

Hydrological control of system characteristics of floodplain lakes

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Abstract

Water bodies within floodplains are strongly governed by their hydrological connectivity with the main river (Heiler *et al.* 1995). Connectivity is decisive for the general ecosystem characteristics and the balance between input and output of nutrients and organic carbon sources.

A major determinant is the abundance of macrophytic vegetation, which is controlled by through-flow, dry-falling and scouring effects.

The autochthonous primary production is strongly augmented by local terrestrial carbon sources and by the riverine transport in form of dissolved and particulate organic matter. The significance of these different sources depends on hydrology.

Flood pulses represent a disturbance to pelagic communities (followed by successions) and a source of nutrients. High loads of inorganic nutrients produce conditions for prolific algal growth.

High availability of allochthonous organic carbon provides the basis for a prolific bacterial secondary production. Our data emphasize that the stimulus of local aquatic primary production enhances carbon utilization by bacteria.

Key words: alternative stable states, nutrient pulses, DOC, microbial activity, plankton succession

Ecohydrological control of macrophytes in floodplain lakes

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Abstract

Floodplain lakes are one of the most essential habitats for aquatic macrophytes in the modern cultural landscape. Their maintenance and support calls for ecohydrological strategies, as river development, enhanced flood control and other stakeholder interests may have negative impact on the present oxbow ecosystems. Three examples are given to present the situation of macrophytes in floodplain water bodies on the Danube, and the Tisza River. The importance of ecohydrology as a sustainable strategy and a look back to its sources in the Ecotone MaB program are presented. Finally conclusions point to regionalisation of planning goals as the solution for many aspects in floodplain water management.

Key words: Biosphere Reserve, Danube, Tisza, macrophyte dominated state, water flow susceptibility, GIS scenario

Optimised management strategies for the Biosphere reserve Lobau, Austria - based on a multi criteria decision support system.

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Abstract

Without sustainable rehabilitation measures, the Lobau, a freshwater Biosphere Reserve, will soon become a primarily terrestrial ecosystem with major implications for its rich aquatic and amphibic biodiversity. An innovative ecosystem management scheme for this Danube floodplain needs to optimally balance between conservation and restoration objectives and to harmonize the partly competing ecologic and socio-economic requirements for the next 40 years. Therefore, we present a project dealing with the development of a multi-criteria Decision Support System (DSS), based on interdisciplinary historical analyses and state-of-the-art ecosystem modelling. The DSS will assist multiple stakeholders in finding coherent and realistic management alternatives, by linking all objectives and measures in a transparent and reproducible way.

Keywords: ecosystem modelling, bio-complexity, ecosystem services, multi criteria decision support, Danube River Basin

Alternative stable states in floodplain ecosystems

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Abstract

Floodplain and ox-bow lakes form excellent examples of alternative stable states. Clear water, macrophyte dominated stages can alternate with turbid conditions characterised by high algal concentrations. Stable states can switch from one to the other domination through alterations of natural factors such as changes in water level, reduction in through-flow etc. Forward switches are often associated with anthropogenic pressure. In such cases, restoration to the original, macrophyte dominated stage is difficult and needs careful planning to establish sustainability. A case study from a shallow, urban, seepage lake, the 'Alte Donau' within the city proper of Vienna is presented. Results on switches between stable states, causes, consequences and restoration measures will be detailed. The analysis is augmented with data from floodplain lakes east of Vienna which have different levels of connectivity to the main river.

Key words: Equilibrium, disturbance, recovery, management, restoration, urban lake

**Restoration of a river landscape:
Biotopes as a basis for quantification of species diversity
and evaluation of landscape quality**

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Abstract

This study was conducted in three river stretches, which are comparable in their natural features and conditions, but whose principal difference is in floodplain land use. Thus, they are different in the extent to which anthropogenic disturbance influences the river. The sum of the biotopes in each stretch was measured and groups of functional biotope types made. Biotopes diversity indices, as well as species diversity in aquatic and terrestrial ecosystems measured by the Shannon-Wiener function and by the Simpson's index, were calculated. Microbiotopes were defined and species diversity was measured within them

Key words: river landscape, biotope, microbiotope, species diversity, habitat heterogeneity, Morava River

Diurnal variations in carbon isotope composition of dissolved inorganic carbon (DIC) in a freshwater dam reservoir.

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Abstract

Dissolved Inorganic Carbon (DIC) is a common inorganic component of freshwaters and the main source of carbon for primary producers. The pilot studies on daily changes of the carbon stable isotopic ratio of dissolved inorganic carbon ($\delta^{13}\text{C}(\text{DIC})$) were conducted during the clear water phase in shallow, eutrophic, freshwater dam reservoir. Both, DIC concentration and $\delta^{13}\text{C}(\text{DIC})$ demonstrated pattern of daily changes with higher variability in the lacustrine part of the reservoir than in riverine zone following higher biological activity. Results of the first studies on diurnal variations in the $\delta^{13}\text{C}(\text{DIC})$, suggest that 1/ sediments can be an important sink for dissolved inorganic carbon due to microbial reduction of CO_2 from the water column to methane and other organic compounds, 2/ large amplitude of diurnal variations of DIC concentration and $\delta^{13}\text{C}(\text{DIC})$ values are due to daily fluctuations of phytoplankton photosynthetic activity - typical for eutrophic system, 3/ Many carbon cycling models based on seasonal observations of DIC may be biased with large error resulted from DIC diurnal variations, which amplitude appears to be comparable to those commonly interpreted as seasonal and spatial fluctuations.

Keywords: dissolved inorganic carbon, carbon stable isotopes, daily changes, dam reservoir

The state and water quality of small rivers in Belarus: the case study of the Dnieper river basin

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Abstract

For the assessment of ecological water quality in small rivers of the south-western part of the basin of the River Dnieper on the territory of Belarus the integrated approach was implemented based on hydrological, hydro-chemical and biological data.

The rivers overflow has been determined as the main factor triggering the inflow of the water seeping from mires and also the pollution of the watershed that has led to decrease of the pH level, change in the color of the water, and also concentration of nitrogen and phosphorus in the water.

The water quality was assessed on the basis of species diversity, the amount of sensitive macro-invertebrate community species as well as the biotic indices. In most of the cases, the water quality could be defined as “good” or “very good”. The indicated river reference sites were selected on the basis of the integrated (common) analysis of abiotic and biotic characteristics. It is clear that the most credible information on water quality could be obtained only on the basis of an approach which includes abiotic and biotic components.

Key words: hydrological and hydro-chemical factors, species richness, biotic indices

The relationship between autotrophic picoplankton (APP) – the smallest autotrophic component of food web and the trophic status and the depth of lakes

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Abstract

The occurrence and dynamics of autotrophic picoplankton (APP) in relation to the trophic status of a lake is discussed basing on results from 9 lakes situated in north-eastern Poland and southern Finland. The lakes varied in the concentration of basic nutrients, chlorophyll *a*, phytoplankton biomass, pH depth and the composition of APP.

A positive relationship between the productivity of the lakes and the APP biomass was confirmed. Shallow lakes were characterised by a significantly higher abundance and biomass of APP than deeper lakes, regardless of their trophic status. The abundance of APP as well as its contribution to the total phytoplankton biomass in the studied shallow lakes was also higher, than it could be expected from the level of basic nutrients in those lakes.

Results imply that, when compared to deep lakes of a comparable trophic level, shallow and occasionally turbid water environment may create favourable conditions for APP, enabling it to occur in high numbers and thus influence the carbon cycling causing an increase of the carbon flow through the microbial food webs.

Key words: autotrophic picoplankton, key factors, shallow lakes

Interrelationships between macrophytes (including charophytes) and phytoplankton and the ecological state of lakes.

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Abstract

Multidisciplinary investigations of 30 lakes (mid-Western Poland) were carried out in the years 2001-2004. Micro- and macrophyte vegetation was studied against the background of abiotic conditions. Significantly higher biomass of phytoplankton was found in nutrient rich shallow lakes without both charophyte and vascular submersed vegetation as well as in lakes with only poorly developed vascular communities. Visibly better abiotic conditions and the lowest phytoplankton biomass were observed in deeper lakes with diverse macrophyte (and particularly charophyte) vegetation. Lakes with poorly developed charophyte vegetation represented transitional conditions and biomass. Nevertheless, in some (mostly shallow) lakes, where submersed vegetation and particularly charophyte communities were well developed, phytoplankton biomass was rather low and the transparency was high despite eutrophic conditions. Additionally, in those lakes macrophyte vegetation was not only abundant but also diverse with rare, valuable or even unexpected communities of high bioindicator value. Interestingly, an opposing situation with abundant phytoplankton and bad light conditions was also documented in shallow lakes with submersed vegetation. In those lakes, however, only vascular macrophytes developed dense but homogeneous (monospecific) beds. The results are discussed regarding interrelationships between macrophyte vegetation and phytoplankton assemblages.

Keywords: submersed vegetation, charophyte vegetation, Characeae, Cyanobacteria, shallow lakes, stratified lakes

Evolution of ecohydrological approach during 60 years of hydrobiological activity at Nicholas Copernicus University, Toruń

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Abstract

Until the late 1960s, Toruń hydrobiologists worked almost exclusively on the impact of certain abiotic factors (temperature, hydrochemistry) on the biota. Only in the 1970s they focused on the fact that also the dynamics of water masses have important effect on the oxygen regime of the lakes under study.

In the 1980s, the research on the chemistry of ground waters feeding the lakes of the Tuchola Forest was initiated. Since then, an integrated catchment-balance approach to the research on lakes and their protection has been applied. Typical ecohydrological studies included also research on the run-of-river Włocławek Dam Reservoir (area of ca. 70 km², water retention time ca. 5 days). Those studies have shown that hydrology has decisive impact on chemistry and biology of this largest Polish run-of-river reservoir.

Key words: water dynamics, hydrochemistry, ecohydrology, water and nutrient balances

Effects of land use changes on surface runoff

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Abstract

Land use changes which have occurred during the last eight decades in the subcatchment of the Krupá River catchment are analysed; historical and actual panchromatic aerial photographs, historical cadastral maps and old forest maps are available for this period and were used as a background to assess land use changes.

Through the SCS - CN method, we have estimated how the runoff processes in the Krupá River catchment have been influenced by land use changes. Runoff conditions in the catchment have been assessed by curve number (CN). The CN was calculated for the upper reaches of the Krupá River catchment for 1936 and 2002. Runoff conditions were affected by changes of forest border and arable land transformation into meadows and pastures. Changes in age structure and species composition of forest were reflected in the CN.

Keywords: Landscape, historical context, historical aerial photographs, catchment, surface runoff

Impact of water sampling frequency on estimating water quality status in the Ondava River

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Abstract:

The influence of the number of the water samples on classifying surface water into water quality classes with regard to nitrate was determined. The characteristic values c_{90} (percentile 90%) of the nitrate nitrogen concentrations were computed according to following three ways:

- from the monthly time series of nitrate nitrogen concentrations monitored in Ondava River by Slovak Hydrometeorological Institute (SHMI) at basic network sampling site under Stropkov (period 1987–1991);
- from the daily time series of nitrate nitrogen concentrations monitored by Institute of Hydrology of Slovak Academy of Science (IH SAS) at Ondava: Stropkov sampling site;
- from the theoretical log-normal distribution estimated from the daily time series.

Key words: nitrate, surface water, long-term trends

The role of natural systems in urban water management in the City of the Future - A 3-step strategic approach

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Abstract

UWM should be considered within the wider context of sustainable development. This means that a holistic approach must be followed, where the management of urban water services is linked to that of water resources and of nutrients. It also means that interventions should not be focussed exclusively at 'the end of the pipe', which is extremely costly and ineffective. By applying the principles of cleaner production, we propose the so-called 3-Step Strategic Approach for UWM. The three steps include 1) pollution prevention and minimisation, 2) treatment for reuse, and 3) stimulation of the self-purification capacity of the receiving environment. Examples of possible interventions under each step will be given. The overall aim is to achieve sustainable UWM and nutrient management. Natural systems and processes play a crucial role in the implementation of this strategy. We should therefore aim at maximizing the exploitation of natural systems and processes for the effective management of municipal water resources (water quality), of water supply and sanitation services, and of the municipal water cycle as a whole (water quantity).

Keywords: Cleaner Production, Millennium Development Goals, Sewage treatment, natural processes and systems

Valuing and paying for ecosystem services: a pre-condition for sustainability

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Abstract

The paper addresses the socio-economic importance of ecosystems and the valuation of ecosystem services. Principles and examples of valuation and payments for ecosystem services (PES) are reviewed and compared. Special emphasis is given to water-related ecosystems. Markets for ecosystem services are discussed, and future developments are put into perspective. Conclusions for policies on PES, based on a number of recent conferences, are formulated.

Key words: Socio-economic importance of ecosystems; valuation of ecosystem services; financing of ecosystem services; markets for ecosystem services.

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Water and soil - the bases of our life

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Abstract

Most people may not be aware of the fact that about 95% of our food comes from the soil, directly or indirectly, and that about 80% of the water we need passes through the soil. Soil is a producer of biomass for man and beast as well as filter for meteoric water and, as such, is essential for survival on our planet.

Following a survey and discussion of both global and Austrian data relating to the distribution of water and the natural water cycle, the author includes the function of the soil in his considerations. In an effort to demonstrate the importance of water for life on the planet, he presents a survey of a few climatic regions using climate diagrams, and then proceeds to explain specific phenomena of local climate using examples from the vegetation science. The presentation of a schematic soil profile including its vegetation serves as a basis for outlining the practical implications. The effects of different crop sequences on both water consumption and groundwater renewal, and the potential nitrate enrichment involved, are discussed.

The present climatic change, which is certainly not an entirely new phenomenon, but whose causes are still a controversial subject, will manifest itself in increasing climatic amplitudes, such as more severe droughts and heavier rainfalls. Greater soil depths may help to balance their detrimental effects. This should lead us in the future to paying greater attention to the soil as a buffer and filter.

The central theme of this year's meeting of the German Soil Science Society was: "Soil – the thin Skin of the Earth". Let us look after this sensitive organ!

Key words: Soil-water-balance, Chernozem, Kastanozem, Marchfield

Risk reduction of extreme hydrological events with sustainable land use and soil management

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Abstract

The limited water resources and the increasing frequency of extreme hydrological events (flood, water-logging, over-moistening and drought) due to the high territorial and temporal variability of atmospheric precipitation; the heterogeneous (micro and meso) relief; and the unfavourable physical/hydrophysical characteristics of soils are pressing to improve agricultural water use efficiency and necessitates an efficient control of soil moisture regime in the Carpathian Basin.

Another reason of the necessity of soil moisture control is water quality and its ecohydrological consequences. During the periods of high atmospheric precipitation, especially of quick, high intensity rainfalls a considerable amount of plant nutrients and potentially harmful (or even toxic) chemicals and other compounds are transported to the surface and subsurface water resources by surface runoff, filtration and seepage in the unsaturated zone and by groundwater movement. Efficient soil moisture control may considerably reduce this pollutant and/or „nutrient” transport and its undesirable hydroecological consequences.

Soil is the largest potential natural water reservoir: 350–400 mm/0–100 cm soil layer. But in many cases this huge water storage capacity is not used efficiently, mainly due to four reasons: „filled bottle effect”, „frozen bottle effect”, „closed bottle effect”, „leaking bottle effect”. Consequently, the aim of an efficient soil moisture control to help infiltration into, and water storage within the soil in plant available form. For those „actions” adequate information are required on land/soil characteristics. These information are provided by a comprehensive soil/land survey–analysis–categorization–mapping–monitoring system which was developed in Hungary and served as a scientific basis for sustainable land use and soil management including ecosystem management and risk reduction of extreme hydrological events.

Key words: hydrophysical characteristics of soil; water storage capacity; soil moisture control; soil database and monitoring; drought sensitivity.

Sediment tracing using environmental radionuclides; the distribution and behaviour of ^{137}Cs and natural radioisotopes in a small loess agricultural watershed

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Abstract

The concentrations of ^{137}Cs , ^{226}Ra , ^{232}Th and ^{40}K in loessial soil from cultivated field located on a gentle slope on the Proboszczowicki tableland (near Ujazd village, SW Poland) were measured using gamma-ray spectrometry with the aim of investigating the behaviour of those radionuclides in soil in the eroded area. These concentrations were also determined in soil after citrate-dithionite extraction treatment, as well as in the remaining liquid. The ^{137}Cs concentrations in soil profiles suggest that soil movement for the study area is considerable. The ^{137}Cs inventories were 10-63% lower on the slopes than on the plateau and were 66% higher at the bottom of the valley. The calculated values of soil erosion range between 1.3 and 59.8. tons $\text{ha}^{-1}\cdot\text{a}^{-1}$ whereas in the deposition area the calculated soil accumulation rate is about 89.6 tons $\text{ha}^{-1}\cdot\text{a}^{-1}$. Activity concentration measurements using the chemical extraction solutions suggest that ^{137}Cs is not retained by the iron oxide layers in these soils, in contrast to a significant fraction of the natural radionuclides ^{226}Ra and ^{232}Th . The relative standard deviations (RSD) of the activity concentration ratios of $^{137}\text{Cs}/^{226}\text{Ra}$, $^{137}\text{Cs}/^{232}\text{Th}$ and $^{137}\text{Cs}/^{40}\text{K}$ are comparable with the RSD of caesium activity and thus cannot be used to minimize particle size effects at this location.

Key words: ^{137}Cs , natural radioactivity, activity ratios, particle size.

Bioaugmentation as a method of biodegradation enhancement in oil hydrocarbons contaminated soil

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Abstract

Respirometry studies using the 10-chamber Micro-Oxymax respirometer (Columbus, Ohio) were conducted to determine the effect of adding bacterial consortium for enhancing biodegradation in soils contaminated with oil hydrocarbons from the former military airport. Bioaugmentation was carried out using both indigenous and extraneous bacteria able to degrade hydrocarbons. The potentials of intrinsic and enhanced biodegradation were evaluated by the mean O₂ uptake and CO₂ production rates. The results demonstrated that the highest biodegradation rates were achieved using bacterial consortium containing 4.8×10^{15} Colony Forming Units (CFU) cm⁻³. Generally, in all cases, enhanced biodegradation rates were four times higher than intrinsic biodegradation rates. Moreover, application of indigenous bacterial consortia was more efficient in comparison to the employment of extraneous bacterial consortia. This study showed that bioaugmentation could be an effective method for enhancing intrinsic biodegradation of oil hydrocarbons in soil.

Key words: intrinsic biodegradation, indigenous microorganisms, extraneous bacteria

Soil sealing in Austria and its consequences

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Abstract

In Austria the year 2005 has seen dramatic inundations and mudslides resulting from heavy rainstorms. In the light of such natural disasters, we should intensify our efforts to analyse the causes.

A brief description of the balance is followed by a discussion of soil sealing, which may be considered to be one of the causes of such catastrophes. The present area of land consumed by soil sealing in Austria is estimated at between 15 and 25 hectares per day. Sealing the soil reduces, or completely eliminates, its water-storage capacity. Hence, precipitation water finds its way overland at an increasing speed and with full power. This article presents proposals for a responsible strategy in the future.

Keywords: extent of soil sealing in Austria, soil functions, soil-water balance.

Occurrence of amylolytic microorganisms in soil depending on the type of cultivation

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Abstract

The count and growth dynamics of amylolytic microorganisms in soil beyond rhizosphere and within rhizosphere as well as in potato rhizoplane was compared in ecological (organic) and conventional farmingsystems. Potatoes in ecological system were fertilized only with organic fertilizers and in the conventional system NPK fertilizers + manure were used. The results showed that the count of bacteria showing amylolytic activity was generally higher in ecological farming than in conventional one. Vegetation stage had a significant effect on the growth dynamics of microorganisms tested. The highest level of their count was achieved at the end of the vegetation during tuber harvest maturity. A remarkable smaller count of microorganisms secreting amylases was recorded in the soil beyond rhizosphere in comparison with the rhizosphere area and rhizoplane. Selected physico-chemical properties of soils (humidity and pH) were more favourable in the soil cultivated under organic farming system in comparison to the conventional one.

Key words: amylolysis, organic and conventional farming, soil humidity

The effect of organic amendments on the phytoavailability of heavy metals in polluted soil

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Abstract

Four substances used for organic soil amendments to reduce immobilisation and thus the bioavailability of heavy metals in soils were tested in field stonepots rye culture. The bio-accumulation index (BI) was calculated to evaluate the mobility of heavy metals in the soil and their availability to plants. The (almost) total contents of Zn, Pb, Cd in soil after first year of growing plants on contaminated soil not changed significantly in soil with organic amendments. The contents of bioavailable forms of heavy metals were reduced in soil with organic amendments, and the degree of this reduction depended on the type of the organic amendment used. The phytoavailability of tested heavy metals was the lowest when a brown-carbon derived preparation (the Rekulter) was used as an amendment, as indicated by the lowest BI.

Key words: bio-accumulation index, Cd, Zn, Pb, immobilization.

Integration of waste-water treatment and sludge handling on small scale, for the conservation and restoration of water and land quality

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Abstract

Water quality conservation requires adequate waste-water treatment and proper soil management. The processes of waste-water treatment and sludge handling were formerly treated as separate activities, but integration of the two aspects is now both necessary and possible. The processes described here are aimed at achieving higher effectiveness of sewage treatment, sludge quantity minimisation and quality than was previously possible. For effective land and water resources protection, more attention should be given to small and medium waste water treatment plants. Ecohydrological techniques such as dispersion of point sources of water pollution, creation and restoration of wet areas, and local use of sewage sludge are seen as a necessity for environment sustainability.

Key words: water quality, sewage purification, landscape

Closing the nutrient loop between urban and rural area - wastewater and sludge utilization in Ner River Valley.

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Abstract

For decades an area of 4 500 ha of Ner River valley was used as a part of Łódź municipality wastewater treatment system. Sandy alluvial soils were irrigated with nutrient rich river water for high hay crop production.

Nowadays wastewater treatment plant in Łódź discharges $2 \text{ m}^3 \text{ s}^{-1}$ of wastewater and produces daily 30 - 35 t of dry matter of sludge which can be utilized in the valley for energy biomass production.

Of a great importance for sustainable development is the recirculation of nutrients between urban and rural areas. Reuse nutrient rich wastewater and sludge results in saving natural resources (mining rocks, forest wood) and protection of receiving water bodies.

Keywords: water protection, irrigation, fertilization, willow, renewable energy.

Sludge composting validation for minimizing environmental hazards. A new indirect method of sanitation effectiveness assessment.

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Abstract

The main purpose of the study was to assess a new sewage sludge composting validation method based on the survival of indicator microorganisms (*Escherichia coli*, *Salmonella senftenberg* W775, streptococci group D) introduced into composting piles. The experiment was carried out during summer and winter seasons. The piles were aerated mechanically by turning. The results obtained in the summer cycle showed that the time needed for the total inactivation of the indicatory bacteria in samples from three layers of the pile (top, middle, bottom) did not exceed 9 days. In winter the elimination of the indicatory microorganisms was longer and lasted from 29 days in the center of the pile to 60 days at the bottom layer. The implemented method for the estimation of sludge composting hygienization effectiveness is very useful and contributes to minimizing soil and ground water contamination.

Key words: indicatory bacteria, hygienization, thermal conditions

The initial risk assessment and emission control from contaminated sediments

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Abstract

Discharged persistent organic pollutants and heavy metals into the rivers are often assumed to adsorb on sediments without re-suspension, thus sediments may function as a sink for contaminants. Sediments, however, may also function as a (secondary) source of contaminants, depending on the hydrodynamic characteristics of a river. To assess whether the sediments function as a sink or a source of contaminants, a preliminary risk assessment using the so-called SEDINA tool (**SED**iment **IN**itial Assessment) is recommended. By comparison of the total concentrations of pollutants in sediments upstream, at, and downstream of the site area, the role of sediments can be determined. When the sediments function as a sink, no specific sediments-related measures are required, although monitoring of the surface water and sediments quality is recommended. If the output of the SEDINA tool reflects that the sediments may function or function as a source of contaminants, the risk-reduction measures are necessary that may include emission control at the source(s), pathway(s) and/or receptor(s).

Key words: the SEDINA tool, bioavailability, remediation, persistent organic pollutants, heavy metals

Geophysical investigation in contamination hazard studies

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Abstract

The influence of mine water reservoir on the groundwater quality was estimated. The geophysical methods as the electromagnetic and conventional resistivity method combined with elementary hydrogeological techniques were used to mapping and monitoring groundwater contaminant plumes. The investigation area is situated around the reservoir of mine salt water in Upper Silesia, Poland, where groundwater contamination either does occur or may soon occur. First the electromagnetic measurements were carried out to mapping anomaly areas. Then on the basis of geophysical measurements interpretation the proving bore holes were made to measure groundwater level and conductivity. The conductivity of water from surface seepages, reservoir and neighbouring rivers were also measured. The electromagnetic and hydrogeology results shown the connection of geophysical anomalies with migrated mine water from reservoir. It can enable mapping of the contaminated areas and identify contamination hazards.

Key words: electromagnetic VLF survey, resistivity sounding and profiling

Endocrine disruptor contaminants in water and their adverse effects in humans

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Abstract

Since the early 1990s the occurrence of pharmaceuticals and chemicals with hormone and hormone-like activity in the environment, has received considerable attention. There are approximately 150 distinct substances being suspected to act as endocrine disruptors. A number of endocrine disruptors have been detected in ground and drinking water. Endocrine disrupting compounds are of particular concern as these cannot only interfere with the natural production and metabolism of hormones in the body, but also represent a serious carcinogenic risk. The hormone-like action of drinking water contaminants could affect the proliferation and cell cycle of cells expressing hormone receptors. Moreover, hormone-like agents may modulate the susceptibility of cancer cells to chemotherapy.

Key words: xenoestrogens; endocrine disrupting compounds; hormones, chemotherapy; breast cancer; CDK inhibitors