

A contribution to the pull-apart theory of the origin of the Vienna basin based on an analysis of geological and reflection-seismic data

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Abstract

The seismic profile 101/88 extending from NW to SE across the borehole Sušice-1 was analysed in order to evaluate the pull-apart theory of origin of the Vienna Basin. The wavefield analysis led to identification of the place where the frequency content and the directional arrangement of reflections change, and which corresponds with the sought horizontal disjunction. The existence of a horizontal displacement along the found regional zone of horizontal disjunction is supported by the occurrence of negative flower structure. The horizontal displacement passes through the disjunction zone and ends in the Magura nappe base. Another phenomenon observed in the proximity of the horizontal disjunction is the impact of compression on the deformation of the flysh complex fixed to the platform, i.e. pushing of allochthonous rocks against the flysh nappe thrusting. The compression locally affects underlying crystalline formations.

Pulse Ekko GPR in archaeological investigations

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Abstract

Applications of the PULSE EKKO GPR system are demonstrated on examples, namely location of procession sacred roads in antique Ephesus where until then unknown sections at a length of over 2100 m were traced in 8 days. Also the results of investigation of a terrain body in Carinthia, Austria identified as a sizeable pre-historic gravemound with a complicated inner structure are presented. Another example discussed in this contribution is a detailed mapping of an uncovered part of a Roman settlement in Upper Austria. All these results demonstrate the efficiency of the system.

Macroseismic fields in the Jeseníky area

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Abstract

Confrontation between the geophysical pattern, tectonic setting and seismological data from the Jeseníky area is presented in this paper. Seismicity of the area under study is known from historical macroseismic observations and manifests itself also in the existing weak natural seismicity. Geophysical fields are of a complicated character as a result of an intricate geological structure. The visual analysis of isoseismic lines of the most intensive earthquakes in confrontation with geophysical anomalies has shown the existence of two important focal areas with different characteristics – Jeseníky Mts. and the foreland in the vicinity of the town of Opava.

Contribution of geophysical well-logging techniques to evaluation of water resources

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Abstract

The Department of Applied Geophysics, Charles University, Prague, has contributed to the solution of hydrogeological tasks since the 1960s. Initially, regional geophysical measurements were applied in search for sources of drinking water. At present, well log analyses are focused on providing a basis for protection and optimisation of exploitation of both surface and underground waters.

The principles and technical background of measurements as well as applications mainly of fluid-movement logging are presented. Fig. 1 shows the application of fluid-movement logging in an exploration hydrogeological borehole demonstrating the dynamic regime of groundwater with respect to the technical conditions of the borehole. Fig. 2 deals with exploitation hydrogeological well. Fig. 3 shows the changes of groundwater dynamics in time and in space in an observation hydrogeological well in the proximity of an intensively exploited water source.

The importance of implementation of geophysical measurements in boreholes is emphasized by the fact that by carrying out borehole geophysical measurements applicable to groundwater studies repeatedly in time we can monitor both the dynamic regime of underground water and/or the technical parameters of the borehole. Geophysical logs can also be reinterpreted in a post mortem investigation of some geological or hydrological factor that was not considered when the hole was being drilled.

Relationship between the chemism and physical properties of rocks from the drilling R-150, the village of Rejvíz, Jeseníky Mts

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Abstract

The 151 m deep drilling R-150 is situated in the village of Rejvíz between the towns of Jeseník and Zlaté Hory (Jeseníky Mts., Czech Republic). The task discussed in this paper was to find out whether it is possible to distinguish between individual rock types on the basis of physical parameters only.

A total of 63 rock samples from this drilling including three rock types (amphibolites, carbonate gneisses and quartzites) were analysed for chemism, and their physical properties were measured in the laboratory. By combining both types of data suitable parameters were identified for an in-situ classification of the rock types in the geologically complex conditions of epimetamorphites of the Vrbno Group, Jeseníky Mts. The rock types can be best distinguished using the parameter Z_{ef} , the total gamma-ray activity Gamma and the bulk density D_b .

Paleogeographic and tectonic evolution of the Carpathian flysh belt of South Moravia

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Abstract

Variscan and Alpine orogeny are overlapping with opposite vergencies in the contact area of the North European Platform and West Carpathians in Moravia (SE of the Czech Republic). The present understanding of geological structure is based on geological mapping, deep boreholes and seismic profiles through the Carpathian Foredeep, allochthonous nappes of the Carpathian Flysh Belt, the superimposed Neogene Vienna Basin, and underlying Platform. The Carpathian nappes were formed during the Savian and mainly Styrian phases of the Alpine orogeny and have buried the Paleozoic, Jurassic and Paleogene sediments to depths. Sedimentary, tectonic, and thermal evolution is simulated as a series of events of deposition, erosion, and thrusting using basin modelling software and structural measurements.
