SUMMARIES

Stanisław Gruszczyński, Krzysztof Urbański: **Application of Interpolation Algorithms and Artificial Neural Networks for Chromium Contents in Soils Characterizatio**n • Inżynieria Środowiska 2005, t. 10, z. 1

Various ways of approach, to determine the horizontal distribution trend (tendency) of Chromium (Cr) in soil, where is high pollution by this element are analysed. Polynominal regression algorithms (I, II, III degree polynominals), interpolation algorithms (TIN, Kriging, RST), and also artificial neural networks (MLP, CANFIS, RBF, GRNN, PNN, MDN) are applied. Data from field experiments, carried out in the area of Chemical Plant in Alwernia were used. The differences between several ways of approach are presented in a graphical form, and also in some remainders distribution statistics. The soil pollution spatial distribution examinations lead to following conclusion, that in the first place is the information precision determination, and also the limit of error, through the pollution evaluation acceptance, whereas in the second place is the indication or standing out the regularity connected with the imission effect mechanism. It seems that the chromium concentration in soils variation, noticed even on short distances, makes it difficult the acceptance of interpolation method, as a method of contamination distribution evaluation. On the other hand the considerable nonlinearity makes difficult the acceptance of regression model. In these circumstances, the possibility which is worth consideration, is the modelling with the application of neuron networks, that is also hybrid solution application (for instance MDN), which gives the possibility of Cr concentration in soils variation deeper analysis.

Edeltrauda Helios-Rybicka, Agnieszka Hołda, Elżbieta Jarosz: **Monitoring and Quality Assessment of Selected Physical and Chemical Parameters of the Sola River System, South Poland** • Inżynieria Środowiska 2005, t. 10, z. 1

The purpose of the research carried in winter 2001 and spring 2002 was to monitor and assess the quality of the Sola River system. Representative samples of river water, suspended matter and bottom sediments were taken from 10 sampling points located along the Sola River course, and additional 2 before and after Sola River outlet to the Vistula River. Physical parameters (pH, temp., O_2, conductivity) of the river water were determined directly in the field. The spatial variability in concentrations of elements in the Sola River system was estab-

lished using ICP-MS, AAS as well as IC, and further the pollutants were compared to national and international quality standards.

With respect to physico-chemical parameters the Sola River shows good quality meeting the 1st to 3rd Polish Surface Water Quality Class. The detected levels of metal concentrations in suspended matter were found to exceed the geochemical background values. Metal concentrations were found to be much higher than in the river water and with respect to LAWA classification system relatively highest pollution was found with Cd, Zn. Metal concentrations ranged (in mg/kg): Pb 19.4–124; Zn 343–1725; Cd 0.86–5.78; Tl 0.087–0.568; Cr 68.3–176; Ni 52.5–67.2; As 9.44–32.1; and Fe 22815–54007. Content of metals in bottom sediments revealed lower concentration level in comparison with suspended matter indicating uncontaminated to moderately contaminated conditions with respect to the Igeo classification system.

A leaching test was performed to established the mobility and bioavailability of investigated metals in both suspended matter and bottom sediment samples. Obtained results indicate low metal mobility upon acidic leaching conditions. Nickel was found to be the most mobile metal in suspended matter (97% released), whereas in bottom sediment Pb (58% released) appeared to be the most bioavailable.

Results obtained lead to formulation of the following conclusions and further recommendations for national chemical monitoring in Poland: (1) metal concentrations in the Sola River did not exceed the values of the 1st Polish Surface Water Quality Class; (2) pollutant content did not reveal significant seasonal variations, therefore chemical monitoring conducted twice a year is sufficient; (3) chemical monitoring of suspended matter should be included in the Polish National Monitoring System on the routine basis; additional arguments are: easy sampling, better homogeneity of material and less time consuming laboratory procedure.

Tadeusz Gołda, Andrzej Haładus, Ryszard Kulma: **Geo-Environmental Effects of Sulphur Mines Closure in Tarnobrzeg Region** • Inżynieria Środowiska 2005, t. 10, z. 1

The water conditions prognosis within the area of mines put to closure of Tarnobrzeg Sulphur Basin, elaborated on the basis of hydrogeological model results, show the possibility of occurrence the negative changes in ground-water environment, after eliminating the existing drainage systems. Within the surroundings of "Jeziórko" and "Piaseczno" mines, the water conditions engineering is of basic importance, for further direction of post-mining land development. The paper presents the evidence of the influence of reconstructed ground-water level over the soil productiveness, the size of damages and main threats removal of which needs to carry out special detailed land melioration.

Robert Oleniacz: **The Air Pollutant Emissions from Incineration of Distillation Wastes from Vitamin C Production in a Fluidized Bed Incinerator** • Inżynieria Środowiska 2005, t. 10, z. 1

In the paper some results of continuous or periodical measurements of selected air pollutant concentrations and mass streams in the flue gases from liquid waste incineration in a fluidized bed incinerator were presented. During the researches distillation tails from vitamin C production, that is waste traces from regeneration such solvents as for example ethylene chloride, chloroform or trichloroethylene were incinerated. As a result of the researches there was determined optimal temperature of the fluidized bad in which the waste incineration should be carried out to minimization of CO and NO_x formation. Required effectiveness of HCl removal from combustion gases to comply with the emission limit values was presented as well. Applied in the installation alkaline fluidized absorbers working on the parallel arrangement were not sufficient to achieve it.

Jan Macuda, Tadeusz Solecki: **Ground-Water Environmental Pollution with Polycyclic Aromatic Hydrocarbons Near a Refinery** • Inżynieria Środowiska 2005, t. 10, z. 1

Oil refineries belong to industrial plants frequently polluting the ground-water environment with a variety of hydrocarbons. Ground and water contamination may be caused by leakages in the production installments and also during oil and oil-products storing.

One of the most toxic ones are polycyclic aromatic hydrocarbons, produced in considerable quantities in the course of oil and crude oils processing.

The quantitative state of the ground-water environment with respect to the polycyclic aromatics near one of the Polish oil refineries has been analyzed in this paper. Basing on the comparison of geochemical and hydrochemical results with threshold environmental standards, a conclusion was drawn that both grounds and underground waters are contaminated with polycyclic aromatics above the admissible values, qualifying them for remediation procedures to be applied.

Tadeusz Zbigniew Dworak, Maria Bonikowska: **The Remote Sensing Monitoring of the Environment** • Inżynieria Środowiska 2005, t. 10, z. 1

The paper presents some suggestions of an applictaion of remote sensing methods for the monitoring of envirnonment (natural and antropogenic). It contains also a short historical introduction to the problem of monitoring. As next it have been listed fundamental remote sensing methods (passive and active). Moreover, it is described principial differences between an in situ and remote sensing monitor-

ing supported by the GPS and GIS technics. The neccesity of an application of complementar monitoring systems for more precise interpretation of obtained results of observations and measurements of environmental components is taken into consideration. Three fundamental, substantial components of environment have been defined such as: atmosphere, hydrosphere and litosphere together with biosphere. For the need of the remote sensing monitoring – especially for aerial photographs, satellite images and radiometric observations – an idea of morfostructures of antropogenic and natural ecosystems have been introduced. The importance of using remote sensing methods in the environmental monitoring according to the accession of Poland to the European Union, at most was emphasized.

Marta Wardas, Leokadia Budek, Agnieszka Kijas, Romana Rembalska: **The Influence of the Flood of 1997 on the Distribution of Heavy Metals within Water System of the Malinówka River in the Vicinity of "Barycz" Waste Disposal Site near Kraków** • Inżynieria Środowiska 2005, t. 10, z. 1

The presented paper contains the results of the study of water environment of Malinówka River in which catchment the municipal waste disposal site has been located. The subject of investigation was the distribution of heavy metals: Cd, Cr, Cu, Pb and Zn between water and bottom sediments. The interpretation of that distribution has been done on the base of physicochemical characteristics of water determined as pH, EC (electrical conductivity) and concentration of anions: F^-, Cl^-, NO_3^-, SO_4^{2-} and PO_4^{3-}. It was found that the substandard concentrations show in water Pb, Cu and all anions. Concentration of Zn, Cd, Cr as well as pH are as high as those in water of the 1st or 2nd class of purity. Concentrations of Zn, Pb and Cd in river sediments quality them as low contaminated sediments (1st class) while Cu and Cr concentration as intermediate contaminated sediments (2nd class). The results obtained were compared with those determined before the flood of 1997. It appeared that as a result of flood: increased pH and EC, considerably increased salinity, decreased heavy metal concentrations in both water and water sediments.

Teresa Łozowicka Stupnicka, Monika Talarczyk: **Application of Neural Network Models for Assessment and Forecasting of Air Quality** • Inżynieria Środowiska 2005, t. 10, z. 1

The paper deals on the air pollution assessment and forecasting method based on artificial neural network. For solving the problem the four-layer, feed-forward neural network is proposed. The method has good properties of generalisation and high speed of operation. In this aspect artificial neural network can be regarded as good instrument for prediction of smog state. The chosen type of the network seems to be the promised tool for assessment and forecasting of states, which influence people health and the surrounded environment.