

## Application of geophysical methods in hydrogeology

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### Abstract

Application of geophysical methods in hydrogeological studies has already had a long term tradition in the Czech Republic. According to archives various hydrogeophysical studies have been conducted since 40's. Application of hydrogeophysical methods increases after World War II not only in the Czech Republic but all over the world. These trends have been kept and they are closely tied with ever increasing consumption of potable water and water for industrial use, waters for spa treatment and mineral water, which is connected with requirement both to locate new sources and to protect existing ones against contamination. On the contrary interest in application of geophysical methods increases proportionally with increasing power in solving various and more complex hydrogeological tasks due to continuous and accelerating developments in instrumentation, computer technology and interpretation techniques.

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## Application of logging in hydrogeological wells

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### Abstract

Well logging is very powerful tool for all hydrogeologists. Nowadays non-oil logging is highly developed and experienced. There are some examples, which prove wide capabilities of these methods. Well logging is able to save a lot of money when it is realised during the exploration phase of the project. Results of well logging can be used for exact positioning of screening, for controlling of injection process, for qualitative and quantitative determination of the ground water dynamics in the well, for analysing structures by correlation among wells, etc.

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## Application of geophysical methods in search for contaminated rock environment and in realisation of following rescue methods

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### **Abstract**

Geophysical methods can be successfully applied in solving problems connected with clearance of environmental loads namely in the phase of survey of hydro-geological setting of studied area including appraisal of technical conditions of constructions that could affect spreading of contaminated waters through rock environment. Application of geophysical methods – usually in the form of a complex of several methods used in monitoring boreholes is suitable in the phase of study of spatial extent of contamination and its changes in time as well.

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## Use of hydro-environmental maps for solving land use planning and support of regional development at municipal and regional administration level

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### **Abstract**

Hydroenvironmental maps became recently an important basis for regional administration decision making and they can be widely used in land use planning and for support of regional development namely during the process of joining the Czech Republic to the European Union. It is assumed that hydroenvironmental maps will be used in waste disposal management and could be widely used even for operative breakdown assessment namely in the framework of an integrated rescue system.

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## **Application of geophysical methods in geotechnics and construction**

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### **Abstract**

Geophysical methods can bring a lot of interesting and useful in geotechnical studies. The main contribution lies in three spheres of the studied problems: determination of geological setting, division of the rock massif into the quasihomogeneous blocks and development of geophysical fields in time and time changes of physical properties. Examples from highway prospection, tunnel and dam prospections, influence of fault on physical properties and relations among various modulus are presented.

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## Geophysical methods in slope deformation investigations

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### **Abstract**

Geophysical methods are an integral part of slope deformation investigations. In this paper the following sequence of techniques during geophysical investigation is recommended: surface geophysical measurement and its primary interpretation, physical properties analysis, generating geophysical model, parametric measurements, primary reinterpretation and generation of geological section, monitoring measurements, secondary reinterpretation and creating of engineering geological section. The proposed procedure is documented by practical examples.

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## Geothermal observations of pipelines laid on coal mine waste dumps – an integral part of environmental protection against fire

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### **Abstract**

In areas with intensive mining activities some pipelines are laid on coalmine waste dumps. Since these dumps are predisposed to fire the pipelines are severely endangered in this way. Prompt protection measures taken on the basis of geothermal monitoring may help to stop burn processes in the beginning. Example of such geothermal monitoring from the area of the Ostrava Coal Basin is presented in the paper.

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## Volumetric radon activity of the rocks of the city Brno area

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### Abstract

Radon risk mapping data from the Brno area were collected from databases of six private companies. A newly created radon database contains now information about 685 measured places. Values of the radon activity concentration in the rocks and dumps of the Brno region are low (mostly from 10 to 40 kBq/m<sup>3</sup>), but in some places with extremes (up to 175 kBq/m<sup>3</sup>). Uranium contents in the rocks and dumps taken from literature are mostly low or medium. It usually changes from 1 to 9 ppm, with maximum 17.6 ppm. Radon activity concentration and uranium content are higher in loess, loess loam, fluvial sandy loam and calcareous clay, and lower in leucotonalite and diorite. Only two radon risk categories of building sites, low and medium were classified in the Brno area. In the rocks with higher values of the radon activity concentration the medium radon risk category of measured place is mostly more probable.

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## Laboratory measured functional relations between electric resistivity and content of oil contamination in sand

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### Abstract

In the course of the oil product exploitation, transportation, processing, storing and selling contamination of soil and mineral environment and consequent pollution of agricultural soil and water resources often occurs. Therefore it is important to find a reliable way for searching oil contamination and determination of its scale, and so to be able to react in time and eliminate the consequences of these ecological catastrophes. However, there is still a problem to be solved – a measure of oil contamination impact on the electric resistivity changes. During geoelectrical measurements around the sources of oil contamination decrease of electric resistivity was observed at the places where oil contamination was supposed unlike the uncontaminated surroundings (Gajdoš 1995). Presence of the oil deposit is showed by increase of electric resistivity at the records of resistivity borehole logging (Dachnov 1953). To solve this contradiction we decided to find out impact of oil contamination on electric resistivity of soil at laboratory conditions.

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**Use of remote sensing in monitoring of environment in daily practice of state administration**

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**Abstract**

Remote sensing with use of satellites represents a powerful tool for investigations of a land cover and for studies of changes of the environment. State-of-the-art of remote sensing techniques, instrumentation, digital methods of compilations of different kinds of map and detection of changes in environment are described in the paper.

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