

**Present day earthquake activity of the Moravo-Silesian region:
(Registration by the HRMC, ZLHC and ZARC seismic stations)**

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Local geodynamic network "Sněžník"

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Abstract

Seven years ago the local geodynamic research network "Sněžník" was created in Czech-Polish cooperation (Technical University Brno, Akademia Rolnicza Wrocaw). Since 1992 measuring campaigns were carried out there every year including GPS together with various kinds of terrestrial measurements as EDM, levelling, gravimetry and astronomy. Results of these annual field campaigns constitute a large base for experiments, tests and comparisons of GPS and terrestrially derived positions and heights. In years 1996 -1998 the works in scope of the research project oriented on problems of the common processing of GPS and terrestrial measurements were carried out, in cooperation of TU Brno and Research Institute of Geodesy, Topography and Cartography Zdiby - Geodetic Observatory Pecný. This contribution gives the layout of "Sněžník" network, describes various types of measurements and deals with some factors influencing the GPS baseline accuracy.

Gravity changes observed in the Polish part of Eastern Sudety Mountains and Fore-Sudetic Block in period 1992-1998

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Abstract

In eastern part of Sudety Mountains (in Śnieżnik Massif, since 1992) and in Fore-Sudetic Block (Paczków Graben, since 1992) during five cycles, there have been performed observations of gravity differences between installed geodynamical stations. Using precise gravimeters the temporal variations of gravity have been monitored in reference to some pointed out stations outside geological structures under investigation. The reference level for our measurements by the gravity on fundamental station at Józefosław Observatory, near Warsaw has been supported, where the absolute gravity by ballistic instrument ZZG has been determined and by gravity point situated at Agriculture University in Wrocław building. This one is connected with permanent GPS station existed there.

In Śnieżnik Massif, there was pointed out a clear tendency of gravity arising on points in lower parts of geodynamic test field and decreasing of gravity in upper parts. The most interesting situation, taking into account the temporal gravity changes has occurred in Fore-Sudetic Block, in Paczków Tectonic Graben. Our investigations pointed out the gravity decreasing to the East from Nysa and, anti-symmetrically, the gravity increasing on the western part of this complex.

Neotectonic and recent movements of the Earth crust in Polish part of the Sudetem and the Fore-Sudetic Block

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Abstract

The Sudeten and Fore-Sudetic Block region constitutes the northern part of the Bohemian Massif. During the Alpine orogenesis it had formed a resisting block for the folding Western Carpathians. The current orographic picture of the region is the result of tectonic movements, the culmination of which occurred in Neogene. Geodetic and geological studies show that those movements have not yet ceased. Historical records, which mention earthquakes since the X. century, confirm this. National precise levelling measurements carried out in the last one hundred years show vertical movements of the crust of $-(1.5 \text{ /- } 6)$ mm per year. During the 90's geodynamic examinations have intensified in this region. Three local geodynamic polygons and "GEOSUD" regional network have been set up. Satellite GPS and other measurements, repeated since 1992, show horizontal and vertical movements of the earth's crust.

The role of relative observations in multisegment geodynamic research system in Sudeten

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Abstract

A multisegment geodynamic research system which has been implemented in Sudeten is briefly explained and demonstrated with special regard to a segment of detailed relative observations on fracture zones. Four individual segments play different roles in looking for movements of tectonic and/or other origin in the area and provide data that can be integrated to upgrade the system in higher levels, as well as to make interpretation of results more transparent. Data obtained in Bear Cave (Śnieżnik Massif area) with the use of TM-71 feeler gauge confronted with precise levelling in the cave between 1985 and 1998 are given to demonstrate the role of such relative observations in the system and its effects when interpretation of the obtained data is demanded. The example of the survey in Bear Cave resulted in a quite practical decision to close the nearby quarry which proved to be a source disturbing by blasts the natural environment in the cave and even deteriorating conditions of safety for visitors underground.

Strong seismic events in the Upper Silesian Coal Basin, Poland

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Abstract

In the paper seismic events with a source energy high than 100 MJ occurring in the Upper Silesian Coal Basin, Poland, are analysed. The distribution of strong shock epicentres is not uniform in the area and shows the non - random character of seismic phenomena. This distribution is fractal with a fractal dimension equal to 1.17. Lines connecting an epicentre of successive events reveal characteristic directional features. Results of the study suggest that an origin of the strongest seismic events in the Upper Silesian Coal Basin lies in a dynamic processes having a regional extent.

Influence of the differential refraction correction in GPS measurements on accuracy of coordinate determination

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Abstract

The paper quantifies the effect of the tropospheric delay in precise height determination. First the theoretical background of data processing operation of determining total tropospheric zenith delay in the layer between the endpoints of the baseline is presented. Introduction of Niell's mapping function to our model enables elaboration of GPS measurements to 3° above the horizon. In presented model there are two unknown tropospheric parameters, which are estimated by the trial and error method. Presented approach enables us the estimation of differential tropospheric delay without any information about meteorological conditions.

GPS network Sudeten and preliminary results of two campaigns 1997 and 1998

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Abstract

The regional network "SUDETEN", which was established in 1997, creates an umbrella to all-existing Czech and Polish GPS networks in the Sudeten area. An identification of recent mobile active zones, a motion potential classification of particular geologic blocks and a verification of possible mobile activity of significant equatorial faults are its main goals. The data obtained in two GPS campaigns of 1997 and 1998 were processed by the Bernese 4.0 software and two preliminary solutions (constrained and free) were performed. For the GPS campaign 1998 the RMS errors of the horizontal components were round 1 millimetre and of the vertical components about 5 to 6 millimetres.

Hydrogeological data as indicator of neotectonic activity

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Abstract

Hard rocks (crystalline and sedimentary highly cemented and/or folded rocks) are generally characterised as a hydrogeologic environment with chaotic permeability and transmissivity distribution. This is evidently truth in a local scale. Transmissivity in hard rocks differs considerably from place to place as proved by results of aquifer tests from hydrogeologic boreholes in many areas. These local differences in transmissivity can reach three or even four orders of magnitude in the same rock. The main reason for this is a highly anisotropic hardrock environment due to its fissure porosity. Importance of different petrology on transmissivity distribution of hard rocks was proved, with only some exceptions, as insignificant.
