollution, environmental risk, eutrophication

767 Preliminary Results on Cyanobacterial Survey on Doiran Lake - the Beginning of Revealing of the Ultimate Truth about the Lake's Water Quality

Lesoski Jovica, Zdravevski Nikola, Krstic Svetislav

Institute of Biology, Faculty of Natural Sciences and Mathematics,
"St.Ciril and Methodius" University, Skopje, Macedonia

skrstic@pmf.ukim.mk

Doiran Lake has been put in a position of ecocide back in 1988 when almost 1/3 of its waters has been removed for irrigation purposes. Since than the lake has lost almost all of its original bio components and has been transformed to a typical swamp ecosystem. The efforts to put additional waters in the lake from the wells in Gavato have not produced the expected results. Total lack of any relevant

monitoring system on the lake and its catchment reveals the full extension of the negligence for the lake and, more importantly, for the local inhabitants and their destiny.

Starting from February 2010, a WFD based monitoring system on Doiran Lake has been established with focus on the water quality and cyanobacteria. In monthly intervals, the comprehensive physic-chemical analysis and cyanobacterial taxa composition and abundance will be examined for 12 months, including water and sediments as well as toxin (hepatotoxin microcystin) productivity. Here we present the preliminary results on the whole range of parameters and overall water quality of the lake, toxin concentrations in water and sediments and genetic variability among the detected cyanobacterial taxa known as toxin producers. Authors believe that this research will be an important starting point for implementation of a regular monitoring system in the region and basis for development of a Watershed Management Plan essentially needed for more than 20 years regarding the improvement of the environmental quality and sustainable development.

771 Environmental Problems and Solution Suggestions for Meke Crater Lake

Senol Karaaslan

Selcuk University, Faculty of Communication, Department of Journalism, Campus, Konya-Turkey

karaaslansenol@hotmail.com

Meke Lake, included in Ramsar Agreement, is one of the most important wetland areas present in Turkey. Meke Lake, which is at eutrophic level, is a volcanic and brackish lake which is within the borders of Karapinar district 110km away from Konya. Meke crater Lake and its environment is a bird heaven which is called “blue bead of the world” and occurred after a crater explosion millions of years ago. It is one of the most important lakes in Turkey in terms of ecotourism. It was determined that there are approximately one hundred kinds of birds in the region.

In this study, it’s aimed to raise the awareness of public by searching the environmental problems that Meke Crater Lake has within global warming. The environmetal problems of the lake were determined by making investigations for 3 months between December 2009 and February 2010 within the scope of this study. A 40-minute documentary film was prepared which included the historical and ecological importance as well as these determined environmental problems of Meke Lake. It was aimed with this documentary film to display the present situation of Meke Lake and to create a database for the precautions that

will be taken by the authorized agencies and institutions. It was revealed that determination of the precautions aimed at the region should be performed in detail and actualized as soon as possible.

Keywords: Meke Lake, Environmenal problems, Documentary

772 Assessment of Biomarkers for Toxicity of the Danube and Tisza River Pollution: Histological, Morphological and Ecological Parameters of Sterlet (Acipenser Ruthenus L.)

Mirjana Lenhardt 1, Ivan Jaric 2, Vesna Poleksic 3, Dragana Djordjevic 4, Gorcin Cvijanovic 2, Bozidar Raskovic 3, Zoran Gacic 2

1 Institute for Biological Research, Belgrade, Serbia
2 Institute for Multidisciplinary Research, Belgrade, Serbia
3 Faculty of Agriculture, University of Belgrade, Belgrade, Serbia
4 Institute of Chemistry, Technology and Metalurgy, Belgrade, Serbia

Within environmental monitoring programs, the monitoring of biological effects is becoming an integral component and supplement to the more commonly used contaminant monitoring approaches. During the last few decades, a number of methods have been developed that are able to provide early warning about the consequences of the exposure to a wide variety of environmental contaminants. Such indicators are useful tools for the assessment of the effect that contaminants have on organisms, before the produced damage becomes irreversible. In this study, we have analyzed a number of different parameters of sterlet (Acipenser ruthenus L.) with the aim to use them as biomarkers in environmental monitoring programs for the Danube and Tisza River. Sterlet is a bottom feeding fish species with a direct exposure to contaminants from water and sediments, which makes it a good indicator of water ecosystems quality state. Research was performed during the period 2002-2008 in the Serbian and Hungarian part of the Danube and Tisza Rivers. Research included histopathological analyses of the extent and intensity of alterations in skin, gills, and liver tissue, as well as determination of concentrations of Ag, Al, As, B, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Mo, Ni, Pb, Se, Sr, Zn and Li in the sterlet muscle, gills, liver and intestine. Furthermore, general fish health indicators, such as Fulton condition factor (FCF) and hepatosomatic index (HSI), as well as parasite prevalence, intensity and the mean intensity, were analysed during an annual cycle. Results have revealed presence of significant differences in FCF, HSI and parasite prevalence and intensity among different months throughout the year, while the multi-biomarker approach showed differentiation among isolated sterlet populations in the Danube and Tisza River.

Keywords: heavy metals, sturgeons, histopathology, pollution

773 Structural Indexes on Gastropoda Fauna from Different Habitats of Lake Ohrid

Biljana Budzakoska-Gjoreska, Sasho Trajanovski, Sonja Trajanovska

Hydrobiological Institute, Ohrid, Macedonia

biljanab@hio.edu.mk

The class of Gastropoda from Lake Ohrid characterizes highest biodiversity as well as highest percentage of endemic and relict form in the frame of the whole benthic fauna.

The purpose of our researches was to determine the structural integrity of the Gastropoda populations that settle up different habitats during the different seasons using the indexes of diversity, richness and homogeneity.

The results pointed out that in the littoral and the sublitoral zones on the profile HBI-v.Radozda maximum values of the indexes are registered in February (H', Shannon-Wiener diversity index), March (J(e), index of homogeneity) and April (d, Simpson's Index).

In general, in the littoral region of Lake Ohrid, the diversity index (d) and index of homogeneity J(e), have close values; while the value of diversity index (H') is higher, reaching its maximum in the zone of macrophyte vegetation.

All three indexes for the Gastropod fauna in the littoral zone of Lake Ohrid, reach their highest values in the zone of macrophyte vegetation, while they are slightly lower in the shell zone, and on sandy bottom.

Keywords: Lake Ohrid, Gastropoda fauna, structural indexes

TOPIC 6

COMPUTING AND TECHNOLOGIES

037 Interactive Ground Water Data Processing and Presentation in Digital Format for Data Sharing

Jasminko Karanjac

Dr.Ivana Ribara 163, 11070 Beograd, Serbia

karanjac@yahoo.com

In a recent ground water project covering a transboundary area between Bulgaria and Romania in Dobrudja/Dobrogea, data collection and assessment was the key input to developing a monitoring programme, making a groundwater model, and to establishing a ground water information system (GWIS). All information from all institutions in both countries were compiled, analyzed, processed and presented as a Baseline Analysis Report (BAR). The report, produced on a CD with over 600MB of information, included all categories of groundwater, meteorological, climatological, water quality and water use data, many legal documents, various reports, GIS maps, etc.

The following categories of groundwater-related data have been compiled, analyzed, processed, turned into information, stored in a dedicated Ground Water Information System (GWIS), and presented as a Baseline Analysis Report:

-Lithology and stratigraphy of drilled formations (wells' database with over 800 wells);

-Groundwater quality (individual samples and time series most often in the interval from 1996 through end of 2006); lake water quality;

-Groundwater levels (hydrographs) covering at some sites the period from 1970s through today;

-Groundwater abstractions and water distribution;

-Meteorological data (rainfall, temperature, evaporation, etc.);

-Hydrological data (river discharge, lake levels, lake water storage);

-Legal data (water-related legislation);

-GIS layers, maps, various publications and professional papers, and other data.

The Baseline Analysis Report (BAR) was prepared simulating a web portal using the HTML allowing quick access to information uploaded to the CD. The output of the BAR was used as input to other project components (Monitoring, Modelling, and GWIS). The project's team was of opinion that data prepared in graphical formats, in maps, lithological logs and cross sections, as time series, etc. are of help in making assessments and interpretations of hydrogeology, water quality, and availability of groundwater resources and current use of groundwater resources. The data in an easily-retrievable format are of help in arriving at

conceptual model of the groundwater system. Thus, the information presented on the CD is considered "resource" information.
Clicking on any entry in a menu or submenu, information is retrieved either as a diagram, a map, a text, a document, etc. Mostly information is presented in graphical format as jpg files, diagrams, maps, photos, etc. Following links on the Main Menu, other information can be retrieved such as hydrogeological cross sections, groundwater quality, meteorological data, water levels in lakes and observation wells, discharge of rivers, various time series, and much more.

Keywords: Interactive data presentation, transboundary ground water, ground water data sharing

500 Water Distribution And Sewer System Modelling Like Prereasons of Succesfull Reconstruction / Rehabilitation

Dragan Milicevic 1, Slavoljub Milicevic 2

1 Faculty of Civil Engineering and Architecture, Serbia
2 "Hidrozavod" , Serbia

drgara@eunet.rs

Problems who were envolved in former praksis in water distribution and sewer systems are usually resolved with classical aproach wich includes exchange an existing parts of system or expanding system. Classical aproach include investment of high finantial resources and very often increase already existing or create new problems in water distribution and sewer systems. Necessery finantial resources for resolving problems in water distribution and sewer systems in this way, usually surpass available resources. In last twenty years big accent is on a new aproach of resolving problems by using new computer systems and technology. New aproach includes planning the development of water distribution or sewer systems could be based on analyzing complete system as in constructing and management structure. Detail analysis should show real flames and problems in the system and direct to rational approach of reconstruction/ rehabilitation or expanding the system. That way it shows rational functioning and economicaly and suistanable managing of water distribution or sewer system. According to the complexity of water distribution and sewer systems and big number of datas who are necessary for efficiant planning of developing system new aproach is based on use of simulation and optimisation models. Simulation and optimisation models of the system are expected to give informations who could be used for the needs of planning and bringing decisions before water

distribution or sewer system take any action, wich is very important for rational using of finantial resources according to any interventions on the system, specialy its expansion which neccesery includes high investments. This paper shows significant software packages wich used in water distribution and sewer systems modelling, principles, phases of model development and efects of its application. It shows the significants of application of simulation models for analyzing the conditions in water distribution or sewer system, specialy analysing the needs and justification of reconstruction/rehabilitation or expanding system, for example water distribution system of small cities in Serbia.

Keywords: water distribution and sewer system, system performance, simulation and optimisation model

759 Determination and Monitoring of the Open Pit Mining in Area by Using Satellite Images: a Case Study Can (NW Turkey)

Mulayim Gure 1, Cengiz Akbulak 2, Hasan Ozcan 3

1 Canakkale Onsekiz Mart Univ, Fac. Edu. Dept.
Computer and Instructional Technologies Education, Canakkale, Turkey
2 Canakkale Onsekiz Mart Univ, Fac. Art.and Scie. Dept. Geography Canakkale, Turkey
3 Canakkale Onsekiz Mart Univ, Fac. Agri. Dept. Soil Science, Canakkale, Turkey

mgure@comu.edu.tr

The aim of this study is to determine the land use/cover change on open pit mining area of Can. The study area is located between the latitudes of 39°50' to 40°16" north and longitudes of 26°58' to 27°22' east, northwest Turkey. In Land use/cover change studies remote sensing techniques are widely used.
In this study TKI CAN mining coal company where open coal mining is made was examined. Remote sensing method was used in examining the changes in 20 years' period. In this study, LANDSAT 1987, 2000 and 2007 satellite images were used. These years, studies done in the field of coal mining areas can be identified, 1987-2000, 2000-2007 and changes between the years 1987-2007 were determined. Changes were examined by change detection method.
According to the study results, it was observed that there was a great expansion in cool mining areas during all three periods. Drop in coal mining areas are mostly pasture and agricultural land. Therefore, between the years 1987-2007 farmland and pasture areas have narrowed. It was also determined that the change in the land use was dramatic after year 2000.

Key word: Change Detection, Open pit mining, Satellite Imagine

009 Modelling Wast Water Treatment Plant Efficiency, an Integrated Approach

Mrs Anjali Khambete, Robin Christian

S.V.NIT Icchanath,Piploat road,Surat,Gujarat,India

anjali_khambete3@yahoo.co.in

Man's desires for ultimate joy and comfort have led him to exploit nature's free goods to the extent of reducing its natural capacities for self stabilization. As a consequence of this outright disregard of the impact of these activities on the environment, numerous environmental problems have arisen. So today's need is to enhance the awareness among the people to maintain environmental quality. Evaluating the efficiency of wastewater treatment system often requires decision makers to consider conflicting, vague, and uncertain information. Fuzzy set theory offers a possible means of managing these kinds of data or information. This study, proposes a systematic approach to evaluating efficiency of waste water treatment system in a fuzzy environment. The approach employs three main concepts: linguistic variables, fuzzy numbers, and an analytic hierarchy process. The linguistic variables are used to represent the degree of appropriateness of decision criteria, which are vague or uncertain. These linguistic variables are then translated into fuzzy numbers to reflect their uncertainties and aggregated into the final fuzzy decision value using a hierarchical structure. Through a case study, the approach is applied to the evaluation of the efficiency of waste water treatment system consisting of three types of treatment processes, physical, chemical and biological. The results demonstrate that the developed approach can be a useful tool for evaluating the efficiency of waste water treatment system, where criteria are vague or imprecise.

Keywords: Evaluating the efficiency, linguistic variables, efficiency of waste water

011 Uncertainty of Satellite Estimates for Hydrologic Applications

Amir AghaKouchak

University of Louisiana at Lafayette,USA

amir@louisiana.edu

Hydrological and climate studies have long relied on rain gauge measurements. While rain gauge measurements do not provide reasonable areal representation of rainfall, remotely sensed precipitation estimates offer much higher spatial

resolution. Recent advances in the field of remote sensing have led to an increase in available rainfall data on a regional and global scale. Several NASA sponsored satellite missions provide valuable precipitation data. However, the advantages of the data are limited by complications related to the indirect nature of satellite estimates. This study introduces a stochastic model for uncertainty analysis of satellite rainfall fields for hydrologic applications. The presented model is implemented over a large area across the North and South Carolina. The results show that the model can be used to describe the uncertainties associated to satellite precipitation estimates.

Keywords: Rainfall satellite data hydrologic modelling

013 Evaporation and its Evaluation on the Albanian Territory

Aferdita Laska (Merkoci), Miriam Ndini (Bogdani), Mirela Ndrita

Institut for Energy, Water and Environment (INEUM), Albania

aferditamerkoci@yahoo.it

Many particular studies are made in Albania to evaluate the evapotraspiration. This paper is an attempt to present a general evaluation of the evapotranspiration in Albanian territory, including the evapotranspiration regionalization.
Evaluation and computing of evaporation, it's a principal and very complicated problem because of natural specific conditions of Albanian territory (mountainous regions, lake system present, Mediterranean climate, etc.)
It is evaluated using multi-annual archival information of the Hydrometeorological Institute.(now INEUM)
Evaporation is evaluated by computing its principal components, such as: potential evapotranspitarion - Ep, real evapotranspiration - ER, evaporation deficit - ΔE, pluviometric deficit - Δ x, and water flow deficit - Z0.
Evapotranspiration evaluation in the Albanian territory is calculated by different ways, such as: 1) water balance method; 2) direct observed method, and 3) indirect calculating method using empiric formulas.
Division scheme of Albanian territory in homogeneous regions based on evaluation and determination of the natural factors that influence on evapotranspiration process is presented in this paper. Analyzing and dividing the Albanian territory, in homogeneous, region is accepted as the smallest tacsionometric unit. As the result of the specific physicogeographical conditions of Albanian territory, the principal nature factors that influence on the ecotranspiration processes are: a) climate regime and b) morphometric conditions of the territory.

Evapotranspiration and territory altitude dependence subdues the vertical zonal law, having e typical regional character. Using these dependences, the evapotranspiration maps are made for the Albanian territory.

Keywords: Potential evapotranspiration, real evapotranspiration

014 Estimating Reference Evapotranspiration Using Two Different Models of Penman-Monteith Method for Climatic Conditions of Albania

S. Grazhdani, A. Ahmeti

Agricultural University of Tirana, Tirana, Albania

spiro.grazhdani@yahoo.com

In this study two different models of Penman-Monteith method are used to estimate grass-reference evapotranspiration (ET0) over a range of climate at six locations based on hourly and 24 h weather data: FAO-56 Penman-Monteith (FAO56-PM) and standardized ASCE Penman-Monteith (ASCE-PM). Hourly ET0 computations were summed over 24h periods and reported as sum-of-hourly. The sum-of-hourly ASCE?PM ET0 values (ET0,h,ASCE) were compared with the 24 h timestep ASCE-PM ET0 values and with the sum-of-hourly FA056-PM (respectively ET0,d,ASCE, ET0,h,FAO56). The ET0,h,ASCE values were used as the basis for comparison. The values ET0,h,FAO56 correlated well with values ET0,d,ASCE (r2= 0.994), but estimated lower than ET0,h, ASCE at all location by 4% to 9%. This was due to the impact of higher surface resistance during daytime periods. Summing the ET0 values over multiple days and longer periods for peak ET0 months resulted in inconsistent differences between the two timesteps. The results suggest a potential improvement in accuracy when using the standardized ASCE-PM procedure applied hourly rather than daily. The hourly application helps to account for abrupt changes in atmospheric conditions on ET0 estimation in advective and other environments when hourly climate data are available.

Keywords: Albania, climate, evapotranspiration, Penman-Monteith.

026 Performance Evaluation of Agnps Model on Steep Slopes by Means of GIS

Halit Apaydin, Fazli Ozturk

University of Ankara, Turkey

apaydin@agri.ankara.edu.tr

Non-point source pollution has become a significant topic for several researches and these researches have revealed numerous models and modelling techniques. In this study, commonly used rainfall-runoff-erosion model (AGNPS-Agricultural Non-Point Source Pollution Model) was examined to investigate its applicability on steep slopes. The use of GIS to improve the efficiency of the model was also considered. The data collected for this study were from the Guvenc basin which covers an area of about 16 km2 in Ankara, Turkey. It has a high slope (up to 49%) and sediment yield ratio (35.83 t/ha/year) compared with Turkey's average of 2.18 t/ha/year. The annual average rainfall is 562mm, with an average temperature of 11.7 ^{o}C, and relative humidity of 62 percent.
The Guvenc basin was divided into 52 subbasins by GIS software considering topography. Beside determination of watershed area and subbasin boundaries, also contributing cell, subbasin which cell includes, cell area, average elevation, slope, aspect, topographic factor, flow length, flow slope, concentrated slope and concentrated length was determined by GIS. Model predictions were compared with measured data between years of 1997 and 2000. During this period annual average rainfall was 562.3mm and surface runoff was 176.7mm. AGNPS, predicted 166.5mm surface runoff at that time period.

Keywords: AGNPS version 2001, GIS, Guvenc basin, runoff, steep slope, topography

033 Climatic Risks and Informational Database

Maria Nedealcov

Institute of Ecology and Geography, Academy of Sciences, Republic of Moldova

marianedealcov@yahoo.com

Climatic risks intensity and frequency growth in the past few decades demands using a vast informational database that would allow identifying their regional manifestation particularities adequately In this sense, Geographical Informational Systems ensure simultaneous access to informational database on different level

(world, regional, local), obtaining operatively complex analysis of risks under investigation. Keeping in mind that in most cases climatic risks have regional character of manifestation, the actual investigations are of great scientific interest, as they can be useful for comparison with the researches executed abroad.

Keywords: risk, vulnerability, Standardized Precipitations Index, informational database, GIS, risks identification criteria

034 Decision Support System (D.S.S.) for Regional and National Water Supply Planning

Eilon Adar, Nehemiah Hassid

Ben Gurion University, Zuckerberg Institute for Water Research, Israel

eilon@bgu.ac.il

Planning a new or additional regional water supply system involves the processing of a huge number of parameters, optimizations and the selection of the best between various alternatives. The presented research project suggests a hydro-economic assessment and cost model, consists of specific tools and methodologies for a computerized economic assessment of various scenarios of water supply and demand. These tools assist in computing costs and benefits, as well as finding optimal solutions for defined demands. The computerized tools enable the establishment of rapid comparisons between dissimilar backgrounds, at different periods of time, under various assumptions, granting the selection of the best cost-benefit solution from a set of alternative feasible systems, which meets the defined demand and time requirements. Such tools may serve as a Decision Support System (D.S.S.) for regional and national water supply planning. The newly developed model was tested on four hypothetical scenarios of freshwater production, based on real data from the Negev Highlands, illustrating the model's ability to integrate various hydrological and technical components with variable weights and roles within the water distribution system. With the appropriate adjustments, the model might be applied to other areas with similar climatic properties. Each of the four scenarios emphasized one or more of the following items: depth of aquifer, groundwater quality, reverse osmosis (RO) desalination plant, water distribution distances, energy, production rates and demand in terms of quantity, quality and pressure. The model selected the less expensive scenario, able to supply the defined demand. The main factors that affected the cost of water have been found to be:

- The cost of desalination as a function of the chemical content of the raw water;

- The cost of disposal of the brine produced by the desalination as a function of the disposal method ;

- The cost of energy (pumping, desalination).

Keywords: Decision support system, cost model, desalination, brackish water, water supply

039 Remote Sensing for Land Application - Wildfire and Drought

Antoaneta Frantzova

Aerospace Monitoring Center, Bulgaria

afrantzova@abv.bg

Aerospace Monitoring Center (ASMC) at the Ministry of emergency situation was established in the middle of the 2007 year. The Center is the first ever existed structure in the country which is equipped with real time data acquisition systems from earth observing satellites and its main aims and tasks are focused on monitoring, risk and disaster analysis as well as damage assessment. The center is equipped with two receiving satellite ground stations (one for NOAA - AVHRR and Feng-Yun - MVISR, and second for TERRA/Aqua - MODIS) for real time data receiving and processing. For a first time in Bulgaria sophisticated software program that detects and monitors wildfires based on data received from satellites is installed in ASMC . The Software downloads real time, high-resolution data directly from the satellites and uses the powerful software to process the data into maps that show the location and estimated size and intensity of wildfires. Also, full suite of algorithms developed by the NASA MODIS Science Teams for Level1, Level2 and Level3 processing are installed in center. Algorithms are divided in 3 groups - Land, Atmosphere and Ocean. The report deals with the methodology for detecting and monitoring of wildfires and drought with remote sensing data. For fire and drought detecting and monitoring we use:
- Data from NOAA - AVHRR and TERRA/Aqua MODIS,
- Data published in EOWEB, - MODIS Land Algorithms,
- National database and spectral library for vegetation index and agriculture data for the last 10 years .
The database contains data about land cover and agriculture crops and can be used for drought assessment and analysis and also for estimation of "the best" and "the worst" years concerning agriculture.

Keywords: satellite remote sensing, land, fire, drought

042 Classification of Day and Night Stability Indexes of the Atmosphere over Bulgaria Using Remote Sensing

Magda Bozhkova

Aerospace Monitoring Center, Bulgaria

magdasvbo@abv.bg

Research of the atmospheric stability, using remote sensing, is now possible in Bulgaria thanks to the ground based station of MODIS data. The algorithm MOD07 - "Atmospheric Profiles", established by NASA MODIS Science Team provides information for the profiles of the temperature and the dew point, as well as for three stability indexes: Lifted Index, K-index and Total Totals. The main advantages of these data are: (i) they are available day and night, up to eight times in 24-hours (ii) all the data are available in 5x5km grid; (iii) all the data are available in real time; (iv) for many regions of interest these satellite data are the only source of information. A first attempt for a classification of the stability indexes over Bulgaria based on MODIS data is presented in this report. Most of the existing classifications used in North America and Europe are not applicable for Bulgaria. For this reason an effort is made for detailed analysis of all three indexes together. Moreover, special attention is paid to night images, which are more important for now-casting and forecasts, especially when it is about non-frontal processes with developing of Cumulonimbus and probability of thunderstorm activity summer-time.

Keywords: remote sensing, atmosphere, Lifted Index, K-index, Total Totals

045 Determination of Discharge by Entropy Concept in Natural River

Mehmet Ardiclioglu 1, Huseyin Bilgin 2

1 Erciyes University, Department of Civil Engineering Erciyes University, Kayseri, Turkey
2 Department of Civil Engineering, Epoka University, Rruga e Durresit, Tirana, Albania

mardic@erciyes.edu.tr

Determination of flow discharge is most important for different demands such as water management, water supply, pollution control, irrigation, flood control, energy generation, and industrial use. The classical methods such as empirical formulas including much elusiveness and velocity samples requires a great amount of time and effort. In this study, flows discharges in natural rivers have

been investigated by using entropy concept together with measuring data by Acoustic Doppler Velocimeter (ADV). Field measurements were undertaken on the River Kizilirmak basin, which flows through the central Anatolia in Turkey. The classical methods and entropy method are compared with discharge calculating and found that entropy equation gives good results and application of this method is very easy for natural rivers.

053 The 3 Dimensional Presentation of Geo-Hazards in the Track of Vermice-Merdare Highway

Zenun Elezaj, Berat Sinani

F.M.M., Mitrovica, Kosovo

zelezaj@kosovo-mining.org

Geohazards in general and especially for Highway Vermice-Merdare are widespread phenomena that are related to geological and environmental conditions and involve long-term and/or short-term geological processes. Geohazards can thus be relatively small features, but they can also attain huge dimensions and affect local and regional socio-economy to a large extent. Evidence of geohazards in geohazards map is a necessity to minimize the losses that may be caused by these phenomena. The presentation of different geological processes, their interpretation in 3Dimensional model is more than necessary, to enable real image to these phenomena, which enables and facilitates the protection of these quite dangerous processes.

Identification, description and evidence of geo-hazards phenomena is a very important factor, which is successfully performed during the compilation of geo-hazard map for Vermice-Merdare highway. The most interesting phenomena will be identified for the needs of this paper, which will be recently analyzed by taking all required information. In this paper the geo-hazard phenomena which are of a high probability will be interpreted and will be presented by 3D with animations the succession of probability of their location and chronology. 3D presentation will enable the recognition of the complexity of these phenomena and at the same time will reduce the risk from them.

Keywords: Geo-hazards, 3Dimensional Interpretation, Highway

078 Development of the Hydrological Model for the Upper Vit Watershed by HEC-HMS with Regard to Identification of Missing High Waves

Plamen Ninov, Tzviatka Karagiozova

NIMH-BAS, Sifia, Bulgaria

ninov.plamen@gmail.com

Hydrological modelling system HEC-HMS is created to simulate the precipitation -runoff processes in dendritic watershed systems, rendering an account of existing processes of evapotranspiration, snowmelt, infiltration losses, baseflow contribution and transformation of excess precipitation into surface runoff, separated in different modules. The hydrographs simulated by the modelling system enable to asses the water resources in the studied watersheds and sub-watersheds, to asses the high waves characteristics, including quantitative as well the meteorological characteristics raising the extreme hydrological events. The usage of the hydrological modelling platform HEC-HMS is preceded by the analysis of the digital terrain information by mean of GIS programs and tools determining and transforming the drainage paths and watersheds and sub-watersheds boundaries in a hydrological structure that is a basin response to the meteorological conditions setting up the river runoff. Through a calibrated and validated working model for the studied region of Upper Vit watershed and on the base of a long term historical meteorological and hydrological information at the National Institute of Meteorology and Hydrology - BAS has been identified the probable periods of "missed" high waves not comprised by the monitoring observations. In the material the different selected transform and routing methods, the base flow determination and infiltration losses approaches are discussed. The developed working hydrological model for the Upper Vit watershed can be used for further hydrological comparisons between the measured hydrological data and simulated ones on the base of the available meteorological information and for the restoration of missing data.

Keywords: hydrology, modelling, high waves

081 Rule Curves for Sluice Gate Operation and Water Level Management in Lake Micro Prespa

George Parisopoulos 1, George Sapountzakis 1, Pantazis Georgiou 2, Maria Giamouri 1, Myrsini Malakou 3

1 Institute of agricultural Machinery and Constructions (IAMC) / National Agricultural Research Foundation (NAGREF), Greece
2 Aristotle University of Thessaloniki, Greece
3 Society for the Protection of Prespa (SPP), Greece

iamc@ath.forthnet.gr

Micro Prespa is an international, natural lake shared by Greece and Albania, with great ecological value. It forms the upper part of a larger hydro-system, also including lakes Macro Prespa and Orchid. The annual max and min of lake level, the pattern of the temporal variation and the rate of rising or dropping, decisively influence important ecosystem's processes and characteristics. Current water level management plan - to sustain lake's good ecological status and local economy - requires the maintenance of a stable level at high elevation (+850,60m to +851,00m a.s.l.) during the vernal period followed by gradual lowering not exceeding a specific rate. Water level control according to the management plan is achieved by four sluice gates at Koula, regulating the outflow discharge to Macro Prespa. The discharge is calculated according to the lake's elevation and the gates dimensions and openings. Two different discharge flow patterns may occur according to opening of the gates namely free overflow for fully open gates and orifice flow for partially open gates. For each flow condition the discharge and the associated lake level drop are derived with the use of a set of curves, developed for the specific level control structure. The developed rule curves allow a quick and reliable estimation of the impact, on the lake level, of various scenarios for gates operation. They were then used, in a simulation of water level control via gates operation, for two hydrological years 2004-2006. The decisions on opening or closure of gates during the simulation run were taken with the aid of the rule curves by non specialists. The results obtained were successful and currently these curves are used in real time operation.

Keywords: Micro Prespa

084 Review of Present Rainfall-Runoff Modelling Processes, Leading, Possibility of Developing Decision Support Systems

Vaibhav Gosavi

IIT Roorkee, Dept. of Hydrology, Indian Institute of Technology Roorkee, India

vaibhavgosavi8@yahoo.co.in

Rapid development in computers and information technologies leads researchers to model a very complex process of rainfall-runoff very accurately. This leads to new horizon in water observation and information systems for the betterment of mankind. Aim of this paper was to critically review present rainfall-runoff models, software developed to simulate this process and then presenting the scope and suggestion for making a well comprehensive, easy-to-use decision support system (DSS) for water resources development and management. Rainfall-runoff modelling is an important aspect of hydrologic analysis and design. It is believed that about 325 years ago, the rainfall-runoff study begun with quantitative measurement. Since then historical developmental works in the field of rainfall-runoff modelling took place which is still continuing. Author here review different methods for computing runoff from rainfall, their approaches, data requirement, limitations and advantages over one other, some of them are rational method, black box and stochastic models, conceptual model, physically-based distributed models. Approaches such as popular SCS-CN method, AGNPS, CREAMS also reviewed. Then software like HEC-HMS, SWAT, MIKE-SHE also reviewed. Recent development such as Remote Sensing and GIS has witnessed a phase transition from resources mapping to decision-making. This paper present the scenario of whole rainfall-runoff process and use of advance techniques which helps in simplifying the process and by-then giving scope and suggestion to develop a decision support system for a particular region. At the end author gave a complete overall process of development of decision support system (DSS) from the available resources and models with subparts of the system, connecting link between various process, limitation of various models, suggestion for future development of decision support system (DSS) to assist government agencies and river-basin commissions etc., in decision-making for the efficient management of water resources in terms of both quantity and quality. Keywords: Rainfall-runoff, Decision Support System, Remote Sensing and GIS.

Keywords: Rainfall-runoff, Decision Support System, Remote Sensing and GIS.

089 Filling Gaps and Disaccumulation of Precipitation Data for Rainfall-Runoff Model

Mauricio F. Villazon, Patrick Willems
Katholieke Universiteit Leuven - Belgium
Mauricio.Villazon@bwk.kuleuven.be

Precipitation data is one of the most important inputs in rainfall-runoff models. Long records often contain gaps and need to be filled. For the present paper linear regression and multiple linear regression techniques are applied for the estimation of monthly precipitation. For the multiple linear regression technique the tool called HEC4 developed by the U.S. Corps of Engineers is used. The disaccumulation from monthly to daily time scales was done assuming that each station has the same distribution of daily precipitation intensities as the recording station with the highest correlation. The study area considered for this study is part of the Pirai River basin located in Santa Cruz-Bolivia, which is a tributary of the Amazon River. The available data consisted of 33 daily rainfall stations where 8 have more than 25 years of recorded data. These data have been collected by the regional meteorological and hydrological services SENAMHI* and SEARPI**. The spatial distribution and the range of altitudes of the stations are quite high (334m a.s.l. to 1875m a.s.l.). The rain gauge density for the study area is 81.97 km2 per station. The gap filling techniques were evaluated based on 32 months extracted from the recorded data. The evaluation was done for 6 days, 3 days and 1 day of disaccumulation period. The multiple linear regression technique applied for the monthly rainfall estimation gives us an important reduction (36%) in the Standard Deviation and Root Mean Squared Error over the linear regression. It is observed that the accuracy of the disaccumulated results decrease when the period of accumulation is smaller. At the daily time scale, the multiple linear and linear regression methods have similar performance.

Keywords: Pirai River, linear regression, multiple linear regression, disaccumulation, error reduction

096 Water Data Management / Dissemination for Sustainable Water Management in New South Wales

Kandasamy Kuhan, John Hayes

NSW Office of Water, DECCW, Parramatta, Australia

Kandasamy.Kuhan@dnr.nsw.gov.au

In the most populous state on the driest inhabited continent knowledge of the available water resources is critical. Water data collection started in NSW in the early 1800's with the establishment of stream gauging stations along major rivers in NSW, mirroring the development of population centres and early records from artesian bores. To undertake its current water management obligations the Office operates four major data collection programs; surface water, groundwater, water quality and biological and water usage.

The value of this water data increases with its use and the NSW Office of Water, has been pre-eminent in both the collection, management and the dissemination of water data in Australia. In December 2009, the Office will be releasing the 20th anniversary edition Pinneena Continuous Monitoring DVD which contains a complete copy of its hydrometric archive for some 1200+ sites along with software tools to display, extract and analyses the data. It provides construction and lithographic details of its over 100,000 registered bores plus water level information form the over 5,000 monitoring bores on its Pinneena Groundwater CD. It also provides access to "real" time data from over 700 sites from its WaterInfo web site which has been in operation for over 10 years, and its newly released Real Time data web site. The paper will examine the methods the Department uses to determine what data is collected and from where and examine some of the latest technologies the Department is using to make this information available to the widest possible audience.

Keywords: NSW, Groundwater

098 Modelling Tools from Sweden to Pan-European Scales for European Water Framework Directive Data Requirements

Chantal Donnelly, Joel Dahne, Jorgen Rosberg, Johan Stromqvist, Berit Arheimer

Swedish Meteorological and Hydrological Institute, Sweden

chantal.donnelly@smhi.se

In Sweden the Meteorological and Hydrological Institute (SMHI) is responsible for delivering high-resolution data to water authorities, to support their work on characterisation of water body status, establishment of environmental goals, remedial measure planning, and development of monitoring strategies to support the European Water Framework Directive (WFD). A high-resolution hydrological and nutrient model, S-HYPE, was developed for the Swedish landmass. The SMHI has also set up a similar high-resolution hydrological model for calculating discharge across the European continent (E-HYPE) and furthermore, to calculate nutrient fluxes across the Baltic Sea catchment area (Balt-HYPE). These models and S-HYPE may be used in the appropriate region for characterisation of water body status, establishment of environmental goals, remedial measure planning, and development of monitoring strategies to support the WFD. This is necessary as most waterbodies do not have monitoring programmes, and modelled data is used for expert judgements. The applications were set-up using the HYPE model, a new, daily time-stepping hydrological model (Lindstrem et al. 2009) using readily available regional databases for model input and evaluation. The model applications are used to assess, at high-resolution, discharge variables, nutrient loadings and source apportionment. The applications describe present climate variability, closely linked to observed data where such is available, and can also be applied using climate model data to predict future conditions. Results were compared with published values for a wide variety of locations within the model domain for evaluation purposes. Comparisons indicate that S-HYPE, E-HYPE and Balt-HYPE are useful tools for evaluating hydrological and nutrient fluxes. Examples of model performance will be given for various scales, as well as some preliminary results of climate change impact on different variables. The approach could be exported to other European countries in cooperation with local authorities.

Keywords: WFD, nutrient moddelling, large-scale, high resolution

106 Novel Membership Function in Process of Building Pattern Trees from Diatoms Community in Lake Prespa

Andreja Naumoski, Kosta Mitreski

University Ss. Cyril and Methodius, Faculty of Electrical Engineering and Information technologies, Macedonia

andrejna@feit.ukim.edu.mk

In the process of induction pattern trees the first part of the algorithm transforms the input set from crisp values into fuzzy values and then the algorithm proceeds to build pattern trees. This is achieved by using different membership functions, which have different shape and mathematical description. Later in the induction phase this will have effect on the process of building pattern trees, effecting on their accuracy and complexity of the tree. This paper further extends pattern trees membership function (by implementing modified bell membership function) used to convert crisp value into fuzzy term, one of the essential steps in the process of building pattern trees. The novel function that is put on test, have advantage of being smooth and nonzero at all points over the triangular and trapezoidal function that were used before [1]. The experiments on diatoms datasets water quality (WQ) classification dataset from Lake Prespa show that bell membership function pattern trees outperform pattern trees which use trapezoidal, triangular or Gaussian, and both of them is better than the pattern tress using the three above membership functions in terms of prediction accuracy. Finally, a evaluation performance analyse of the pattern trees is revealed via diatoms dataset analysis is discussed and the research direction is outlined.

Keywords: pattern trees, membership functions, diatoms abundance, accuracy

122 Application of GIS For Modelling Runoff Generation in Urban Catchment, Jimma, Ethiopia

Ashenafi Seifu Gragne

Jimma University, Jimma, Ethiopia

ashenafi.seifu@ju.edu.et

Built in environments are usually subject to rapid land use changes which result in changes in runoff generation. The subsequent common challenge in urban hydrology is in predicting the associated change on degree of catchment response, which is determining flood magnitude versus return period relationship and the subsequent choice of a design flood. This paper presents a study conducted in a developed urban environment of 10 ha in South-western Ethiopia. In determining

response of the catchment using the SCS curve number method, analysis of the governing spatial variables was carried out on Geographical Information System platform using the Spatial Analyst Tools. Versatility of the GIS platform assisted in reducing the length of time required to carryout spatial analysis and also helped to give clear picture of spatial variation of the catchment response over Jimma City.

Keywords: GIS, runoff modelling, urban catchment, Jimma

128 Water Distribution Systems. Design, Operation and Upgrading Procedures Performance Indicators

Manuel Malafaya-Baptista

Universidade Fernando Pessoa, Portugal

manuelmalafaya@clix.pt

Water distribution systems (WDS) design (namely looped network systems) has been traditionally performed based on a static approach on the results of the 'normal' hydraulic performance of the pipes to satisfy the consumptions (quantified by demands on the nodes of the network) and subjective criteria for pipe diameter sizing. 'Abnormal' situations (as pipe failure scenarios) consequences in the performance level of the system (mainly in the changes in the pressure in the nodes of the network) usually are not analysed and evaluated. The present work describes new different alternative procedures to eliminate this lack in the information needed for an efficient operation and eventual upgrading of an existing water distribution system, as follows: i) Maximum entropy flow pattern methodology; ii) Pipe diameter resizing methodology; and iii) Double pipe network layout methodology. The description is based on a case study (looped network with 9 loops, 16 nodes, 24 pipes). Pipe failure scenarios and its hydraulic consequences (flow pattern changes in the pipes and energy losses between source nodes and demand nodes) are studied and the obtained results are used as essential information for the further stages of the proposed alternative methodologies. An exhaustive comparison between the traditional approach and the alternative methodologies is made, using numerical and graphical indicators of the obtained performance levels for each of the analysed scenarios. The obtained results allow to present a matrix of 'costs-benefits' objectively grounded, which allow a more coherent comparison of the alternative solutions studied for the WDS.

Keywords: Entropic flow, Pipe resizing, Double pipe layout, Performance indicators

133 Reservoir Cleaning Without Turbidity Effect

Klas Lange

Weda Poolcleaner AB, Sweden

klas@weda.se

The Weda VR-600 under water cleaning robot enables you to remove bottom sedimentation in drinking water reservoirs, including water towers, without creating any turbidity. This makes it possible to clean the reservoirs without any interruption to the water distribution since the reservoir can be kept on-line (in-duty) during the entire cleaning operation. The VR-600 is a remote controlled under water cleaner vehicle equipped with a strong on-board submersible pump connected to a discharge hose. The sediment is released from the bottom with separately controlled brushes on the vehicle and then sucked out through the submersible pump. The VR-600 is today introduced in 5 continents and is used not only in drinking water applications but also in industrial applications. Weda offers a wide range of under water cleaners for various applications. The common target is to offer cleaners that will do a good under water cleaning job without adding any chemiclas and with minimal waste of water. For further info please visit www.weda.se or contact Weda directly at info@weda.se

221 Autoregressive Modelling and Investigation Changes of Monthly Streamflow of Firtina Stream in Turkey

Meral Buyukyildiz, Ali Ihsan Marti, Volkan Yilmaz

Selcuk University, Eng. Arch. Faculty, Civil Eng. Department, Turkey

meralbyildiz@selcuk.edu.tr

Although water resources projects have long economic life, the uncertainty during the decision-taking stage of the water resources projects having rather short-term observations increases. When necessary long-term streamflow data for the reduction of this uncertainty could not be determined, the generation of new samples will be possible only by using modelling methods. More accurate decision-taking will be possible by selecting the most appropriate model to define the time series and generating more realistic and liable scenarios directed towards the future. Operating with the hydrological and meteorological data for the design purposes of water resources and using them as the basic input of the models have great importance. Since these data naturally have random characteristics, their estimated future values can be only determined by the help of the probability and statistical principles. In this study, non-parametric Sen's t-method was used

to investigate the changes in the monthly average streamflow data of No.2232 streamflow observation station at Firtina Stream existing inside the Scattered Eastern Black Sea Waters Basin and autoregressive models were developed to make monthly estimations for the future. After using Maximum Likelihood Method for the parameter estimation of these models, Akaike Information Criteria Test was applied to select the most appropriate method with the Portmanteau Test that examined the internal dependency of the residual series. Synthetic series having the same length with each streamflow series were generated by using the selected models. AR (1) model was determined to be the best model representing the monthly streamflows of the Firtina Stream due to the harmony provided between the generated series and the measured historical series at the end of the controls. An evaluation was made about the performance of the obtained model according to the determination coefficient (R2) defined by considering the streamflow estimation error.

Keywords: Trend, Autoregressive, Firtina, Stream, Maximum Likelihood Method

143 Creation of Add-Ins for Geostatistic Applications

Berat Sinani 1, Bahri Sinani 1, Imer Preteni 2, Sami Preteni 2, Bedri Beqiri 3

1 Faculty of Mines and Minerals, Kosovo
2 Ministry of Education, Science and Technology, Kosovo
3 ICMM, Kosovo

berat_sinani@hotmail.com

Compilation of extra components for geostatistical needs is essential. We have worked on some additional components through which we will automatically solve a lot of geostatistical problems which require lot of resources and a lot of work for solving these problems. The methodology chosen for this was to make it easier and simpler for the clients to use these components that are easy to use. These components are written in VBA and are fully-compatible with Microsoft Office package, and can directly solve lot of geostatistical problems with these applications. All of these geostatistical problems that we have created add-ins for; we have tested them also with other applications which gave us very accurate results same as the results which we got from other applications. These components are tested and are ready to be used in Microsoft Word 2003, Microsoft Excel 2003, or higher. A fifteen-day trial version of these components is available, whereas the full package can be purchased.

Keywords: add-Ins, Microsoft Office, Microsoft Word 2003, Microsoft Excel 2003, VBA, Easy to Use

151 One-Dimensional Unsteady flow Model in the Non-Prismatic Butoniga Channel

Elvis Zic 1, Nevenka Ozanic 1, Mijo Vranjes 2

1 Faculty of Civil Engineering University in Rijeka, Croatia
2 Faculty of Civil Engineering and Architecture University in Split, Croatia

elvis.zic@gradri.hr

The Butoniga channel, as a drainage - retaining channel of the Botonega accumulation is a typical and complex trapezoidal earth channel with inundations on both sides that can be found in most water-managing solutions in Croatia. Within hydraulic interrelationship research, this channel is appropriate for the performance of several series of water measurements with different discharges in unsteady conditions. This is particularly important for the analysed section of the Butoniga drainage - retaining channel for practical reasons,, that is, for the purpose of establishing the maximum capacity of the channel in terms of evacuation of high waters. On the basis of the numerical model of one-dimensional unsteady flow, created in the software package MIKE11, we can determine all kinematical and dynamic characteristics of the Butoniga channel and simulate or identify channel spillways. The article defines ruling equations for the modelling of 1D unsteady flow in the Butoniga channel and the algorithm for determining the coefficient of roughness. Furthermore, the most frequent methods for defining the numerical schemes for calculation of unsteady flow in the open hydraulics channels have been described too. The developed model of 1D unsteady flow in the non-prismatic Butoniga channel represents the contribution to the development of hydraulic modelling in terms of the insurance of an adequate tool for the quantification and verification of the influence of the channel geometry change on the coefficient of roughness and thereby on the channel throughput.

Keywords: the Butoniga channel, unsteady flow, numerical model, channel throughput, coefficient of roughness

169 Influence of Elevation on Spatial Interpolation of Precipitation

Marko Milosevic, Dragoljub Strbac, Jelena Kovacevic-Majkic

Geographical Institute "Jovan Cvijic" SANU, Serbia

m.milosevic@gi.sanu.ac.rs

The study of spatial interpolation of precipitation values using the adequate interpolation method was done. Research was done in the municipality Jagodina (Central Serbia). Input data were digital elevation model (DEM) and precipitation

data from 9 measurement stations for the period from 1961 to 1990. The study is GIS based, with grid resolution of 100 m. Spatial interpolation method which includes relief (elevation) is chosen. Precipitation analysis was done by examining the influence of morphometric components of relief (absolute and relative height). The aim of the study is to investigate the type and degree of influence of relief morphosculptures on precipitation increase.

Keywords: precipitation, DEM, relative height, relief morphosculptures

177 FLIWAS: The Right Information at the Right Place at the Right Time for the Right Persons to Take the Right Decision

Kees de Gooijer

HKV Consultanta, The Netherlands

gooijer@hkv.nl

The risk of floods along the major rivers is a real danger in a large part of Europe. To prevent victims and minimize damage, mankind has to be well prepared for flood events. At such times up to date, unambiguous and reliable information is essential. The system FLIWAS collects and presents the information and predictions that are required in the case of (threatening) floods. In this way it contributes to better emergency response and disaster relief. FLIWAS is the acronym for FLood Information & WArning System. FLIWAS is a multi lingual web-based system and consist of different independently usable modules. FLIWAS will provide, share and communicate current information about imminent floods to the right persons, at the right time, at the right location, to take the right decisions. This way better decisions can be made and professionals are more aware of the impact of their decisions. FLIWAS is primarily intended for water management professionals and for decision makers on different levels. The water manager can access information that can be used to take appropriate practical actions during flood events (technical, organizational and communication level). Also information on current water levels and predictions or weak spots in embankments can be supplied. Decisions have to be taken about protecting and watching dykes (operational level). Supported by FLIWAS, decision makers on local, regional and even (trans) national level are better informed when they have to determine how to respond in a flood event (strategic level). Is the population at risk? Is evacuation required? Is military relief needed? Detailed geographical information and the results of flood modelling calculations show the impact of potential flooding. The information and maps supplied by FLIWAS make it possible to provide better answers. In this way uncertainties are reduced.

Keywords: Flood, calamity management, information exchange

184 Remote Sensing and Gis Techniques for Flood Monitoring and Damage Assessment. Study Case in Romania

Anisoara Irimescu, Vasile Craciunescu, Gheorghe Stancalie, Argentina Nertan

National Meteorological Administration, Bucharest, Romania

anisoara.irimescu@meteoromania.ro

Floods cause every year important damages over large areas and also the loss of human lives and economical consequences for Romania as well as for many other countries. The evaluation and management of floods constitute the first step and the rational basis of mitigation measures against flood damages. Remote sensing provides information that have proved useful for a wide range of application in disaster management. The use of remote sensing and GIS techniques for flood rapid mapping and monitoring is an important tool of information for decision-makers. The paper describes the working methods, developed in the Remote Sensing Laboratory of the National Meteorological Administration in Bucharest by using Earth Observation techniques, to map the flood-affected areas and to estimate the damages. Since 2005, for all reported events, the remote sensing data played a major role in producing high temporal resolution flood maps. In this regard, MODIS TERRA and AQUA images were acquired during the flood events and used as the main input to map the affected areas. Considering the fact that MODIS is an optical sensor, one of the main difficulties encountered was the cloud cover. The temporal resolution proved to be one of the strongest points of the MODIS imagery.

Keywords: floods, remote sensing, MODIS, GIS, damage assessment

205 New Water Data Base (Wdb) Approach of State Hydraulic Works in Turkey

Murat Mert Toklu

General Directorate of State Hydraulic Works (DSI), Turkey

mertt@dsi.gov.tr

Importance of water resources and management has been grown considerably in the world due to the negative impacts of global warming in the recent years. Efficient water resources management and conservancy depend on widespread and improved observation and information network system for both quantity and quality. The General Directorate of State Hydraulic Works (DSI), established in

1953 by Law 6200, is the primary executive state agency of Turkey for all national water resources planning, managing, execution and operation. The main objective of DSI is to develop all water and land resources in Turkey. DSI is empowered to plan, design, construct and operate dams, hydroelectric power plants, domestic water and irrigation schemes. In this respect, executing of these responsibilities requires collection and operation of large amount of data. Observation of water resources both quality and quantity are conducted by 26 Regional Directorate of DSI. Periodically collected data as groundwater levels, groundwater quality, discharge of rivers, level and quality of dam-natural lakes, usage of water on irrigation and energy and etc. are transferred to General Directorate of DSI. Until recent years, DSI has stored these data in the file holders as a paper or on the individual computers. But this stored system was not safe and not allowed querying, searching, sharing or assessing of the data. In order to serve these requirements to concerned persons, comprehensive software called DSI-Water Data Base (DSI-WDB) which includes data bases have been prepared. The aim of WDB is storing the all data concerned with water of DSI's issues into a web-based database and also providing operation, querying, searching and assessing possibilities of data to the users. In this presented study, information about WDB and its groundwater module processing have been introduced and some samples of the groundwater module processing have been submitted.

Keywords: Groundwater, State Hydraulic Works (DSI), Turkey, Water Data Base

231 Digital Elevation Model (Dem) at Determining Basin Characteristics: a Case Study on the Cihanbeyli (Konya) Basin

Ayla Bozdag, Guler Gocmez

Selcuk University, Faculty of Engineering and Architecture, Department of Geology Engineering, Turkey

aayaz@selcuk.edu.tr

Basins are based on hydrological borders instead of managerial or politic divisions. Basins are the most suitable units to conserve water resources and ecosystems and to plan the sustainable usage of them. Until now borders of river and dam basins' are determined considering geomorphologic borders. Basins are supported out of geomorphologic borders; consequently detailed geological and hydro-geological characteristics of the region should be recognized while determining the conservation borders. Wherein a basin is composed of many sub-basins determining the basin's borders is too complex. Digital Elevation Models (DEM) is a beneficial and effective method used in the studies related with water resources to determine the drainage networks and their features as

size, length, slope etc. and basin and / or subbasin features. Important values as slope, area, direction, flow length, runoff lengths etc. at hydrological analyses can be reached by using DEM. Scattered hydrological models clearly reveal the spatial variability of the basins' physical properties and allow spatial assessment of modeled hydrological variables. The scope of this study is to determine the characteristics of the Cihanbeyli sub-basin (CB) located in Turkey's second largest basin- Salt Lake Closed Basin. So CB basin borders, flow directions and drainage networks have been identified by using DEM.

Keywords: Basins, Digital Elevation Model (DEM), Cihanbeyli (Konya) sub-basin (CB), flow direction

140 The Influence of Grains Size Sediment upon Flow Processes in Porous Medium

Bakos Mihaela Violeta

Polytechnic University of Timisoara, Romania

mihaelapisleaga@yahoo.com

Grain size is the most fundamental physical property of sediment. Porosity, hydraulic conductivity and permeability are very important parameters for study flow and transport process in porous media. This hydrological parameters depend on the size of sediment grains and the percentage of various sediment fractions. The techniques and equipment used for particle-size analysis must be accurate and yield highly reproducible results. The accuracy of these measurements is limited by sampling techniques, storage conditions, equipment, and the capability of the operator. The most used method to determine grain size distribution is laboratory analysis. In the present study will take into account two wells, whose lithologic will be described, it will be the grain size distribution chart and will determina te granulometry. Laboratory method helps us to determine: the range of grain size present in the sample, the grain size that is important for groundwater flow, to design a gravel pack around well screens and drains, and to determine hydraulic conductivity or permeability in porous medium. In the paper will present the types of particles or grains that are present, the size and size distribution of those grains, and then make some interpretations that help for study the flow and transport processes in aquifer.

Keywords: grains size, porous medium, hydrological parameters

188 Study of Water Penetration Trough Porous Material

Lidia Todorova 1, Stefan Todorov 2

1 Institute of Solid State Physics, Bulgarian Academy of Sciences, Bulgaria
2 Institute of Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences, Bulgaria

ttlidia@yahoo.com

A laboratory study of water penetration trough porous filter is accomplished. The investigation is carried out by the method of water spectra. The result presents a laboratory simulation of natural processes of penetration of water trough natural relief elements.

Keywords: water spectra, water penetration

189 Investigation of Clean Mountain Waters by Water Spectra Method

Stefan Todorov 1, Lidia Todorova 2

1 Institute of Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences, Sofia, Bulgaria
2 Institute of Solid State Physics, Bulgarian Academy of Sciences, Bulgaria

todorov_st@yahoo.com

The water spectra method is applied to investigate clean mountain waters from Rila mountain. Water probes from rivers, lakes and snow are examined and characteristic parameters are established.

Keywords: water spectra, clean waters

195 Study on Opportunities of Applications to Automatically Systems for Meteorological Measurement for the Needs of Agriculture in Bulgaria

Desislava Slavcheva-Sirakova, Kalinka Kouzmova

Agricultural university-Plovdiv, Bulgaria

kalinka_kuzmova@abv.bg

It was conducted investigation to possible application of automatically systems for meteorological measurement for the needs of agriculture in one of the most intensive agriculture territory in Bulgaria - Trakia lowland It was prepared two

models of inquiry accordingly: sex, age, education and direction of agriculture production to people who were asked. The first model was applied for students educated in agriculture sciences in two of general Bulgarian university - Agricultural University - Plovdiv and Trakia University - Stara Zagora. The second model was applied for farmers in Plovdiv region. The data was statistically analyzed. The data was presented in graphics and tables.

Keywords: automatically systems for meteorological measurement, climate, weather, agriculture, agrometeorological service

208 Development of a Transboundary Monitoring System for Prespa

Christian Perennou 1, Miltos Gletsos 2, Philippe Chauvelon 1, Martin Dokulil 3, Maureen Decoursey 4, Alain Crivelli 1, Patrick Grillas 1, Alain Sandoz 1, Remi Grovel 5

1 Tour du Valat, Arles, France
2 Society for the protection of Prespa, Greece
3 Austrian Academy of Sciences, Institute of Limnology, Austria
4 Forest, Environment and Enterprise Specialist, Fort Collins, Colorado, USA
5 Expert in environment, natural resources, forestry, France

perennou@tourduvalat.org

A transboundary monitoring system (TMS) for the Prespa environment was developed jointly by Society for the Protection of Prespa (SPP) and Tour du Valat in 2007-09, in full coordination with a concurrent GEF Project. It covers all key environment-related issues over the whole lakes and their watershed. The TMS intends to be fully transboundary, complementing and not substituting national monitoring programmes. A Preparatory Stage (2007-2008) developed the framework of the monitoring system: Aims; Geographical Scale; Significant Elements, Values and Issues of concern to the monitoring system; Appraisal of the existing situation; Guidelines. In Stage 2 (2008-09) the full proposal for a TMS was made, covering 7 thematic areas : Water (quantity/ quality); Aquatic vegetation and habitats; Forests and terrestrial habitats ; Fish and Fisheries; Birds and other biodiversity ; Socio-economy; Land-use. For each theme, monitoring indicators (70 in total), methods, equipment, proposed organizations for monitoring, budgeting, and an evaluation scheme for the future TMS implementation were proposed, as well as a proposal for a pilot application (48 indicators out of 70), to be implemented from 2010 onwards. The whole process was largely participatory, with four trans-boundary technical workshops involving the participation of dozens of local experts. It was constantly steered by a Transboundary Monitoring

and Conservation Working Group, composed of representatives of the primary relevant stakeholder institutions of the three countries. This group guides the process and ensures consensus at all stages of development of the TMS.

Keywords: Prespa, Monitoring, transboundary

359 Sensitivity Analysis for Key Parameter Estimation in a Groundwater-Dominated Basin

Serdar Korkmaz 1, Emmanuel Ledoux 2

1 Atilim University, Turkey
2 Ecole des Mines de Paris, France

serdar.korkmaz@mines-paris.org

In this research, a distributed hydrogeological model named MODCOU was applied to the Somme river basin in the north of France. The basin is prone to floods due to its large chalk aquifer. According to baseflow analysis, it was found that the groundwater contribution to the streamflow is about 90% which proves the strong groundwater domination in the hydrology of the basin. The model consists of surface, groundwater and unsaturated flow components. It computes the surface-groundwater interaction in every time step and the exfiltration of groundwater onto the surface. Input parameters are composed of meteorological data, superficial features and properties of aquifer including the unsaturated zone. Large number of parameters involved in the calibration of the model necessitates the usage of a sensitivity analysis. Sensitivity analysis is used to observe the impact of an input parameter on the output of model. It helps determine not only the most important calibration parameter but also the portions of the basin which are most sensitive to changes in input. The former decides the time to be spent on the calibration of each parameter and the latter facilitates future field data collection. These are essential because the current model will be integrated into two research projects in France; namely, REXHYSS and SIM. The project REXHYSS aims to estimate the impact of climate change on water resources of the Somme and the Seine river basins and to perform flood risk assessment studies. The project SIM is used for the real-time estimation of the soil moisture and to calculate the water and energy budgets for the entire France.

Keywords: sensitivity analysis, the Somme, hydrological modelling, MODCOU

215 A Two Stage Fuzzy Model for Domestic Wastewater Treatment Plant Control

Sukran Yalpir 1, Esra Yel 2

1 Selcuk University, Geomatics Engineering Department, Kampus-Konya,Turkey
2 Selcuk University, Environmental Engineering Department, Kampus-Konya,Turkey

sarici@selcuk.edu.tr

The role of fuzzy systems in control may vary depending on the level of assistance of artificial intelligence technologies required in the process. A conceptual fuzzy model is introduced and applied to a case study of a domestic waste water treatment plant. The model is using treatment plant input and output data as well as separate treatment unit outputs. Similar studies on treatment plant modeling focused on single variables in the input and output sets, or multi variables in only influent and effluent of the plant, not in internal units. This study divides the treatment plant water line into two parts namely primary treatment and biological treatment. The variables in the first part are pH, flow rate, suspended solids, COD and BOD, in the second part additionally nitrogen and phosphorus compounds are modeled. Fuzzy model was applied in both parts consecutively, and output of the first part was defined as the input of the second part. The developed model with two stage and history extension has been able to adequately represent the behavior of the treatment system. The predictive power of the developed model was improved by adding the recent values of parameters monthly.

Keywords: fuzzy logic, Wastewater, treatment

217 Artificial Neural Network (Ann) Model for Domestic Wastewater Treatment Plant Control

Gulay Tezel 1, Esra Yel 2, R. Kaan Sinan 2

1 Selcuk University, Computer Engineering Department, Kampus-Konya, Turkey
2 Selcuk University, Environmental Engineering Department, Kampus-Konya, Turkey

gtezel@selcuk.edu.tr

An artificial neural network (ANN) model is introduced and applied to a case study of a domestic waste water treatment plant. The model is using treatment plant input and output parameters data as well as separate treatment unit outputs. Similar studies on treatment plant modeling focused on single variables in the input and output sets, or multi variables in only influent and effluent of the plant,

not in internal units. This study divides the treatment plant water line into two parts namely primary treatment and biological treatment. The variables in the first part are pH, flow rate, suspended solids, COD and BOD in the second part additionally nitrogen and phosphorus compounds are modeled. ANN model was applied in both parts consecutively, and output of the first part was defined as the input of the second part. The developed model with two stage is able to adequately represent the behavior of the treatment system.

Keywords: ANN, treatment, wastewater

219 A Rough Set Model for Domestic Wastewater Treatment Plant Control

Aynur Keskin 1, Esra Yel 2

1 Selcuk University, Mathematics Department, Kampus-Konya, Turkey
2 Selcuk University, Environmental Engineering Department, Kampus-Konya, Turkey

akeskin@selcuk.edu.tr

Recent advances in control engineering suggest that hybrid control strategies, integrating some ideas and paradigms existing in different soft computing techniques, such as fuzzy logic, genetic algorithms, rough set theory, and neural networks, may provide improved control performance in wastewater treatment processes. Since the operation of a wastewater treatment process is intimately linked with wastewater sources, under dynamic loading conditions has become increasingly challenging. Designing fuzzy logic controls would require a series of prerequisites, including the determination of the input and output variables, the parameters of membership functions, and the fuzzy control rules. This paper presents a two-stage analysis that is designed in series for generating a representative state function. Research findings in the case study clearly indicate that the use of rough set theory produce relatively better plant performance in terms of water quality parameters namely pH, flow rate, suspended solids, COD and BOD, nitrogen and phosphorus compounds. Such a methodology is anticipated to be capable of dealing with many other types of process control problems in wastewater treatment processes.

Keywords: Rough-set, Wastewater, treatment

301 Design of Dry Dams at Watershed Scale: Lessons Learnt from Sensitivity Analyses Using a Simple but Consistent Rainfall-Runoff Model

Etienne Leblois, Christine Poulard, Jean-Baptiste Faure

Cemagref, France

etienne.leblois@cemagref.fr

We investigate the assessment of the overall efficiency of a set of dry dams on flood mitigation. To ensure the spatial consistence of our flood scenarios, we used a stochastic rainfall simulator to generate rainfall fields representative of the climatology of a 150 km2 catchment near Lyon. The influence of the variability and spatial structure of the rainfall on the choice of the best locations for a set of dams was previously studied using a simplistic rainfall-runoff model. The estimated optimum is highly dependent to the choice of the sub-sets of events, confirming that assessments based on a limited number of scenarios are heavily flawed. A large set of events, representative of the regime, is indispensable. For further investigations of this approach, a cascade-of-reservoirs conceptual model now computes the rainfall-runoff transformation and can optionally be chained to a 1D-hydraulic models. This increases both results consistence and computation-time, however sensitivity analyses remain accessible. We studied optimisation of outlet dimensions in addition to dam location. The effect of a given solution at a given point is represented over a wide range of flood probability, versus peak flood return period, but also versus peak volume return period, which strongly influences the mitigation potential.

Keywords: dry dams, flood mitigation, flood regime, stochastic distributed rainfall fields

302 Application of GPS and GIS Methods in the Process of Water Management

Slobodanka Kljucanin, Emina Hadzic, Dzenana Bijedic

Faculty of Civil Engineering Sarajevo, Bosnia and Herzegovina

slobodanka63@yahoo.com

Since the classical methods in handling spatial data showed significant limitations, it is necessary to introduce new technologies that enable better and more reliable analysis of the hydrology, complex and extensive knowledge of the

complex interactions of water, nature and man, and assist in the development of alternatives for future strategic and operational water management and economic activities. In this article, on the example of hydropower potential investigation in drilled water well are shown interoperability and applicability of the recording method of GPS and GIS in water management processes. Article deals with used GPS devices and methods of recording, GIS, transformation of GPS results, ie, data collection, their analysis and processing, and display in GIS environment and Oracle database.

Keywords: water management, GPS, GIS, database

305 An Outline of WISKI7 and HBV Systems Implemented at the Hydromet Service of Serbia

Mihailo Andjelic 1, Elin Langsholt 2, Matthias Egeling 3, Slavimir Stevanovic 1, Nena Kovacevic 1

1 Hydrometeorological Service of Serbia, Belgrade, Serbia
2 Norwegian Water Resources and Energy Directorate(NVE), Norway
3 Kisters A. G., Germany

Mihailo.Andjelic@hidmet.gov.rs

A project is being implemented in 2009 and 2010 by the Hydrology Department of the Hydrometeorological Service of Serbia (HD/RHMSS) and its partner - the Norwegian Water Resources & Energy Directorate (NVE), with financial support of the Government of Norway. The project assists the HD/RHMSS in its effort to modernise hydrological information management system and improve flood forecasting services at small river basins in Serbia. Currently, WISKI 7 and HBV rainfall-runoff type model are being installed and tested at the HD/RHMSS. Further on, it is envisaged to develop tools for WISKI - HBV integration, while the HBV model will be tested and calibrated at several pilot basins in Serbia, and eventually used for real-time flood forecasting. WISKI 7 is an information management system that provides modern tools for advanced analysis of hydrological and meteorological data. It is based on the KISTERS WISKI Time Series Management Core solution, which imports, exports, computes, evaluates, stores and presents various data in GUI and report formats. It has recently been released by, and is purchased for the project from, the KISTERS A.G., Germany. The latest version of the HBV model is a modern, well-tested and fully operational flood forecasting tool, which will be linked to real-time weather forecast systems. The project opted for HBV system keeping in mind its flexibility, widespread use and rich experience, in particular in Sweden, Norway and elsewhere. The paper describes in more details main characteristics of the WISKI 7 and the HBV/IHMS installed at the HD/RHMSS; it

discusses current status of the WISKI-HBV interface, the link of the two with the meteorological real-time weather forecasting system of the RHMSS, and plans for further modernisation of the flood forecasting system in Serbia. The paper concludes with presentation of some preliminary results illustrating application of the newly installed systems for data management, model calibration and flood forecasting.

Keywords: hydrology, real-time flood forecasting, HBV model, information management systems, WISKI, Serbia, Norway, weather forecasts

253 Weiss, a Water Emission Inventory Planning Support System Aimed At Reducing the Pollution of Water Bodies

Leen Van Esch 1, Greet Vos 2, Guy Engelen 1

1 VITO, Geel, Belgium
2 VMM, Belgium

leen.vanesch@vito.be

The European Water Framework Directive (2000/60/EC) commits the EU Member States to achieve and maintain a clean and well-managed water environment by 2015. Monitoring and reporting about the water quality in the water bodies of Flanders (the northern part of Belgium) is the responsibility of the Flemish Environment Agency (VMM). To be able to keep track of all significant emission sources, a Water Emission Inventory planning Support System is currently under development in collaboration with the Flemish Institute for Technological Research (VITO). A first prototypical study on the quantification of heavy metal emissions generated by the corrosion of building materials provided the fundaments for the conceptual framework of WEISS.
As of January 2010, the project is partly financed by the EU-Life+ programme. WEISS is to result in a methodology and supporting instrument generically applicable in the EU Member States or parts thereof.
WEISS operates at a high geographical resolution (1 ha grid) and integrates all relevant emission sources, all transport routes, and a planning support module. The latter enables accounting for the pollutants in distinctive nodes of the pathways as required by the monitoring and reporting tasks, but also, the assessment of various technical and policy measures aimed at reducing the pollution loads in the water bodies.
For each source and pollutant, WEISS proceeds in three consecutive steps: spatial allocation of the source, computation of the pathways and production of accounts in distinctive nodes of the pathways. For every step, specific algorithms are applied. They are implemented as part of model blocks stored in a model library. For every emission source the appropriate model blocks are selected and

chained to perform the required calculations. This modular approach allows to add new sources and new pathways.

Keywords: WFD - emission inventory - WEISS - high geographical resolution - model blocks

258 Testing of Automatic Turbidity Sensor Solitax SC and Evaluation of Suspended Sediment in Rivers

Florjana Ulaga, Luka Ravnik

Environmental Agency of the Republic of Slovenia

florjana.ulaga@gov.si

In complex of monitoring of suspended sediment, the Environmental Agency of the Republic of Slovenia started with implementation of new technology. At the automatic gauging station Suha on the Sora River, a torrential tributary of the Sava River, an optical turbidity sensor Solitax_sc from Hach Lange Company, was set up for trial operation. Suspended sediment concentration (SSC) can be estimated from the turbidity of water. Therefore the purpose of testing was to start implementing Solitax_sc as automatic sensor for SSC determination. The measurement method of sensor is nephelometric, measured in FNU (Formazin nephelometric unit). Testing of sensor was carried out in year 2007 and in autumn 2009. During the testing period parallel measurements with automatic water sampler were also conducted. Automatic water sampler WS Porti PP was used as a reference instrument. During most of the testing period Solitax_sc shows good response to changes in hydrological parameters such as precipitation and water discharge. It reflects dynamics of suspended solid according to expectations.
From the aspect of monitoring of suspended material, the testing of the turbidity sensor proved that the sensor is suitable. The correlation that exists between turbidity and the SSC is evident from data. The measurements complied best in the rainy period in September 2007. The relationship between turbidity and SSC is not completely invariable but depends on geological and hydrological parameters of river basin, and also on the size, structure and colour of the particles. Relationship between two parameters needs to be tested and proved periodically for every hydrological station. Advantage noticed during the testing time was: high resolution sampling of SSC in water; SSC measurements in extreme hydrological conditions; semi-automation of monitoring procedures. Higher data sampling rate results in better on-line data availability through network communication links.

Keywords: suspended sediment concentration, optical turbidity sensor, Solitax_sc, automatic gauging station

308 Classification of Surface Water Quality of Kizilirmak Basin in Turkey by Using Factor and Cluster Analyses

Volkan Yilmaz 1, Meral Buyukyildiz 2, Ali Ihsan Marti 2

1 Selcuk University, Eng. Arch. Faculty, Civil Eng. Department Konya,Turkey,
2 Selcuk University Konya,Turkey

vyilmaz@selcuk.edu.tr

Watershed monitoring programs depend on water quality characterization data collected for many parameters, at many times and places, and with limited resources. The purpose of this study is to demonstrate a strategy that reduces the measured parameters, locations, and frequency without compromising the quality of the monitoring program. In the study, the multivariate statistical methods including Factor and Cluster Analyses were used to characterize the surface water quality data sets obtained from Kizilirmak River Basin, one of the most polluted river basin in Turkey. Parameter reduction and the relationship between parameters were determined by using the Factor Analysis for the data set and the most polluted stations of this basin was marked with respect to the factor scores. We can group the stations and match the factor scores with the stations' cluster membership situation by the Cluster Analysis. In this way, we examined the parallelism between the results of the Factor Analysis and Cluster Analysis. At the end of the study, we focused on the most polluted station by observing the stations in terms of highest scores in order to provide different solutions for the reduction of pollution in these stations.

Keywords: Water Quality, Factor Analysis, Cluster Analysis, Kizilirmak Basin

313 Initial Measurements of Flow in Water Supply Network of Prilep within Frames of the "Water Supply Project"

Vladimir Mijakovski 1, Nikola Mijakovski 2

1 Faculty of Technical Sciences, Macedonia,
2 SPARK, Macedonia

The Water and Sewerage Utility of the City of Prilep, Macedonia, has engaged the Consortium Kittelberger Consult GmbH - SETEC Engineering GmbH - ABC Consulting as Consultant of the Water Supply Prilep. The project is financed by the German Financial Cooperation through KfW. Measurements of flow in the system were necessary to determine the total inflow and consumption of water in the city and further to quantify Non-Revenue Water (NRW) and its components.

In order to accomplish this, the Consultant, initially, performed 5 series of flow measurement on various locations and supply points and compared results gained with statistical data obtained from the utility.High percentage of NRW (60 to 70%) imposed further detailed evaluation in order to determine the components of Non-Revenue Water.

Keywords: measurements, inflow, consumption, quantification

317 The Water Information System Austria

Stephan Nemetz

Federal Environment Agency, Austria

stephan.nemetz@umweltbundesamt.at

The awareness of the importance of an intact environment and the wish to get accurate and actual information of the water quality and the availability of the water resource has tremendously risen in the last decades. Also the legal regulations in many countries and especially in the Europe Union have been following these needs. Environmental information shall be well accessible, understandable and inform at the scale of the citizen's interest. On the example of the Water Information System Austria (WISA) will the presentation inform about ways of involving and informing the citizen about topics of the water management via the internet and about the current chosen way of data collection, data management, data aggregation and data presentation in the water sector of Austria. There will be discussed the future needs of the public and the European Community and given a perspective of the system's future development. The main tasks will deal with: - Description of Data collection by the example of water quality data in Austria - Dissemination of water data from sectoral data bases to a central data ware house - Public participation for the development of the national river basin management plan - Access to the water data for users of the public and for expert users - Visualisation of water data in WISA - The current and future design of WISA

Keywords: Data management, Water Information System

325 Water Quality Modeling of a Lake Considering Rainfall-Runoff Pollution Loads and Water Quality Improvement by Diffuse Pollution Control

Jae Heon Cho

Kwandong University, Department of Health and Environmental Hygiene,
Kwandong University, South Korea

Pollutant runoff survey was carried out for a lake watershed, major pollutant sources of the lake are storm water runoff from resort areas and various land uses. The rainfall-runoff curves and the rainfall-runoff pollutant load curves about BOD, TP, TN were acquired from the rainfall-runoff survey data of the 2 survey sites, the Jangcheon watershed and a storm sewer, for the last recent 4 years. Using the rainfall data from the weather station established on the watershed, runoff flow and pollutant load for each rainfall event of the year 2005 and 2006 were estimated. The impact of the runoff pollutant load upon the lake water quality was analyzed with WASP7, a dynamic eutrophication model widely used for lakes. The estimated runoff and pollutant load were used as the flow and the boundary input of the model. Water quality parameters of the WASP model were calibrated with the the measured water quality of the year 2005 and 2006. The calibration results showed a good correspondence between the calculated and observed values for most of water-quality variables. Control measures of diffuse pollution, wet pond of the Jangcheon watershed and infiltration trench of the storm sewer, were introduced for water quality management of the lake. The predicted water quality of the lake with the control measures were considerably improved compared with the present condition.

Keywords: rainfall-runoff curve, rainfall-runoff pollutant load curve, lake water quality, WASP7, diffuse pollution control

327 On the Possibility to Use Infrared Thermometry for Irrigation of Wheat Canopy

Georgi Stoimenov, Yordanka Kirkova, Vera Tenova

ISS, Bulgaria

stoimenov@algo-bg.com

Six year (2004-2009) experiment with Bulgarian variety Sadovo 1 was carried out on meadow-cinnamone soil in Experimental Base of Institute of Soil Science Tzalapitza, South Bulgaria, Plovdiv region. During the first four years the variants

of the soil moisture regimes are only non irrigated control and irrigated when the difference (dT) between the canopy temperature (Tc), measured by Infrared thermometer, and ambient air temperature (Ta) became 1°C. In 2008 the 3 irrigated variants were realized: at dT = -1°C, 0°C and +1°C and non irrigated control. During the next 2009 were realized variants with missed irrigation in: 1/ head development, 2/ear formation and 3/ milk ripeness 4/optimal irrigated and 5/ non irrigated control. All variants were in 3 replications. Soil water content dynamic were evaluated by gypsum blocks and plant water status- by Infrared thermometer every day at 14 o'clock. Precipitation, air and soil temperatures, relative humidity were determined during wheat vegetation season. In the dry 2007 as the result of two irrigation depth of 60mm the yield increased 1,9 times. In 2008 the yield was the highest for the variant, irrigated at dT=+1°C. In 2009, the yield was the highest for optimal irrigated variant, irrigated at dT=+1oC. The missed irrigation during air formation and milk ripeness decreased the yield more than this during head development, when the canopy had water reserves from winter. The relationships "Yield- water (rain + irrigation depth)" and "Yield-number of days with dT>0" were obtained with R2>0,7 . The results allowed us to conclude that IRT can be used for determination the moment of wheat canopy irrigation.

Keywords: canopy temperature, yield, irrigation depth

330 Bersi 10 - Device For Measuring Level of Underground Water

Berat Sinani 1, Bahri Sinani 1, Imer Preteni 2, Sami Preteni 3, Nexhmi Muliqi 4

1 Faculty of Mines and Minerals, Kosovo
2 Ministry of Education, Science and Technology, Kosovo
3 ICMM, Kosovo
4 Trepca Mines - Flotation, Kosovo

berat_sinani@hotmail.com

Studying the level of the underground waters nowadays is very important; therefore it is more than necessary to improve and study more this field, but always moving towards the digitalization of various devices. For this purpose we have constructed a device which measures the level of the underground waters, the device named BerSi 10 is a device which measures the level of the underground waters, flux of ground water, direction of movement of underground waters, active radius, hydrolines, hydraulic gradient, the distance between boreholes, etc. The above mentioned device measures all these parameters in digital way in computer, and then does their calculation to the output device. Here we can also print various types of the reports, depending on the request of the user. The device stores all data in a database called BerSi Database, where data

are secured and encrypted. Furthermore, the software supports the multiuser security system. With BerSi software the user can also, print the drilling lithology and create various geological and hydrogeological profiles.

Keywords: Bersi 10, BerSi dBase, Underground water, multi-user

336 WebGIS Services for Real-Time Water Monitoring - an Application for Water Quality Crisis Management

Alberto Ortolani, Roberto Costantini, Letizia Costanza, Lucia Innocenti,

Carlo Brandini, Luca Angeli, Bernardo Gozzini

CNR Ibimet - Consorzio LaMMa, Sesto Fiorentino, Italy

angeli@lamma-cres.rete.toscana.it

Quantity and quality of underground water is stressed by multiple factors such as natural and human induced pollution, or water table recharge decrease due to climate changes. Approaches of constant monitoring and management of water resources shall promote the implementation of actions that may prevent irreversible damages to the resource and guarantee its availability and quality. Monitoring systems to assess water resources quantity and quality require extensive use of in-situ measurements, that have great limitations like difficulties to access and share data, and to customise and easy reconfigure sensors network to fulfil end-users needs during monitoring or crisis phases.
This paper describes the application carried out for underground water monitoring and environmental crisis management through Sensor Web Enablement (SWE) services, under the European Integrated Project of the Sixth Framework Programme OSIRIS (Open architecture for Smart and Interoperable networks in Risk management based on In-situ Sensors, www.osiris-fp6.eu). The main objective of OSIRIS was to create a monitoring system to manage different environmental crisis situations, through an efficient data processing chain where in-situ sensors are connected via an intelligent and versatile network infrastructure (based on web technologies) that enables end-users to remotely access multi-domain sensors information. The project has developed a service oriented architecture, accessible through INTERNET, with high levels of automation and interoperability, for the remote management of heterogeneous sensors (fixed and mobile) and the data processing for monitoring and managing environmental crises arising from natural hazard as well as industrial accidents (water pollution, urban air pollution, forest fires, etc.). The experimental system implemented at Santa Fiora (Grosseto, Italy) water springs, under the Italian responsibility by the Foundation for Climate and Sustainability and LaMMa Consortium, allows data

acquisition and early identification of crises in the drinking water supply system, for supporting the assessment of proper intervention plans.

Keywords: water monitoring, crisis management, in-situ measurement, real-time, inter-operability, SWE, GMES, webGIS

338 Decline Openning and Calculations by the Software 3d Studiomax in Trepca Mine in Stan Terg

Muhamedin Hetemi, Berat Sinani

Faculty of Mining and Minerals, Kosovo

muhamedin@yahoo.com

This paper describes openning of the 12th horizon in Trepca mine in Stan Terg by the underground spiral decline and exploitation of the surrounding ore bodies, especially ore body P-169. Therefore, we can use the same decline for openning and exploitation at the same time. This task was done based on the software 3DStudio Max which makes enable the grafical presentation of the decline in ration with the decline dimensions. 3DStudio Max allows us to present 3 Dimensional methods and simulation method of opening and exploitation of ore bodies. By the exploitation of the ore bodies in depth, the metal content of Lead and Zinc is getting lower and at the same time the expenses are higher. One of the indicators to keep the running of the mine with the same planned production of 700,000 t/year and predicted production in the future of 850,000 t/year, is possible by the construction of this declines. The horizon difference (11th quote15.2m -12th, quote -45.2m) is 60m, which mans that the decline will have the same ratio. The progress of the decline will be from up-down, with the levels of 9.0m that will have three sub-levels to approach the ore bodies, downward, horizontal and upward corridores, which will divide the levels in 3.0m. We assume that the dimensions of the decline will make possible big exploitation and haulage transport.

Keywords: decline, horizon, up-down method, exploitation, 3D Simulation, 3DStudio

339 Calculation of Maximum Discharges and Water Levels of Veliki Rzav and Golijska Moravica Rivers

Marko Urosev 1, Natasa Urosev 2

1 Geographical Institute, Serbia
2 Republic Geodetic Authority, Serbia

m.urosev@gi.sanu.ac.rs

It is very important to calculate accurately maximum discharges and water levels for purposes of constructing water reservoirs and embankments for flood defense. Construction of four large reservoirs in Golijska Moravica basin is planned until 2021, according to Water management plan of Serbia. Maximum discharge of Veliki Rzav at Roge has been calculated for conditions of projecting hydrotechnical object of first class That's why detailed analyses of maximum discharges and water levels of Moravica and Veliki Rzav of frequency P = 0,01; 0,1; 1%, for the 1961 - 2000 period, are presented in this paper. Method of series was used for calculation of maximum discharges and water levels and function of Pierson III type for construction of frequency curves.

Keywords: maximum discharges and water levels, frequency curves, Moravica

344 GIS-Based Assessment of the Main Environmental Issues in"Muntii Maramuresului" Natural Park

Mihaela Nastase 1, Gheorghe Kucsicsa 2, Ines Grigorescu 2

1 National Forest Administration, Romania
2 Institute of Geography, Romanian Academy, Romania

mihaela_nastase78@yahoo.com

Within the last years, mountain areas are facing radical changes mainly related to global environmental change and regional and local socio-economic transformations determining new and diverse environmental-related problems and a computer-based assessment tool, such as GIS, is highly requested. Information and spatial analysis are two main necessities of the contemporary world especially when dealing with environmental issues in protected areas whose dynamics and impacts are to be assessed and monitored. "Muntii Marammuresului" Natural Park (MMNP) is the biggest park in Romanian Carpathians (134.000 ha) located on the northern boarder of Romania with Ukraine whose valuable biodiversity features and landscape qualities lead to its declaration as protected area, under the Category V IUCN - Protected Landscape-Natural Park, in 2004. Taking into

consideration the management objectives and the dimension of human integration as requested by the Category V IUCN provisions, landscape conservation in MMNP must be achieved having in mind the proper management of the relationship between nature and human activities. The paper is aiming to highlight the most accessible GIS applications used for environmental assessment within protected areas in order to create a useful, interactive and easy to update database relying on the most relevant cartographical documents, datasets and field surveys. Thus, the authors' main purpose is to obtain GIS-based maps focused on revealing the most important environmental issues specific for MMNP in terms of land use/land cover changes, land degradation and fragmentation, human impact categories, natural and technological hazards etc. The present study is will be a starting point in developing a comprehensive spatial database for the study area and a useful tool for improving decision making and implementation of the MMNP Management Plan.

Keywords: GIS-based assessment, environmental issues, "Muntii Maramures"" Natural Park, Romania

346 Hydrologic Information System Based on Ontologies

Milan Gocic 1, Slavisa Trajkovic 1, Srdjan Kolakovic 2

1 Faculty of Civil Engineering and Architecture, Serbia
2 Faculty of Technical Scienties, Serbia

mgocic@yahoo.com

Hydrology is closely related to biologic and environmental sciences, making it a good choice for understanding systems in the environment. The fact that the sources of hydrologic information are scattered and that measured hydrologic data are presented in a variety of formats can be overcome by introduction of a new hydrologic information system based on ontologies. Such system should facilitate transfer of knowledge about the water resources to the end users, starting from the data acquisition, to the implementation of accumulated knowledge in the user's domain of interest. The paper is conceived in such a manner, that after the first introductory section, there is review of the existing hydrologic information systems in the second section. The third section contains description of the architecture of hydrologic information system based on ontologies. In the fourth section, is a conclusion and announcement of the future development of the presented information system.

Keywords: hydrologic information system, ontology, hydrological data

349 Multivariate Statistical Approach for Assessment of Surface Water Chemistry

Sonya Damyanova
University of forestry, Bulgaria
sonya_damyanova@abv.bg

A major goal of the research is to evaluate the chemical composition of surface water in order to find some relations between compounds and reveal their origin. The chemistry database contains 20 components of a river and a dam for 3 years period. Ward's method reveal 4 major factors forming quantity of waters. Principal component analyses indicates 3 latent factors in the data stucture.

Keywords: water chemistry, ecology

353 Preparation of Granulation Curve through BerSi 10

Sabri Avdullahi, Berat Sinani
Faculty of Mining and Minerals, Kosovo
sabriavdullahi@hotmail.com

To create different curve on the size of grain and processing of data on for a long time have worked in the absence of a software application. Specialized application software for selecting various problems in particular geological led us to for a long time we managed consultations to introduce the collection BerSi 10 a special part of the curve on geological processing. This software package is part of BerSi 10 who did so making the curve very professional and a very great accuracy and this software is part of the software "Easy to use" or as otherwise called the software application. This application has been tested and has yielded very accurate results and which were ready for use, what makes it even more applicable is the possibility of applying different standards that allow us to work with the curve in different ways. This software is part of the collection is BerSi 10 can be obtained as the only software and uses for simplification and easier work with.

Keywords: BerSi 10, Grain curve, Easy to use, BerSi Collection, different standards

329 Mathematical Model and Forecasting Calculations for Regime of Optimum Management by Water Reservoirs on Example of the Volga-Kama Cascade

Leonid Levit-Gurevich

Water Problems Institute of Russian Academy of Sciences, Russia

Lev-Gur@yandex.ru

Control mode by water reservoirs of water-economic system of the large rivers on the basis of the forecasting inflow data is established in the manner of daily average discharges from water reservoirs during the long period of time (hydrological inflow phase). In practice managerial process is carried out through certain time intervals on days by calculations of operating mode of reservoirs under the concrete inflow forecast and water conditions data to that moment. Now control is executed by the dispatching schedules that made beforehand on base of actual data influx of many years for account of inflow probabilistic.

It is considered optimizing problems of a choice of control mode by reservoirs cascade in the periods of a spring flood or autumn high water, summer or winter low water. During the periods of high waters it is necessary to fill all water reservoirs as much as possible (on normally headwater level), do not permit to rise storages levels higher forced levels at observance of throughput discharge capacity of hydro-units constructions. During the periods of low inflow and realization of a compensatory operating mode in cascade it is necessary to provide the satisfaction of requirements of water consumers and water users as possible and not allow falls of reservoirs levels below dead volumes, also to provide required ecological (sanitary) flows.

The general formalized method optimum calculation according to the scheme of dynamic programming that consist in generation and analysis of set of variants of a discharge hydrographer from water reservoirs and choosing best. The program system is approved by calculations on management of the Volga-Kama water reservoirs cascade in conditions of a flood and low water. Optimum control of water reservoirs does not exclude control under dispatching schedules. Combinations of these methods are most effectively. But it is proved that in extreme hydrological conditions optimum control is more effective despite of probable uncertainty forecasting inflow.

Keywords: water reservoirs, control mode, optimizing problems, inflow probabilistic, flood, low water, dynamic programming, Volga-Kama reservoirs cascade

477 Renewable and Usable Ground Water Balance Maps for Northern Algeria

Zoran Radic 1, Vladimir Belicevic 2, Mileta Bojovic 2, Goran Ljumovic 2

1 Faculty of Civil Engineering, Serbia
2 ENERGOPROJECT, Eng. & Cons. Co., Serbia

zradic@grf.bg.ac.rs

As a result of three years of cooperative work of Serbian experts from Energoproject (Engineering and Consulting Company, Belgrade) and consultants from the University of Belgrade (Faculty of Civil Engineering and Faculty of Mine and Geology), as well as the experts from ANRH (Algeria) an Integrated Hydrological Information System is developed and Geological maps, Hydro geological maps and Renewable Ground Water maps for Northern Algeria where produced. Analyzed area covers 300.000 km2. For the purpose of ground water balance calculations digital maps for monthly potential evapotranspiration and yearly average precipitations and surface runoff are first prepared. Than, using long series of yearly precipitations for three referent locations (Oran, Alger and Constantine) probabilities of yearly precipitations are obtained, and using all available stations with monthly series data probabilities for monthly precipitations module series are obtained. In a similar way (using the data for 101 stations during the same “referent” period of 40 years) probabilities for yearly and monthly runoff modules are obtained. Using the same runoff data (but with the daily data step, and by applying the method for BFI derivation) regional relations between total and base flow are established. Renewable ground water balance is obtained for 170 hydro geological macro unites. Ground water balance composes from vertical and horizontals components. Vertical ground water balance component is calculated by overlaying the monthly precipitation, potential evapotranspiration and surface runoff maps and horizontal ground water component is added according to the influences of direct runoff from contributed areas and base flow from the streams crossing hydrological unites. Usable ground water balance is obtained using different restriction criteria as water quality, aquifer type, topographical conditions etc. Produced usable ground water maps contains average and two extreme (dry and wet) year values, but developed information system offer possibilities for the renewable ground water balance reproduction for different combination of precipitation, temperatures and runoff conditions.

Keywords: Regional Hydrological Analyses, Integrated Hydrological Information System, Geological maps, Hydro geological maps, Water Balance,Renewable and Usable Ground Water maps

478 Structural Analyses of Daily Precipitations Series

Vladislava Mihailovic 1, Zoran Radic 2

1 Faculty of Forestry University of Belgrade, Serbia
2 Faculty of Civil Engineering University of Belgrade, Serbia

vmihailovic@beotel.net

In preliminary analysis of different methodologies for hydrological drought analysis (Radic & Mihailovic, 2006), daily varying threshold based on marginal distributions (LP-3) derived from daily streamflow data was introduced. Distribution parameters are changing periodically over the annual cycle, and exceedance probability levels determined by those distributions are smooth lines. Daily varying threshold level was extracted from marginal distributions diagram, as a time function (for each day in the year) of the theoretical 90% exceedance probability level. As components of hydrological cycle, different drought types are highly connected but with different dynamic for separate process. So, drought monitoring system must include all types of droughts and specific characteristics for some regions. To satisfy that requirement, in this paper analysis of daily rainfall were included. The main objective of this paper is to determine the best fitting distribution to describe marginal distributions of cumulative daily rainfalls on 25 climatological stations in Serbia for representative (WMO “normal”) period 1961-1990. As precipitations are discrete stochastic values (with a lot of zero daily values), for the droughts analyses is common to use cumulative rainfall values. In this study cumulative rainfall for past 30, 60 and 90 days (updated daily) are analyzed. The ability of various two and three-parameter probability distributions to describe marginal distributions of cumulative daily precipitation series, and preliminary selection of candidate distributions was performed using L-moment diagrams. Further analysis has shown that neither of three-parameter distributions are suitable for moddeling marginal distributions of cumulative daily precipitation over given range of time scales. Among two-parameter models, rival candidate distributions were gamma (G2) and Weibull (W2) distributions. The results of performed goodness of fit tests, (the mean absolute deviation - MAD, the root mean square deviation - RMSD and probability plot correlation coefficient - PPCC), showed that the most suitable model is W2.

Keywords: Hydrology, Stochastic Analyses, Droughts Analyses, Precipitations, Marginal Distributions, Daily varying threshold

266 Estimation of Crop Evapotranspiration. Are the Simple Formulas less Precise?

Kouman Koumanov 1, Milena Moteva 2, Valentin Kazandjiev 3

1 Fruitgrowing Institute, Plovdiv, Bulgaria
2 Research Institute of Land Reclamation and Agricultural Mechanization, Bulgaria
3 National Institute of Meteorology and Hydrology, Bulgaria

kskoumanov@hotmail.com

Crop evapotranspiration ETC is a key factor for the irrigation scheduling and management. In order to estimate ETC, a number of empirical equations have been developed, using different crop or environmental characteristics. Usually, ETC is related to some meteorological factor F through a formula of the type, where K is an experimentally estimated bio-physical coefficient ( ). Subject of the present paper is the variability of K when estimated using five empirical formulas respectively based on: the sum of the average daily temperatures (°C), the sum of the average daily vapor pressure deficit (HPa), the evaporation from GGI-3000 evaporation pan (mm), and the reference evapotranspiration ET0 estimated according to both Blaney-Criddle and FAO-Penman-Monteith. The experimental work was carried out five vegetations in a 1.0 ha peach orchard in the conditions of microsprinkler irrigation and sod mulch in the interrows. The trees were of Glohaven cultivar grafted on GF-677 rootstock and planted at 5.5-3.0 m distances. The evapotranspiration was estimated through water balance in a 0.60 m soil layer and for ten-day intervals. It was found that the variation of the values of the bio-physical coefficient K were of same magnitude ( ) irrespective of the used formula. Hence, the selection of a formula for ETC estimation mostly depends on the available meteorological data. Probably, the using of complicated formulas with numerous meteorological parameters, like the FAO recommended one, will appear needless in terms of precision. In order to clarify the problem, more investigations and analyses have to be carried out including both much longer periods and many more crops.

Keywords: irrigation, scheduling, ETC, empirical equations, peach

001 Ability of GCM to Simulate Winter Precipitation and Temperature in Iran

Sina Samadi Naghab

National Climate Center(NCC)- Climatology Research Institute(CRI), Iran

sisamadi@yahoo.com

In recent studies, to reach the best results of seasonal and long term forecasts, the global circulation models (GCMs) are usually used to simulate the past and future climate parameters. Unfortunately, despite the advancement in GCM research and modern computing technology, the most recent generation of general circulation models still have serious problems due to their low spatial resolutions (with the field variables being represented on grid points 300 km apart). Even if GCMs in the future are to run at higher resolutions, there will still be the need to 'Downscale' results from such models to individual sites or localities for impact studies. To successfully downscale GCMs results, it is necessary to know if GCM data have enough ability to simulate predictor variables in the selected region. In this paper, we used winter seasonal data of Precipitation and Temperature (Maximum and Minimum) in 36 synoptic stations of Iran as predictand and HadCM3 with A2 Scenario as Predictors. me scale that we selected for this simulating ability is from 1990-2005 for the past and 2030 for future and using SDSM model version 4.2 for this purpose. Results were shown that there was good ability to simulate winter predictand such as minimum and maximum temperature and there is no significant deference with 0.5 critical errors and accepted at 0.01 significant levels and there is a good accepted correlation between modeled and Observing data. All changes of parameters could synthetic in winter months and we could model past period in acceptable level at study Region and future decade simulated with best results and propose to use other Climate Models.

Keywords: seasonal Forecast, GCM, HadCM3, Downscaling, Statistical Models

383 Geostatistical Problems and their Choice with Arcobject

Naser Peci, Berat Sinani

Faculty of Mining and Metalurgy, Kosovo

Expansion of various software components and growth in these applications offers us great opportunities to enhance and professionalize the applications for our personal needs.

During our work with such applications, we saw reasonable to deal with some geostatistical application and easier way of electing their ArcObject.

Here we have chosen some basic problems which are often necessary but that their application is too large.

These problems were chosen in ArcGIS through VBA code (Visual Basic for Application), and have presented ways the easiest and most simple choice these geostatistical problems.

As geostatistical problems that we choose for the application are the determination of minimum, maximum, Range, Mean, Mode, Median, Standard Deviation, which we encountered a quite accurate result for further work.

For the selection of such problems we use two ways of selection of these problems are methods of choice through VBA internal objects and the second way through the importation of foreign objects of code which can fully exploit.

Keywords: ArcGis, ArcObject, Geostatistical Problems, Internal Code

387 Modelling Solar Energy Potential in Turkey

Serhat Sensoy 1, Yusuf Ulupinar 1, Mesut Demircan 1, Ilker Alan 1, Zuhal Akyurek 2, Pinar A. Bostan 2

1 Turkish State Meteorological Service, Turkey
2 Middle East Technical University, Turkey

ssensoy@dmi.gov.tr

Since the Industrialization revolution, atmospheric CO2 concentration has been increased from 280 to 400 ppm due to mainly caused fossil fuel uses in the energy sector. However, small portion of the incoming solar energy into the world is sufficient to meet human needs. For this reason nowadays to use renewable energy sources such as solar energy is very important to protect atmosphere. Geographic variables are measured at certain points, and prediction map for the entire area is been obtained by some spatial interpolation methods. Spatial distribution of geographic data can be obtained only from this data and also prediction map can be obtained by using secondary variables which have spatial relationship with the measured values (Bostan, P.A., et al, 2007) Geographically Weighted Regression (GWR) and Co-kriging methods were applied in the modelling of radiation. GWR is the multi-faceted approach to the analysis of spatial data. GWR opens a window through the data set to calculate local r2 (Laffan, 1999). Co-kriging is an extension of ordinary kriging method which takes into account the spatial cross-validation between two or more data. In the modeling of spatial

interpolation of radiation data, aspect, latitude, relative humidity and cloudiness were used as secondary variable. Best results were obtained with the cloudiness and relative humidity parameters. Simple linear models generally are been solved by ordinary least square method is given below formula: P= C1+C2+e where; P= Radiation (KWh/m²) C1= solar radiation parameters change with the humidity C2= solar radiation parameters change with the cloud cover e= error term Co-kriging and GWR model results were compared by the lowest RMSE and higher r² values obtained in the model. Because of the RMSE is smaller and r2 is grater than the Co-kriging result, GWR tool is been selected for modeling solar energy potential in Turkey. According to model result, southern parts of Izmir-Igdir line, have over 1500 KWh/m²/Year radiation potential and is considered as optimum area for the photovoltaic installatio.

Keywords: GWR, Co-kriging, Modelling, Radiation, Photovoltaic

392 Image Compression for Wireless Outdoor Sensor Networks

Indrit Enesi, Elma Zanaj, Bexhet Kamo, Vladi Kolici, Olimpjon Shurdi

Polytechnic University of Tirana, Albania

ienesi@fti.edu.al

The recent availability of inexpensive hardware such as CMOS and CCD cameras has enabled the new research field of wireless multimedia sensor networks. This is a network of interconnected devices capable of retrieving multimedia content from the environment. In this type of network the nodes usually have very limited resources in terms of processing power, bandwidth and energy. Efficient coding of the multimedia content is therefore important. In this paper a low-bandwidth wireless camera network is considered. This network is especially designed for use in outdoor sensor networks for environmental monitoring and for applications in agriculture or animal tracking. A new image compression codec suitable for this type of network was developed. The transmission of the compressed image over the wireless sensor network was also considered. Finally a complete system was built to demonstrate the compression for the wireless camera network. The image codec developed make use of both spatial and temporal redundancy in the sequence of images taken from the camera. By using this method a very high compression ratio can be achieved, the compression rate varies depending on the content but is usually between 90% and 99% compared to the previous camera network.

Keywords: wireless sensor, image compression, FDCT, Entropy Coding

411 A Gis-Based Methodology to Better Estimate Eutrophication at European Coastal Zones

Jutta Reumann-Schwichtenberg

University of Stuttgart, Germany

jrs@ier.uni-stuttgart.de

One of the most threatening impacts on coastal zones is eutrophication and harmful algae blooms caused by the critical exceedance of nutrient input, especially of nitrogen and phosphorous. Besides coastal parameters, e.g. bathymetry and currents, nutrient loads of rivers determine the sensitivity to eutrophication of coastal zones. River loads often have their sources hundreds of kilometres away from the river mouths. Important emission sources for nutrients are agriculture and point sources, especially waste water treatment plants. So far, analyses of the impact pathways from emissions to impacts have been carried out for a small range of watersheds. But still, an overarching European wide view is missing, especially when the interconnections of watersheds to coastal zones are considered. Thus we developed a European wide approach to better estimate the nutrient input to coastal zones and to identify which coastal zones are highly sensitive to eutrophication. Of course, data availability is a limiting factor for modelling. Hence, our approach is also based on practical considerations, for which a consistent and area-wide data base is an important prerequisite. We developed an approach (using GIS) where the above mentioned emissions could be estimated for approximately 35000 European watersheds, mainly based on data on population density and land use. Since these watersheds are all adjacent to the coastal zone, we then could combine this derived information with the PSA-index (Physical Sensitive Index) developed by JRC showing coastal zones with low resistance to eutrophication. A combination of both, the coastal classification and the potential nutrient loads give first indications, where hot spots of eutrophication can be expected - an important basis for pointing out where action is needed and further more detailed studies with higher spatial and temporal resolved input data should be conducted.

Keywords: emissions, bathymetry

420 Estimating Water Consumption Time Series using Artificial Neural Networks and Fuzzy Logic

Mustafa Erkan Turan 1, Mahmut Faqrat 2

1 Celal Bayar University, Civil Engineering Department, Turkey
2 Pamukkale University, Turkey

erkanturan1982@yahoo.com

In this study, Feed Forward Neural Networks (FFNN), Generalized Neural Networks (GRNN) and Fuzzy Logic (FL) are employed for predicting monthly water use of Izmir City from past values. The data set including total 108 records is divided into two subsets for training and testing. 6 different models are exercised based on the past values up to the sixth day. The performances of FFNN, GRNN and FL models in training and testing phases are compared with the observations and the best fit model is identified using several performance criteria such as Correlation Coefficient and average absolute relative error

Keywords: Monthly water use, water use prediction, water management, ANN

424 The 21 St Century Precipitation Estimation in the Danube Middle and Lower Basin by Non-Homogeneous Hidden Markov Model Simulation

Ileana Mares 1, Constantin Mares 1, Petre Stanciu 1, Mihaela Mihailescu 2, Heike Huebener 3, Ulrich Cubasch 4

1 National Institute of Hydrology and Water Management, Romania
2 Agricultural Science University, Romania
3 Hessian Centre of Climate, Germany
4 Free University of Berlin, Germany

ileana.mares@yahoo.com

In this study the estimation of changes in the springtime precipitation from ten stations situated in the Danube middle and lower basin (DMLB) in the 21-st century, in association with changes in the indices of the atmospheric circulation is analyzed. This analysis is achieved by means of non-homogeneous hidden Markov model (NHMM). The observation data for 1958 - 1999 are obtained from the ECMWF (ERA-40) and ECA&D Project. The simulated data are outputs from 4 models CNRM, ECHAM5-MPI, EGMAM and IPSL achieved within the ENSEMBLES project. For the 20-th century the period 1958 - 1999 was considered

and for 21-st century two periods (2009 - 2050) and (2051 - 2092) from the A1B scenario. Both the pressure and precipitation were corrected of bias related to the reference period (1958-1999). From the pressure field, the predictors from three key zones were selected as being significant in the precipitation behaviour. These zones are centred on (45^{o}N; 12.5^{o}E), (42.5^{o}N; 17.5^{o}E) and (40^{o}N; 25^{o}E). The precipitation values are simulated with a NHMM in which the three indices of the pressure: the laplacian, the mean pressure and the WE gradient in the key zones are considered as predictors. After the daily precipitation modelling with NHMM, a simulation was done on 100 realizations each with 42 years and 90 days for each year. The EVT modelling of the simulated precipitation by NHMM leads to the results which are slightly different for the two basins. For instance, it was observed that for the middle basin, the models estimate an increasing of the return level compared with the observations while for the lower basin, the models indicate generally a decreasing of the return level corresponding to the return period of 100 years. The precipitation behaviour in the DMLB in the second half of 21-st century in comparison with first half is detailed in the paper.

Keywords: modelling by extreme value theory, climate change scenarios

425 Rams6.0 Boundary-Layer Simulation over Sofia (Bulgaria)

Ekaterina Batchvarova 1, Enrico Pisoni 2, Giovanna Finzi 2

1 NIMH, Bulgaria
2 University of Brescia, Italy

Ekaterina.Batchvarova@meteo.bg

The horizontal and vertical structure of the atmospheric boundary layer over Sofia have been simulated using appropriate high resolution runs of RAMS6.0 mesoscale model for the periods of 28 September to 3 October 2003. During these days unique data set is available, comprising high resolution in time and space vertical profiles, turbulence profile on a meteorological tower and standard meteorological observations for the city of Sofia, Bulgaria. The RAMS6.0 prediction for sensible heat flux during the intensive campaign (28 September - 3 October 2003) were very close to measurements, while the 10 m wind speed was highly overestimated. The results showed further that the diurnal variation of wind speed in the model is quite idealized and very likely the simulation cannot reflect the complex mountain-valley circulation pattern typical for the city and the measurements site used. The results showed that even well validated over

complex terrain models when applied for “new” complex terrain conditions, do not ensure a success. Measurements for model initial conditions, data assimilation and model validation are needed for all applications of mesoscale models.

Keywords: mesometeorological models, turbulence measurements, vertical profiles of meteorological parameters

427 Methods for Evaluation of Numerical Models in Meteorology

Ekaterina Batchvarova 1, Sven-Erik Gryning 2

1 NIMH, Bulgria
2 Risoe DTU, Denmark

Ekaterina.Batchvarova@meteo.bg

Progress in meteorological models developments is based on comparison with data. In this process it is crucial to discuss the uncertainties and representativiness inherent for both models and measurements. Models can be good enough without an exact match with the measurements, as often shown and aimed. An important new emphasis in model evaluation is to consider vertical profiles of meteorological parameters, not just traditional surface measurements. This will contribute to the understanding why different mesometeorological models calculate quite different atmospheric boundary layer height even when using the same method, and thus influence significantly the air pollution models results. The study is based on data from sites in Bulgaria and Denmark that perform profile measurements on masts, with radiosoundings and lidars. The RAMS6.0 mesoscale model is used for the simulations.

Keywords: evaluation of numerical models, turbulence measurements

475 Using of Remote Sensing (Satellite Images) for Assessing the Environment Situation

Neki Frasheri 1, Betim Cico 1, Hakik Paci 2, Jozef Bushati 2

1 Center for R&D on IT Faculty of Information Technology Polytechnic University of Tirana, Albania
2 University of Shkodra "Luigj Gurakuqi", Albania

jozefbushati@gmail.com

Remote sensing can be used to evaluate the environmental state of a specific area, as well as the evolution in time of different environmental parameters. First, combination of visible bands gives a view in natural colors of the area. Use of combination of visible and infrared bands gives false colors view of the status of vegetation and water areas. Use of specific combination of bands permits the evaluation of water parameters as content of chlorophyll and of suspended materials; and in suitable conditions even the status of the bottom of water bodies. Comparison of images of different years permits the evaluation of shorelines of water bodies. Repositories of images of medium and medium-high resolution are open for public access in the Internet, as Landsat and MODIS. In previous works we have used remote sensing in environmental studies of Prespa Lakes complex, shoreline of Adriatic Sea, and Shkodra Lake - Buna River

431 Hydraulic Analysis of a Novel Fish Passage-Way

Maruf Mortula 1, David Hansen 2, Serter Atabay 1

1 American University of Sharjah, United Arab Emirates
2 Dalhousie University, Canada

mmortula@aus.edu

An innovative hydraulic structure was proposed for fish passage-way in surface water. The structure consisted of identical 'cells' throughout its length and was designed to create coupled spatially varied flow for achievement of desired depth and velocity of water. The objective of this paper was to run the simulation models of a single cell to find suitability of this hydraulic structure. The numerical model used for this hydraulic structure was developed to simulate the water surface profiles and longitudinal variation of 1-D velocity through one cell. The transition in the water surface profile between longitudinally adjacent cells (chamber) was also investigated. The model was run with upstream depth of 0.3 to 0.9 meter with an increment of 0.1 meter. An effort was made to get a smoother transition between two consecutive cells. The depths arising from analysis of the hypothetical

prototypes were found to be adequate for all Atlantic fish species. Minimum average depths were adequate, as compared to optimal habitat depths for most Altantic fish species. Velocities within the cells were found to be reasonable in light of the preferences of most Atlantic fish species. Although cross-sections within the cell did not always provide habitat quality velocities, the species considered can cope with the high velocity zones using their burst speed capabilities. The maximum lateral velocities within a cell were much smaller than the burst speed capabilities of Atlantic fish species. The cell thus provides acceptable hydraulic conditions for fish to travel both longitudinally and laterally.

Keywords: Water Surface Profile, Velocity Profile, Fish Passage-way,Hydraulic Structure and Numerical Model

432 Modeling Phosphorus Removal Process using Artificial Neural Network

Maruf Mortula, Jamal Abdallah, Ahmad Ghadban

American University of Sharjah, United Arab Emirates

mmortula@aus.edu

Phosphorus pollution is one of the most important causes of surface water pollution. Effective phosphorus removal was observed using dried alum residual. The use of waste residuals as a treatment media is very new. For this reason, a model to predict phosphorus removal using alum residual is novel. Experimental results were obtained from a fixed bed column tests conducted in a control environment. Five input variables were used to tests the efficiency of phosphorus removal at different times. In this study Artificial Neural Networks (ANN) are used to predict the effluent phosphorus concentration (mg/L) in a fixed bed column tests. The input parameters for the network are the pH of the influent solution, particle size of alum sludge (mm), initial phosphorus concentration (mg/L), flow rate (mL/min), porosity and time. The output of the ANN is the effluent phosphorus concentration (mg/L) and the effluent pH. The data used to train and test a Multilayer Perceptron using the Back-Propagation algorithm ANN are the results of experiments conducted for different values of the input parameters. Explicit and implicit solutions of finite difference approach are also used to solve mass transfer models for comparative reasons. The ANN predicted and experimentally measured values were compared and the accuracy of the ANN was evaluated. It is concluded that the ANN gives very accurate results compared to the experimental

results. However, conventional approach to modelling phosphorus using alum residual was erratic. Explicit solution of finite difference discretization was not very successful. Implicit solution was found to provide reasonable accuracy at times. However, due to erratic nature of the results, further exploration and investigation are needed on these methods.

Keywords: Artificial neural network, Alum residual, Phophorus pollution, Fixed bed column tests and Porosity

436 Multivariate Stochastic Modeling of Daily Streamflow of Rivers in the Coruh Basin by Artificial Neural Networks

Ibrahim Can 1, Fatih Tosunoglu 1, Ercan Kahya 2, Cahit Yerdelen 3, Hilal Erdem 4

1 Ataturk University, Civil Engineering Department, Erzurum-Turkey
2 Istanbul Technical University, Civil Engineering Department, Istanbul-Turkey
3 Ege University, Civil Engineering Department, Izmir-Turkey
4 Ataturk University, Graduate School of Applied Science, Erzurum-Turkey

ibcan@atauni.edu.tr

Streamflow simulation is quite important for engineering project design, development and management of water resources systems. In this study, multivariate artificial neural network model was obtained for daily streamflow observations of 9 stations located in Coruh Basin, Turkey. Using this multivariate artificial neural network model, 100 synthetic streamflow series were generated and compared to historical series of the stations. The results showed that generated streamflow series saved the statistical parameters of historical series within 95% confidence intervals, such as daily mean, daily standard deviation and autocorrelation. As a conclusion, it can say that ANN model is acceptable for daily streamflows of rivers and the generated streamflow series can be used for design, planning and management of water resarch in the Coruh basin.

Keywords: Multivariate artificial neural networks, daily streamflow simulation, Coruh basin

438 Analysis of the Spatiotemporal Heterogeneity of Modis Satellite Data for Hydrologic Forecasting

Lina Castro, Marcelo Miranda, Bonifacio Fernandez

Pontificia Universidad Catolica, Chile

lecastro@uc.cl

The global development of remote sensing made possible to have satellite data of variables that influence the hydrologic processes, such as land surface temperature, albedo, vegetation index, radiation and others. However, the discrepancy between spatiotemporal observation scale, model scale and land surface process scale may lead to different conclusions in the processes of simulation and forecasting. In order to handle with this problem, it is necessary to define the level of aggregation of information with a spatiotemporal heterogeneity analysis. The objective of this work was to characterize and quantify the spatiotemporal heterogeneity of MODIS satellite data (MYD11A1-Land Surface Temperature, MYD13Q1-Vegetation Index, MCD43B3-Albedo) in order to define the appropriate level of aggregation for a distributed hydrological model forecasting. For this, the experimental semivariogram was calculated and adjusted to theoretical semivariograms. The images spatial structures were characterized using structural information of the semivariograms and the spatiotemporal heterogeneity was quantified with the purpose of determine the information level aggregation of the satellite information. With this, we can capture the space variability of the information and minimize the variability between pixels to later incorporate aggregate information into hydrologic modeling.

Keywords: MODIS satellite data, spatiotemporal heterogeneity, semivariogram, hydrologic forecastinga

474 Ict Application for Monitoring Air Pollution in the Area of Shkodra Lake

Jozef Bushati 1, Florian Mandia 1, Neki Frasheri 2

1 University of Shkodra “Luigj Gurakuqi”, Albania
2 Center for R&D on IT Faculty of Information Technology Polytechnic University of Tirana, Albania

jozefbushati@gmail.com

The main theme is treatment environmental problems, primarily on the evaluation of the whole ecosystem, air, water and soil properties. In this paper we have introduced the problem of ICT application in the air quality monitoring. The properties of the

lowest part of the Troposphere influence on the entire ecosystem. Monitoring is a routine procedure, in which the researcher uses the instruments sounds to collect measurement data, transfer these data by using dataloger properties of the instruments together with ICT application, using wireless connections, and in the last step these data are elaborated by using appropriate software. Principal air quality parameters include particulate matter, sulfur dioxide, carbon monoxide, nitrogen oxides, lead and ozone. Aerosol concentration constitutes on the physical part of the problem, and so we are concentrated mainly on aerosol monitoring. The measurement campaign was carried out in the Shkodra region, including Shkodra Lake. The instruments used for monitoring are suitable for the stationary and mobile operation, making measurements in indoor and outdoor ambient. In our campaign these instruments are installed in several points of in stationary mode. Their measurement results are collected instantly processed and saved on our database. The common peculiarities of these instruments are intersection and their cooperation with ICT applications in receiving and processing data in digital manner, saving directly in digital storage (memory cards) and depend of the needs, transmit with wireless connections. These advantages of the instruments let us make uninterrupted measurements for a relatively long period, giving in this way an accurate picture of the environmental situation. The analyzed results give a clear picture of aerosol concentration in the region of Shkodra Lake, which is done by using the statistical software, all data collections compare with the allowed intervals of aerosol concentration will give us possibilities for conclusions in this area

Keywords: ICT application, software, air pollution, aerosol concentration, Shkodra Lake

441 The Method of Estimation a Small Retention in Forest Catchments

Antoni Tadeusz Miler

Department of Forest Engineering Poznan University of Life Sciences, Poland

amiler@up.poznan.pl

The field investigations were carried out in a small forest catchment situated in the area of the Krajeskie Lakeland, in the Lipka Forest District, the Biskupice Forest Range, in Poland. The catchment covers the area of 182ha, 95% is covered by forests and 5% by arable land and meadows. The field measurements comprised a continuous recording of the course water levels at the Thompsons overflow and weekly measurements of groundwater levels in ten wells. Construction

development was introduced on the area of the watercourse during the conducted research: six damming devices (installations) constant weirs-were constructed there. The annual outflow coefficient from the catchment in focus equals to 0.330. It confirms the necessity of developing the discussed watercourse in order to create the so-called small retention. However, no significant influence was found of the development on the water balance components of the catchment. The influence of the watercourse bank development can be clearly described conducting an analysis of direct runoffs. 14 recorded high water waves were subject to analysis, 6 prior to the development and 8 following it. Each of the waves was described applying Nashs conceptual model. A constant number of 2 reservoirs in a cascade was assumed. Means of time-constants for high water waves after the development were higher by approx. 50% than for the waves prior to the construction. Resulting from it a hypothesis can be constructed here stating that the time of runoff water deposition in the catchment as a result of the weirs development was significantly prolonged. It can be thus assumed that systems of small and basic weirs should be applied in forest small retention programmes.

Keywords: forest catchments, small retention, runoff modelling

449 Modelling Groundwater Recharge of an Urban Area in Germany

Sabine Tesch, Volkmar Dunger, Joerg Matschullat

TU Bergakademie Freiberg, Germany

sabine.tesch@ioez.tu-freiberg.de

Groundwater recharge is an important part of the natural water cycle. Particularly in urban areas is an enormous encroachment on the natural water cycle caused by gradually increasing land use of areas and sealing of soils. Sealing influences the hydrological and the mechanical behaviour of the soil. Infiltration of water to groundwater is reduced followed by a decreasing groundwater recharge and an increasing surface run-off. Not only man-made impacts but also climatic changes actually and in the future have a high impact on available water resources associated with cultivation of land, forest management, water supply, waste water disposal and urban infrastructure. Actually, there is no regard to modelling groundwater recharge with high resolution and comprehensive in consideration of differentiated classification of soil data and land use for the region of Dresden (Germany). Studies in the context of the project REGKLAM (Development and Testing of an Integrated Regional Climate Change Adaptation Programme for the Model Region of Dresden funded by the Federal Ministry for Education and Research) are currently in realization on quantification of groundwater recharge

for present and regionalised scenarios of climate change base upon using a two-dimensional hydrological model BOWAM. The results of modelling groundwater recharge for the Quaternary aquifer for the region of Dresden are important input for groundwater modelling.

456 The Study of the Drainage of Ground Water by the Boundary Element Method

Adrian Carabineanu

University of Bucharest,
Institute of Mathematical Statistics and Applied Mathematics of Romanian Academy, Romania

acara@fmi.unibuc.ro

The free-surface steady motion of ground water determined by a constant rain fall in the presence of a network of circular or rectangular drains is studied by means of an iterative procedure. At every iteration one utilizes the complex boundary element method to solve the Cauchy-Riemann system for the potential of the velocity and the stream-function and then one calculates the free-surface and the hydrodynamic spectrum.

Keywords: Drain, rain fall, free-surface, velocity, boundary element method

458 MSGM - Estimations of Pollutions in Regional Scale

Boris Sekirarski

Hydrometeorological Service, Macedonia

bsekirarski@yahoo.com

The idea for a mobile server for global monitoring exists since year 2002. Today this is an active server with few new programs added in last two years. 6 accepted models in different stage of functionality exist into the program of ecological modelling. The models are related to evaluation of air, land and water pollutions, but also in the area of fire spread estimation. MSGM is capable to process data from different sources and prepare inputs for modelling processes. The main idea for the server is its automated work. In this way we prepare necessary applications able to manage the pre-processing, start and work of the adopted models. We first started with test cases scenarios and in this moment

we finished with testing real region cases with prepared hydrologic and hydraulic parameters for those regions (placed in the region of Balcans). The Treska River basin was the first one and here we are presenting the results from different scenarios of precipitations. The sources for the precipitation data are different: satellite estimations forecasted with the global weather numerical model and regional scale forecasted precipitations data.

Keywords: Pollution, monitoring, information system, forecast, estimate, Balkans region

459 Discharge Variations of a Subalpine River Watershed since the XX Century Second Half through the Application of a Hydrological Model

Viviano G., Ricchiuti M., Guyennon N., Copetti D., Tartari G., Carraro E., Manfredi E.C., Salerno F.

1 Water Research Institute - Italian National Research Council (IRSA-CNR), Brugherio (MB), Italy
2 Water Research Institute - Italian National Research Council (IRSA-CNR), Monterotondo (RM), Italy

viviano@irsa.cnr.it

This work examines the river discharge variations in a subalpine basin since the second half of the XX century through the application of a hydrological model. The investigations were carried out within a sub-basin of the Lake Pusiano watershed, situated on the southern edge of the Alps (Northern Italy) between the two branches of Lake Como (Lombardy Region). The area chosen for calibrating and validating the hydrological model was a sub-basin with outfall point situated 4 km north of the lake (Caslino watershed). The hydrological model used is SWAT (Soil & Water Assessment Tool), a deterministic, semi-distributed and with daily time-step surface model that rebuild the river discharge in continuous. The calibrated and validated model was used to simulate the river discharge since the second half of XX century with a daily time step. In this paper we shall describe how the discharges vary in function of the rainfall during the same period discussing the possible impacts on socio-ecosystems (flood risk and water quality) as consequence. Finally the paper points out how the proposed approach could be applied more widely and used to analyze the effects of possible climate changes.

Keywords: Hydrological model, Climate change, SWAT, Flood risk, Water quality

465 Upon Flowbed Deformation of Hydrodynamical Processes

Roumen Gadjev

IMM_Agric. Academy, Bulgaria

hydroigr@abv.bg

This paper deals with a deformation of natural beds due to erosion processes of the surface and river flows, which cause environmental changes of global and regional scale. For that are shown the respective hydraulic processes and a main characteristic of the surface and river flows - tangential tensions and the hydrodynamic forces of the flows based on the pulsation velocities. This work gives an analytical dependency for prognostication of the main characteristics of the flows.

Keywords: hydrodynamics, open flow, pulsation velocities, tangential tensions

467 Potential Downstream Escapement of European EEL from Lake Peipsi Basin

Ain Jarvalt 1, Meelis Kask 2, Teet Krause 2, Anu Palm 2, Meelis Tambets

1 Centre for Limnology, Institute of agricultural and environmental sciences, Estonian University of life sciences, Estonia
2 Centre for limnology, Estonian University of life sciences, Estonia

ain.jarvalt@emu.ee

According to the European Council Regulation of establishing measures for recovery of the stock of eel, the principal element is to achieve the objective of a 40% escapement of adult silver eel from each river basin. The construction of the hydropower station on the Narva River (Estonia) in the early 1950s blocked the natural path of eel to the water bodies of L. Peipsi basin. As a result, eel almost disappeared from the fish fauna of Estonian large lakes and since 1960s the population of eel based entirely on stocking. During the half hundred years (1956 - 2009) about 50 million eels were stocked into the lakes of Narva River Basin. Due to the stocking, eel is one of the most important commercial fish in Lake Ve rtsjerv and in some small lakes in Narva River Basin. One of the most crucial tasks for Narva River Basin was to determine potential silver eel escapement and survival in turbines to allow improved eel migration. To investigate the downstream migration of silver eel from L. Peipsi Basin and their possibility to go through the turbines there was tagged 147 eels. All specimens were tagged with Carlin-type of tags, among them 7 specimens with radio telemetric tags. Stocking of label-

tagged eels into Narva water reservoir took place in 2006 - 2007. During the folloving years there were recaptured 4 tagged eels in the river downstream of the station, two in Finnish Gulf and three large eels have been caught in Danish Straits. One of them covered the distance more than 1200km with 4 month. There were observed also survival and behaviour of 7 eels equipped with transmitters after coming through the turbines using manual registration of migration. Minimum 42% of radio-tagged eels came through the turbines alive and without any damage. Two of them were caught back in Narva R. and one next summer close to island Saaremaa. The fixed evidence of successful downstream migration of silver eel was very important result for sustainable and reproductive management of European eel in Narva River Basin during the last 50 years.

Keywords: eel, migration, turbins, tagging

479 Improving Method for Structural Analyses of Daily Runoff Series

Zoran Radic 1, Vladislava Mihailovic 2

1 Faculty of Civil Engineering University of Belgrade, Serbia
2 Faculty of Forestry University of Belgrade, Serbia

zradic@grf.bg.ac.rs

Needs for efficient hydrological methods in the last decades occurred for the increase of water needs, sever droughts and extraordinary flood events. Previous analyses (Mihailovic& Radic, BALWOISE 2006) based on new methodology showed the advantages of complete 365 daily data sets analyses against monthly or characteristic daily data. Advantages are demonstrated for the purposes of hydrological regime studies and droughts analyses. Methodology is based on TIPS method for structural analysis of daily hydrological series: (i) On the basis of observed daily flows series for N years, series of 365 daily values of a certain statistical parameter could be estimated (minima, maxima, conventional moments, L-moments, etc.) (ii) Mutual dependence between series members in the original series introduces dependencies into derived series of statistical parameters, so it is possible to derive time functions which describe that dependence (iii) Based on the established periodic functions of parameters 365 marginal probability distributions during the annual cycle could be derived. The main goal of this paper is the question of the selection of appropriate probability distribution type for marginal distributions of daily flows. Study is based on data from 33

representative profiles in Serbia and for the period till 2006. For the purpose of regional analyses and other applications referent period 1961 - 1990 is selected for the marginal distribution studies. In the case of wide range of variation of skewness and kurtosis coefficients in the year, the logical choice is a very flexible probability distribution. According to this, only three-parameter distributions were taken into the consideration. Possible three-parameter candidates are identified on the base of preliminary analysis of conventional moment ratio diagrams and L-moment ratio diagrams. Comparisons of distributions were evaluated using different goodness of fit tests and condition that the lower boundary of distribution shouldn't be negative. The LP3 distribution perfomance is found to be the best.

Keywords: Hydrology, Stochastic Analyses, Daily Runoff Series, Marginal Distributions, Daily varying threshold

487 Effects of Land Cover Change as Erosion Factor Using Landsat Imagery

Ivan Mincev, Bozin Trendafilov

University "st. Cyril and Methodius" Forestry Faculty, Macedonia

i_mincev@yahoo.com

In the past, the mountain region of Mavrovo and its vicinity had been a huge economic center. As a part of the process of migration, many of the mountainous regions of Macedonia have been practically deserted. This had a huge effect on the environment and it largely diminished the human impact. The aim of this study is to examine the land cover changes, which occurred in the past, and to show the impact of the land cover change on the environment. The erosion risk was used as a function for the impact of the environment and it was represented through the land cover change. For the detection of the changes of the land cover, two Landsat satellite images were used (1977 - MSS and 2000 - ETM+). The two images were separately automatically classified using several sources for sampling points (aerial images, topographic maps, forestry maps, etc.). The classification methodology used was unsupervised classification using several additional processing sources (NDVI, PCA). The land cover maps were then reclassified according the needs of the erosion assessment. For this purpose the methodology of Gavrilovic was used and the land cover was transformed into the "X" variable of the equation for erosion coefficient. Finally, the two produced land cover/erosion maps were compared and assessed. The methodology

for assessment of erosion risks with remote sensing automatic classification using medium to high resolution imagery is a good tool for this purpose but on regional scales. For scales that are more detailed the use of additional sources of information are imperative.

Keywords: land cover, Landsat imagery, unsupervised classification, erosion

494 Informatical Support of Projecting and Building of Small Hydro Power Plants

Dragan Milicevic 1, Slavoljub Milicevic 2

1 Faculty of Civil Engineering and Architecture, Serbia
2 "Hidrozavod", Serbia

drgara@eunet.rs

There is big investor's interest in building small hydro power plants in Serbia, but for some reason it didn't started with some serious investments. One of the key reasons is not enough data, who will allow potential investors to have clear idea, and help them to bring correct decision. Cadastre of SHPP on the territory of Serbia there are 856 potential locations suitable for building SHPP with concrete solutions and basic technical data for each of them Cadastre was built in 1987 in analogue form and meanwhile it wasn't upgraded and new data were collected, so that the data that are on Cadastre disposal are old and can not be realistic base for investors to bring final decision. According to the number of potential locations for building SHPP, and a big number of necessary data for each and every location, and use of new software methods, could simplify and help a lot in collecting, arranging and analizing all data in Cadastre. This paper shows the software system, which development is in progress, and which contain base of potential locations for building SHPP from Cadastre, with basic technical data for each one of them, as well as supporting database of equipment meteorological data, hydrological data and historical database of projects. Calculating module of this system allows any location, choice of equipment, prognosis of useful energy for concrete hydro scheme, as well as financial analysis which define costs and financial payoff of the project. System GIS oriented, which allows quick and easy management data, as well quality presentation of gain results. Software system like this could allow investors and projectants to economise time and costs with choosing best location for building SHPP and management necessary technical documentation.

Keywords: SHPP, informatical support, choice of location, planning and building

508 Aggregated Mathematical Model for Water Quality Control in the River Basin (Volga River Application)

Aleksey Gotovtsev, Valentina Pryazhinskaya

Water Problems Institute of the Russian Academy of Sciences Moscow, Russia

gotov44@mail.ru

The report presents the developed specific methodology for water quality modeling in the large river basin. The results of study apply to the Volga River basin. All calculations were based on a detailed evaluation of all types water pollution sources of 38 administrative units and their efforts on ambient water quality. This report results is a part of study “Mathematical modeling of decision making for the Volga River basin administrative units”. The study was carried out in the framework of the Federal Program for the Volga River basin.

Keywords: water quality protection, river basin, mathematical modeling, decision making, point source pollution, diffuse source pollution, diffuse pollution modeling, calibration

509 Real-Time Flow Forecasting Using Adaptive Neuro Fuzzy Inference System

Ibrahim Gurer, Ibrahim Ucar, Rifat Tur

Gazi University, Turkey

gurer@gazi.edu.tr

Accurate estimation of River flow changes is a quite important problem for wise and sustainable use in operational hydrology. Flow forecast is usually very complex owing to the uncertain and unpredictable nature of the underlying phenomena. Traditional flow forecasting methods can be insufficient because of the nonlinear characteristics of the system. In this study, an Adaptive Neuro Fuzzy Inference System (ANFIS) approach was used to construct a River flow forecasting model. ANFIS has been used in similar forecasting applications in recent years. To illustrate the applicability and capability of the ANFIS, the Degirmendere River, located within Eastern Black Sea Basin, North of Turkey, was chosen as a case study area. The models having various input structures were constructed and the best data set was investigated. The models are formed by training and testing procedures as suitable to the ANFIS Methodology. The performance of the ANFIS models in training and testing data sets were compared with those of multi-variable regression analysis outcomes. These comparisons are presented

both in tables and graphs. The results indicate that the ANFIS can be applied successfully and provide high accuracy and can be a useful tool for River flow forecasting.

Keywords: River flow estimation, ANFIS, Degirmendere River, Turkey

523 Proposed Coding of European Rivers for Water Framework Directive

Lidija Globevnik 1, Dunja Zupan Vrenko 1, Hans Mose Jensen 2

1 Institute for water of the Republic of Slovenia, Slovenia
2 International Council for the Exploration of the Sea, Denmark

lidija.globevnik@izvrs.si

GIS feature coding for hydrogeographical objects in Europe is the assignment of unique identifiers or codes to each spatial object that give reference to other hydrogeographical objects. We need this for Water Information System for Europe (WISE) to ensure uniqueness at national and international levels. Standard identifier formats will ease electronic data transfer and enhance the possibility of central querying against distributed storage. First step in ensuring unique identifiers or codes in water management is to develop a harmonized coding system for implementation of Water Framework Directive (WFD) and Marine Strategy. The harmonized coding system is designed using the same hydrological systems and sea regions delineation. The basis of water feature coding present hydrological systems and sea regions as parts of hydrological systems that were defined for Marine Strategy. The marine eco-region boundaries were set to follow the boundaries of the ICES eco-regions. It is proposed that boundaries should be re-evaluated at 20 year intervals. It was also noted that according to the Coast Guidelines under the Common Implementation Strategy for the WFD, that the recommended interval for examining eco-region borders is every 6 years to account for climate change. Primary catchment and inter-catchment area codes in Europe defined the basis for coding of European rivers. These codes are prepared on European level within European Catchments and Rivers Network System (ECRINS) and depend on defined hydrological systems and sea regions. Each river in the river network within primary or inter-catchment is defined according to hierarchical Pfafstetter coding concept. Pfafstetter hydrological feature codes have been assigned to each river reach and primary catchment over the entire area and will be linked to marine codes in order to generate unique hydrological feature codes for Europe. Pfafstetter codes are structured feature codes, which implicitly carry information on the topology of the river network.

Keywords: coding, WFD, river

525 Bathing Water Quality Information for Public In Europe - Availability and Issue of Integration of Data for the European Level

Lidija Globevnik, Dunja Zupan Vrenko, Marko Kovacic

Institute for water of the Republic of Slovenia, Slovenia

lidija.globevnik@izvrs.si

Since 1976, European member states annually report the state of bathing water quality according to Bathing Water Directive 76/160/EEC. Directive defines mandatory and guide values of biological parameters in bathing waters. In 2006 a new Bathing Water Directive 2006/7/EC was adopted, which provides reporting by only two microbiological parameters. Reporting under both Bathing Water Directives is taking place at the end of each bathing season. These data are available on European level in three different platforms for public. While public is interested in the current status of bathing waters, European Environment Agency established a system for near real-time reporting on bathing water quality. Near real-time reporting is not regulated by any directive, but operates on a voluntary basis where member states are sending their data on weekly or bi-weekly basis. A step further is a distributed Shared Environmental Information System that removes human interaction from the reporting process and shift from annual data reporting to real-time data flow. This system is still under development, bathing water quality reporting was used as a pilot project. The purpose of this project was to test the readiness of member states to integrate their systems into Shared Environmental Information System. For this purpose Eye On Earth Water Watch portal was designed, which began test operation during 2008 bathing season. In bathing season 2009 GeoRSS standard was adopted to automatize and standardize the reporting process. Member states have difficulties in establishing this standard, therefore during 2009 bathing season GeoRSS conversion was done by European Topic Centre on Water. In future seasons, a higher degree of automatization of this process is expected with adding international location codes into national databases.

Keywords: bathing water quality, GeoRSS, data availability

527 Application of a Complex Hydrodynamic Analysis in Assessing the Feasibility of Increasing Groundwater Source Yield: Case Study of Podrum Palic (Serbia)

Dusan Polomcic 1, Srdjan Parlic 2, Vesna Ristic Vakanjac 1

1 Faculty of Mining and Geology, Serbia
2 Natural Mineral Water, Serbia

dupol2@gmail.com

The groundwater source of the Natural Mineral Water Bottling Company ?Podrum Palic" is currently comprised of two wells (B-1 and B-3) whose aggregate yield is 33.7 l/s. However, larger amounts of groundwater are required for the company's business development. This paper presents a complex hydrodynamic analysis which was developed with the goal of assessing the feasibility of increasing the yield of this groundwater source by adding two new wells whose capacity would be 50 l/s each. In situ investigations included two pumping step-tests of the existing wells and one long-lasting group pumping test. The results of the pumping tests were processed applying graphoanalytical methods and the entire hydrograph of each well and each pumping test was interpreted. The interpretations provided the hydraulic status of each well and the groundwater flow characteristics of the aquifer. Group test data were used to assess permanent drawdown development and define a mathematical model to simulate current groundwater abstraction and identify potential locations of the new wells.

Keywords: ground water sources, aquifer testing, hydrodynamic models

761 Flood Inundation Mapping using Geographic Information Systems

Ivana Donevska 1, Kosta Mitreski 2

1 Informatics and Computer Engineering, Indiana University-Purdue University Fort Wayne, USA
2 Faculty of Electrical Engineering and Information Technologies, Macedonia

donei01@students.ipfw.edu

Hydrologic modeling and its integration with ArcGIS is carried out to address four types of water problems: floods, droughts, water pollution and degradation of aquatic eco-systems. For all cases, a description of the physical environment through which the water flows is needed first and second, a simulation of water movement and the transport of constituents such as the sediment, dissolved chemicals that water carries as it flows. Geographic Information Systems is very

useful for the first task, namely the description of the physical environment. This includes the definition of the shape of the terrain surface, watershed and stream network delineation, description of land cover and types of soils, and three dimensional description of channel and floodplain morphology. All these details are spatial varying, but they change little during time. Hydrologic modeling is used for the second task, that is simulation of water movement, depth and discharge or quality through a watershed or river channel system. These variables fluctuate rapidly in time.

The paper presents 2D analyses of river floods for Brajcinska River in the Republic of Macedonia and presentation of flood inundation map. The analyses are consisted of presentation of flooded areas by Brajcinska River in cases when the river discharge exceeds the value of Q=15m3/s as a boundary value when the water starts to spread over the surface of the terrain. The additional condition is the inclination of the terrain which is set to be lower than 0,03%. The analyses are performed using ArcMap software, which offers 2D visualization of the Prespa Valley from the DEM model. ArcMap model builder and hillshade are used as tools for Brajcinska River flood prediction. The results as flood inundation map is presented in the paper.

Keywords: flood modeling, Geographic Information System, Brajcinska River

541 Assessing Water Discolouration within Temperature Controlled Pipe Test

Jasem Alkandari

University of Sheffield, United Kingdom

j.kandari@hotmail.com

This study was intended to assess discolouration of tap water under three different flow regimes (e.g. loop 1 = 0.2, loop 2 = 0.4 & loop 3 = 0.8 l/s) within controlled ambient temperature which was equal to 8^{o}C throughout the test period. The work consists of two subsequent tests carried out during the period of the study which are water recirculation test and flushing test. During water recirculation test, water samples from the three loops in addition to the storage tank and the inlet water were gathered on a daily basis for total iron and chlorine analyses. Also, water quality parameters including redox potential and water conductivity were measured within the three loops throughout the test. The result shows that water redox potential has decreased within the three loops which led to increase water minerals oxidation. Conductivity of water within the three loops has decreased due to loss of water minerals constituents. Total chlorine decay was faster in loop

1 due to water longer residence time presented in loop 1 among the other loops. The flushing test was conducted for the three loops by increasing the flow rates in a step-by-step process. Analysis of total iron and turbidity measurement were carried out during the test. The result shows that water becomes more turbid by increasing the flow rates where the highest water turbidity value was measured in water within loop 1. Also, total iron concentration in water within the loops has increased during the flushing processes where the highest concentration was measured in loop 1. Overall, the result indicates that the longer water stays within the transition pipes, the faster water quality deteriorate. Also, a change in the system hydraulic condition represents by increasing flow rate will result in an increase in water turbidity.

537 Optimization of the Communication Channel Bandwith for a Multifunctional Monitoring System in Distance

Bexhet Kamo, Adrian Shehu, Rozeta Miho, Indrit Enesi, Vladi Kolici

Faculty of Information Technology, UPT, Albania

bkamo@fti.edu.al

Design and implementation of a multifunctional monitoring system in distance consist in a system that has to provide video surveillance for in and out of the monitoring sites, temperatures control, humidity control, dew point control, fluid detection, air flow control and also controlling parameters of other devices on site. In this paper we present a model for this system, by considering the bandwith required for all data transmission. The optimization of bandwith is done taking into consideration mostly video sensors. The number of video sensors and video resolution are the main parameters that are studied, in order to get the optimum bandwith required for a normal and acceptable quality of video or other alarms transmitted. Using Matlab we provide the graphical data for the bandwith and the number of sensors used in real application. The modeled system is implemented in a real case and we have viewed and compared the quality of data and mostly video transmission, for different value of frame rates. The system is modeled based on a base station solution, so the number of sensors that can transmit in real time is limited based on the interface's bandwith, of the base station. Considering this element and the maximum number of base stations for a site, we give a value for the maximum sensors and base station for one site, based on the channel's bandwith between remote site and control center.

Keywords: Monitoring system, temperature control, humidity control, video surveillance

542 Problems of Draft and Use of Rain Waters in Gire Approach in Allada (Benin)

Etene Cyr Gervais, Boko Michel

Laboratoire de Climatologie DGAT-UAC, Benin

cyr_gervais_etene@hotmail.com

In Benin, the resources surface water available for the people's consumption is estimated at 13 billion m3 but, the level of mobilization of these resources is only neared 5 %. With an annual pluviometry estimated at 1300mm the town of Allada is confronted with a serious problem of supply water, and this paradox deserves a serious reflexion. The rainfall records collected with the direction of meteorology were treated by statistical tools. The empiric investigations are focused on discussion with various actors (populations, local authorities, agents of cleansing, etc). Rapid Rural Appraisal (RRA) was used in contribution with the others participating observations. The analyses show that the climatic assessment is positive six (06) months during which, rain water largely exceeds the needs for the populations. During the dry season, water becomes so rare and the populations endure difficulties to reach water for drink and for other uses. To define strategies to mobilize rain water during the abundance season for report various uses, is the framework of integrated management of the water resources, essential for human sustainable development tools.

Keywords: Allada, water rain, mobilization, GIRE

544 Photovoltaic Solar Energy Applied to Systems of Ultraviolet Desinfection of Water

Nilton Cezar Pereira, Ricardo Ruther, Jair Urbanetz Jr., Lucas Rafael do Nascimento

Department of Civil Engineering - Technologic Nucleus - Federal University of Santa Catarina - Trindade - Florianopolis-SC, Brazil

nico@ecv.ufsc.br

In agreement with OMS, World Organization of Health, about 1,7 milion people they die from diseases related to the inadequate supply of water and to problems in the areas of basic sanitation and hygiene conditions. In the Brazil there are many places with water's problem like shortage, in spit of Brazil to own about 20% of total drink water of the earth but not equally distributed on country surface.

Indeed many rivers and underground water are polluted by many toxic substances through industrial effluent, agricultural defensive, sewage and others. One of the causes leaders in mortality for in development countries are diarrhea, disease due to infections of the gastrointestinal system, whose predominant cause is the viruses and bacteria's that are easily found in the no treated water. About 90% of the deaths they happen in children with age inferior to five years and for each child that dies, countless another suffer of problems of health, reduced productivity and loss of education opportunities. This paper reports a build of a system to disinfection of water using ultraviolet disinfection (UV) thought of photovoltaic system and it consists in involucres acondicionador, germicide lamp of mercury steam using no expensive materials, because the intension of this system is to solve problems for distant communities in Brazil that have not electricity power. The disinfection UV system doesn't remove particles of the water, however it inactive any organic matter with potential pathogenic and it can be solution to many people in Brazil, mainly poor people. The available of water will be make using physic-chemistry and microbiologic analysis into specialized laboratories.

Keywords: Water desinfection, ultraviolet, solar energy, photovoltaic system

566 Characterizing Groundwater Dynamics in Western Victoria, Australia using Menyanthes Software

Yohannes Woldeyohannes, John Webb

La Trobe University, Environmental geoscience, Bundoora, Vic, Australia

yyihdego@students.latrobe.edu.au

Water table across much of the western Victoria, Australia have been declining for at least the last 10-15 years, and this is attributed to the consistently low rainfall for these years, but over the same period of time there has been substantial change in land use, with grazing land replaced by cropping and tree plantations appearing in some areas. Hence, it is important to determine the relative effect the climate and land use factors on the water table changes. In this study, a standardized computer package Menyanthes was used for quantifying the influence of climatic variables on the groundwater level, statistically estimating trends in groundwater levels and identify the properties that determine the dynamics of groundwater system. In this approach, the spatial differences in the groundwater system are determined by the system properties, while temporal variation is driven by the dynamics of the input into the system. Overall, the model fitted the data well, explaining 89% (median value of R2) of variation in groundwater level using the climatic variables left without significant trend (-0.046 m/yr, on average), which is within the range of

variable input standard error. The model output parameter values characterized by their moments. The zero-order moment Mo of a distribution function is its area and M1 is related to the mean of the impulse response function. The relation is M1/Mo. It is a measure of the system's memory. It takes approximately 3 times the mean time (M1/Mo) for the effect of a shower to disappear completely from the system. The average estimated system response is 5.2 years which is less than by 1/10th of the previously estimated. From a time series analysis there is no indication that the groundwater table was rising/falling due to changes in landuse, at least not during the observation period.

Keywords: Climate, landuse, water table, modeling

569 The Challenges of Satellite Based Data Transmission System on Integrated Water Resources Management n the River Niger Basin

Ibraheem Alabi Olomoda

Niger Basin Authority, Niger

Olomoda@abn.ne

River Niger covering West and Part of Central Africa is the third longest river in Africa and 9th in the World. It has since the last 4 decades reduced its catchment area to about 1.5 million km2 from 2.1 million km2 as a result of the impact of climatic change which is also causing continued low flow, reduction in the reservoir storage capacity, consistent erosion, river siltation, pollution, weed encroachment, increasing water borne diseases, mortality rate, famine, poverty and high rate of migration to urban areas. Since 1984, the UNDP, OPEC, EU and the NBA member countries funded the establishment of 65 satellites based Data Collection Platforms (DCP) Stations to monitor the river and the impact of climate change among others under the framework of the HYDRONIGER project. Also in 2006, under the framework of Niger-HYCOS project, the French Agency for Development (FAD), the Netherland Government, the African Water Facility and some NBA member Countries financed the establishment over 30 additional DCP stations. Hydro-meteorological data transmissions in Niger basin started with the ARGOS Data Satellite transmission and now to the ELTA and the SUTRON DCPs that use EUMETSAT data Collection and Retransmission System. Since their establishment, DCP transmission stations are facing technical problems in addition to non availability and non adaptability of spare parts to African environment among others which pose challenges to integrated water resources management of the river Niger basin.

Keywords: Hydro-meteorological data transmissions

570 Sono-Sorption of Chromium (VI) by Using Waste Straw Paper

Serkan Sahinkaya, Dunyamin Guclu, Mehmet Faik Sevimli, Havvanur Ucbeyiay

Selcuk University, Turkey

sahinkaya@selcuk.edu.tr

We investigated the removal of Cr (VI) from aqueous solutions by sono-sorption process on waste straw paper (WSP). All the experiments were carried out in a batch process. Effects of pH, adsorbent quantity and ultrasonic power density were investigated on removal of Cr (VI). Sono-sorption process conducted in a water jacketed reactor with 100 ml volume at 20kHz frequency by using a horn type ultrasonic homogenizator. WSP used as sorbent was cut to small pieces in the shape of square of 5 mm length. We compared sorption and sono-sorption process in this study. Approximately, 99% of chromium (VI) was removed at pH 1 within 30 min at 1 w/ml US power density, with sono-sorption process using 0,5g WSP. However, 120 minutes was taken to remove 99% of Cr (VI) with conventional adsorption process in same conditions. As a result, Sono-sorption as a new method is more effective and faster than conventional adsorption process.

Keywords: Sono-sorption, chromium removal

573 An Environmental Security and Water Resources Management System Using Real Time Water Quality Warning and Communication

Haseen Khan 1, Shaden Abdel-Gawad 2, Paula Dawe 1, Amir Ali Khan 1

1 Department of Envrionment and Conservation, Government of Newfoundland and Labrador, Canada
2 National Water Research Center, Ministry of Water Resources and Irrigation, Egypt

hkhan@gov.nl.ca

The economic and social importance of ensuring the security of the Nile River against any natural or anthropogenic threats cannot be overemphasized. Egypt, with a population of 76 million in 2007, is experiencing rapid population and urban growth which leads to additional demand on its limited water resources. It is anticipated that by year 2025 Egypt's total population will be about 100 million, thus, increasing the demand for scarce water and arable land and decreasing per capita water share. In view of the above, there existed an urgent need to establish a pilot system in Egypt to monitor its strategic water bodies (the Nile River and its vast network of canals and drains) on a real time basis. The implemented real-time water monitoring and reporting system allows senior water managers

to protect the integrity of Egypt's vital water resources, as well as, report the suitability of water for designated beneficial water uses. Eight real time water monitoring stations were established on the Nile River (from the Aswan Dam to the Damietta and Rosetta branches) and El-Salam Canal (which runs eastward 261 km from its inlet on the Damietta branch into the Sinai desert). Data was collected on water level, pH, dissolved oxygen, water temperature, conductivity, ammonia and nitrate every 15 minutes beginning in January of 2008. The real time stations were effective at detecting the condition of transboundary water entering Egypt, seasonal variations during high and low flow periods, dam effect erosion and reservoir stagnation, increased salinity due to irrigation drainage, sudden changes in hydraulic regime affecting quality and quantity, and point source pollution discharges and their timing. An Egyptian Water Quality Index was also developed to evaluate and communicate the suitability of water bodies in Egypt for various uses such as drinking, irrigation, livestock, and aquatic life.

Keywords: Egypt, water quality index, monitoring, real time

585 Modelling of Quality Parameters for Hops (Humulus Lupulus L.) in Relation to Meteorological Variables

Martin Pavlovic

Slovenian Institute for Hop Research and Brewing, Slovenia

martin.pavlovic@ihps.si

The brewing industry accompanied with a production of raw material sources i.e. field crops used in beer production supports a wealth of direct and indirect jobs across Europe, in particular in the agricultural and hospitality sector. Hops are vital for brewing industry since they provide their certain bitterness (alpha-acids), specific aroma and beer stability as well as a tranquillizing effect. One of the most important market quality parameters of hops are contents of alpha-acids, which may range from 2-8 % by aroma varieties till 10-16% by super alpha varieties. Correlation analysis between meteorological variables and alpha-acid contents in hop varieties in time period 1994-2008 showed, that Slovenian varieties react with resemblance on weather circumstances. Tests of air temperature, rainfall and length of sunshine impacts on alpha-acid content in hop cones were carried out. The included meteorological variables point out in certain phenological phases of hop plants from moderate to high level of dependency with alpha-acid values of varieties analysed. Related to weather situation these hop varieties could be sort out into 2 groups. Aurora, Celeia and Savinjski golding show a very high positive interacting correlation ($r=0,9$; $p<0,001$). Based on correlation analysis between alpha-acid values in hop varietie

s and meteorological variables, a model concept for early prediction of alpha-acid values for Slovenian hop varieties was formulated. The results validate the application of the model for further research. The impact of the research is estimated to enhance capability of the hop industry sector research community, raw material producers in agriculture as well as the brewing industry as its end user.

Keywords: hops, alpha-acids, weather data, modelling, simulation

586 Predicting Water Quality Class from Diatom Quantity in Measure Sample with Classification Algorithm

Andreja Naumoski, Kosta Mitreski

University Ss. Cyril and Methodius, Faculty of Electrical Engineering and Information Technologies, Macedonia

andrejna@feit.ukim.edu.mk

In literature is well known that the diatoms can be good bio-indicators of certain ecosystem environment. This property is used to characterize the environment and thus helping in process of predicting the correct water quality class using the diatoms. Because the biological experts dislike dealing with exact numbers they transform the water quantity of certain physic-chemical parameters into water quality class. This is in fact a fuzzy membership function in the fuzzy control theory, or better known as classification problem in data mining terminology. In this paper we use classification algorithm known as pattern trees, trees which have combine these advantages with the information theory from fuzzy decision trees in process of predicting the water quality class from diatoms water sample. The water quality classes have range of values, so we divide each diatom into three evenly ranges, which will be represented with fuzzy membership functions (low, medium and high). Using this data mining techniques then we learn pattern trees which can predict the outcome of the water quality class from the dataset based on the particular diatom found in the tree. The experimental results have shown that the extract knowledge has high level of confidence factor in many cases and the trees obtain high accuracy during the process of building. As future work we intend to expand the number of fuzzy membership function implement more fuzzy aggregation functions and similarity definitions in process of pattern trees, to obtain better accuracy.

Keywords: Classification algorithm, fuzzy theory, diatoms, water quality, Lake Prespa

591 Intelligent System Based Dynamic Optimization and Geo-Information Technology for Sustainable Water Management

Hussain Aziz Saleh 1, 2, Georges Allaert 2

1 Higher Commission for Scientific Research, Damascus, Syria
2 Institute for Sustainable Mobility, Ghent University, Gent, Belgium

hussain.saleh@ugent.be

Economic and rapid population growth, industrial development and pollution, uncontrolled domestic discharges from urban areas, diffuse pollution from agriculture and various alterations in land use or hydro-infrastructure may all has increased the risk of pollution of environmental resources and consequently contributed to non-sustainable use of water resources. The problems in water pollution monitoring and water management are complex and require a combination of diverse expertise to effectively solve them. These non-differentiable problems require robotic algorithms that can provide a degree of functionality for spatial representation and flexibility suitable for quickly creating real-time optimal solutions that account for the uncertainty present in the changing environment of these problems. Moreover, the volume of data collected for these problems is growing rapidly and sophisticated means to optimise this volume in a consistent and economical procedure are essential. Up to now, water pollution risk is increasing and the environmental degradation is continuing as there is no clear methodology to understand the operational needs that handle inter-related risk and environmental impact due to the incompatible shared information systems that provide easy access to relevant data. Large amount of data (hydrological, geological, economic, social economic, demographic, physical, meteorological, etc) is required for the data analysis which will promote model and systems integration and monitoring. Therefore, this paper is effectively link into wider strategic aims of bringing together innovative ways of thinking based on knowledge and technology in many scientific disciplines (e.g., dynamic optimisation and advanced computer simulation procedures, artificial intelligence, graphical visualisation, geo-information technology, risk analysis and environmental impact assessment, early warning, spatial and environmental planning, land-use, urban development at all levels (local, regional, and national), etc. A monitoring network based on the above disciplines is developed in order to provide real-time monitoring of the impact of the above problems and minimise their effects and this will support water pollution control and water management as well as to track water quality distribution and variations.

599 A Visual Assessment for Land Use Analysis at the Coastal Area of Beysehir Lake

Cigdem Ciftci, Sukru Dursun, Sinan Levend

Selcuk University, Turkey

cigdemcif@gmail.com

A lake strongly depends on its basin's geography through the headwaters. Lake Basin's land use affects the lake ecosystem via transport of materials carried by surface runoff which is caused from agriculture, urbanization and mining and forestry practices. All kind of land using contributes to nonpoint-source phosphorus (P) loading by approximating overland flow. All fluxes cause to cultural eutrophication of surface waters by increasing loading of phosphorus. Both land use practices and rapid land use changes in the watersheds are a serious threat to water quality. In the mean while biodiversity especially amphibian species also are positively correlated with forest cover and the size of wetlands on the coastal area negatively correlated with road density and water quality. The drought and providing water are also the most important issues of Beysehir Lake as with any place in the world. Beysehir Lake is both a wetland according to Ramsar Convention and freshwater lake which is the biggest one of Turkey. There are settlements, agricultural lands, marshlands, forest areas, shallow areas etc. in the coast of Beysehir. Some of settlements are caused to reduced the water sources with uncontrolled usage. Especially the affects of Beysehir Country Area's are important for negatively using the coastal areas. This research's goal is to analysis the current land using on riparian corridor at the lake of Beysehir Country Area depending on ecological parameters such as physical environment, geological and geomorphologic specifications, fauna and flora, soil types, water resources, climate and weather quality, topography, impervious surfaces, directional orientation and height via the Visual Riparian Assessment.

Keywords: Land use, Watershed, Visual Assessment Lake Beysehir, Beysehir City Center

606 The Environmental Role of Icts and Sustainable Development

H. Filiz Alkan Meshur
Selcuk University, Turkey
hfilizalkan@yahoo.com

The development of information and communications technologies (ICTs) has the potential for making major contributions towards sustainability of the earth's ecosystems. Innovative use of information technology offers substitutes for travel and for the transportation of goods, and a major shift towards less resource-intensive production, consumption, trade, and services. Such changes can significantly reduce the environmental impact of industrial and commercial activities and thus contribute to sustainable development. Telecommunications technologies are firmly implicated in both sets of changes, simultaneously increasing the efficiency of production processes and reducing the need for material inputs, while allowing physical spaces and flows to be reconstituted generating environmental problems through dispersal, generation and enhancement of travel. Urban environmental policy needs to develop a new conceptual framework that starts to include the conflicting and complex role of telecommunications. Without such changes researchers and policy-makers will fail to develop a more omplete understanding of urban environmental roblems or develop relevant policy responses. Telework supported by pervasive computing and other new forms of information and communication technologies application can have a significant effect on passenger transport, because it increases the share of time spent in traffic that people can use productively (Marvin, 1998). The aim of this study is to examine the relationships between the urban environment and the role of the ICTs regarding sustainability. It critically reviews the relations between urban areas and the role of ICTs in cities. Potential research questions regarding the impact of technologies on rural and urban forms, transportaion and environment are examined. From policy and planning perspectives, it is important to learn the effects of information technology in general, and telecommuting in particular, on urban development patterns. This paper points out that the effects of telecommuting on location decisions of households and offices. Finally, the important results of this paper are; urban sprawl and decentralization are aggraveting,the location criteria of households and offices are changing, peak-hour travels are reducing, the use of otomobile is declining and environment pollutions are decreasing. ICTs have dual effects. The use of these technologies has had both centralizing and decentralizing effects on cities. They also has the potential for making major contributions toward sustainability of the earth's ecosystems.

Keywords: Information and Communication Technologies, sustainable development, urban sprawl, environment

613 A Study on Modelling Daily Mean Flow with MLR, ARIMA and RBFNN

Volkan Birinci, Onur Akay

Okan University, Turkey

volkan.birinci@okan.edu.tr

Prediction for hydrologic events has always been an important issue for optimizing and planning the whole system. In this study, a conventional MLR (Multivariate Linear Regression) approach, an ARIMA (Autoregressive Integrated Moving Average) approach and an artificial neural network approach which is called RBF (Radial Basis Function) were used to predict and model daily mean flow of the river.

Keywords: ARIMA, MLR, RBFNN, MODELLING

620 Missing Data Analysis for Turkish Temperature Series Using Expectation Maximization Algorithm

Mahmut Firat 1, Fatih Dikbas 2, Abdullah Cem Koc 2, Mahmud Gungor 2

1 Inonu University, Malatya, Turkey
2 Pamukkale University, Turkey

mfirat@inonu.edu.tr

In this study, the applicability of Expectation Maximization (EM) algorithm to forecast the missing monthly mean temperature records at 267 meteorological stations of the Turkish State Meteorological Service between 1968 and 1998 is investigated. For this aim, monthly mean temperature series recorded at all stations for each month are examined in detail and the missing values and dates for each station are determined. In this detailed analysis, 38 meteorological stations are rejected because of having missing values more than 5 years, 105 stations are completed and 124 stations already have complete data. The nearest meteorological station (reference station) having complete data is used to forecast the missing values of each station. The performance of EM algorithm is evaluated by using performance evaluation criteria like Correlation Coefficient (CORR), Efficiency (E) and Root Mean Square Error (RMSE) between two series. The results show that the EM method can be succesfully applied for forecasting missing monthly mean temperature data.

Keywords: Monthly mean temperature, Turkish temperature series, Missing data analysis, EM method

621 Homogeneity Test for Turkish Temperature Series

Fatih Fikbas 1, Mahmut Firat 2, Abdullah Cem Koc 1, Mahmud Gungor 1

1 Pamukkale University, Turkey
2 Inonu University, Malatya

f_dikbas@pau.edu.tr

In this study, homogeneity tests were applied for 267 meteorological stations having temperature records throughout Turkey. For this, the monthly and annual mean temperature data of stations operated by National Meteorology Works (DMI) covering the years between 1968 and 1998 were considered. In the stations, each month was analyzed separately and the stations with missing values for too many years were eliminated. In consequence of the analysis, annual total mean data are obtained by using the monthly values. These data have to be hydrologically/ statistically reliable if they will be used in later hydrological, meteorological, climate change and estimation studies. For this reason, homogeneity test was applied for the annual mean temperature data and Standard Normal Homogeneity Test (SNHT), (Swed-Eisenhart) Runs Test and Pettitt Tests were applied. Each test was evaluated separately and inhomogeneous stations were determined.

Keywords: Monthly Mean Temperature, Annual Mean Temperature, Homogeneity test, SNHT

628 Estimation of Missing River Flows by using Expectation Maximization Method

Mahmut Firat 1, Fatih Dikbas 2, A.Cem Koc 2, Mahmud Gungor 2

1 Inonu University,Turkey
2 Pamukkale University, Turkey

mfirat@inonu.edu.tr

In this study, missing data analysis was carried out for monthly river records throughout Turkey. For this, the monthly river data of stations operated by General Directorate of Electrical Power Resources Survey and Development Administration (EIEI) were considered. In the stations, each month was analyzed separately and the stations with missing values for too many years were eliminated. Expectation Maximization (EM) method was used to complete the missing values. For this aim, each month of the year is evaluated separately and estimations were made by using the long year monthly series of the station with missing values and the neighboring station. The results of the estimation were evaluated by looking at the correlation coefficient and the runs of the time series of the estimated

and neighboring stations. In addition, Linear Regression Analysis was applied to complete the missing river flows for more accurate comparison and evaluation of EM method results.

Keywords: Monthly river flow, missing data analysis, completion of missing values, EM Method

654 An Original Algorithm for Automatic Hydrogeomorphological Features Extraction Using Remote Sensing Data

Denis Marechal 1, Pierre-Alain Ayral 1, Christian Puech 2, Sophie Sauvagnargues-Lesage 1

1 Ecole des Mines, France
2 UMR TETIS, France

denis.marechal@mines-ales.fr

The automatic characterization of watersheds hydrogeomorphological features remains an essential step to elaborate any kind of hydrologic and geomorphic models. In particular, a better delineation of the whole hydrographic network of a catchment could lead to a better modeling of river discharges in a hydrological prevision context. This paper presents an original algorithm (ExtracTIN) for automatic extractions of watersheds and rivers hydrogeomorphological features using remote sensing data. It is applied to Mediterranean watersheds subjected to flash-floods events in the Cevennes region. The goal is to analyse the role of watersheds and hydrographic networks morphologies in upslope catchments in their hydrological response when subjected to heavy rainfalls events. Working on a Triangulated Irregular Network (TIN) scheme, the extracted networks are compared to those obtained with the classical D8 raster method and with the known hydrographic networks reported in IGN- database. All these networks will finally be validated by a network digitalization on a LIDAR Digital Elevation Model (DEM). More than river courses, hydrogeomorphological features are calculated, directly usable in some hydrological models and allowing the study of the relations between local morphology and surface hydrology. These morphological features are then analysed and validated thanks to field work. This algorithm is able to better sharpen the courses of hydrographic networks compare to the D8 method. Moreover, it refines the knowledge of hydrographic networks on small catchments by extracting the whole information contained in the TIN structure and is able to extract some drains that were not reported in the known network database but observed on the field.

Keywords: Triangulated Irregular Network (TIN), Hydrographic network delineation, Hydrogeomorphology, Mediterranean watersheds, Flash floods

640 Numerical Modeling of the Effects of Kizildere Geothermal Power Plant on Water Quality of the Great Menderes River, Turkey

Sebnem Elci

Izmir Institute of Technology, Department of Civil Engineering Gulbahce Campus 35430 Urla Izmir, Turkey

sebnemelci@iyte.edu.tr

Although geothermal energy is considered as one of the cleaner forms of energy, discharge of the power plant's effluent into nearby streams impacts the environment which requires special attention. Motivated by high boron concentrations observed in crops and soils of a river basin located in the south-west of Turkey, this study is investigated the effects of Kizildere Geothermal Power Plant on water quality of the Great Menderes River. In this study, first the hydrodynamic model was validated with the discharge measurements conducted by Electrical Power Resources Survey and Development Administration (EIEI) and State Hydraulic Works (DSI) in five different stations within the modeled segment of the river. After validation of the hydrodynamics along the river, dissolved oxygen (DO), nutrients (ammonia and nitrate), metals (Li, As, Sb) and boron were modeled by Water Quality Analysis Simulation Program (WASP 7.2). Then the results were compared to the water quality measurements conducted within the study area. The effect of the Power Plant was investigated via modeling considering two scenarios: with and without the Power Plant discharges introduced into the model as loading. The simulation results indicated that boron concentrations were significantly affected during winter, when most of the water is kept to increase the upstream reservoir storage. During the same period, when the flows are low; arsenic, lithium, antimony, dissolved oxygen and ammonia concentrations were also significantly affected by the effluent of the Power Plant.

Keywords: geothermal energy, water quality, WASP, Kizildere

643 Groundwater Vulnerability Mapping Optimized with Groundwater Quality Data: the Tahtali Basin Example

Alper Elci

Dokuz Eylul University, Turkey

alper.elci@deu.edu.tr

The concept of groundwater vulnerability assessment is a key component in integrated watershed management. Groundwater vulnerability is an intrinsic property of the groundwater system that defines the likelihood of breakthrough

of any contaminant released at or near the land surface. A wide range of approaches for assessing groundwater vulnerability were developed based on identified factors affecting the transport of contaminants in the vadose zone. Many of the approaches are simple overlay-and-index methods, which are executed within a GIS framework. These methods involve assigning numerical ratings to hydrogeological and physiological attributes and subsequent weighted combination (overlaying) of various rating maps of these attributes to develop a range of final vulnerability classes. The DRASTIC method and its variants are widely used in the assessment of groundwater vulnerability. The main objective of this study was to optimize the conventional DRASTIC method and show the applicability of the optimized method with a case study. The Tahtali stream basin, which is of utmost importance for the city of Izmir, was selected as the study site. Raster-based input layers were constructed that represent the factors contributing to surface-originated groundwater contamination. The vulnerability of the stream basin to groundwater contamination was mapped using weighted overlaying and index calculating approach as prescribed by the original DRASTIC method that was subsequently optimized with groundwater quality data. Nitrate concentration measurements, which represent surface-originated conservative contaminants for the basin, were used as groundwater quality data. Correlation coefficients between nitrate values and parameters affecting groundwater vulnerability were calculated to accordingly revise the conventional DRASTIC parameter weighting coefficients. The correlation coefficient between measured nitrate concentrations and corresponding vulnerability ratings increased from 0.589 to 0.653 by optimizing the layer weights. Optimized vulnerability maps were produced, interpreted and discussed.

Keywords: GIS, groundwater, vulnerability, nitrate, optimization, DRASTIC, Turkey

648 Model Validation for Maize Irrigation Scheduling in Plovdiv Region

Zornitsa Popova 1, Luis S. Pereira 2

1 N.Poushkarov Institute of Soil Science, Sofia, Bulgaria
2 Agricultural Engineering Research Center, Institute of Agronomy, Portugal

zornitsa_popova@abv.bg

This paper reports on using independent historic datasets relative to 6 years experiments (1985-1990) with diverse irrigation treatments of maize for further testing the irrigation scheduling simulation model ISAREG in the Thrace plain, Bulgaria. The experiments concern 10 treatments, including deficit and full irrigation, as well as rainfed, in an alluvial soil (Total Available Water TAW=116

mm m-1) at Calapica, Plovdiv region. The calibration of the model produced crop coefficients Kc and depletion fractions for no stress p relative to the crop growth stages adapted to the maize variety and the local soil and climate conditions. The calibrated parameters were obtained through searching the minimal differences between observed and simulated soil water content. The model test was performed using the data relative to the experiments in 1988. The split data method was applied: half of the data were used for calibration, while the remaining was used for validation of the derived parameters. The resulting average absolute errors of the estimate (AEE) for the soil water content are less than 0.02 cm3 cm-3, thus indicating appropriate model parameterisation. The accuracy of the calibrated model was tested against experimental data (1985-1990) from all irrigation and rainfed treatments by comparing the computed versus observed seasonal evapotranspiration. Results show a regression slope close to the 1:1 line and an AEE smaller than 10% of the average evapotranspiration observed. The yield response factor Ky was also derived from the observed data sets for the hybrid variety used, H708, resulting in a value of 1.495. With this purpose, a statistical test was performed to compare the model predicted versus observed relative yield decrease due to water stress. The obtained results support model use for developing water saving and environmentally oriented irrigation practices in the Plovdiv region, South Bulgaria.

Keywords: Bulgaria, evapotranspiration, model testing, soil water simulation, water-yield relation

650 Estimation of Actual Evapotranspiraiton of Reed Community in Baiyangdian Lake, China

Qiang Wang

School of Environmental, Beijing Normal University, China

wq21st@163.com

Evapotranspiration (ET) is one of most important variables to influence the hydrological and ecological process of the wetland ecosystem. In this paper, the transpiration (Ev) of the reed community and evaporation of the free surface (EL) were monitored, which used to estimate the actual ETa in the in Baiyangdian Lake. Furthermore, using the Penman-Monteith, ET0 was calculated from the meteorological variables. Results showed that ET0, ET and Ev of the reed community all exceeded annual gross precipitation. They were sensitive and had a positive relationship with sunshine hours and precipitation. The annual ET of the reed community varied from 2743.2 mm a-1 to 3660.7 mm a-1, which is 3~5

times that of ET0. Ev of the reed communities was 2.24~4.64 times of El, which occupy over 70% of the total water consumption of the ecosystem. The ratio of ET to EL ranged from 3.32 to 5.91 in the annual scale.

Keywords: evapotranspiration, reed, wetland

653 Distributed Information Systems Providing Localised Environmental Services for All: Case Study on Bathing Water Quality in the Netherlands

Andreja Jonoski, Schalk-Jan van Andel, Ioana Popescu

UNESCO-IHE Institute for water education, The Netherlands

a.jonoski@unesco-ihe.org

Adequate provision of environmental information has became increasingly challenging tasks for environmental management organisations in recent years. This information can by nature be very diverse (air quality, soil and water quality, food- and health-related information, etc), while at the same time different stakeholders may require the same information in different forms or in different spatio-temporal scales. An obvious approach towards meeting this challenge is development and deployment of information systems that will integrate the operations of data collection, data and model integration, and information dissemination in ways that environmental management organisations can work together with the users of their information for mutual benefits. The availability and constantly increasing power of distributed electronic networks (Internet and Mobile Phone networks) has provided new platforms for development of such systems. Research for development of such environmental information systems and their deployment over the Internet and mobile phone networks has recently been initiated by the European research project LENVIS - (Localised Environmental and Health Information Services). The types of environmental information covered in LENVIS are air quality, water quality and health-related environmental information. This article is focusing on the approach developed for water quality information, in particular ? bathing water quality in The Netherlands. The demonstrators of the system are being developed for several fresh water lakes in The Netherlands in collaboration with the Dutch water authorities. The presented demonstrators are being deployed the World Wide Web, but system components are also developed for mobile phones. The main goals of the system are: improvement of the water quality information via better and faster integration of existing data; integration of data and water quality models for providing

information in periods without measurements, or for forecasting purposes; assimilating user feedback on water quality which may come in semi-structured forms (SMS messages, photos, etc) via users' mobile devices (phones).

Keywords: Environmental Information, Mobile Phone Application, Web Application Water Quality Information Dissemination

655 Optimization of Pumps' Working Regimes in Conditions of Exceptional Fluctuations in Water Demand on Example of City of Budva, Montenegro

Sreten Tomovic 1, Dragan Milicevic 2, Vladimir Nikolic 2

1 University of Podgorica, The Faculty of Civil Engineering Podgorica, Montenegro
2 University of Nis, The Faculty of Civil Engineering and Architecture, Nis, Serbia

sreten.t09@hotmail.com

Due to seasonal fluctuation in water demand, Montenegrin coast's water supplying system characterizes monthly water expenditure in summer regime of exploitation five to seven times higher compared with monthly water expenditure in winter regime of exploitation. Hence, summer regime of exploitation, beside regular - permanent sources, demands introduction of additional sources of potable water, mainly positioned in remote areas. This necessity results in enormous increase of electrical energy consumption. With the aim of minimizing the electrical energy consumption an appropriate methodology for optimization of pumps' and reservoirs' work regimes has been developed, providing the constant fulfilment of consumers' demands. Complete optimization procedure is aligned with tariff system in force at the time of making a doctoral thesis (2004.y.), but can easily be harmonized with the eventual change in tariff system) for electrical energy trade suggested by Montenegrin Elektro Power Industry. Developed optimization model is applicable for water supplying system's physical parameters optimization (reservoirs volume optimization, pump's station expansion, etc.). In optimal analysis the best possible system configuration and water supplying system parameters, which execute the target function, have been searched for. Furthermore, it is possible to calculate expenses of spent electrical energy for various volumes of reservoirs' space. Developed optimization methodology was applied in case of water distribution system in city of Budva, where additional water distribution system, "Podgor - Przno", is exploited during summer season. In example of water supplying system Budva it is possible to demonstrate potential savings, depending on reservoirs volumes and the level of optimized regimes.

Comparable patterns in water distribution system functioning are observed in other coastal cities: Ulcinj, Bar, Kotor. Those systems also include exploitation of additional water sources during summer season: Lisna Bori, Orahovo polje, and Orahovac. Utilization and application of developed optimization model in these distribution systems can possibly decrease electrical energy consumption.

Keywords: Optimization models, pumps, optimal regimes of performance

656 Modelling of Water Distribution System of City of Budva

Sreten Tomovic 1, Dragan Milicevic 2, Vladimir Nikolic 2

1 University of Podgorica, The Faculty of Civil Engineering Podgorica, Montenegro
2 University of Nis, The Faculty of Civil Engineering and Architecture, Nis, Serbia

sreten.t09@hotmail.com

Due to seasonal fluctuation in water demand, Montenegrin coast's water supplying system characterizes monthly water expenditure in summer regime of exploitation five to seven times higher compared with monthly water expenditure in winter regime of exploitation. Developed optimization methodology is applied on water distribution system of city Budva, where additional water resource, water distribution subsystem "Podgor-Przno", is exploited during summer. In order to establish the optimal pumps' regime, with special focus on water quality analysis, the city of Budva water distribution system has been modelled using software package - "EPANET". Obtained optimal pump regimes were introduced in simulation model, while the hydraulic regime and water quality parameters in system were monitored. The simulation model calibration was performed indirectly, by comparison values of residual chlorine in defined nodes, observed in experiments and gained after the simulation. Results obtained after the model simulation present that optimized regime of pump performance did not have major effects on water quality in Budva distribution network compared with actual state. The worsening in water quality in model is observed after the swelling from reservoirs "Toplis" and "Bijeli Do" toward distributive system. This statement was confirmed after performed water quality analysis in actual system. On the other hand, the optimized pumps' and reservoirs' regime radically influence the hydraulic state of the system, which is manifested with water spilling in reservoirs during night hours. This observation shows the necessity and benefits of unitary utilization of optimization and simulation models during water distribution systems designing and management processes. Optimization model presents, as a result, the optimal pump stations regimes, while simulation models gives an analysis

of hydraulic states and water quality in distribution networks having the optimal pump regimes as a base. Obtained results enable achieving the most economical system performance.

Keywords: Optimization and simulation models, optimal regimes of performance, water distribution system modelling

662 Ultraviolet Spectrophotometer for Atmospheric Research

Stiliyan Stoyanov 1, Rumen Kodzheykov 2

1 Space Research Institute - Bulgarian Academy of Sciences, Bulgaria
2 Shumen University, Bulgaria

zhekovz@yahoo.com

The contribution aims to develop a method for rational selection and evaluation of the optic-electronic tract's transmission characteristics parameters in a scanning spectrophotometer intended to register dot-source emissions (the Sun, the Moon) which, while passing through the atmosphere, provides to determine the spectral composition of the atmosphere using absorption methods. The spatial variations of emission brightness are, in their essence, external noise, against the background of which the dot-source emissions are registered (atmospheric turbulence, silvery cloudiness, etc.). In practice, usually the spectrophotometer is required to have rectangular view field with uniform sensitivity and to scan along the x line with angular velocity. Developing the method, it was assumed that the emission is registered by a receiver with a predominant white noise, the optic system is isoplanatic, the function has the form of a 2D Guassoid, the electronic tract describes the product of the transmission characteristics of n pieces of integrating units with one and the same constant, and external and internal noises at the output of the optic-electronic tract are uncorrelated.

663 Development of Environmental Flow Assessment Procedure for Bosnia and Herzegovina

Branko Vucijak 1, Natasa Smolar 2, Francesca Antonelli 3

1 WWF MedPO, Bosnia and Herzegovina
2 Institute for Water of Republic of Slovenia, Slovenia
3 WWF MedPO, Italy

bvucijak@wwfmedpo.org

Alteration of water flow regime downstream of dams is one of the most stressful factors influencing the aquatic and riparian ecosystem in many rivers in Bosnia and Herzegovina (BiH). To protect and improve structure and function of river ecosystem below the dams, Environmental Flow (EF) needs to be evaluated. The main aim of the Living Neretva project was to review different existing methods for EF assessment and to propose application of a new methodology for EF assessment to be used in BiH. In the first phase of the project hydrological EF assessment method GEP (guaranteed ecological flow) was assessed in details and testing exercise carried out led to the conclusion that the GEP methodology provides some advantages, but also has remarkable disadvantages. In the next phase, GEP methodology was tested in the river Trebizat, so as methodological approach for interdisciplinary EF assessment was developed, including instream ecological values and critical parameters for EF assessment. River was assessed in terms of its geography, climate conditions, historic heritage of the river, demography, geology of the river and its tributaries, river hydrology and morphology, ecological characteristics, river pollution, river use and river management. At selected sampling sites along the rivers, additional data on biological and physico-chemical parameters were collected and analysed. During next phase 4 selected methods of EF assessment were tested. Large difference was the cause of elimination for three of these methods for EF estimation. Considering the advantages and disadvantages of tested methods, MNQ approach was selected as the most acceptable method to use in BiH, still in need for some methodological improvements. In case of protected areas or the presence of endangered and rare species, the holistic approach of EF assessment was proposed too and both of methods are part of proposed draft By-law on EF.

Keywords: Environmental Flow, Flow Regime

665 The Structure of Channels and Dynamics of the River Pechora Delta

Ekaterina Ukraintseva

Institute of the Earth Cryosphere, Siberian Branch of the Rus. Ac. of Sci, Moscow, Russia

katya_ukr@mail.ru

The main goal of the study is to reveal the structure of the Pechora river channels in its delta area and to reconstruct the 50-year dynamic history of its development.

The Pechora river mouth belongs to those of the estuary-delta type. Its total length equals to 190km and includes the 70km long near-delta- area and the proper delta 120km long. The total area including the lake of Golodnaya Guba equals to 3250 square kilometers.

The Pechora River has a complicated structure of channels united into three main stream systems of the Pechora, Malaya Pechora and Bolshaya Pechora. In the delta area the run-off repeatedly diverges and redistributes between the main systems. Mean width of the distributing channels ranges from 0.7km (Konzer Shar) to 7.2km (Bolshaya Pechora). Among them only the 116.91km long Bolshaya Pechora channel constantly increases its water content down to the delta marine boundary.

Evaluation of spatial and temporal dynamics of the water flow in the Pechora delta performed for the last 50-year period (1953-2003) with the help of GIS-based technique has shown that in spite of a relatively stable water content reflected in the mean water discharge the total area of the main river branches decreases. This process is accompanied by the island growth and simultaneous shallowing of the coastal water. One of the factors leading to shoaling is the development of oil and gas deposits located in the Pechora delta.

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Keywords: delta, Pechora, river, GIS

670 Model and Software Development for Applicability of Irrigation Water Depending on its Quality

Spaska Kalcheva 1, Ivanka Dimitrova 2,
Ashwani Kumar 3, Mausumi Raychaudhuri 3, Peter Dimitrov 4

1 University of Forestry, Agricultural Faculty, Bulgaria
2 TCOM EOOD, Bulgaria
3 Water Technology Centre for Eastern Region, India
4 Institute of Land Reclamation and Agricultural Mechanization, Bulgaria

s_kalcheva@abv.bg

Deficiency of irrigation water has been observed in the latest years because of drought conditions, deteriorated quality of water sources and intensive usage of the available water resources of good quality. The negative water balance during the summer leads towards limitation of the development of irrigated agriculture. This implies the usage of new economically effective water sources for irrigation. The irrigation of agricultural crops with water of poorer quality not only decreases the yield of agriculture output but also substantially worsens its quality. Quality control on the water for irrigation is needed to avoid emerging problems at using inadequate quality water. The information system for assessing suitability of water for irrigation depending on its quality is going to issue recommendations how to use the available water on the base of laboratory analysis of water for irrigation and on the information of cultivated crops, soil and agro-climatic characteristics of the region and irrigation technology. The purpose is to be developed an information system, providing recommendations and suggestions how to use the irrigation water for different crops considering the water quality in the best way. The aims of the development are directed towards the protection of water resources, soil fertility, crop production and consumers' health. The methodology's scope is a database for the characteristics of the irrigation water quality and irrigated fields, and recommendations preparation in respect of the irrigation water, cultivated crops and environmental conditions. The degree of restriction on the usage of irrigation water has been presented as a remark for all analyzed parameters. They are salinity, infiltration, specific ion toxicity and miscellaneous effects. The recommendation how to use the irrigation water focuses on irrigation water considering qualitative parameters of the available water. The software responds to the main tasks of the methodology.

672 Topographic Effects on Snow Depletion Curves of Upper Euphrates River Basin, Turkey

Aynur Sensoy 1, Gokcen Uysal 1, A. Arda Sorman 1, A. Unal Sorman 2

1 Anadolu University, Turkey
2 Middle East Technical University, Turkey

asensoy@anadolu.edu.tr

Monitoring snow covered areas and modelling snowmelt play an important role in predicting runoff especially in regions where snow is an important resource. Snow cover can be analyzed both temporally and spatially with snow cover depletion curves of an area. Besides, some commonly used hydrological modeling programs such as SRM (Snowmelt Runoff Model) and HBV necessitate snow depletion curves either as a main hydrological variable input or as a internal validation tool for output comparison. Since depletion of snow is a cumulative effect of climatic conditions in and around snow cover area, its evaluation for the complex topography of mountaionous Eastern Anatolia is a crucial task. The study was carried out for Upper Euphrates River Basin, Turkey, of 10 200km2 area, and elevation range of 1125-3500m. Snow depletion curves are derived based on monitoring SCA (Snow covered area) using Moderate Resolution Imaging Spectroradiometer (MODIS) with 500 m spatial resolution. Since cloud obscured days cause inadequate data for analyzing and estimating SCA, images with less than 35% cloud cover were used in the analysis. The present study aims to identify the relationship between snow covered area with topographic and hydro-meteorological variables. Topographic variables are represented by elevation, aspect, and slope, the basin is subdivided into five elevation zones and snow depletion relation with aspect and slope were analyzed for each zone in the mountainous pilot basin. Moreover, snow depletion relations were evaluated with respect to temperature and discharge data in the same basin. Analyses were performed for the snow melting periods (Feb-Jun) of the years 2005 - 2009. This period of analysis also gives an indication of climate change for snow covered area with respect to time for the limited number of years.

Keywords: Snow covered area, topographic effect, Upper Euphrates

673 Data Analysis of Spatio-Temporal Sensor Data as a Contribution to the Model Analysis for Water Resources

Sanja Veleva, Kosta Mitreski

Faculty of Electrical Engineering and Information Technologies, Macedonia

sanjav@feit.ukim.edu.mk

The quality of the information is measured by its accuracy and its relevance over time. Therefore, the process of data analysis of the sensor eco-data is of a great importance to the detection and prediction of the eco-hydrology phenomena. The existing models for data mining do not relate to the continuously changing characteristics of the sensor eco-data. Furthermore, most of the monitoring systems are based on event alert services, which do not answer to the continuous variations of the measured parameters. Our approach embeds the nature of system characteristics into one dynamic model for data mining of continuously changing spatio-temporal characteristics of one eco-hydrology system. The continuously gathered sensor eco-data from the region of Lake Prespa consisted of 320 water samples, among them 224 from the lake gauging stations and 96 from the river gauging stations. Considering the recommendations from the Water Framework Directive (WFD), the sensor eco-data were grouped into three types: physical, chemical and biological, corresponding to their aspect of water quality. All of these types convey the same class definition in the form of value, spatial and temporal information. To define our sensor data mining model we contribute to three segments: outlier analysis, pattern analysis, and prediction analysis. The suggested sensor data analysis model should be of a useful asset in obtaining knowledge for certain aquatic phenomena.

Keywords: sensor eco-data, model analysis, eco-hydrology, Water Framework Directive, Lake Prespa

674 Overview of the Water Management Information System of Serbia

Dragana Ninkovic 1, Brankica Majkic 1, Milos Mancic 2

1 “Jaroslav Cerni” Institute for the Development of Water Resources, Serbia
2 Public Water Management Company “Srbijavode” , Serbia

dragana.ninkovic@jcerni.co.rs

The EU funded Project “Preparation of a Water Management Information System for Republic of Serbia (WMISS)” have been carried out from January 2007 to January 2009 in order to establish a unique water management data base and

provide basis for further water management activities in Serbia. Basic idea of WMISS is to provide improved access to water resources information and data and to promote the inter-institutional exchange of information and data on water resources. Since the Serbian water law, dating from 1991, is the actual base for the Serbian water management and at the other hand, a new one based on EU Water Framework Directive (WFD) is waiting to be adopted in near future, the WMISS should have satisfied both old and new water management principles and requests. Having in mind a fact that the WFD implementation activities, being in the initial phase in Serbia, explicitly require use of GIS technologies, the WMIS is structured as a spatial information system that supports comprehensive and integrated river basin management as whole. It also offers tools that facilitate fulfilling reporting obligations and data dissemination with respect to the current Water Law and Preliminary draft Law on Waters, Danube River Protection Convention (DPRC), etc. The Paper gives the general overview of the WMISS describing its legal basis, data sets involved, data model structure and basic tools.

Keywords: information system, water management

675 An Hydrogeological Web-Gis Platform for Water Resource Management and Consensus Reaching at the Basin Scale

Luca Casagrande 1, Michele Bellezza 2, Stefano Casadei 2, Arnaldo Pierleoni 1

1 T4E S.r.l., Italy
2 University of Perugia, Italy

luca.casagrande@gmail.com

Water is strategic but also highly vulnerable natural resource, this because the increasing demand from multiple uses, in many cases competing amongst them, seems to influence the concepts of sustainability of the exploitation of the water resource. In this context, mathematical models were developed to support the decision process (DSS), in order to evaluate and manage the available superficial water resource. The approach of this models is focused towards a natural integration of the two processes of evaluation and management of the available water resource, in an operating context, that is shared amongst managers, users and the local administration concerned. These results can be achieved by means of the new technologies in the field of elaboration, representation, communication and sharing data, this means to combine the potentialities of the Web with those of GIS systems (WebGIS). The application of the methodology briefly introduced was applied to the Tiber River basin, and has been focused to the building of an hydrological database and the setting of the evaluation model of the superficial

water resources, that bases its algorithms on regionalization procedures of flow parameters derived from the geomorphologic features of the basin (Area, BFI Base Flow Index) and that returns, as output, a set of Duration Curves (DC): natural, measurable (natural DC minus the upstream withdrawals) and residual (water still available for dissipative uses). The hydraulic modelling is performed by a GIS engine that allows the elaboration and the regionalization of data for each link that composes the network. This tool offers a common platform that could allow the sharing of all the information collected, and computational and modelling engines in the effort of sharing the entire decisional process so that more effective water resources management plans could be developed and possible controversies could be prevented.

Keywords: water management, decision support system, web-gis

716 Application of Mish Method for Gridding of SPI Series

Tamas Szentimrey, Zita Bihari

Hungarian Meteorological Service, Hungary

szentimrey.t@met.hu

The MISH (Meteorological Interpolation based on Surface Homogenized Data Basis; Szentimrey, Bihari) spatial interpolation method developed at the Hungarian Meteorological Service. The main difference between MISH and the geostatistical interpolation methods built in GIS can be found in the amount of information used for modelling the necessary statistical parameters. In geostatistics the usable information or the sample for modelling is only the predictors, which are a single realization in time. While in meteorology we have spatiotemporal data, namely the long data series which form a sample in time and space as well. The SPI (Standard Precipitation Index) series are often applied to characterize the drought variability within a region. The SPI values are certain transformed values of the precipitation sums assuming gamma distribution. After the transformation procedure the elements of the SPI series have expectedly standard normal distribution. However the SPI series can be calculated for station data series while there is the need to obtain gridded data series or mapping of SPI. In order to solve the above problem the following possible procedures are planned to compare during our presentation: - Gridding, interpolation of SPI series by geostatistical methods. - Calculation of SPI series based on the gridded precipitation series obtained by MISH. - Gridding, interpolation of SPI series by MISH.

Keywords: SPI, interpolation, gridding

706 Modeling the Seasonal Snow Potential in the Upper Euphrates Basin, Turkey

Arda Sorman 1, Aynur Sensoy 1, Egemen Yamankurt 1, Mustafa Ozkaya 2, Yucel Kaya 2

1 Anadolu University, Turkey
2 Electrical Power Resources Survey, Turkey

asorman@anadolu.edu.tr

Snowmelt runoff in the mountainous eastern part of Turkey is of great importance as it constitutes nearly 2/3 in volume of the total yearly runoff during spring and early summer months. Therefore, determining the amount and timing of snowmelt runoff especially in the Euphrates basin, where large dams are located, is an important task in order to use the water resources of the country in an optimum manner. Upper Euphrates Basin (10,250km2) is selected as the pilot area in this study, being one of the major tributaries of the Keban Dam. In the past few years, several automatic real-time monitoring snow-meteorological and stream gauging stations are installed in the region at different locations and altitudes by governmental organizations and universities. In addition, since ground based observations can only represent a small part of the region of interest, spatially and temporally distributed snow cover data are acquired through the use of Moderate Resolution Imaging Spectroradiometer (MODIS) satellite. Ground observations and remotely sensed snow cover are distributed into elevation zones using Geographic Information Systems (GIS) to prepare input data for hydrologic modeling. The two well-known conceptual hydrologic models, HBV and SRM, are applied to the headwaters of Euphrates River for 2008-2009 water years. Taking into account the geopolitical position of Turkey in the Middle East, hydrologic modeling studies give promising results indicating the possible operational use of runoff forecasting which can be an important desicion support tool for reservoir and basin management.

Keywords: snowmelt runoff, HBV, SRM, MODIS, Euphrates Basin, Turkey

713 Mathematical Model for Optimization of Combined Water Supply Systems

Goce Taseski

Faculty of Civil Engineering Macedonia

go_taseski@hotmail.com

In this paper analyzed the combined water supply systems with two water supplies, one of which is a pumping and the other is a gravitational water supply. The purpose of an optimization in these water supply systems, with the use of technical - economical analysis, is to determine the minimum annual costs to meet the demand for water in the entire operating period of the system, although the source of gravitational water does not meet the needs of water in the area in certain months during the year, these deficiencies are covered by the surface water source whose water is brought to the pumping area. Also in the paper are analyzed the mountainous sources of groundwater which are considered to be of a very good quality and needing only disinfection to be used for water supply. So it is needed to know the capacity of the source of the gravitational water and the duration of the flow of the data sources that can be obtained by hydrological measurements in a several years time span. The mathematical model with the name “GRAVITY - OPTIMUM” which analyzed the costs of construction of the intake pipes, process equipment accompanying them and the pumping station, and annual maintenance costs, depreciation, and repayment of credits. Capital costs for construction of the pipeline and pump station are determined by an analysis of the cost of these facilities depending on their size, and a mathematical correlation between the size of objects and their cost is made, while the cost of process equipment of pipelines is taken as a percentage of the cost of pipelines. The annual cost of gravitational supply pump and supply should be minimal for the projected system to be optimal.

Keywords: optimization

729 Spatial Distribution of SPI Drought Index in Hungary

Akos Nemeth, Szabolcs Bella

Hungarian Meteorological Service, Hungary

nemeth.a@met.hu

There are lots of drought indices all over the world. One of the most common used and well known is SPI (Standardized Precipitation Index). This index is able to handle different time steps. The paper presents spatial distribution of SPI index in different seasons, months in Hungary. The spatial evaluation was made by using GIS tools, mostly by ESRI software (ArcGIS). Finally, the results for different time periods are compared with Palfai index, which is common used in Hungary.

Keywords: SPI, drought, GIS, Hungary

742 Mobile Applications in Management Support System for Biebrza National Park: Red Bog Case Study

Ignacy Kardel, Jarosaaw Chormaski, Tomasz Okruszko

Division of Hydrology and Water Resources, Warsaw University of Life Sciences, Poland

i.kardel@levis.sggw.pl

The role of information technology is especially important for the areas of high ecological values and restricted access. There is a case for the Biebrza Wetlands (NE Poland) which belongs to the biggest protected areas in Europe aiming at conservation of wetland ecosystems. In order to optimize the expensive and time-consuming protection and restoration measures a Management Support System (MSS) was developed. The MSS was found as an effective and helpful tool for spatial planning and management activity of the Biebrza National Park staff and very valuable platform for exchange results of different research groups. Recently, the advantages of MSS are used for the investigations of phenomena and biodiversity of the Red Bog - the oldest strict nature reserve area in Poland and one of the most valuable parts of Biebrza National Park. In the frame of this research project, several mobile applications have been developed for improving and assisting a monitoring system of groundwater level, groundwater quality and methane emission, as well as description of soil and vegetation diversity. The area of the Red Bog as restricted reserve would be closed for scientists after realization of the project. Therefore, continuation of monitoring could be realized by BPN staff only. The question raised how to implement the simplest

possible data input to the existing database? As a result the simplified and user friendly interface of ArcGIS Mobile - a component of ArcGIS Server by - ESRI was developed. Other simple tools have been developed additionally, ready to install even on Smart Phone OS Windows Mobile. Using this technology and Internet connection, field data are automatically stored and published on the server of the Biebrza National Park. The initial costs of software and training of staff have been covered from the research project budget; therefore operating of this system is possible without additional costs. Application of this innovative toll improves functioning of existing MSS of BNP in both directions: automatic field data input and data publishing via Internet.

Keywords: Management Support System, GIS, wetlands, mobile application

744 Development of the Spi Drought Index for Greece Using Geo-Statistical Methods

Christina Chortaria, Christos A. Karavitis, Stauros Alexandris

Agricultural University of Athens, Agricultural Engineering Department, Water Resources Management Section, Greece

ckaravitis@aua.gr

Drought is a dynamic phenomenon seemingly difficult to confront. Nascent sources of difficulties in applying appropriate management responses may be derived from the following causes of confusion: elusive drought definitions; diversified and devastating drought impacts; and absence of systematic response mechanisms. The basic premise of the present effort is that the use of a drought index, such as SPI, can lead to a better understanding of drought magnitude and duration and thus contributing to more comprehensive drought management approaches. Greece has very often in the past faced the hazardous impacts of drought with the worst drought on record the period of 1989 - 1993. In the current effort, the SPI drought index is developed for all of Greece and is evaluated accordingly to historical precipitation data. The importance of the Index may be marked in its simplicity and its ability to identify the beginning and the end of a drought event. Its application requires long time series of at least 30 years precipitation data and the desired timescale depending on the area under consideration. In the study, different time series of precipitation data from 41 rain stations, covering the periods 1959 - 2001 and for time scales of 6 and 12 month were used. The application of the index was achieved with the appropriate correction of the source code files obtained from the National Drought Mitigation Center, University of Nebraska- Lincoln, USA. Forty eight (48) interpolation surfaces were produced and assessed using statistical parameters and historical data. The results in

combination with the spatial representation by the GIS, suggest its usage as a drought monitoring tool to support drought forecasting and to potentially inspire integrated strategies for drought management.

Keywords: Drought management, SPI, Greece

724 A Comparison of Methods for Estimating Potential Evapotranspiration in South Backa Region (Serbia)

Milica Rajic, Salvai Atila

University of Novi Sad, Faculty of Agriculture, Department for Water Management, Novi Sad, Serbia

milica@polj.uns.ac.rs

In order the irrigation measures could give the expected results it is necessary to determine, as exactly as possible, the necessary amounts of water ensuring a normal crop growth. Smaller amounts than the necessary ones do not give the expected results, whereas the excessive water may cause certain problems and undesirable consequences (overmoistured soil, secondary salinization). There are several irrigation factors that can result in significant improvements in the use of agricultural water. The determination of crop water requirements (potential evapotranspiration) is of major importance in providing desirable irrigation management in arid and semiarid climates.

The investigation in this paper deals with the comparison of nine well-known equations for estimating potential evapotranspiration using climatic data from Rimski Sancevi, South Backa region in Vojvodina Province. The various equations used can be separated into different methods of estimating ETo, depending upon the type of climatological data utilized to determine ETo. These methods are solar radiation, temperature, atmospheric relative humidity and combination of these three variables. The different equations used were Radiation, Turc, Blaney-Criddle (original), Blaney-Criddle (modified), Thornthwait, Ivanov, Eagleman, Penman modified and Penman-Monteith method. The computed ETo for each equation was compared to the Pan method as a standard for evaluating the consistency and reliability of the particular equation. Those estimates, which most closely approximated the open pan values, were considered most reliable and consistent. The results for the South Backa region in Vojvodina Province showed that there was considerable variability among the different equations for predicting potential evapotranspiration.

749 Daily Precipitation Prediction using by Artificial Neural Network in Isparta Station

Kemal Saplioglu, Mesut Cimen, Bilgehan Akman

Department of Civil Engineering, Suleyman Demirel University, Isparta, Turkey

kemsa@sdu.edu.tr

For the proper utilization of water resources and for properly planned water structures to be built and to be conducted rightly, it is necessary for many parameters (precipitation, runoff leaking, evapotranspiration, plant pattern, geological settlement etc.) and their influences should be analyzed and examined properly. Precipitation are one of the most important parameters of these mentioned above. The proper analysis of this parameter is very important at the level of water resources conduct and running. While planning, recorded data has great importance. When there are no recorded data, this data could be obtained by integrating it with a temporary data collection system and the other measurement stations in the basin. From this point, the forecast precipitation methods (the complement of lack data) will be activated. As a result of right analysis, all data of the past could be completed by a few years' measurements. Moreover, in the future, the lack of data arosed as a result of any problem could be met thanks to the precipitation prediction methods. In this study a new model is tried to be developed by using artificial neural network methods. This formed model has been tested for the daily precipitation data obtained from the precipitation stations of Burdur, Bucak, Egirdir and Isparta in Turkey. Number of 9125 data belonging to this station, has been used between the years of 1975 - 1999 in this model. Furthermore, this formed model is compared with the commonly used arithmetic average as well.

Keywords: Precipitation, Artificial Neural Network, Prediction, Turkey

751 Reconstruction of Cokal Dam (Canakkale, Turkey) Breach Flooding Using 1d Hydraulic Modeling

Hasan Ozdemir 1, Cengiz Akbulak 2, Hasan Ozcan 3

1 Istanbul University, Geography Department, Physical Geography Division, Turkey
2 Canakkale Onsekiz Mart University, Department of Geography, Turkey
3 Canakkale Onsekiz Mart University, Department of Soil Science, Turkey

ozdemirh@istanbul.edu.tr

Dams are built for irrigation, hydropower generation, water supply and flood control. For these purposes, 585 dams were built in Turkey. These Dams play a vital role in economically for located areas and our country, but same time they constitute high risk. One of these risks is dam-break induced floods. This type of flood produces a very large amount of water and damage more than the normal river flood. Cokal Dam which is investigated in the study is located in Gelibolu County in Canakkale district. The Dam which was built for irrigation breached in 16 November 2007 due to overtopping of water related to intensive rainfall in the area. Therefore, Evrese settlement and agricultural lands of Kavak village were damaged from the flood.

The aim of the study is modeling of Cokal Dam-Breaching using 1D hydraulic modeling and calibrating of the model result with the real flood event map. For these purposes, 10 m Digital Elevation Model (DEM), soil maps scaled 1:25000, land use maps, precipitation and discharge data in 30 years, technical properties of the dam were used. All these data will be processed and analyzed using Geographic Information System (GIS), Remote Sensing (RS), hydrologic modeling (SCN-CN rainfall-runoff modeling), Hec-GeoRAS and HEC-RAS hydraulic modeling. The result of model was calibrated using real flood event.

Hence, the study shows that resolution of DEM, geometric descriptions of river course affect the model result. To able to provide more accurate inundation model, the representation of topography, river geometry must be more precise.

764 Assessment of Initial Soil Moisture Conditions for Event-Based Rainfall-Runoff Modelling

Yves Tramblay 1, Christophe Bouvier 1, Claude Martin 2, Jean-Francois Didon-Lescot 2, Dragana Todorovik 1, Jean-Marc Domergue 2

1 HydroSciences Montpellier, UMR 5569 CNRS-IRD-UM1-UM2, France
2 UMR 6012 - ESPACE - CNRS, University de Nice-Sophia-Antipolis, France

bouvier@msem.univ-montp2.fr

Flash floods are the most destructive natural hazard that occurs in the Mediterranean region. Rainfall-runoff models can be very useful for flash flood forecasting and prediction. Event-based models are very popular for operational purposes, but there is a need to reduce the uncertainties related to the initial moisture conditions prior to a flood event. This paper aims to compare several soil moisture indicators for the initial soil potential water retention: local Time Domain Reflectometry (TDR) measurement of soil moisture, outputs of the Soil-Vegetation-Atmosphere-Transfer (SVAT) ISBA model (Meteo-France), antecedent precipitation and base flow. A modelling approach based on the soil conservation service-curve number method (SCS-CN) rainfall-runoff model is used to model the flood events in a small headwater catchment in the Cevennes region (France). The model involves 2 parameters: the S runoff parameter and the K routing parameter. The S runoff parameter can be interpreted as the maximal water retention capacity, and acts as the initial condition of the model, depending on the antecedent moisture conditions. The model was calibrated from a 20-flood sample, and led to a median Nash value of 0.9. The local TDR measurements in the deepest layers of soil (80-140cm) were found to be the best predictors for the S parameter. TDR measurements averaged over the whole soil profile, outputs of the SVAT model, and the logarithm of base flow are also good predictors, whereas antecedent precipitation was found to be less efficient predictor. The good correlations observed between the TDR predictors and the S calibrated value indicate that monitoring soil moisture could help setting the initial conditions for simplified event-based models in small basins. Comparing with other studies with the same scope, it appears that regressions between the S parameter and the water contents measurements are specific on a given site.

Keywords: Flash flood prediction, soil moisture, Time Domain Reflectometry, Soil Conservation Service method, small Mediterranean catchment

769 Use of Remote Sensing Information to Estimate Environmental Flow for Data Scarce Areas

Suwia Liu 1, Xingguo Mo 1, Chang Shu 1, Chaolei Zheng 1, Cheng Li 2

1 Key Laboratory of Water Cycle and Related Land Surface Processes, IGSNRR, Chinese Academy of Sciences, Beijing 100101, China
2 Chengdu Institute of Biology, CAS, Chengdu , 610041, China

liusx@igsnrr.ac.cn

On a purely analytical frame, a new hydraulic method is proposed to determine environmental flow with the only data requirement of water surface width, water depth, river bed roughness and the surface slope. The method is applied in the donating rivers of the western route South-to-North Water Transfer project in China, which is located in the south rim of Tibet Plateau with most of area being hard to access. For the sites along the rivers with cars accessible, the water-surface width and depth were observed in 2004 and 2006. For the remote sites not accessible, the width was retrieved from Google Earth, which is a new interactive 3D visualization tool for personal computers that combines satellite imagery and maps from Google's database. The result of environmental flow is close to the result by Tennant method (10%) and wetted perimeter method and less than the result of Tennant method (20%). With less data requirements, the method is helpful to provide the information of the spatial distribution of environmental flow along the rivers. With sensitivity analysis, it is obvious that the larger the change of roughness, the larger the change of environmental flow. The change of environmental flow is not sensitive to the change of slope. The method is deduced based on simple triangular cross-section channels, which are found popular in those head rivers of this study. Being independent of discharge data, the method is useful in finding applications in ungauged basins.

Keywords: Hydraulic rating method, instream flow requirements; Eco-hydrology; ungauged basins; Western Route South-to-North Water Transfer Project in China

442 Flood Forecasting and Early Warning System for Maritsa and Tundzha Rivers - Data Exchange Tool and Web-Site

Minka Stoyanova, Eram Artinian

National Institute of Meteorology and Hydrology, Bulgaria

minka.stoyanova@meteo.bg

This article covers some of the results of the project "Technical Assistance for Flood Forecasting and Early Warning System for Maritsa and Tundzha Rivers". This project was part of the more global European PHARE project "Capacity Improvement for

Flood Forecasting in the Bulgarian-Turkey Cross Border Cooperation Region". Its realization has been entrusted by the Ministry of Regional Development and Public Works to the consortium "BCEOM societe d'Ingenierie" (now EGIS) & "HKV Consultants" from France and Holland with the participation of Bulgarian experts and the support of the National Institute of Meteorology and Hydrology (NIMH) and the East Aegean River Basin Directorate of the Ministry of Environment and Water. One of the project results is a real-time flood forecasting system with proper data exchange which provides on-time information to authorities from Bulgaria and Turkey in charge of alerting the population and of managing the operations during the flood events. In order to integrate existing, prescribed and requested databases and systems a Data Exchange Tool (DET) was developed. A dynamic web-site was created to disseminate results. This article describes how the different systems and databases work, how the web-site provides access to users of different levels of responsibility, and how information eventually reaches the stakeholders and the general public.

128 Water Distribution Systems. Design, Operation and Upgrading Procedures Performance Indicators

Manuel Malafaya-Baptista
Universidade Fernando Pessoa, Portugal

Water distribution systems (WDS) design has been traditionally performed based on a static approach on the results of the 'normal' hydraulic performance of the pipes to satisfy the consumptions (quantified by demands on the nodes of the network) and subjective criteria for pipe diameter sizing. 'Abnormal' situations (as pipe failure scenarios) consequences in the performance level of the system (mainly in the changes in the pressure in the nodes of the network) usually are not analysed and evaluated. The present work describes new different alternative procedures to eliminate this lack in the information needed for an efficient operation and eventual upgrading of an existing water distribution system, as follows: i) Maximum entropy flow pattern methodology; ii) Pipe diameter resizing methodology; and iii) Double pipe network layout methodology. The description is based on a case study (looped network with 9 loops, 16 nodes, 24 pipes). Pipe failure scenarios and its hydraulic consequences (flow pattern changes in the pipes and energy losses between source nodes and demand nodes) are studied and the obtained results are used as essential information for the further stages of the proposed alternative methodologies. An exhaustive comparison between the traditional approach and the alternative methodologies is made, using numerical and graphical indicators of the obtained performance levels for each of the analysed scenarios. The obtained results allow to present a matrix of 'costs-benefits' objectively grounded, which allow a more coherent comparison of the alternative solutions studied for the WDS.

Keywords: Entropic flow, Pipe resizing, Double pipe layout

TOPIC 7

OTHERS

007 Lithostratigraphy of Nigeria - an Overview

Kazeem Akorede Shitta 1, Ayiki Aboderin 2,
Daramola Yekini Adeniyi 2, Ayodele Isiaka

1. Geotech Nigeria Limited, Nigeria
2. Niyidam Ventures Nigeria Limited, Nigeria

kazy1424@yahoo.com

Nigeria lies very close to the equator (hot country) West coast Africa between latitude 4 N and 14 N degree and longitude 2 E and 15 E degree. The country is located at the Northern end of Eastern branch of west coast of Africa rift system. Nigeria geological set up comprises broadly sedimentary formation and crystalline basement complex, which occur more or less in equal proportion all over the country. The sediment is mainly Upper Cretaceous to recent in age while the basement complex rocks are thought to be Precambrian. The studied area lies between latitude 12.4" and 11.11"W and longitude 13.81" and 14.13" S. The studied area is underlain by Precambrian basement complex of southern western Nigeria .The major rock in the area is charnokite and granite rock. The granite rock which are member of the older granite suite occupy about 65% of the total area .The principal granite is petrographic variety are recognized .The fine grained biotite-granite medium-coarse, non porphyritic biotite -hornblende granite and coarse-porphyritic biotite -hornblende granite. Also three main textural type of Charnokitic rock are also distinguished are coarse grained, massive fine grained and gneissic fine grained .The mode of occurrence of rock is three (1) core of the granite rock as exemplified by study area and few smaller bodies (2) Margin of the granite bodies as seen in Ijare and Uro edemo-idemo Charnokitic bodies and (3) Discrete bodies of the gneissic fine grained Charnokitic rock within the country gneisses as seen in Ilaro and Iju and Emirin village. All the charnokite in the region are dark-greenish to greenish-gray rocks with bluish quartz and greenish feldspar.

Keywords: Geology of the study area, Colour, Occurrence, type of minerals

017 Households Participation in Recycling of Solid Waste: a Case Study

Abdelsalam Omran, Abdelnaser Ali

Universiti Sains Malaysia, Malaysia

amrony12@yahoo.com

Waste management is pressing harder with the alarming signal warning the industry. The success of local recycling programmes is reliant upon households participation. Recycling of solid wastes is considered as the only method to recover the waste generated. In recognition of this, the trend in recycling policy is geared towards promoting households centred approaches in recycling with public education as the main driver towards increasing households participation. Most of the time, these initiatives do not take into consideration the attitudes of the key stakeholders of municipal officials and the households towards recycling of solid wastes. However, the implementation still has much extent for improvement. In order to ameliorate the recycling situation, evaluation of households participation towards solid waste recycling is studied in this paper. This study is based on a case study few selected residential areas within the city of Benghazi (Libya). Questionnaire survey was used to gather the information from the households. As results, the study found that, even though the households are aware of recycling, this does not necessarily translate into participation in recycling initiatives. Other factors such as lack of awareness, lack of facilities and no incentives were found to limit participation in recycling activities.

Keywords: Households attitude, Recycling, Solid waste

126 Assessment of Heavy Metals Accumulation by Different Spontaneous Plant Species Grown Along Lana River, Albania

Alma Shehu, Alfred Mullaj, Fatos Harizaj, Julian Shehu

Faculty of Natural Sciences, University of Tirana, Department of Chemistry, Tirana, Albania

a.shehu@albnet.net

Plants absorb a number of elements from soil, some of which have no known biological function and some are known to be toxic at low concentrations. The aim of this study was to assess the accumulation of heavy metals (lead, cadmium, nickel, manganese) in some plant species grown in water media. Concentrations of heavy metals were measured also in bottom sediments, near the root of plant

species, in one of the most polluted rivers in Tirana, Lana River. Three stations were chosen to assess the effect of growth environment in metal accumulation by each plant depending on water quality and pollution. Beside this, physic-chemical parameters of water samples were measured on the moment of sampling. Considerable higher contents of Ni and Cd were accumulated especially in species Typha latifolia., (about 254.3mg/kg Ni) whereas species Arundo donax accumulated more Mn (about 182.7). The accumulation of Pb and Cd was almost the same in all plant species. Positive correlation was found between the concentrations of Pb and Ni in sediments and in plants for species Typha latifolia and Arundo donax, as well as for Arundo donax. The content of metals accumulated in species Salix alba was not in good correlation with the content in sediments. All sediment samples sites in the study area basin were generally more or less polluted when compared with the control values. Therefore, all plants can be used as biological indicators while determining environmental situation of a special environment. The results confirm the complexity of factors influencing the efficiency of heavy metal accumulation by plant species; they indicate increasing ion absorption in the case of some metals, while the accumulation of other heavy metal ions was limited.

Keywords: bioaccumulation, heavy metals, polluted water, AAS

028 Assessment of Potential Risks From Consumption of Fish for the Population Living in the Chemical Weapon Dumping Area in the Baltic Sea

Margarita Katkova

RPA "Typhoon", Kaluga region , Russia

katkova@typhoon.obninsk.ru

Chemical weapon dumped during the World War II in the Baltic Sea is causing anxiety of the world community and the population living in the countries located in the vicinity of the dumping sites. One of such areas is the part of water area close to the Bornholm Island. The experimental studies in this area have been carried out during 2007 - 2008 within the frameworks of the EU MERCW project “Modelling of Environmental Risks related to Sea-Dumped Chemical Weapons”, and also with possible impact of the flooded chemical weapon on the Baltic Sea ecology. The basic goal of present paper is to assess the risk for the population from consumption of fish caught in the chemical weapon dumping area in the Bornholm Deep. The estimation of risk for the population from consumption of fish containing arsenic compounds was made. It is shown that the level of

risk perception for the population makes the amount at which (according to the classification of cancerogenic risks) it is recommended to the persons making decisions to take measures for its decrease.

Keywords: the chemical weapon, arsenic, island Bornholm, risk assessment

044 Evaluation of the Development of Cape Gooseberry (Physalis Peruviana L.) Plants under the Environmental Conditions of South Bulgaria

Ani Popova, Nikolay Panayotov, Kalinka Kuzmova

Agricultural University, Bulgaria

capsicum@abv.bg

Cape gooseberry is a new vegetable crop for Bulgarian agriculture. The main goal of the present study was to evaluate the environmental conditions and their influence on the plant development of Cape gooseberry. The experiment was carried out in Experimental fields of the Agricultural University of Plovdiv, Bulgaria with two varieties Plovdiv and Obrazetc 1. The plants were grown by both technology - with seedlings and with direct sowing in tree term of sowing 1, 15 and 30 March and 1, 15 and 30 April, respectively. The average daily temperature, total active temperature sum, maximal and minimal temperature, rainfall, relative humidity for vegetation period were measured. The morphological characteristics such as a high of stem, number, weight and area of leafs, total weight of plant, number of flowers and fruits per plants were investigated. The productivity also was established. The relations between vegetative behaviors and elements of climatic conditions was determinate. The correlation between average daily temperature and total active temperature sum form one hand and morphological development of plant form other hand were calculate. The significant of the environmental conditions on the productivity was established. Better results for South Bulgarian conditions on the yield was registered from the technology with direct sowing.

Keywords: cape gooseberry, environmental, temperature, relative humidity

046 Influence of Some Beneficial Microorganism on the Development of Pepper Seedlings

Nikolay Panayotov, Mladen Naydenov, Jordanka Kartalska, Krassimir Sapundjiev

Agricultural University, Bulgaria

nikpan@au-plovdiv.bg

The development of pepper plants depends on quality of transplants. In soil, the great number of microorganism colonized the root system and stimulated the plant development. The main goal of this study was to investigate the effect of some beneficial microorganism on the development of pepper seedlings. Experiments were carried out with pepper cultivars Kurtuvska kapia 1619 and Bulgarski rotund. The substrate for sowing of seeds and growing of plant was inoculated with bacterias Bacillus subtilis strain A1 and Pantoeae agglomerans strain B43 and fungi Trichoderma viride strain T6 in doses 50ml, 100ml and 150ml. The treatment was done also 10 days after prickling. The morphological characteristics of plants such as a weight and volume of roots, weight, height and thickness of stem, weight and number of leafs and number of flower buds were studied at the moment of transplanting. The treated plants were with better development. The strongest roots were observed in application of 150ml Bacillus subtilis and Pantoea agglomerans B43. Highest stems were development plants treated with Bacillus subtilis A1 and Trichoderma viride T6. The number and weight of leafs increased mostly in variants Bacillus subtilis and Pantoea agglomerans B43 while the generative behaviors were influenced significant in Pantoea agglomerans B43. Total vegetative weight was highest in both varieties in inoculation with Pantoea agglomerans B43.

Key wods: pepper, microorganisms, morphology, seedlings

047 Some New Data in Flora of Lalzi Bay

Alma Imeri 1, Alfred Mullaj 2

1 Agricultural University of Tirana, Albania
2 Faculty of Natural and Science, Albania

bioalma_79@yahoo.com

In Lalzi bay, we have identified a rich flora of Coastal wetlands as well as aluvional forests. In the composition of aluvional forests it is worth mentioning the species Humulus lupulus, Vitis sylvestris, Malus sylvestris, Ficus carica var. caprificus,

these species present the most important source of germoplasm, and the wild ancestors of nowdays fruity cultures. Our surveys over the blooming phenomenon in costal vegetation at Lalzi Bay, can distinguish a dependence between blooming phases and environmental conditions (soil, salinity, hidrologycal conditions). Therefore, in high salinity soils, the vegetation blooms among the periods of July to October. More different is the situation with the other species that belong to not that high salinity environment. They represent an early bloom period. Spring-Summer bloom is presented in psamofil vegetation, when salinity is absent. During expeditions carried out the years 2008-2009, it is collected a rich floristic material. Based on the literature like a "Flora of Europaea", "Flora of Albania" etc, finally we have identified two new species for Albania's Flora, they will represent a modest contribution in this direction.

1. Scirpus setaceus L., Sp. Pl. 49 (1753)
2. Polypogon maritimus Willd., Ges. Naturf. Freunde Berlin Schr. 3:442 (1801)

Keywords: Aluvional forest, Germoplasm, Psamofil vegetation, Phenophase

061 Cows to Kilowatts: Abattoir Waste Turned Into Clean Energy

Joseph Adelegan

Global Network for Environment and Economic Development Research, Nigeria

dr_joseph_adelegan@yahoo.com

Cows to Kilowatts" abates water pollution, improves ecosystem health, mitigates greenhouse gas emission and creates cheap source of domestic energy with environmentally safe organic fertiliser from slaughterhouse waste through the installation of sustainable biogas plant. The innovation is a winner of the prestigious 2005 Supporting Entrepreneurs for Environment and Development (SEED) International Awards (www.seedinit.org). SEED is supported by IUCN-The World Conservation Union, UNDP, UNEP, GPPi Germany, VRom, Global Compact, Swiss-Re, the Government of United Kingdom, Germany, Netherlands, South Africa and the United States of America. The initiative also featured as 2008 Principal Voices www.cnn.com/principalvoices by CNN in association with Shell, Times and Fortune Magazine. The innovation also receives the 2009 Technology Pioneers Award of the World Economic Forum, Geneva, Switzerland. The Problem and Alternative: Cows to Kilowatts Slaughterhouses are a major source of water pollution and greenhouse gas emissions, especially in the developing world. Specific regulations for abattoirs do often not exist or are poorly enforced. This represents an immediate environmental problem, affecting among others the development of aquatic life. Slaughterhouse waste also often carries zoonotic diseases - animal diseases that can be transferred to humans. Communities

depending on polluted water for consumption and agriculture therefore face significant health risks. Moreover, the anaerobic degradation of wastewater generates methane and carbon-dioxide and thus accelerates climate change. Two African citizen sector organizations, Green Globe Trust and the Global Network for Environment and Economic Development Research drew attention to this issue. The way out of the dilemma was to find a way of capturing the gas emissions and turning them to productive usages. Relevant technology for achieving this was created in association with a Thai research institution. The anaerobic fixed film bioreactor treats agro-industrial waste and produce biogas as well as organic fertiliser. Business Model and Benefits The initiative gained international recognition. Hence, UNDP provides an initial support of US $500,000. The project was designed to be commercially viable. Producing around 270 m3 of compressed biogas a month, the plant generates return on investment after 2 years. With an estimated lifespan of 15 years, the plant creates substantial economic returns. The biogas plant generates several positive environmental, economic and social impacts. The plant was designed to capture 900 m3 of methane per day and emission reduction of 22,300 tons of CO2 per year. The captured methane is upgraded and compressed for as household cooking gas which serves 5,400 poor households monthly. The predominantly poor families benefit from the gas because it constitutes a cleaner alternative to other commonly used fuels. At significantly lower cost than currently available sources of natural gas, it reduces indoor air pollution and associated health hazards in poor communities. Roll-out and replication Many other cities across Africa are facing similar environmental challenge from untreated slaughterhouse waste. Through the use of innovative technology, it presents a solution to the problem of waste treatment which at the same time minimises the carbon footprint of slaughterhouse operations and other organic wastes. Moreover, it is an economically self-sustainable and profitable initiative, generating a classical win-win situation.

Keywords: Abattoir, wastewater, pollution control, biogas, renewable energy

062 Wetland System: a Cheaper and Efficient Treatment Option for the Food Processing Waste in Africa

Joseph Adelegan

Global Network for Environment and Economic Development Research, Nigeria

dr_joseph_adelegan@yahoo.com

The study investigates an alternative wastewater treatment system for the food and beverage industry in Africa. A subsurface flow wetland system was designed and compared with a UASB bioreactor installed for a brewery in Nigeria. The

cost of the installed 3000m3 bioreactor for the brewery industry is USD 5.00 million however the cost of the constructed subsurface flow wetland system with a capacity of 5,200m3 is USD 1.65 million. Hence, the cost of the designed wetland system is 33% of the cost of installed bioreactor. The cost of operation and maintenance of the designed wetland system is much lower than that of the installed bioreactor. The comparative treatment efficiency of the designed wetland system and the installed bioreactor shows that the waste characteristics for the designed subsurface flow constructed wetland after treatment falls within the USEPA threshold for food processing industry. However, for the installed UASB Bioreactor, most of the waste characteristics are above the stipulated threshold. In addition, the treatment efficiency of the designed subsurface flow constructed wetland for the controlling parameters, BOD, TSS and Faecal Coliform are 96.83%, 88.42% and 96.29% respectively. For the installed UASB reactor, the treatment efficiency for the same controlling parameters, BOD, TSS and Faecal Coliform are 62.94%, 15.36% and 63.81% respectively. Hence, the designed subsurface flow constructed wetland is more efficient in the removal of BOD, TSS and Faecal Coliform hence could be an excellent alternative for the food and beverage industry in Africa.

Keywords: wetland system, subsurface flow, wastewater treatment, effluent threshold, bioreactor

063 Eco-Innovation and Corporate Performance: the African Experience

Joseph Adelegan

Global Network for Environment and Economic Development Research, Nigeria

dr_joseph_adelegan@yahoo.com

Addressing a paucity of research about industrial adoption of environmentally benign technologies in Africa and, more generally, in tropical developing countries, we examined the Nigerian pulp and paper industry as a case study. Qualitative interviews with twenty upper echelon executives representing five Nigerian firms challenge conventional expectations that energy intensive industries in developing markets operate amid highly pollution-intensive conditions, within weak or non-existent formal environmental regulatory frameworks, and with limited institutional capacity. Our findings suggest a strong positive relationship between cleaner technology use and corporate financial performance of African industrial firms. Our study also suggests the adoption of classical 'win-win' integrated preventive environmental strategy, eco-efficiency and green productivity which improves

industrial efficiency and profitability. Nigerian pulp and paper firms are shown to have moved beyond end-of-pipe technologies and cleaner technologies and adopted industrial ecology and "zero emission" principles with appropriate reuse of the remaining waste streams turning the production system into a sustainable industrial ecosystem.

Keywords: Environmentally Benign Technologies, Environmental Policy, Eco-Innovation, Financial Performance, Pulp and Paper

068 An Influence of Molybdenum upon the Content of Antioxidants in the Fruits of Tomatoes

Denka Valerieva Kostova

Agricultural University - Plovdiv, Bulgaria

deny_kostova@yahoo.com

The influence of the fertilization as an element of the agricultural technics upon the synthesis of antioxidants and microelement molybdenum is complex and makes an impression. Vegetables are sources of a line of powerful antioxidants: lycopene, β Carotene, as well as vitamins A, C, E.. It has been proved that tomatoes are a main source of many nutritious carotenoids, as well as lycopene. That's why we directed our studies to a vegetable crop tomatoes. The influence of the potassium fertilization upon the content of molybdenum in plants of tomatoes has been studied. The concentration of molybdenum in fruits increase from 10.12 mg/kg to 30.53 mg/kg with the increase of the fertilization norm of potassium nitrate in soil. With the increase of the fertilization norm of potassium sulphate in soil the amount of the accumulated molybdenum in fruits of tomatoes decreases from 32.65 mg/kg to 10.00 mg/kg dry matter. The molybdenum content in the fruits of tomatoes was determined by a new method with Triphenyltetrazolium chloride. To check the method that we propose, a parallel determination of molybdenum content was carried out by the atomic-absorption method (AAS). In connection with the positive action of molybdenum upon the vegetation and growth of plants we studied the subordination between the accumulated in the fruit of tomatoes molybdenum and the quantity of antioxidants: vitamin “C” , β Carotene and lycopene. The experimental data show that not only the fertilization norm, but also the kind of the potassium fertilizer do have influence upon the content of molybdenum and antioxidants. The study shows that the high concentrations of molybdenum have positive influence upon the content of vitamin “C”, β Carotene

and lycopene in the fruit of tomatoes (in fertilization with KNO3). The deficit of the nutritious element molybdenum leads to retardation of the growth and decrease of yield.

Keywords: molybdenum determination, antioxidants, plants

069 A Comparative Analysis for the Content of Manganese in Different Fertilization in Plant Material

Denka Valerieva Kostova

Agricultural University - Plovdiv, Bulgaria

deny_kostova@yahoo.com

In the conditions of intensive farming, the problem of trace elements in the soil-plant system attained significant importance. The level of manganese in plants is usually increased with the progress of the vegetation. Higher levels of manganese were found in plant organs in which the metabolism is more intensive. Manganese is an element which is important for the nitrogen metabolism in plants. Manganese insufficiency leads to a considerable accumulation of nitrates, disturbance in the protein synthesis in plants and illness to some plants. Also the manganese insufficiency causes a decrease in Ca and Mg content in plants of vegetable crops. The extremely important role of manganese in the growth of plants determined the goal of our study. The present study is intended to clear up the effect of a prolonged fertilization (mineral and organic) on the manganese content in radishes using a new method with Crystal Violet for determination of manganese. Beer's law is obeyed in the range of 0.2 – 2.2 μg ml-1 manganese (VII), limit of detection is 0.032 μg ml-1 Mn(VII). To show that the triphenylmethane dye Crystal Violet which we used, can be applied to the analysis of manganese in plant material. A study in a multiple-factor stationary field experiment with 16 variants NPK on background without and with annual fertilization with manure has been carried out. The manganese content in the roots of radishes, cultivar Red with white tails, was determined. It was established that fertilization has an effect upon the manganese content in the roots of radishes. In the three levels of nitrogen fertilization with N120, N240 and N360, the highest content here was 95.25 mg/kg Mn dry mass after fertilization with N240:P360:K120 = 2:3:1. As we take into account the different fertilization with N, P and K it can be seen that radish accumulate least manganese 10 mg /kg in fertilization only with P and K (N0P120K120). The content of manganese grows up above 5 times if in the fertilization can be used a nitric fertilizer N120P120K0 and N120P0K120..

Keywords: manganese determination, fertilization, plant samples

070 Basic Research on the Influence Sinter in the Blast Furnace Melting Zone Position

Ruica Mihai - Florentin

University Polytechnic of Bucharest, Romania

ruica_mihai@yahoo.com

This paper presents results of laboratory experiments carried out in order to find a connection between physico - chemical characteristics of basic sinter indicators of different tailings on the reduction behaviour in conditions similar to the furnace. Its significance lays in the relationships influence the development of reduction reactions in the furnace were busy on a cohesive zone of blast furnace position and impact productivity and total fuel- making equipment used for iron making. Is describe materials used, testing which have undergone tests crowded and experimental results. After the data obtained show the influence of very important basic feature of tailings on the extent of reduction index. Is presented a theoretical development process by reducing chemical kinetics on particles sinter.

Keywords: Blast furnace, melting zone, iron ore and iron oxide waste

079 Phenological Development of Triticale (X Triticosecale Wittmack) Varieties Depending on the Climatic Conditions in Plovdiv Region

Hristofor Kirchev, Aleksandar Matev, Vania Delibaltova, Atanas Sevov

Agricultural University - Plovdiv, Bulgaria

hristofor_kirchev@abv.bg

Field experiment were carried out in the experimental field of the Agricultural University ?" Plovdiv during the period 2002-2005 to determine the phenological development on triticale varieties depending on climatic conditions. In this experiment five triticale varieties took place, which have been made in different selection research stations. Mexican AD7291 was selected as standard, Rakita and Zaryad from DAI - Gen. Toshevo, Sadovetz and Rojen from IPGR - Sadovo were also included in the experiment. The beginning of the major phenological stages was identified according to Zadoks scale (1974): Sowing, Sprung, 3th leaf, Tillering, Stem elongation, Spike emergence, Maturity.

Keywords: triticale varieties, phonological development, climatic conditions

083 Determination of Chromium with Methylene Blue in Plant Material

Mary Atanasova Kamburova, Denka Valerieva Kostova

Agricultural University - Plovdiv, Bulgaria

maryKamburova@yahoo.com

Chromium have a positive effect upon the vegetative and reproduction behaviour of farm crops. It is been established that chromium takes part in a number of oxidation-reduction processes, accelerates some biochemical processes in plants and increases yield. The aims of the present research are to study the influence of the level of a mineral fertilization in soil upon the content of chromium in headed cabbage using Methylene Blue(MB) for determination of chromium. Chromium(VI) forms an ion-association complex with the cation of Methylene Blue. The fertilization brought about considerable changes of the chromium content in the cabbage. Determined by the method with MB, the lowest content of this element 1.2 mg/kg Cr dry mass was in the plants fertilized with N : P : K = 2: 3: 1. Chromium content increased with the increase of the fertilization norm of phosphorus. This was evident in the two levels of nitrogen fertilization, especially with N120 and N360. When NPK was individually applied, the highest yield 3703.3 kg/dka was obtained in the variant where it was fertilized with N120P360K120.

Keywords: chromium determination, methylene Blue, plants

092 Wind Speed Prediction by Diffrent Computing Techniques

Munir Ahmad, M C Deo

Indian Institute of Technology, Bombay, India

munir.nit70@gmail.com

The wind speed forecasting has always been of great interest because number of applications of wind in many diverse fields. Wind speed data for goa station has been taken from 2nd month of 1998 to 2nd month of 2002. The wind speed data is available in three hour interval. Wherever the data is missing or is of exceptional value; there the data has been modified by linear interpolation method. The wind speed forecasting is done by three most popular methods .The wind speed forecasting is done for a future time of 3 hours, 6 hours and 12 hours. Fist; the polynomial curve fitting method is applied to get two, three and four degrees model equations. The equations are developed for 70% of data available and tested for rest 30% data. Secondly; autoregressive moving averages commonly

know as ARMA models are applied on data. Two ARMA models for each time head are developed from 70% of data and tested for rest 30%.The third method which is applied is the neural networks which has got a lot of fame these days and is extensively used in many forms of modelling and other applications. Different network architectures with different parameters have been tried and two best fitting architectures are used for forecasting the wind speed.70% data is used to train the networks and 30%is used for testing. The forecasting accuracy is compared for all the three models by taking the correlation coefficient and mean square error which are commonly used error measurement. Improvements over the wind speed forecasting are required for better usage with respect to time and location of wind. Bayesian methodology can be used on AR or ARMA models to provide a very accurate forecast. Application of Kalman filtering as a post processing method in numerical forecasting of wind speed is shown to provide very accurate forecasts. Conformal methodology is a new forecasting methodology. It can be applied to forecast wind speed and also estimate the confidence level of forecast.

Keywords: Arma, Artificail Neural Networks, Wind Speed, Forecast

093 Biodiversity in Metal Rich Soil

Aida Bani 1,3, Fadil Thomai 2, Eugen Skura 1, Guillaume Echevarria 3, Sulejman Sulce 1, Jean Louis Morel 3

1 Agro-Environmental Department, Agricultural University of Tirana, Kamez, Albania
2 Department of Horticulture, Agricultural University of Tirana, Kamez, Albania
3 Laboratoire Sols et Environnment, Nancy-University, INRA

aida_alushi@hotmail.com

Metal-rich soils and mainly ultramafic soils (i.e. serpentine soils) are widespread over the Balkans and cover 10% of the area of Albania. These soils contain high concentrations of heavy metals, low concentrations of N, P, K and the Mg/Ca ratio is high (Proctor, 1999). Plants growing on serpentine soils often accumulate metallic elements, resulting in elevated tissue metal concentrations, relative to plants on normal soils. These species, termed hyperaccumulators (Brooks, 1987). We evaluated the plant biodiversity in mineralized soils across the country in order to select tolerant and hyperaccumulating species. We also investigated the locations of accumulated metals by Alyssum murale. Collection of both plant (analysis of element contents in aerial parts) and soil (analysis of total elements and DTPA-extractable Ni) samples allowed for the evaluation of the phenotypic and possibly genetic efficacy in hyperaccumulating Ni. The soils had an extreme chemical nature, with abnormally high concentrations of Ni (3200 mg kg-1), Cr (1600 mg kg-1) and Co (200 mg kg-1). The highest Ni content were found in A. murale in Pojska (Pogradec) (1.33 %), A. markgrafii in Gjegjan (1.23 %) where

DTPA extractable Ni was respectively 117 and 65.6 mg kg-1 and Bornmuellera baldacii in Gramsh (1.22 %). The results showed that Ni accumulation occurred in the base of trichomes (leaves), phloem (shoot), embryo and endosperm (fruit), petals (flower) in A. murale. We have identified a new member of the Albanian Ni-hyperaccumulator flora: Thlaspi ochroleucum in Pojska (0.13 % Ni) and in Pishkash (0.14 % Ni) for which DTPA extractable Ni was high 285 -94.5 mg kg-1. Such results obtained by this approach suggest the use of A. markgrafi and A. murale (the most efficient Ni-hyperaccumulator among the four species) for bioremediation and habitat restoration.

Keywords: Heavy metals, serpentine soil, Ni bioavailability, bioaccumulation,

100 Reproduction Biology of Dalmatian Pelican (Pelecanus Crispus) in the Divjaka-Karavasta National Park

Anni Kallfa 1, Taulant Bino 2

1 University of Tirana, Faculty of Natural Sciences, Albania
2 Deputy Minister, Ministry of Environment, Forestry and Water Administration, Albania

a_koci@hotmail.com

The Divjaka-Karavasta wetlands are coastal lagoons, included in the Ramsar list of wetlands of international importance, fulfilling no less than 6 Ramsar criteria, especially regarding total wintering water birds and individual species. The Dalmatian Pelican Pelecanus crispus population, an internationally endangered species, has been encountered in Albania since the beginning of the last century. Although the pelican is included in the national list of strictly protected species, currently it is still under threat. Its population was reduced from 200-250 breeding pairs in 1980's down to no more than 30 breeding pairs currently. Different factors have contributed to this species being at risk. The factors analyzed in detail in this presentation are: Impact of the population of fish species the pelican feeds on; impact of erosion and hydrological changes of the ecosystem and habitat degradation (transformation of coastal line and loss of breeding islands) on the pelican breeding pairs. The Divjaka-Karavasta ecosystem has undergone different management strategies aiming at different components over a 40-year period: increase of fish population, protection of Divjaka forest, A management strategy, focused on the pelican population as a flag species of this ecosystem, is proposed at the end. Data on the number of breeding pairs has been collected through frequent site visits from mid-april to mid-june, visiting the inner lagoon islands, beaches, dunes and shrubs. Data has also been received from the monitoring reports of the Government of Albania and other studies.

Keywords: Dalmatian pelican, wetland, lagoon, Divjake-Karavasta, population

103 Air Quality of Particles Pm10 and Pm2.5 in the Mitrovica Urban Atmosphere - Kosovo

Syla Afrim, Fisnik Kabashi, Petrit Jonuzi

University of Prishtina, Kosovo

afrimsyla2002@yahoo.com

The city of Mitrovica, approximately 40km north of Prishtina, was the site of one the largest lead smelters in Europe. The present environmental situation in Mitrovica, put as in front of the responsibility to act more rationally towards nature and to be more responsible towards the protection of the environment for future generations. The protection lack of the environment during the last ten years, as well as the conflict in Kosovo is the origin of huge problems regarding present environmental situation in Mitrovica (Kosovo). Mitrovica has its air divided in two kinds, speaking in quality terms: Air above rural and mountainous zones, which is clean. Air above the city centre urban and nearby different plants, which is more polluted. Urban air contains dust particles and gases, added on it is as results of normal activity of the city and industries in them. Mitrovica can be cited as one of the capitals of Europe with worst air pollution. Exposure to airborne particulates PM10 and PM2.5 containing low concentrations of heavy metals, such as Pb, Cd and Zn, may have serious health effects. However, little is known about the specification and particle size of these airborne metals. Fine and PM10 particles size with heavy metals in aerosol samples from the Mitrovica urban area were examined in detail to investigate metal concentrations and speciation. The crystal structures of the particles containing Pb, Cd and Zn were determined from their electron diffraction patterns by XRF methods. Sampling of suspended particulate matter, PM10 and PM2.5 started in July April 2003 and are still in progress at three sites in the very urban area of Mitrovica: roof of the FXM building MIP, roof of the elementary school "Bedri Gjina" at about 4m height; 40m far from heavy-traffic streets; on the platforms above entrance stairs to the faculty of Mining at the height above 3m from the ground. Suspended particles were collected on Pure Teflon filters, Whatman (37 mm diameter, 2μm pore size) and Pure Quartz, Whatman (37 mm diameter) filter paper, using the low volume air sampler Mini-Vol Airmetrics Co, Inc. (5 l min-1 flow rate). The duration of each sampling period was 24 hours.

Keywords: Air quality, PM10, PM2,5

111 The Petrophysical Characteristics and their Effect on the Reservoir Fulieds for Mheiherrat Formation at the Central Part of the Gulf of Suez, Egypt

Mahmoud Ghorab

Egyption Petroleum Research Institute, Egypt

ghorab9@hotmail.com

The present work for determned the petrophysical characteristics of the Mheiherrat Fomation which is formed generally of carbonates and other case from sandstone. These include twelve wells (HH 84-1, GG 85-1, WFA-1, WFB-1, GS 216-1, GS 206-1A, GS 207-1A, GS 197-2, GS 196-1A, TANKA-1, TANKA-3 and TANKA-4) were selected for applying the present technique of the reservoir performance for Mheiherrat Formation in the considered area. In this respect, shale volume is needed for correcting the porosity and water saturation results for the biased effects of shale. It is considered as an indicator of reservoir quality, in which the lower shale content usually reveals a better reservoir. These petrophysical parameters (Φe, Vsh, Sw, Swir, Swre, Sh, Shr and Shm) are represented horizontally in the form of iso-parametric maps to illustrate their areal distribution within the evaluated formation across the area of study. The result of this study illustrate that, the hydrocabon quality increases gradually outward the area of study where the movable hydrocarbon shows low content where it varies from 0% to 32% at GS 216-1 well.

Keywords: EPRI

115 Spherulites and their Role to the Environment

Jakup Hoxhaj 1, Fatbardha Cara 1, Hasan Kulici 2, Shehribane Abazi 3

1 Geosciences Institute of Tirana, Albania,
2 Albania Geological Survey,
3 Geology of Kosovo

jakuph2001@yahoo.com

Spherulites are terrestrial and extraterrestrial bodies with different forme and origine. The main genetic types of spherules are:
I. Impact spherules.
Spherules issued from impacts of crater producing meteorites, as dissipated melt.

II. Extraterrestrial spherules.
1. Spherules born from exploded meteorites in the high atmosphere.
2. Interplanetary dust spherules.
3. Interstellar dust spherules.
III. Terrestrial spherules.
1. Volcanic spherules. Very poorly investigated type, however, potential tools for regional and world-wide correlation.
2. Spherules of diagenetic origine. Possible tools for regional correlation.3. Spherules of biogenic origine, no tools for geological correlation.
4. Spherules of industrial origine (flying ashes etc.). In this case the connection with the atmospherical pollution is obvious.
The first step in the world-wide investigations is to find reliable methods to distinguish the various genetic types. It seems that the impact and extraterrestrial types would be the global tools for correlation, because the related events are globaly detected. (Great impacts, traversing meteorite and extraterrestrial dust clouds).
The interstellar spherules can provide data relating to the movement and position of the Solar System our Galaxy, the Milky Way, in the geological past.
The industrial spherulites (terrestrial), being directly related to the recent atmospheric pollutions, can be distinguished among their genetic types (of the collusion, extraterrestrial, terrestrial). They are of different kinds (silicate, irony, silicate-irony) and differently spreaded. Based on these parameters (kind, distribution and quantity) we can judge about the environment and its pollution rate.
It is a new field of investigation in our country. The first results have been obtained in the Kopliku Square. 21 magnetic and only two glassy spherulites were resulted among 23 analised samples.
The other samples have been collected around the Rubiku plant and the metalurgic plant of La and their analysing is in the process. The samples have been collected in the upper part of the soil, according to the fixed methodics. A part from the results, the aplication of this new method is of a special importance for the geological-environmental survey of our country.
The valuable data by this method are obtained in USA, China, Japan, Hungary etc. Although applicative of this method is still in the first steps. The character of the environment is determined by micro and macro elements of spherulites. Their morphology is also evaluated as important element.

Keywords: Spherulite, environment, morphology, etc.

118 Genotypic Response of Maize Hybrids to Different Nitrogen Applications under Climatic Conditions of Plovdiv Region

Vania Delibaltova, Xristofor Kirchev, Atanas Sevov, Aleksandar Matev

Agricultural university - Plovdiv, Bulgaria

vdelibaltova@abv.bg

The field experiment was carried out on the Scientific-Experimental and Introductory Facility of the Department of Plant Growing at the AU - city of Plovdiv in the 2006 - 2008 periods. The effect of four rates of nitrogen (120, 160, 200 and 240kg/ha) on elements of productivity and grain yield of two maize hybrids Florenciq and PR35P12 were determined. The analysis of the results show that maximum number of row per, number of grains per row, number of grains per cob, length of cob, mass of the cob, mass of grains per cob, mass of 1000 grains and grain yield was recorded in application of 240kg/ha when compared with other rates.

Keywords: genotypic response, maize, N application, elements of productivity, yield of grain

124 Estimation of the Non Ionising Radiation Level in the Vicinity of FM Transmitters, UHF Television Transmitters, GSM Antennas and WiMAX Antennas

Bexhet Kamo, Rozeta Miho, Algenti Lala, Olimpjon Shurdi

Faculty of Information Technology, UPT, Tirana, Albania

bkamo@fti.edu.al

Estimation of the non ionizing radiation level in the vicinity of radio FM transmitters, UHF television transmitters, GSM antennas and WiMax antennas, and the comparison of theoretical values with exposure limits for public and occupational limits, offers the possibility of knowing the minimum safety distance from antennas. In this paper, we present results of estimations for the power density radiated from antennas, by eliminating or not considering reflected waves from different surfaces. By simplifying the complex theoretical calculations, we can have a value that is quite real in relatively small distances from antennas. This method is used to estimate the power density of non ionizing radiation for the main applications that "pollute" the environment with electromagnetic waves like radio FM transmitters, television transmitters, mobile telephony antennas and WiMax antennas. For each application we have calculated the minimum safety

distances from real transmitters. The estimation is done for real frequencies and applications, in order to have a clear idea for the minimum safety distances from transmitters used in different applications.

Keywords: Antenna, Radiation, Transmitter, FM, UHF, GSM, WiMAX

125 Analyse and Evaluation of Sar and Influence of Metallic Objects in the Electromagnetic Field Nearby the Mobile Station Device

Algenti Lala, Bexhet Kamo, Olimpjon Shurdi, Vladi Kolici

Faculty of Information Technology, UPT, Tirana, Albania

alala@fti.edu.al

The Specific Absorbation Ratio is a very sensitive issue for the cellular communications.SAR represents the ratio of the power absorbed by the human tissues , and it mus be within the standards. The average SAR, defined by the standards, can be calculated by the measuring of the E (electric field) in an imaginary biological volume filled with tissues. This paper describes a way of measuring SAR, approximated by the technique of the near field. The division of the plane waves, of the field measured in a plain, allows the recreation of the immaginary electric field from which the SAR can be measured. The impact of the Efekti i metallic jewlery in the face be investigated based on the absorbed energy from the human head from the radiation of a PDA (personal data assistant). We will deal with relative differences of SAR in the human head, as result of an radiation from a dypole at the frequency 1.8GHZ and of an monopole inside an conductor box, influented by the presence in the near-field of metallic rings. In this simulation are been used simple and complex models of manikin heads and the evaluations of the FD-TD are checked against the measurements by a industry of standards, of the system of measurements, for the accepterd norms of absorbation (SAR) DASY 4. The simulation as well as the measurements make reference of the IEEE specifications for the manikin head, further defined as antropomorfic. The results lead to the fact that the metallic rings can alter different levels of the specific norm of absorbation (SAR) distributed in time. The results are shown for different size of earrings.

Keywords: Specific absorption rate (SAR), near-field, finite difference time-domain (FDTD), personal data assistant (PDA), metallic jewelry

145 Considerations About Solid Wastes Deposits

Beatrice-Natalia Neagu

Waters Directorate Buzau-Ialomita, Romania

betineagu@yahoo.com

The paper presents some aspects of location, operation and monitoring solid wastes deposits. National solid wastes strategy, the legal norms in force that provide for criteria and procedures for acceptance of solid wastes for storage, technical regulations for solid wastes storage, tracking and control procedures solid wastes deposits is part of documents that indicate how wastes management should be conducted corresponding. In recent years has considerably increased the amount of solid wastes and therefore impact over environmental factors and human healthy. Therefore, due attention to the collection, transport and solid wastes storage of any kind. In important given the choice of solid wastes deposit, how the sealing, drainage works and water discharges and measures of safety in operation.

Keywords: solid wastes deposits, wastes management

053 The 3 Dimensional Presentation of Geo-Hazards in the Track of Vermice-Merdare Highway

Zenun Elezaj, Berat Sinani

F.M.M., Mitrovica, Kosovo

Geohazards in general and especially for Highway Vermice-Merdare are widespread phenomena that are related to geological and environmental conditions and involve long-term and/or short-term geological processes. Geohazards can thus be relatively small features, but they can also attain huge dimensions and affect local and regional socio-economy to a large extent. Evidence of geohazards in geohazards map is a necessity to minimize the losses that may be caused by these phenomena. The presentation of different geological processes, their interpretation in 3Dimensional model is more than necessary, to enable real image to these phenomena, which enables and facilitates the protection of these quite dangerous processes. Identification, description and evidence of geo-hazards phenomena is a very important factor, which is successfully performed during the compilation of geo-hazard map for Vermice-Merdare highway. The most interesting phenomena will be identified for the needs of this paper, which will be recently analyzed by taking all required information. In this paper the geo-hazard phenomena which are of a high probability will be interpreted and will be

presented by 3D with animations the succession of probability of their location and chronology. 3D presentation will enable the recognition of the complexity of these phenomena and at the same time will reduce the risk from them.

Keywords: Geo-hazards, 3Dimensional Interpretation, Highway

182 The Influence of Some Growing Regulators over the Yield and Quality of Alfalfa Legend Variety under the Plovdiv Region Climatic Conditions

Atanas Sevov, Nanko Popov, Hristofor Kirchev, Vania Delibaltova, Alexander Matev

Agricultural University - Plovdiv, Bulgaria

asevov@yahoo.com

In the period 2007 - 2009 a field experiment was conducted in the Agricultural university - Plovdiv, Bulgaria. The investigation was performed by the 4 replications method in 10 m2 lots. The investigation aim is to study the influence of the RENY growing regulators over the basic enzyme systems chemical components, determining the quality of the vegetative leaves mass and the multifolium alfalfa LEGEND variety yield. The results show higher enzyme activities, better protein value, higher carbohydrate and cellulose content.

Keywords: alfalfa, growing regulators, yield, enzyme, quality

190 Effect or Mineral Fertilization on the Yield of Maize

Nadezhda Todorova, Stayka Stratieva, Radka Kancheva

N.Poushkarov Institute of Soil Science, Sofia, Bulgaria

nadezhdat@dir.bg

On the basis of many years field fertilization experiments with maize is investigated the influence of mineral fertilization on the development and yield of maize on Leached Chernozem, Calcerious Chernozem, and Smolnitza. It is established that maize behaves extraordinary good toward mineral fertilizer for all the soils under investigation, though some differences in fertilizer effectivity appear for various soils.

Keywords: soil, fertilization, maize yield

191 Influence or Mineral Fertilization on the Quality and Quantity of Wheat Grain

Nadezhda Todorova, Stayka Stratieva, Radka Kancheva

N.Poushkarov Institute of Soil Science, Sofia, Bulgaria

nadezhdat@dir.bg

It is investigated the influence of N, P, and K fertilization on the quality and quantity of wheat grain for Grey Forest soils, Leached Chernozem and Smolnitza. Many factor field fertilizer experiments are used with wheat of type Sadovo 1. It is established a profound effect of the fertilization on yield. A balanced mineral fertilization increases the quality of grain as well as its cooking parameters.

Keywords: fertilization

241 Study of the Industrial Yeasts Isolated From the Plants and the Waters of the Cold Environments

Rozana Troja 1, Nereida Dalanaj 1, Donika Prifti 1, Aleksander Petre 1, Erjon Troja 2

1 Department of Industrial Chemistry, Faculty of Natural Sciences, University of Tirana, Albania
2 Department of Pharmacy, Faculty of Medicine, University of Tirana, Albania

rozitroja@yahoo.com

The microbial biodiversity of the cold and extremely cold environments is the object of the recent microbiological studies, related with the taxonomy of the microorganisms grown in the specific conditions. Through these studies, it is possible to discover new species and genera of the yeasts with industrial importance and also important for the human health. These strains are actually source of the new active chemical compounds as carotene's, antioxidants and others. The paper here presented, is an introduction of a three year taxonomic study, to discover and analyze the industrial yeasts, part of the micro flora of the plants and waters of Dajti Mountain in Tirana. The isolation, purification and identification of the yeasts was realized, using specific taxonomic methods, described in details by Lodder, Kurtzman and Barnet. There were isolated and identified about 200 strains, for example Rhodotorula spp, Aureobazidium pullulans and others which are representatives of a special microbial population of cold and extremely cold areas. Their full taxonomic study was realized having as target the discovery of the important chemical substances, carotene's and others and the enrichment of the Collection of the Industrial Yeasts with the new identified strains. There is also

included in the presentation the study of the technological characteristics of the isolated strains, in order to complete their view and to use them for the obtaining of the above chemical compounds.

Keywords: Yeasts, Rhodotorula sp., Aeureobazidium pullulans, ascomycetes, bazidiomycetes

196 Impact of Environment and Some Agronomy Practices on the Productivity of the New Wheat Variety Bolyarka in South Dobrudzha Region

Albena Ivanova 1, Nikolay Tsenov 1, Hristofor Kirchev 2

1 Dobroudja Agricultural Institute, Bulgaria
2 Agricultural University-Plovdiv, Bulgaria

Wheat is one of the most widely distributed crops worldwide and is of primary importance as food for human nutrition. Increasing the productivity of the new wheat varieties according to the specific climate of the region is a permanent major task. The impact of environment and some agronomy practices (previous crop and mineral fertilization) on the productivity and the structural elements of yield of the new variety Bolyarka and of the national standard Sadovo 1 were analyzed during a 3-year period (2004-2006) under field conditions. The main components of productivity were investigated: grain yield, 1000 grain weight, number of productive tillers, number of grains per spike and weight of grains per spike, as well as some characters indirectly related to yield: plant height, test weight and spike length. The varieties were grown after four previous crops: bean, sunflower, grain maize and silage maize. Three levels of nutrition regime were involved. The applied mineral fertilization was differentiated according to the type of previous crop as follows: N6P6K0 and N10P10K0 after bean, and N10P10K0 and N14P14K0 after the other predecessors. The trial included also a check: N0P0K0. Mineral fertilization had strongest effect on the formation of the character number of productive tillers and on grain yield. Variety Bolyarka was remarkably responsive to fertilization and increased its productivity with the higher fertilization norms. The year conditions had significant effect on plant height, test weight, spike length and on the structural elements of yield: number and weight of grain per spike. Bolyarka is a new bread wheat variety which demonstrated a higher productive potential than the standard Sadovo 1 expressed in higher grain yield, larger and plumper grain, higher spike length, greater number of grains per spike with higher weight.

Keywords: Wheat, Yield, Environment, Fertilization, Previous crop

212 Effect of Waterborne Copper and Cadmium on Calcium-Dependent Proteases in Blue Mussel, Mytilus Edulis l.

Nadezda Kantserova, Lyudmila Lysenko, Nina Nemova,

The Institute of Biology, Karelian Research Centre of Russian Academy of Sciences, Russia

nkantserova@yandex.ru

Increased human activities, especially the rapid development of agriculture and industry, has resulted in a considerable increase in the levels of pollutants, such as heavy metals, particularly in estuariane environments. Some biochemical parameters can be considered as indicators of water pollution. Intracellular Ca2+-dependent proteases, or calpains, having both degradative and regulatory roles, are believed to participate in multiple cellular processes in vertebrate and invertebrate species. However the contribution of calpain-mediated proteolysis in metabolic response reactions due to variable factors is poorly understood especially in invertebrates. The regulation of calpain activity is complex and there are suggested two different interaction mechanisms for heavy metals and calpains: through SH-groups of their active site and Ca2+ resemblance in Ca2+-binding sites. The effect of heavy metal ions on calpains in some organs of blue mussel, Mytilus edulis L., has been investigated in vivo. Calpain was purified from tissues by gel-chromatography, caseinolytic calpain activity was measured in the presence of 1mM Ca2+ (or other ion, due to experiment purposes), and calpain expression was estimated by RT-PCR. In aquaria experiment was shown that the exposure with Cu2+ (5, 50, or 150mkgL-1) and Cd2+ (10, 100, or 500 mkgL-1) in 24 and 72h affect calpain activity and expression in dose- and time-dependent manner as well as allow to indicate metal specificity and accumulation dynamics in the organs. The in vitro experiment was identified the interaction mechanism of heavy metal ions with purified mussel calpain. Some heavy metal ions including Cu2+ have been found to induce in vitro mussel calpain activity on 24% in comparison with Ca2+, while Cd2+ shown inhibitory effect through calpain SH-group binding.

Keywords: copper, cadmium, calpain, proteolysis, blue mussel

216 Principles and Results Developed for Monitoring of the Radioactivity in the Bulgarian Black Sea Coastal Zone

Blagorodka Veleva, Maria Kolarova, George Mungov, Nikolai Galabov

NIMH-BAS, Sofia, Bulgaria

blagorodka.veleva@meteo.bg

During the last 20 years the radiological pollution of the Black Sea from Chernobyl accident was extensively studied under several international and national projects of the Black Sea riparian countries. At the present time the concentrations of one of the main long-lived radionuclides - 137Cs are several times lower than the values measured immediately after the Chernobyl accident in 1986. The present work reports some of the more significant results obtained during 10 years period (1995-2005) under the monitoring programme of NIMH - Bulgaria developed under the IAEA TCP RER 2/003 Black Sea Project. There are several reasons for implementing of a long-term radioactivity-monitoring program of the Black Sea coastal zone: the existence of several operating NPP situated in the catchment area of the Black Sea and representing a potential source of contamination with technogenic radionuclides; a part of the catchment of the Dniepr river still polluted from the Chernobyl fall-out as a secondary source for contamination, and the specific features of the Black Sea circulation directed from North to South along the Bulgarian coast. The seasonal observations of NIMH-BAS performed in 1995 - 2002 have revealed variations in the concentrations of radionuclides in time and space along the Bulgarian shore caused by the seasonal variations of the river inflow. Along the Bulgarian Black Sea shore from Shabla to Ahtopol regular sampling was performed from 1994 to 2002. In the Bulgarian regional monitoring program coordinated under the IAEA Black sea Project station Varna was pointed out as a reference sampling site. Summarized results of the dissolved 137Cs concentrations in sea water, beach sand, algae, and fish over the period 1994-2004 measured at Varna regional monitoring station and at Shabla basic monitoring station are presented and discussed. The methodology of the sampling procedures, measurements and analyses are shortly described.

Keywords: Ecology, coastal zone, Black Sea radioactivity, technogenic radionuclides, monitoring programme

227 Radon Short Lived Daughters Variation in Sofia and Pleven and Soil Conditions

Blagorodka Veleva, Plamen Videnov, Anna Tzenkova, Nikolai Galabov

NIMH-BAS, Bulgaria

blagorodka.veleva@meteo.bg

Radon and its daughters' radionuclides are useful tracers for atmospheric processes and atmospheric dispersion studies. The main source of 222Rn, 220Rn and 219Rn into the atmosphere are soil and rock surfaces, while the water reservoirs release radon to a much lower degree. The source of radon in the atmosphere might be considered as continuous surface source, with variable emission rate depending on the soil condition (temperature, humidity etc) and the natural Uran/Thorium series content in the soil. The short live beta emitting radon daughter radionuclide attached to the aerosol are measured daily in the frame of the atmospheric radioactivity monitoring program of NIMH at Sofia and Pleven at 5th and 60th minute after sampling by beta radiometry. In Sofia the 24-hours filter samples are changed in the morning at 08:00 LST (06 UTC), while in Pleven the filters are exposed during daytime 8:00-14:00 LST. Radon concentration estimated in Sofia is representative for a stable atmospheric stratification (nocturnal and early morning hours). In Pleven radon daughters' concentration is representative for daytime atmospheric conditions with convective boundary layer development during the warm period of the year. Meteorological parameters and soil temperature at different soil depths (0, 2, 10, 20, 35 and 65cm) measured at 7, 14 and 21:00 LST are processed. The period of investigation is 2000-2007. General analyses of the meteorological conditions during that period are given and comparative assessment of the radon daughters concentration and meteorological parameters is performed. The variability in the Rn emanation by its daughters as a function of the precipitation, moisture content and temperature variation is foreseen. The preliminary results show the statistically significant positive correlation between soil temperature and radon daughters morning concentrations in Sofia during the warm part of the year (r Є 0.31-0.35)). The correlation in the cold period is weak negative (r Є 0.-0.14 - -0.21) in Pleven. When the source term is better understood it can be parameterized and incorporated in the modelling of Rn and other passive tracers' dispersion in the atmospheric boundary layer.

Keywords: radon, radon daughters, atmospheric boundary layer, soil conditions

214 Protected and Proposed for Protection Hydric Monuments in Kosovo 2002-2008

Fadil Bajraktari, Ylber Sherifi, Afrim Berisha, Sami Behrami, Qenan Maxhuni,

Kosovo Environmental Protection Agency, Prishtina, Kosovo

fadilbajraktari@yahoo.com

Despite being a small country, Kosovo possesses a diverse hydrography with permanent and temporary water-flow bodies. Geographical position, geological, pedological, hydrological composition, landscape and climate impacted the creation of many hydric monuments with rare natural and scientific values. Some of these are: Mirusha Waterfalls, The Spring of Drini i Bardhe, Gradishqe Canyon, Rugova Canyon, Thermo-mineral Spring in Banja (Banja e Pejes), etc. Protected areas are an efficient legal instrument for conservation of natural heritage values. The national network of protected areas is consisted by 97 nature protected areas with the total surface of 46,362 ha or 4.36% of Kosovo territory. Among them 1 National Park, 11 nature reserves, 82 natural monuments, 2 Regional Nature Parks and 1 Forest Park. 16 of these areas are natural monuments with hydric values. During 2002-2008 period, about 58 new natural monuments areas are added to the register of protected areas with surface of 5.5 ha. 8 of these areas are hydric monuments. Also, 37 new hydric natural monuments are proposed for protection, most of them being water spring sources, thermo-mineral water sources, lakes, waterfalls, and river canyons. In addition to their nature values, these protected areas have tourist, health, scientific and educational values.

Keywords: protected area, hydric monument, natural value, Kosovo, hydric value

075 Influence of Vertical Vibration of Support on the Dynamic Stability of Subsea Pipeline

N. Mestanzade 1, L. Yilmaz 2

1 Atakoy Campus, Istanbul Kultur University, Istanbul,Turkey
2 Technical University of Istanbul, Civil Engineering Faculty, Hydraulic Division, Istanbul, Turkey

lyilmaz@itu.edu.tr

The underwater suspended pipeline was investigated for the dynamic instability which is applied at the problem for the oscillation of the pipe-line part by inverted pendulum. The connection point of pendulum was received as vertical moving

point by harmonic law. For definition of the dynamical equation it is used the analogy of the Mathieu Equation. For solution it is used Ince-Struut Diagram. As numerical example it was used the pipeline behaviour at the project between Turkey and North Cyprus at the East Mediterranean Sea.

Keywords: Subsea pipeline, dynamic behaviour, Ince-Strutt Diagram, pendulum

354 The Development Opportunities of Navigation between Bucharest, the Danube and the Black Sea

Viorica Manole, Oana Gabriela Mircea

University of Bucharest, The Geography Faculty, Romania

ice_vio_ice@yahoo.com

The Danube - Bucharest Channel, which is still only a project, was planned to facilitate the navigation between Bucharest, the capital of Romania, and the Black Sea. The already built sector of the channel is considered to be almost 70% of the whole project, but at the moment it's been abandoned because the activity was interrupted since 1989. The construction of the channel is a controversial issue, given the fact that there are both pro and con arguments. This project was first brought in discussion in 19th century, but it remained just an idea until 1929 when the Romanian Parliament adopted a law about Bucharest becoming a Danube harbour. The political and economical context caused the project to be delayed until the beginning of the 80's. During the communism, there was an intense activity, but after the 1989 Revolution from Romania, the project was stopped and entered in conservation. There were polemics regarding the construction of the Danube-Bucharest Channel. The ones who were against it argued that the costs were unjustifiably high and that there would be a very negative ecological impact. It was also mentioned that a project having such scale was part of the communist inheritance. To the contrary, there are opinions according to which the existence of the channel would significantly reduce the costs and will facilitate navigation between The Black Sea (Constanta) and Bucharest. The channel would also improve the water supply, the production of electricity, irrigations, tourism and will prevent floods to the surroundings.

Keywords: Bucharest Danube Channel, navigation, water supply

322 An Extended Dynamical Model of a Geyser Induced by Inflow of Gas in Case of Plural Underground Gas Supply Sources (2)

Hiroyuki Kagami,

Hiroyuki Kagami Nagoya College, Japan

kagami@nagoyacollege.ac.jp

We have proposed a static model, a dynamical model and a modified dynamical model of a geyser induced by inflow of gas (periodic bubbling spring) based on observation and model experiments of it and have also proposed a combined model combining above 2 models. And numerical simulations of the dynamical model or the combined model reappear spouting dynamics of a geyser induced by inflow of gas and it becomes possible that parameters (volume of the underground space etc.) under a geyser are estimated due to comparison between results of simulation and those of observation. Moreover we have verified above models through geological exploration, analysis of hot spring water and radioactive prospecting. As a result, spouting mechanism of a geyser induced by inflow of gas spouting regularly has been clarified. But in case of a geyser induced by inflow of gas there are not only one spouting regularly but also one spouting irregularly. In case of a geyser induced by inflow of gas spouting irregularly we cannot explain its spouting mechanism based on above-mentioned usual dynamical model which assumes single underground gas supply source. In such a case it is natural that we think there are plural underground gas supply sources and interaction of them produces irregular spouting period. Then we proposed a dynamical model which assumes plural underground gas supply sources by extension of above-mentioned usual dynamical model. Then we showed complicated spouting period occurs as a result of interaction of plural underground gas supply sources through numerical simulation of this extended model. In this study, we modify above extended dynamical model slightly and analyze a role of each parameter in case of plural underground gas supply sources minutely through numerical simulation so as to clarify spouting mechanism of a geyser induced by inflow of gas spouting irregularly in detail.

Keywords: dynamical model, geyser induced by inflow of gas, plural underground gas supply sources, numerical simulation, spouting mechanism, spouting irregularly

357 EMF Measurements in the Vicinity of BTS Cellular Stations of Vodafone Albania

Olimpjon Shurdi, Bexhet Kamo, Algenti Lala

Faculty of Information Technology, UPT, Albania

oshurdi@fti.edu.al

The paper focuses on the field measurement, procedures, narration, and the used equipment. The Vodafone Albania is one of the three mobile operators offering GSM services to the Albanian telecommunication market. The need of having an independent estimation of the EMF, in the nearby of the BTS Stations, drove the Vodafone to refer to the electronic department of the UPT. The presented paper refers to the measurements of only one of 150 measured sites. The methodology, and Equipments used are the same in every site survey. The final report is published in the official website of the UPT, and linked from the website of the Vodafone Albania.

Keywords: Electric field, magnetic field, Wandel-Goltermann, BTS (base transceivers station).

094 Urban Air Quality in Korca City and its Effect in Population Health

Irena Kallco, Ilir Nicko

University, Albania

irenakallco@gmail.com

University Kor e Vasilika Petri, Jani Bukuroshi, Directorate of Public Health, Kor e Among the group of factors affecting population health is the quality of air too, to which we have dedicated a seven - year study. This study is conducted to evidence the urban air quality in all variety of cases of the patients having problems with the respiratory and cardiovascular apparatus. The sources of pollution are studied in two main directions and they are exactly the movable source of pollution and the immovable source of pollution. Two methods for taking the samples were used; the active and the passive one. Based on the many-year sample analyses, as well as their treatment it results that: Correlation between the air quality and the mortality in the adults caused by the diseases resulting from problematic environment shows that we have to do with an indicator of environmental health which indicates the effect of long-term air pollution in our city caused by PM in

high dose 78μg/m3 on one side and the rate of illnesses which is 1, 2 times higher than in the countryside on the other. The study is accompanied by evidence on the urban air quality about the six air polluters (LNP, PM, SO2, NO2, O3, Pb) which nowadays are really very essential in diagnosing of urban air quality evaluation and protection of environment.

Keywords: Health, air pollution, air quality, environment protection

345 Concrete Abrasion as an Indicator of Sustainable Management of Hydraulic Structures

Nenad Ristic, Jelena Markovic-Brankovic, Slavisa Trajkovic

Faculty of Civil Engineering and Architecture, Serbia

nenadristic82@yahoo.com

Concrete abrasion of hydraulic structures stands for the concrete damage induced by the impact of solid particles with the concrete surface, and the action of hydraulic forces on the concrete. Abrasion damage of hydraulic structures are very frequent, in they depend to a great extent on the management of the structures. Concrete abrasion can be reduced by protecting the concrete with some of the available coating and by application of appropriate managing procedures. The primary goal of this paper is introduction of concrete abrasion as one indicator of sustainable management of hydraulic structures. The paper is organized in the following way. After the introductory chapter, the sustainable development concept is laid out. in the same chapter, the potential of development of a set of indicators of sustainable management of hydraulic structures has been considered, and the criteria which must be met by the indicators have been presented and the methods used for organization of sets of indicators have been analyzed. In the third chapter, onset of concrete abrasion of hydraulic structures has been analyzed in detail, and the most frequent causes of concrete damage have been listed. In this chapter, special attention is paid to the protective measures from abrasion damage. In the fourth chapter, at an example of the Hydro Electric Power plant Temac, concrete abrasion has been used as an indicator of sustainable management. In the last, fifth chapter, the conclusions have been presented.

Keywords: concrete abrasion, hydraulic structures, abrasion prevention, sustainable development

362 Numerical Solution of 3-D Problems in Porous Media Regarding the Retardation Factor

Radko Petkov

Institute of Water Problems, Bulgarian Academy of Sciences, Bulgaria

radolili@yahoo.com

The paper considers the development of a new method of diffuse pollution modeling. A hydrodynamic model for the movement of soluble active admixtures in pressure and non-pressure flows through porous media has been developed. The physico-mathematical model provides the possibility of taking under consideration the sorption (retardation factor). The composed differential equations cannot be solved independently of each other since the fluid velocity in the porous media depends on the fluid density and viscosity that depends on their side on concentration and temperature. On the other side, the fluid concentration depends on the dispersion coefficients, which depend on the fluid velocity in the porous media. The established world practice is to assume the fluid velocity and coefficients as constants (independent of the viscosity and density variations) and to solve only the dispersion equation determining the concentration distribution in the porous media. The hydrodynamic model and its numerical solution gives the opportunity of considering inhomogeneous porous media and different types of pollutants that are being dispersed in it with non-constant hydrodynamic parameters.

Keywords: porous media, diffuse pollution, numerical solution

371 Using High Plant Species as Indicators for the Accumulation of Lead from Polluted Air

Julian Shehu 1, Alfred Mullaj 2, Ardian Maci 2, Alma Shehu 2

1 Department of Crop Production, Faculty of Agronomy and Environment, Agricultural University of Tirana, Albania
2 University, Albania

shehujuli@yahoo.com

Environmental contaminants enter the plant cells from air, soil and water. In most phytoremediation technologies a great deal of attention is paid to the cleaning up of soil and water, even though the research for cleaning of contaminated air is not less important. Plants absorb contaminants primarily through their roots and

leaves. Contaminants enter leaves as a result of the direct spraying of plants with agrochemicals and by absorption of gaseous contaminants in the air. Lead is a widely used heavy metal and its world production is several million tons annually. The most important anthropogenic sources of lead are processes in metallurgy, metal working, engineering, chemical, petrochemical and the exhaust gases of internal combustion engines using lead-containing petrol. Lead compounds are emitted as solid particles from internal combustion engines together with the exhaust gases. The cultivation of agricultural plants, especially fast growing vegetables near roads is, therefore, not recommended. Twelve plant species were chosen to study the accumulation of lead in two different points of Tirana city, one with very heavy traffic density and the other in an unpolluted area. Determination of lead content in soils in the three stations was evaluated as well. The level of accumulated Pb was higher for Citrus medica L. and Tilia tomentosa Monech plant species, about 0.41mg.kg-1 and 0.38mg.kg-1, respectively. The content of lead in plant species grown in the polluted area resulted to be more than four times of the content in plants grown in the unpolluted area. Almost all plant species of the unpolluted area resulted to accumulate less than 0.05mg. kg-1, even though the content in soil was approximately the same.

Keywords: lead accumulation, high plant species, air pollution

372 The Environmental Impact of the Dredging in Port and Durres City

Etleva Delia 1, Enkeljda Sallaku 1, Jerina Koliari 2

1 Agricultural University of Tirana, Albania
2 Laboratory Fishing and Aquaculture, Durres, Albania

etlevade@yahoo.com

Port of Durres is the main Port of Albania. It has an aquarium of 0,67km2, a general area of 1,2km2. Dredged material was used to pump it's in the potential deepwater site approximately 7 km from the port entrance. The deep-water site would be far enough removed from Durres to ensure that material does not return to Durres Bay and thus, to entrance channel. The potential for environmental impact resulting from upland depends on the nature of the material and characteristics of the disposal site. As dredged material placed in an upland environment dries, the material oxidizes and becomes lighter in color, accumulations of salt develop on the surface and precipitations tends to dissolve the salts that may then runoff. The oxidation process may promote the release of contaminants in surface water and groundwater and volatilizations of some contaminations may also occur. Fugitive dust may also disperse contaminates. The upland placement of dredging material can potentially affect water quality,

groundwater quality, wildlife, plants and human health. Biological sampling was conducted in supported of this dredging Environmental Analysis. 14 biological sampling stations were established and samples taken during March 2002. In the harbor basin, the number of phytoplankton species is significantly lower. The prevailing species are blue and green alga (Cyanophyceae). The existences of Eutptia Lanowii Steur from the group Euglenoficeae in the harbor basin is also attributed to the presence of polluted waters and supports prior observations. Previous studies regarding the production of the Adriatic indicate that the sea is not a highly productive sea, expect for a few small localized zones. The nauplius, copepod its and juvenile stages of Calanoidae are very abundant in the open parts of sea and along coastal areas.

Keywords: Port of Durres, dredging, environment pollution, phytoplankton species

418 Industrial-Related Regional Disparities in the South-West Development Region (Romania). Present-Day Dynamics and Evolution Trends

Costin Dumitrascu 1, Bianca Dumitrescu 2

1 Faculty of Geography, Spiru Haret University, Romania
2 Institute of Geography, Romanian Academy, Romania

costin_dumitrascu@yahoo.com

Given the context of the industrial restructuring process, Romanian industry experienced a steep downslide as a result of the post-1990 economic and social transformations. Situated in the south-western part of Romania, the South-West Development Region (SWDR) covers 12.3% (29,010km2) of the national territory and 10.7% of its population (2,301,833 inh.). The region overlaps five NUTS 3 administrative units with a diversity of landforms and natural resources explaining the industrial-related disparities. Thus, the industrial activities are displaying sector-like intraregional disparities in terms of localisation: mining industry in Gorj County, chemical industry in Valcea County, metallurgical industry in Olt County, machine-building industry in Dolj and Mehedinti Counties. The predominance of heavy industry explains the high number of large enterprises that have major problems in terms of structural adaptation. The evolution of the degree of industrialization reflects not only the decline of industry, but also the ability of the local economy to generate new activities that have compensating effects. On one hand, the area is affected by the restructuring of mining industry in the Motru-Rovinari coal field, but on the other, it has benefited from one of the most important foreign investments in Romania. Some of the industrial giants have

gotten over the critical situation by adapting to the market and with the help of top management, gradual restructuring, or were taken over by other companies. The authors used and processed census data related to population structure by economic sectors, workforce, unemployment rates, turnover etc. The paper discusses each industrial branch of SWDR pointing out the regional disparities in terms of present situation as a result of a continuous political and social-related dynamics (post-communist transition, pre and after EU accession) and the evolution trends (the development of industrial parks, new funding instruments, national and regional strategies, plans or policies etc).

Keywords: South-West Development Region, regional disparities, industry, Romania

423 The Structure and Fisheries Management of a Lagoon, Koycegiz Lake, in the Southwestern Anatolia

Huseyin Sasi

Mugla University, Fisheries Faculty, Turkey

hsasi@mu.edu.tr

Koycegiz lake is located Soutwestern part of Turkey, it has in West Mediterrenean Basin, where there are the main lagoon lake, dam lakes and many large rivers. Koycegiz lake is a lagoon and very important wetland area, which is protected area with PEA (Private Environment Area) by the Ministry of Environment and Forestry. In the lake, there are many threats which are pollution such as agricultural activities, fishing pressure, habitat degradation, over-abstraction of water and barriers, as well as less precipitation. This study was carried out to determine structure of lagoon, native and non-native fish fauna, and fisheries activities Koycegiz Lake, which is mainly fed Namnam and Yuvarlakcay Stream, Balikli Brook, as well as precipitation. The lake is connected approximately with 10km canal in the Mediterrenean Sea, which it has a fisheries activities with fishgarth. In this study, fish specimens which were caught by scoop net and gill nets were examined between October, 2008?September, 2009. As a result of the study in Lake has species were identified as Mugil spp., Sparus aurata, Dicentrarchus labrax, Solea vulgaris, Diplodus vulgaris, Diplodus sargus, Cyprinus carpio, Leuciscus cephalus, Barbus plebejus escherichi, Tilapia zillii, Atherina boyeri, Knipowithschia caucasica, Gambusia affinis, Anguilla anguilla, Syngnathus abaster, Capoeta bergamae and Callinectes sapidus.

Keywords: Koycegiz Lake, Water quality, native, exotic fish, Fisheries, Anatolia

290 Environmental Impact of Metal Ore Mining at the Trepca Deposit, Kosovo

Sabri Avdullahi, Isalm Fejza

University of Prishtina, Faculty of Mining and Metallurgy

sabriavdullahi@hotmail.com

Mining activities impact on environment is old as these activities themselves. In what today is Kosovo, base-metal mining has been mainstay of the economy, since pre-Roman times. Modern mining began in the 1930s, when the British Company Selection Trust Ltd revamped the Trepca Complex. In the north part of Kosovo is the sulphide deposit Trepca near Mitrovica town, it is the most important mining field in Europe. There are several stages in the mining evolution in what regards human impact on the environment with different intensities and developments. Modern mining is an industry that involves the exploration for and removal of minerals from the earth, economically and with minimum damage to the environment. Mining is important because minerals are major sources of energy as well as minerals such as fertilizers and steel. Mines produce large amounts of waste because the ore is only a small fraction of the total volume of the mined mineral. In the metal industry production of lead and zinc causes the greatest degradation of the environment. The most affected environment component, both in terms of quantity and quality, by metal mining is the water. The paper analysis the heavy metal concentrations (Pb, Zn, Cu) in the samples taken in the surface waters and samples from the underground water that discharge from the mining in the river Trepca.

Keywords: mining, environment, heavy metal, river, pollution

289 Pseudo-Random Number Generator Using as a Seed Distance (Movement) of a Laboratory Cultured Daphniae

Srbislav Nesic, Djordje Djordjevic

Center for Permanent Education, Nis, Serbia

getset2netbet@gmail.com

Laboratory cultured Daphniae are used for a scale of experiments. Their distance (position and movement) can be used as a seed for random number generator. Such a number, using bio-seed, can be used in different simulations, especially in the chaos-based models.

Keywords: Pseudo-random, numerical bio-seed, Daphniae, Chaos models

288 Natural Light Simulation System for Laboratory Tests

Djordje Djordjevic, Srbislav Nesic

Center for Permanent Education, Nis, Serbia

djoka@ni.ac.yu

Based on the position of the point on the earth globe (obtained by GPS or manually), date and time (obtained by Internet), this software gives natural light simulation usable for different laboratory experiments. The statistical data are used as correction factor. This model has been developed for enlighting Daphniae cultured in laboratory.

Keywords: Natural light simulation, Laboratory tests

445 Environmental Degradation Caused by the Building Construction Processes' side Effects - Origins and Solutions

Dzenana Bijedic 1, Emina Hadzic 2, Slobodanka Kljucanin 2

1 Faculty of architecture, Bosnia and Herzegovina
2 Faculty of Civil Engineering, Bosnia and Herzegovina

dzenanab@af.unsa.ba

Built structures 'steal' parts of the natural environment, and at the same time they are becoming an integral part of it. Misbalanced relations between those two systems have negative effects on all natural ecosystems. Consequently, disrespect of ecological constrains in creating built structures often results in unhealthy indoor environment within designed systems. This is making people feel unwell at times and possibly contributing to cancer and immune disorders. The impact of the building industry on the global environment is increasingly becoming more intrusive in terms of energy use, and depletion of natural resources, as well as water, air, and soil pollution caused by building construction and operation. Contemporary building practice only recently started dealing with problems of environmental degradation caused by the building processes' side effects. The main characteristic of conventional designing and buildings' construction approaches is fragmentation, which resulted from increasing specializations in the professional disciplines. At the same time the ecological, environmentally sound approach requires the architects to apply the integrated building delivery process, with understanding and respecting basic principles of sustainability. Although different in description of achieving desired excellence, the sets of

principles essentially direct strategies towards six major issues of sustainability: 1) site; 2) water; 3) energy; 4) indoors air quality; 5) building materials; and 6) waste. The success in achieving green building objectives relates to proper and timely addressing these six key topics. Contemporary builders must foster a team approach to sustainable built environment. The sustainable team's members must seek constant improvements by sharing knowledge through direct and open communication within the team, as well as within wider community of all concerned parties. The goal of this is to link long-term sustainable considerations with ethical responsibility, and to reestablish the integral relationship between natural processes and human activities. A comprehensive multidisciplinary partnership must be created.

Keywords: environmental degradation, construction, architectural delivery process, sustainability, site, water, energy, indoor air quality, building materials, waste

446 Climate Effects on Monumental Buildings

Esra Yaldiz

Selcuk University, Turkey

mimaresra@hotmail.com

Climate is the act of all atmospheric events such as rainfall, temperature, wind, air pressure and humidity etc. In recent years, the alterations about natural environment and climate observed in Turkey negatively affected the monumental buildings, the cultural riches of the country that they have been worn out by various natural effects for a long time. However, since monumental buildings have great importance due to their identity of transferring old era information to the future generations, there should be taken special precautions against deteriorations on the monumental buildings. Climate-related deteriorations on the monumental buildings resulted from temperature differences between summer-winter and day-night, water movement at the building due to capillarity, abrasive effects of rain water, salt and some chemicals involved in water, particles carried by wind and air pollution. In this study, the deteriorations occurred on the monumental buildings due to climate changes will be investigated for Turkey and the deterioration effects on construction materials will be discussed.

Keywords: Monument, climate, climate effects, stone, Turkey

506 Administration of Biodiversity of the Autochthones Olive Trees in Albania

Erta Dodona 1, Hairi Ismaili 1, Antonio Cimato 2

1 Agricultural University of Tirana, Albania
2 Italy

ertad2000@yahoo.it

Abstract Olive trees in Albania, located in the East Shore of Mediterranean, are considered as an important point of biologic diversity. Referring to Zhukovsk and Bahtjejev, our country is included in the seventh Mediterranean climate centre, based on the origin and formation of the cultivated plants. As conclusion: Albanian flora is genetically linked by the Euro-Asiatic flora of the East and West Mediterranean. For 20 years in Albania have been tried to explore, characterize and evaluation of the existent biodiversity. These kind of researches that have had their origin since 1985 in the Olive Trees Institute, have been undertaken in order to: prevent genetic erosion in the Olea family. Taking into account: the spontaneous expansion of oleo plants by the age over 20 centuries, the diversity of the varieties, the number and exploitation of the olive trees before 1940 (1200), climate conditions, and the evidence about the antic olive culture, the main centers of olive trees diversity are: - Antic olive trees of the Tirana region (Preze, Ndroq, Petrele, Linze, Brar, Kruje) - Antic olive trees of the Vlora region (Kanine, Bestrove, Narte, Panaja, Trevllazer, Dhermi, Himare, Palase, Qeparo, Borsh) Identification activity did take place in two phases: Firstly: identification of the list of the autochthon cultivars, through consultations of the archive for the different varieties of the Albanian territory. Secondly: evaluation of the autochthon varieties, their origin and as well their identification, preservation and recuperation for deeper evaluation. Actually in Albania there are identified 46 genotypes. Out of which 22 have been fully analyzed in terms of morphologic character and genetic variability, 11 are accessions or synonymous. Three cultivars are widely disseminated. Today, 22 olive cultivars are the biodiversity cultivars to be used in the olive plantations of Albania. Regarding the biochemical and molecular analyses, this was able only in the last 5 years. For all the Albanian cultivars (22) was undertaken RAPD analyses, RAPD analyses of 22 cultivars hold up (support) the hypothesis of the autochton origin of our olive trees and their limited dissemination out of their core origin areas. Have been described agronomic and technologic characteristics of the main variety and cloning list. Physic characteristics of the olive oil of the main cultivars in correlation with vermin resistant. The purpose of germoplazma characterization was the total and actual knowledge of this biological diversity through application of a program of variety characterization: i) to have the best and proper genotype for different agronomic demands which directly influence in the productivity and the quality of the olive oil; and (ii) to supply the private farmers and other entities all the varietals asset which have contributed to the olive oil production in Albania. In Albania there

are 5 olive varieties, which are considered as economically viable, because the area occupied by them is 5% of the total olive area. The most popular variety is "Kalinjot", which cover 45% of the total area.

Keywords: biodiversity, autochthones, cultivar, RAPD-analysis

510 The Effect of Oil Pollution in the Soil Fauna of the River Benches of Gjanica River in Albania

Mihallaq Qirjo, Leonard Bejko

Tirana University, Faculty of Natural Sciences, Albania

miha@albania.rec.org

The study aims at assessing the negative impacts of hydrocarbon substances deriving from the pollution of oil extracting and processing industry in fresh water river ecosystems. The study covers spring-summer-autumn period 2009. Transects along 30km Gjanica river are taken for measuring the dynamics soil fauna groups. Water chemical analyzes are undertaken. Groups of Acarina and some Insects shows more tolerance towards the pollution stress.

384 Tourism and Environment

Munther Badriyah

Department of Statistics, Jordan

munther_b@yahoo.com

Tourism and Environment The environment is defined as the quality of life, living conditions of human beings and the natural environment with suitable habitats of animals and plants, and it is a factor influencing tourism demand. Since demand for tourism products is partly determined by the quality of the related environment, the environment can have a positive or negative influence on tourism; likewise tourism can have a positive and negative impact on environment. Factors influencing tourism, the impact of tourism and the interrelation between supply and demand are usually tackled by intergrading data from a great number of sources followed by model type analysis.
Tourism Sector is:
- The activities of persons travelling to and staying in places outside their usual

environment for not more than one consecutive year for leisure, business and other purposes.
- A comprehensive and extensive phenomenon and considered as one of the important economic sectors of the kingdom contributes to the support of the national economy and employment.
- A demand led and influenced by many external factors. It generates physical and financial flows that have strong economic, socio-cultural and environmental impacts.
As a result of that accelerated growth in the size tourism activity, it was necessary to measure the impact of this activity on the national economy, natural resources supply e.g. Water, Energy, etc. while it is affected positively by the inbound tourism. In continuation with the above mentioned, the Department of Statistics will establish the environment and tourism statistics issue which is always keen to improve its work to provide comprehensive statistical data in this field. The decision makers, policy makers, planners and researchers can benefit a lot by the comprehensive environmental database available at DOS.
The Objectives:
- To identify and define the tourism activities themselves, namely not only tourism accommodations, restaurants but also the leisure activities such as golf, swimming pool;
-To identify and collect data related to the amount of natural resources used by tourism activities.
- Breakdown by type of natural resources and by type of tourism activities will be assessed.

561 Row Fresh Milk, Like a Critical Control Point, at Our Milk Processing Industry

Lindita Molla, Donika Bocari, Lindita Tafaj

Health & Environment Department Public Health Institute, Tirana, Albania

lindimolla2002@yahoo.com

Application of HACCP system (Hazard Analysis Critical Control Points) is necessary for our food industry in general, to assure safety products for consumer protection. The proceeding presents the first phase of a study on the implementation of HACCP system in a milk factory of Middle Albania. In this phase of the study are evaluated: a. the situation of the milk factory and it's by products. b. biological, chemical and toxicological hazards of the row material, unprocessed milk.c. manipulation personnel knowledge about food borne diseases and HACCP system. d. educative intervention for the increase of milk safety as row milk. The goal of this proceeding has been estimation of some critical control points for implementation of HACCP system. Initially, has resulted disrespect of good

hygienic practice (GHP) along the reception and the manipulation of row material (fresh milk). From the microbiological analyses resulted that 75% of row milk had microbiological index above allowed norm, this before our educative and information intervention. Content of somatic cells (screening method) resulted to 60% above 500.000. With regard to chemical hazard haven't resulted residues (chlororganic pesticides, heavy metals) at neither row milk samples. From the questionnaires made to the milk employees about HACCP system, hazards and Critical Control Points concept, resulted that the intervention was valid statistically with p value respectively 0,0001, 0,004 and 0,083.

Keywords: HACCP, CCP, hazard, row material, GHP

562 Development of Echinoderm Fauna Regarding the Substrate Type and Depth at Cove Sipavica, Montenegro

Slavica Kascelan 1, Nebojsa Zivic 2, Djuradj Milosevic 3

1 Institute of marine biology-Kotor, Montenegro
2 Faculty of Sciences and Matematics University of Pristina,Kos.Mitrovica, Serbia
3 Faculty of Sciences and Matematics University of Nis, Serbia

skascelan@yahoo.com

The studied area is a part of open Adriatic Sea off the Montenegrin coast, under the influence of warm sea currents, resulting in presence of thermophilous species of sea stars. Diversity of Echinodermata was represented with 18 species from 16 genera. The majority of species belong to groups Echinoidea (7) and Asteroidea (7), while Crinoidea was represented with only a single species and Holothurioidea with three species. The Atlantic-Mediterranean type of geographic distribution was characteristic of 13 species, while three species had boreal-Mediterranean distribution and two species were Mediterranean endemics. Most species inhabited stationary substrates (14), including two species also recorded at the underground meadows. Four species inhabited sandy substrate. Eight species were present in the range of depths of 0-30 m from the coastline, while most species were recorded at the depths of 30-33 m.

Keywords: Adriatic Sea, Echinodermata, Cove Sipavica

590 Total Proteins, Lipids and Minerals of Taraxacum Officinal in Kosovo Region

Arben Hazir, Njazi Hyseni, Nevzat Aliaga, Sevdije Govori-Odai, Fatmir Faiku

University of Prishtina, Kosovo

arbeni77chem@hotmail.com

Total proteins were analyzed, by Kjeldahl method, in leaves, root, stalk and pistil in Taraxacum officinale growing in Shtime (Kosovo). The levels of total proteins in root, stalk, leaves and pistil are 50.08, 51.60, 56.44, 52.50%, respectively. Lipids are analyzed by Soxlet extraction in leaves, root, stalk and pistil. The mean levels of lipids in root, stalk, leaves and pistil are 3.47, 4.00, 4.15, 7.48%, respectively. This plant contains low quantity of lipids but it is very rich with proteins The mineral content of Taraxacum officinal growing in Shtime (Kosovo), was studied and analyzed by flame atomic absorption spectrometry. Five elements, sodium, potassium, iron, manganese, calcium, were determined at leaves, root, stalk and pistil of Taraxacum officinal. The mean levels of sodium, potassium, magnesium, calcium and iron are 0.26, 19.66, 3.43, 15.00, 2.10 mg/100mg in leaves of Taraxacum officinal, respectively. The mean levels of sodium, potassium, magnesium, calcium and iron are 0.81, 13.33, 3.64, 5.75, 0.43 mg/100mg in root of Taraxacum officinal, respectively. The mean levels of sodium, potassium, magnesium, calcium and iron are 0.61, 18.11, 1.45, 7.69, 0.39 mg/100mg in stalk of Taraxacum officinal, respectively. The mean levels of sodium, potassium, magnesium, calcium and iron are 0.33, 16.89, 3.05, 10.25, 0.53 mg/100mg in pistil of Taraxacum officinal, respectively. From our investigation we can conclude that Taraxacum officinal contain more potassium than other elements. The calcium is more concentrated in leaves than in other parts of Taraxacum officinal. Iron is concentrated in higher amount in leaves and magnesium is distributed in equal amount in all part of Taraxacum officinal.

Keywords: Total Proteins, Lipids, Minerals, Taraxacum officinal, Environment

607 The Quality Control of Liquid Pressure Gas Marketed in the Albania

Spiro Drushku, Ismet Beqiraj, Hasime Manaj

Universiteti of Tirana, Faculty of Natural Sciences, Albania

sdrushku@yahoo.com

The Liquid Pressure Gas (LPG) is one of the main by-products of the oil refinery. It is used not only as raw material for petrochemical industry, but also as energetic supply for residencies due to the efficacy in the utilization. In Albania the LPG is produced for the first time by KPTHN, Ballsh in 1978. Initially it was

used as energetic supply by the refinery itself, as well as it was exported in the neighboring countries like Greece and Ex-Yugoslavia. For the first time it was used for residential needs in the Ballsh city during '80, which is located close to KPTHN. After 2000 the LPG is used not only for industrial needs, but also used for in massive way all over the country for residencies and cars. After this year the import of LPG shifted the domestic production, hence was the main source in the market. Another factor that highly impacted the situation was the cut off of the LPG production in Albania in the 2003. The development trends of the market are sustained by two sources: domestic production and imports. This paper presents the analytic results for 20% representative LPG samples which are extracted by 610 analyzed samples. The distribution of the samples covers a 4 year period of time as well as cover different locations and mainly in the urban areas. The study is focused also in the theoretical and analytic considerations upon the products quality by comparing them with actual European Standards. The suggestions for improving existing Albanian standards are outcome of this study. By the January 1st 2007 in Albania is adapted the LPG's standard according to the EU standards.

Keywords: fossil fuel, combustible fuels, L.P.G, density, flash point, sulphur

608 The Quality Control of Combustible Fuels Marketed in the Albania

Ismet Beqiraj, Spiro Drushku, Agim Malja, Hasime Manaj

Universiteti of Tirana, Faculty of Natural Sciences, Albania

ismetbeqiraj@yahoo.com

After the '90s, the Albanian Economy felt in the stagnation. Despite that fact the market demands for oil's by-products like: fuels, lubricants, combustible fuels and liquid pressure gas (L.P.G), is grown continuously. Combustible liquid fossil fuels serve like energy sources not only in the industry and agriculture, but also in the residential services. Statistical data shows that usage of the oil by-products is grown considerably by years, especially after 2003. During that period the demand for fossil fuels is supported by domestic production in roughly 90% of the total consumption. The development of this market conditioned need for ongoing monitoring of the all quality parameters for fossil fuels, especially the sulphur content. During the last decade a close cooperation was set up between the Laboratory of the Chemical Technology at the Faculty of Natural Sciences (FNS) and the High Inspectorate of the Oil and Gas Control. They have conducted the quality control analyses for fossil fuels, especially the combustible fluids, present in the market. This study presents the analytic results for 10% of combustible fuels samples, by the total number of 374 analyzed samples. The distribution of the samples covers a 4 year period of time as well as referred to different locations. The development trends of the market are supplied by two sources: domestic and imported products. The study is focused also in the theoretical and

analytic considerations upon the products quality by comparing them with actual European Standards. The suggestions for improving existing Albanian standards are outcome of this study.

Keywords: fossil fuel, combustible liquid fuels, L.P.G, density, flashpoint, sulphur

615 Study of the Soils of Hisar (Bulgaria) About Growing of Vine

Rada Popova

Agricultutal University, Bulgaria

radapopova@abv.bg

Three soil types in the region of the town Hisar (Bulgaria) were studied. The soil indexes pH, humus content, active carbonates, particle size composition, dissolve salts was determined. The soil reserves with respect to the basic nutritive elements – N, P, K ewrw also determined. The soil types were defined as Chromic Cambisols and in combination with climatic characteristics of the region they proved suitable for vine growing and white and red table wines production, in case of application of appropriate agro-technical measures and fertilization norms.

Keywords: vine, chromic cambisols, physico-chemical properties

618 Statistical Study about the Respiratory Diseases of Shkoder During 1984 - 2005

Zamira Shabani 1, Gentina Qirjako 2, Anila Neziri 1, Nevila Bushati 1

1 University of Shkodra, Albania
2 University of Tirana, Albania

shabanizamira@yahoo.com

In this article we consider the cases of respiratory infection diseases in Shkoder, during 1984 - 2005. Also we have considered the hospitalized cases in the Regional Hospital of Shkoder. The morbidity and mortality of these diseases is studied according selected age - groups, gender and socio - demographic characteristics (place of residence: rural vs. urban areas). The data are taken from the Statistic Office of Hospital and Statistic Office of Public Health. (S.O.P.H.SH), (S.O.R.H.SH). The method is simple, analytic and descriptive and evidences

the incidence of cases. From statistical analyses of the data were concluded that the number of morbidity and mortality is going to be high in the last decade and is linked with the changes in environment as the low air quality. The air quality connected with transport car, combustion of solid wastes and emission in environment air pollutants as: oxides of sulphur, nitrogen oxides, mono and carbon dioxide, hydrocarbons, lead, soot, dust and cancerogenic substances which are the main factors increasing the cases of respiratory infection diseases in Shkoder. The levels of dust in Shkodra presented in this paper in microgram/ m3 which are higher than recommended levels of World Health Organization, WHO.

Keywords: Respiratory infection, morbidity and mortality, air quality

678 Determining Wind Response of RC Buildings by Using Experimental and Analytical Methods: a Case Study of Rixos Hotel Building

Musa Hakan Arslan 1, Cemal Yigit 1, Cevat Inal 1, X LI 2, L GE 2

1 Selcuk University, Turkey
2 School of Surveying & Spatial Information Systems, Australia

mharslan@selcuk.edu.tr

Dynamic behaviour of a tall RC building under wind loading is quite difficult task. To see a real behaviour of a RC building under dynamic loading such as wind, earthquake etc. first of all fundamental and other modal period must be obtained by using some analytical and experimental methods. In recent literature, the researchers have been started to measure dynamic parameters of a building using some devices and sensors. The response of a building under wind loading divided to three components such as; static, quasi-static and resonant. To achieve sensitive outcomes from an experimental measurement, it is very important to use different sensors together like GPS, accelerometer, inclination sensor and etc. There are some difference among these sensors used in monitoring project considering data sampling rate and data quality such as accuracy and precision. Using different sensors together and its integration for monitoring project are very important because of providing and exploring valuable information of structures. In this study, GPS and inclination sensors have monitored behaviour of RC Rixos Hotel building with 30 stories under wind loading simultaneously. According to analyze results in frequency domain, the two sensor show good agreement with each other and first mode natural frequency of building obtained by both observations and FEM model from SAP2000 finite element program is close with acceptable tolerance. In this study, a short comprehensive comparison of the wind loads and their effects on RC buildings is also conducted utilizing five major international wind loading standards and codes.

692 The Water Item in Designing Turkish Garden

Hatice Derya Arslan
Selcuk University, Turkey
kolderya@selcuk.edu.tr

Historical studies show that water, being main source for life has been used for both agricultural and artistic aims such as architectural design since human being started to live as collectively or passed settled life style. Abundance of water resource, interactions between civilizations and having psychological character have effected water use as an artistically object and orientating development of garden art. Garden depicted as a confined field has turned into a space with boundaries, planned and organized for specific aims by people and become a life area thanks to that people get closer to nature and integrates with it. Especially Turkish gardens reflect the related features of the period. Selection of land for a Turkish garden was done by considering the effects of climate, environmental conditions and view to capture the beauty and mystery of nature. Esthetic of a Turkish garden took from using water with different style. Water as an artistically object has been used for either stagnant or active. In this study, the information related with the formation of Turkish Garden in Anatolia is explained firstly. The main characteristics of the Turkish Garden are described and using water in Turkish garden exemplified from collected real sources. The aim of the paper is to give garden concept with water and explain the basic design features of the Turkish garden.

Keywords: Water, Garden Design, Art History, Turkish Garden

695 Water-Based Damages on Building Faces and Solution Proposals

Ulku Sultan Yilmaz, Mustafa Dereli, Saim Korur, Serra Zerrin Korkmaz
Selcuk University, Turkey
ulkusyilmaz@selcuk.edu.tr

Past to present, people have developed many types of buildings corresponding to their needs that their protection against natural events have become one of the most significant problems primarily in terms of protecting cultural heritage. Water is considered as the most important natural effect influencing buildings by their external and internal faces and soil structure, and leads to have deteriorations on the structural members and construction materials of the buildings besides losing their structural characteristics. The issues seen on buildings due to water effects can be grouped in three main titles, namely design (incorrect detailing during

planning and material production stages, improper material selection), application and utilization stages. Therefore, economic damages and unrestorable conditions can be encountered due to above mentioned reasons. When the effects of water over the buildings are not considered, the cross-sectional reduction of the reinforcements in a long term period due to corrosion will be encountered in the course of time which will cause reduction in the strength of the building. Some chemicals existing in water also reduce the concrete strength and adherence between concrete and reinforcement by means of damaging the concrete structure. Hence, the effect of water on buildings is an unneglectable subject not only due to its deformations on the buildings, but also due to its extensions on human health. In this study, the damages on buildings due to atmospheric effects (water, temperature, humidity, hydrothermic events etc.), water leakages from installations and some issues such as soil water and water turning into ice etc. were taken into consideration and explained with visual examples. As a conclusion, some solution proposals against these damages were presented by making analyses on the previously encountered damaged buildings.

Keywords: Water, building, deformation, soil water

697 A Comparative Study on RC Tall Buildings by Using Wind Codes and Experimental Methods: a Case Study of Rixos Hotel Building

Musa Hakan Arslan 1, Cemal Yigit 1, Cevat Inal 1, X LI 2, L GE 2

1 Selcuk University, Turkey
2 School of Surveying & Spatial Information Systems, Australia

mharslan@selcuk.edu.tr

Dynamic behavior of a tall RC building under wind loading is quite difficult task. To see a real behavior of a RC building under dynamic loading such as wind, earthquake etc. first of all fundamental and other modal period must be obtained by using some analytical and experimental methods. In recent literature, the researchers have been started to measure dynamic parameters of a building using some devices and sensors. In this study, first of all, a short comprehensive comparison of the wind loads and their effects on RC buildings is also conducted utilizing six major international wind loading standards and codes such as ASCE 2005 (American), AS/NZ 2002 (Australian and New Zealand), NBCC 2005 (Canadian), RLB-AIJ 2004 (Japanese), Eurocode 2004 (European) and TLC (Turkish Loading Codes). The deficiency and differences of these codes are discussed and compared. The other aim of the study is to investigate these differences on a real tall building. For this aim, RC Rixos Hotel building with 30 stories is selected and analyzed. In the second chapter of the study, GPS and inclination sensors have monitored behavior of RC Rixos Hotel building under wind loading simultaneously. According to analyze results in frequency

domain, the two sensor show good agreement with each other and first mode natural frequency of building obtained by both observations and FEM model from SAP2000 finite element program is close with acceptable tolerance.

Keywords: Wind loading, RC building, GPS and inclination sensor, standards

698 Application of UTCI for Estimation of the Thermal Comfort at Cold and Hot Weather

Anna Tzenkova-Bratoeva, Plamen Videnov, Julia Ivancheva

National Institute of Meteorology and Hydrology, Bulgaria

ani.tzenkova@meteo.bg

There are several theoretical and empirical indexes accounting for a single, or a combination of meteorological parameters, which give to some extent an assessment of the level of human thermal comfort. Most adequate thermo physiological assessment of the thermal environment could be done only on the basis of a complete heat transfer model of the system man-environment, accounting for all energy exchange mechanisms. In a frame of COST 730 has been developed a Universal Thermal Climate Index based on the advanced multi-node 'Fiala' thermoregulation model extended for purposes of the project. The UTCI has been applied for the winter 2005/2006 and summer 2007. The obtained results are compared with those based on other complex indexes such as PMV, PET, PT. The conducted investigation shows that UTCI represents the state-of-knowledge and is suitable for operational work and areas of research such as environment, medicine and health, meteorology.

Keywords: UTCI, thermal comfort, bioclimate

707 Synthesis of Some New [(Pyridin- and Pyrimidin-2-Ylimino)-Ethyl]-Benzopyran-2ones and Their Antimicrobial Activity

Ramiz Hoti, Idriz Vehapi, Naser Troni, Fatbardh Gashi, Veprim Thaci

Department of Chemistry University of Prishtina, Kosovo

ramizhoti@yahoo.com

Novel derivates of 3-[1-(pyridin-2-ylimino)-ethyl]-benzopyran-2-ones 3(a-c) and 3-[1-(pyrimidin-2-ylimino)-ethyl]-benzopyran-2-ones 3(d-e) are synthesized by condensation reactions of 3-acetyl-benzopyiran-2-one 2 with corresponding heterocyclic amines

2(a-e). These products are synthesized by catalytic reactions using zinc chloride, in reflux conditions. Products are characterized on the basis of their spectroscopic data. Antimicrobial activity of products 4(a-e) against S. aureus, E. coli and Candida albicans are investigated measuring inhibition zones around disks marked previously with corresponding compounds. Results are shown for a considerable activity of products against these microorganisms. Key words; Condensation, benzopyran-2-one, aminopyridine, aminopyrimidine, antimicrobial activity, inhibition zone.

Keywords: Condensation, benzopyran-2-one, aminopyridine, aminopyrimidine

732 Deteriorations on Historical Buildings Due to Capillarity - Aksaray Sultanhani Caravansary Model (Turkey)

Mustafa Yildiz, Emine Yildiz Ozsahin, Ali Sinan Soganci

Selcuk University, Turkey

musyildiz@selcuk.edu.tr

Unconstrained underground water rises up through the voids between soil particles such as the water rising in a capillary tube due to water stress forces which was submerged into a container completely filled with water. This capillary rise occurs in significant large amounts for fine grained (clay, silt) soils. If the foundations of the constructions were built on such soils without taking any precautions, the underground water would rise from foundation to the walls depending on the capillary water absorption characteristics of the foundation materials. The water on the wall surface evaporates and causes deteriorations on the wall surface in relation to the acidic property of the underground water. In a similar way, the deteriorations on the inner and outer surfaces of the walls have been occurred at Aksaray Sultanhani Caravansary in the course of time which was the most important Seljuks period building constructed in 1229 on a 4866 m2 construction area composed of clayey soil where the underground water table was so much closer to the ground surface. In the study, the capillary water absorption potential of andesitic tuff used in many constructions of Seljuks period and in other historical buildings from past to present was determined, and the relationship between the obtained capillary water absorption coefficient and the other properties of andesitic tuff was investigated. The capillary water absorption tests were performed on 10 prismatic samples produced in 2x2x2cm dimensions using andesitic tuff, the natural construction material, widely used to construct buildings in Central Anatolia for centuries. It was concluded that the higher capillary water absorption capacity of andesitic tuff has played a great role on the moistening of the historical buildings almost constructed with andesitic tuff. Additionally, the precautions that should be taken for the protection of historical structures were also proposed.

Keywords: Capillarity, Historical Buildings, Aksaray Sultanhani Caravansary

737 A Culture Animated with Water - Sille Orchard Settlements (Turkey)

Arife Deniz Oktac

Selcuk University, Turkey

deniz@selcuk.edu.tr

Sille is a small town lying at 12 km northwest of Konya City in Central Anatolia Region of Turkey. Sille has Karaburga Mountain on its northwest direction, and according to the archeological data, the town has been settled on both inclined sides of the Sille Creek Valley nearly 6000 years ago. The name "Sille" has been supposed to be coming from word "Silene" in Greek mythology which has the meaning "water flowing by boiling and foaming". Ak Monastery ("Hagios Khariton Monastery", "Deyr-i Plato), one of the oldest and largest monastery on the world, Aya Elena Church and a few churches carved through the volcanic rocks exist in this small town. Sille has become an important religious center in the history due to its location on the route of Rome, Byzantine and Jerusalem, and did not lose its importance both in the Seljuks and Ottoman periods since this time Sille was lying on the Spice and Silk Roads. Being a distinctive settlement with its local architectural riches, the town's population has been formed by Turkish Christians and Turkish Muslims up to the 1924 Population Exchange after the foundation of the Republic of Turkey. Born in the west and flowing through the east, the Sille Creek was surrounded with productive lands called "Sille Orchards", and Sille Town exists at the center of these lands. The western and eastern vineyards are called as "Upper Orchard Region " and "Lower Orchard Region", respectively. Orchards of Sille caused the development of a distinctive agricultural life culture dissimilar to the other vineyards of the Central Anatolia Region which affected the town in terms of farming activities, harvesting, winter life and architecture of the town. In this study, there will be explained how the vineyard culture reflects into agriculture, daily life and architecture in "Sille Orchard Settlements".

Keywords: Turkey, Sille, Local Architecture, Orchard, Culture

242 Disinfection by Products from Treated Water Accumulation in Human Milk and Hair

Ristoiu Dumitru 1, Kovacs Melinda 1, Ristoiu Tania 2

1 University Babes-Bolyai Cluj-Napoca,Faculty of Environmental Science, Romania
2 Technical University Cluj-Napoca, Romania

dristoiu@enviro.ubbcluj.ro

Disinfection byproducts (DBPs) are the unwanted results of the disinfection of treated water. They are formed after reaction of disinfectant agent with natural organic matter. Hair and breast milk is a non-invasive biomonitoring tool that could

be successfully used to screen the accumulation of disinfection byproducts from treated water. The aims of our work was to determine the nature and level of DBPs formed in treated water that are consumed by population and the quantity that is accumulated in human body. Four water treatment plant and their distribution systems were monitored in the last 4 year. All water samples were analyzed on gas chromatography using electron capture detector. Trihalomethanes (THMs) and Haloacetic Acids (HAAs) were the main DBPs group detected with higher concentration for THMs (0.5 – 124 μg L^{-1} for CHCl3 and 0.2 – 28 μg L^{-1} for the other THMs compounds like CHCl2Br, CHClBr2 and CHBr3). HAAs concentration were between 0.3 – 38 μg L^{-1} with higher value for TCAA, DCAA and BCAA. Biological samples like hair and human milk were collected from the same sites as distribution system corresponding to monitored WTPs. These biological sample analyses were performed on GC-MS using SIM method. THMs level were higher in hair samples than in breast milk with almost 40%, average of THMs being 48 μg L^{-1}. HAAs and bromo-THMs were accumulated in higher concentration in breast milk, 0.4 – 12 μg L^{-1} and 0.3 – 18 μg L^{-1}, respectively. The higher concentration of DBPs from hair could be attributed also due to bodily care.

Keywords: Disinfection byproducts, Trihalomethanes, Haloacetic Acids

055 Compilation of Geological Map of the Republic of Kosovo on Personal Computer PDA

Berat Sinani, Zenun Elezaj

Faculty of Mines and Minerals, Kosovo

berat_sinani@hotmail.com

Digitalization of different maps has been and is the main demand of geology experts, the need and interest to have those data in the easy form has increased the demand that this digitalization shall continue also to handheld computer PDA. Processing of geological map for handheld computers has been a request since a long time, hereupon we have processed a geological map for a long time which will be used as an applicative software whether in the office or in the field. This software except the support of the Windows operative system, supports also the mobile operative systems such as Palm OS, Windows Mobile, operative system for telephones and all types of handheld computers. The advantages of use of this map are numerous such as possession of geological map wherever we are, the detailed data and the possibility of their change directly in the field. With the help of this device suitable for the field's conditions, it gives us the possibility of selection, registration, delete and change directly in the field, global positioning and localization of all geological regions the whole automated. The pocket computer gives us the possibility of drawing and presentation of data directly on the screen without the use of additional equipments, internet access, phone access, GPS, the easiest access to the server and easy and simple sending/

reception of data. For digitalization of geological map of the Republic of Kosovo with scale 1:200000 will be used the software which consists of ten forms, two modules, 352 geological map sheets, forms for selection of data, forms for change and improvement of geological map, high level security, data encryption according to standards etc.

Keywords: PDA, Palm OS, Windows Mobile, handled computers

206 Methods Development for Determination of Transuranic Radionuclides in Low Activity Waste and their Application in Intercomparison Exercise

Bojidar Slavchev 1, Blagorodka Veleva 2, Lyuben Dobrev 3, Antonina Nikiforova 3, Lidia Kinova 3,

1 Institute for Nuclear Research and Nuclear Energy - BAS, Bulgaria
2 NIMH-BAS, Bulgaria
3 INRNE-BAS, Bulgaria

Man-made transuranic elements have been released into the environment since the use of nuclear weapons and nuclear tests. Other releases into the environment have been associated with nuclear fuel cycles and some accidents but also through the active dumping of wastes into oceansBrief description and classification of the Radioactive Waste produced in the nuclear electricity generation chain is given. A procedure for determination of Plutonium, Americium and Curium isotopes in Low Level Radioactive Waste (LL LRAW) was developed and applied on alkaline waste from Nuclear Power Plant (NPP) Kozloduy in Bulgaria. he proposed procedure was part of inventory waste characterization of 15 storage tanks that involved determination of eighteen isotopes. The modification of the radiochemical procedure developed for the sludge fraction of the waste was applied for determination of plutonium and americium alpha emitting radionuclides in the river bottom sediment sample. The sampling campaign was organized in the frame of the EU international project by “Joint Research Centre” (JRC) -Karlsruhe, Germany. About 60 kg bottom sediments from the river affected by accidental radioactive releases were collected by the Ministry of Health of Slovakia Republic and distributed among the 10 participants -radionuclides. In theγ- and β-, αby JRC-Karlsruhe for analyses of present paper the radiochemical procedures for Plutonium and Americium (Curium) radionuclides separation and their determination is described. Preliminary sample treatment consists of drying and homogenizing. After assuring samples homogeneity by 137Cs measurements in different C. Wet ashing by H3NO3, HCl°sub-samples the sediment is ashed at 600 and HF acids is performed to achieve dissolution of the matrix and full isotopic dilution of tracers added. To separate plutonium and americium fractions from the matrix elements ion-exchange resin AG-1x8 100-200 (Cl-form, Bio-Rad Laboratories) is used. Further the fractions are purified by highly selective chromatographic materials TRU for americium and TEVA (Eichrom

Technologies) for plutonium. The thin source needed for alpha-spectrometry was prepared by electro-deposition by (NH4)2SO4 electrolyte or co-precipitation with NdF3 as fluoride. Alpha spectrometry of the samples was performed by ORTEC Octete Alpha Spectrometric system equipped with 8 Ortec ULTRA-SATM low background ion implanted detectors with 300mm2 active area and energy resolution of 20 keV (FWHM) at the 5.486 MeV (241Am peak). The results of this inter-laboratories comparison show the adequacy of the developed and applied methods and the difference in activity concentration in the frame of 1σ uncertainty. The results for determined other alpha emitting radionuclides in the sediment are also given.

Keywords: transuranic elements, radioactive waste, radiochemical separation

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