

NEW AGE AND PETROLOGICAL CONSTRAINTS ON LOWER SILESIAN BASALTOIDS, SW POLAND

Janusz BADURA^{1)*}, *Zoltan PÉCSKAY*²⁾, *Ewa KOSZOWSKA*³⁾, *Anna WOLSKA*³⁾,
*Witold ZUCHIEWICZ*³⁾ and *Bogusław PRZYBYLSKI*¹⁾

¹⁾ *Polish Geological Institute, Lower Silesian Branch, al. Jaworowa 19, 50-122 Wrocław, Poland*

²⁾ *Institute of Nuclear Research of the Hungarian Academy of Sciences, 4001 Debrecen, Bem tér 18/C, Hungary*

³⁾ *Institute of Geological Sciences, Jagiellonian University, Oleandry 2A, 30-063 Kraków, Poland*

**Corresponding author's e-mail: Janusz.Badura@pgi.gov.pl*

(Received January 2005, accepted April 2005)

Abstract

Fifteen samples of basaltoid rocks were analysed from Lower Silesia, SW Poland, all of them situated close to the Sudetic Marginal Fault. K-Ar datings were made on whole rock samples, using the methodology applied by the Institute of Nuclear Research, Hungarian Academy of Sciences, Debrecen, Hungary. Most of the samples gave dates ranging between 21-38 Ma, whereas that derived from a borehole in the Mokrzeszów graben was dated to 44 Ma. Another borehole sample (Jeżów Sudecki B-5) is of 59 Ma age. On the other hand, the supposedly "Quaternary" basalts from the Dębowiec area fall into the interval of 29-30 Ma. The southeasternmost occurrences of the Lower Silesian basalts at Nowa Cerekiew display two generations of effusive activity: the older lava flows (26 Ma) are cut by plugs dated to 22 Ma. The Oligocene-Lower Miocene (26-33 Ma, 20-24 Ma) rocks represent alkali basalts and basanites. Most of the samples studied show properties typical of the two phases of volcanic activity, hitherto recorded in the Opole area by other authors.

KEYWORDS: basalts, K-Ar dating, petrology, Cenozoic, Lower Silesia, SW Poland

CRUST DEFORMATION MONITORING IN THE POLISH PART OF ŚNIEŻNIK MASSIF-CONTINUING RESEARCHES

Olgiard JAMROZ * and *Jan KAPŁON*

*Department of Geodesy and Photogrammetry, Agricultural University of Wrocław,
Grunwaldzka 53,*

50-357 Wrocław, Poland, tel/fax: +48 71 32-05-617

**Corresponding author's e-mail: jamroz@kgf.ar.wroc.pl*

(Received April 2005, accepted June 2005)

Abstract

Śnieżnik Massif is characterized by complicated geological and tectonic structure. Geodynamical network ŚNIEŻNIK was founded in 1992 as a local network for monitoring of Śnieżnik Kłodzki Massif crust deformation (27 points on Polish and Czech part). Neotectonic activity of this area is confirmed both by results of repeated satellite (GPS), gravimetric and some other field measurements. Results of researches from the period of 2003–2004 in the Polish part of network in the comparison of changes that had been determined previously are presented in this paper. Statistical analysis of the received data allowed four major tectonic blocks in the investigated region to be determined. Authors try to confirm trends of this area mobility.

KEYWORDS: geodynamics, Śnieżnik Massif, deformation analysis, GPS

**STUDIES OF ROCK BLOCKS DISPLACEMENTS ON THE UPPER EDGE OF
THE “SZCZELINIEC WIELKI” MASSIF**

**Krzysztof MAKOLSKI^{1)*}, Stefan CACON¹⁾, Blahoslav KOŠŤÁK²⁾,
Jan KAPŁON¹⁾ and Mirosław KACZAŁEK¹⁾**

¹⁾ *Department of Geodesy and Photogrammetry, Agricultural University of Wrocław,
Grunwaldzka 53, 50-357 Wrocław, Poland*

²⁾ *Institute of Rock Structures and Mechanics, Czech Academy of Science Prague, Czech
Republic*

**Corresponding author's e-mail: makolski@kgf.ar.wroc.pl*

(Received July 2005, accepted August 2005)

Abstract

The studies of rock block mass movements on the “Szczeliniec Wielki” were started in 1972, when local geodetic network was established, in front of a shelter-house. Analogous observations are performed in the “Piekiełko” fissure. These measurements are irregularly made, the last were realised in September 2004. Apart from the local geodetic network, three crack gauges (TM-71) were established in the survey area. The first in 1974 in front of shelter-house, the second in 1979 in the “Piekiełko” and in 1998 near the “Stare Schody”. The results of repeated geodetic measurements and TM-71 observations series show mass movements of rock block in the survey area. The interpretations of these results indicate tectonic instability of the “Szczeliniec Wielki” Massif and paleoseismic character of observed changes in the upper part of the “Szczeliniec Wielki” Mt.

KEYWORDS: rock blocks displacements, geodetic measurements, relative measurements

**EASTERN SILESIA GEODYNAMIC GPS NETWORK-
PRELIMINARY RESULTS OF THE CAMPAIGN 2003-2004**

Piotr BANASIK* and Władysław GÓRAL

*AGH University of Science and Technology (AGH-UST), Faculty of Mining Surveying and
Environmental Engineering, Poland*

**Corresponding author's e-mail: pbanasik@agh.edu.pl*

(Received March 2005, accepted July 2005)

Abstract

*Geodynamic GPS network has been established in the area limited by four permanent GPS stations – KRAW (Kraków), ZYWI (Żywiec), KATO (Katowice), LELO (Lelów). It is an extension of geodynamical network of the vicinity of Krakow into Eastern Part of Upper Silesian Coal Basin(USCB). One of the basic problems occurring in this area which is subject to particularly significant deformations resulting from intensive mining is the current updating of its geodetic frames. Present state of the Geodynamic GPS network linked to the above nearest permanent GPS stations, POLREF system and levelling network GIGANT are presented. Proposals of inspection method of classical levelling network in mines area by means of GPS measurement are also given. Special attention has been paid to the method of ground deformation monitoring in mine areas.

KEYWORDS: Upper Silesian Coal Basin, permanent GPS stations, geodynamic network, deformation monitoring

**GEODYNAMIC STUDIES OF THE PIENINY KLIPPEN BELT
IN THE CZORSZTYN-REGION IN 2001-2003**

***Kazimierz CZARNECKI**, *Marcin BARLIK*, *Krystyna CZARNECKA*, *Tomasz OLSZAK*,
Andrzej PACHUTA, *Ryszard SZPUNAR* and *Janusz WALO***

*Institute of Geodesy and Geodetic Astronomy, Warsaw University of Technology. Plac
Politechniki 1, 00-661 Warszawa, Poland*

**Corresponding author's e-mail: kcz@gik.pw.edu.pl*

(Received January 2005, accepted June 2005)

Abstract

The project was launched in the autumn 2000. The paper presents research programme in the context of up-to-now geodynamic studies of the area. Geodetic methods (terrestrial and satellite) and geophysical methods (gravimetric, seismic sounding, electric resistance profiling) have been applied. The results were compared with those obtained earlier in the years 1970-80-90 in the same region by the Institutes of the Warsaw University of Technology. Aim of the project was to find how the construction of the dam on Dunajec-river and creation of the artificial lake have influenced recent activity of the region. Results of precise leveling and trigonometric leveling have proved significant (6-7 mm) vertical depression of the Pieniny Klippen Belt relating adjacent tectonic units: Magura nape (in North) and Podhale Flysh (in South). Horizontal movements between the control points monitored by laser-distance and satellite GPS measurements have demonstrated shortening at the northern contact of the Pieniny Klippen Belt and differentiated extension trend at the southern contact. The character of the motion corresponds with changes in the seismic wave velocities: increasing in the region of the northern contact and decreasing in the southern contact comparing with those of 1988. Such a behavior can be explained by the increase and decrease of the stresses in the basement resulting probably from the water loading of the artificial lake. Gravimetric measurements have shown inessential increase of gravity in the region of the Pieniny Klippen Belt. The results of geodynamic studies have proved recent activity of the area considerable enough to take it into account in the process of forecasting safety of the dam in Niedzica and the Czorsztyn Lake. For the same reason the studies should be repeated no later than after five years.

KEYWORDS: geodynamics, geodesy, Pieniny Klippen Belt

IMPACT OF SOME SITE DEPENDENT FACTORS ON GPS DISPLACEMENT MONITORING

Otakar ŠVÁBENSKÝ* and Josef WEIGEL

Brno University of Technology, Department of Geodesy, Veverí 95, 662 37 Brno, Czech Republic

Tel.: +420-541147211, +420-541147213, Fax.: +420-541147218

**Corresponding author's e-mail: svabensky.o@fce.vutbr.cz*

(Received March 2005, accepted June 2005)

Abstract

GPS is a convenient today's universal technique which is currently used also for precise positioning applications like e.g. monitoring of 2D (3D) displacements in many fields of interest. Accuracy of GPS derived positional parameters is nearing the millimeter boundary provided that all relevant influencing factors are taken into account and properly modelled. Between many items in GPS error budget the influences of site dependent factors which have to do with receiving conditions at an individual GPS station are very important. Here we include the station monumentation and nearby surroundings, the antenna mounting, the obstacles in signal acquisition, the multipath sensitivity, and also the receiving characteristics of GPS hardware. The last factor includes actual position of GPS antenna receiving point – phase center – precise alignment of which to the station point is important especially in case of observation with different types of antennas. The factors mentioned have direct impact on the accuracy and reliability of resulting displacements.

The paper presents overview of some of the site dependent factors. Discussed are the possibilities of elimination/mitigation of some of the disturbing influences. Problems of relative calibration of GPS antennas at BUT, Department of Geodesy, are described in more detail, together with some examples of practical applications in evaluation of displacement measurements in Krkonoše and Sněžník networks.

KEYWORDS: geodynamics, displacement monitoring, GPS, site dependent factors

DATA PROCESSING OF LOCAL GPS NETWORK LOCATED IN A MOUNTAIN AREA

Jaroslav BOSY

Department of Geodesy and Photogrammetry, Agricultural University, Grunwaldzka 53, PL - 50-357 Wrocław, Poland

Corresponding author's e-mail: bosy@kgf.ar.wroc.pl

(Received July 2005, accepted September 2005)

Abstract

Precise position determination of network points, particularly their vertical component is especially difficult in mountainous areas. Significant altitude differences and spatial variations of atmospheric conditions require the best possible approach to tropospheric delay (δT) estimation expressed by maximum reduction of systematic error caused by tropospheric refraction. The study of influence of tropospheric refraction on GPS measurements was performed on the example of local network KARKONOSZE.

KEYWORDS: GPS network, GPS data processing, tropospheric delay estimation

METHODIC ANALYSIS OF DATA OBTAINED BY MONITORING MICRO-TECTONIC MOVEMENTS WITH TM-71 CRACK GAUGES IN THE POLISH SUDETEN

Bernard Kontny^{1)*}, **Stefan Cacoń**¹⁾, **Blahoslav Košťák**²⁾ and **Josef Stemberk**²⁾

¹⁾ *Department of Geodesy and Photogrammetry, Agricultural University, Wrocław, Poland*

²⁾ *Institute of Rock Structures and Mechanics, Czech Academy of Science Prague, Czech Republic*

**Corresponding author's e-mail: kontny@kgf.ar.wroc.pl*

(Received April 2005, accepted July 2005)

Abstract

On the Polish side of the Sudeten more than ten TM-71 crack-gauges, constructed by Kostak, have been installed for micro-movement monitoring since the 70'ties of the 20th Century. The first instruments were installed for monitoring of gravitational movements of rock blocks on Szczeliniec Wielki Massif in the Table Hills Mts. Later the gauges were installed to detect micro-tectonic movements in Bear Cave near Stronie Śląskie, and the last ones in Dobromierz, Zloty Stok, and Janowice Wielkie. Time series of the data obtained with these TM-71 gauges have been analysed regarding:

- Linear trend analysis using Least Squares method and M-estimation (robust method);
- Frequency component analysis using discrete Fast Fourier Transform;
 - Temperature dependency analysis with the help of correlation coefficient estimation;
- Detection of episodic movement and analysis of correlation with earthquake occurrence.

Results of the analysis show that series of observations several years long enable estimation of linear trends. At most sites in the Sudeten only slow relative movements (below 0.1 mm/year) are detectable. However, results from one site (Dobromierz) show horizontal movements higher than 2 mm/year. Estimation of periodicity requires longer (more than 10 years) data series without many data gaps. One-year periodicity is dominant due to seasonal temperature variations, longer periods are also detectable (e.g. ca 12 years). Some echoes of earthquakes are also detectable in the time series of the TM-71 data.

KEYWORDS: active faults, monitoring, Sudetic Fault Zone

**TRANSMISSION OF CONTINUOUSLY RECORDED DATA FROM REMOTE
GPS PERMANENT STATIONS TO IRSM CENTRAL UNIT**
František MANTLÍK, Pavel KOTTNAUER, Vladimír SCHENK
and Zdeňka SCHENKOVÁ*

Institute of Rock Structure and Mechanics, Academy of Sciences, V Holešovičkách 41, CZ-182 09 Prague 8, Czech Republic

**Corresponding author's e-mail: mantlik@irsm.cas.cz*

(Received May 2005, accepted July 2005)

Abstract

Within activities of the Centre of Earth Dynamic Research, Institute of Rock Structure and Mechanics Academy of Sciences CR (IRSM), five permanent GPS observatories were established to the purpose of geodynamic studies of the Bohemian Massif. Their positions in the Massif were set up with respect to its geological structures and the existence of already operated GPS observatories as well as position of the IRSM networks for GPS epoch measurements. The IRSM GPS observatories are situated at the following sites:

- SNEC – at a top of the Sněžka Mt., the highest point of the Czech Republic, in operation since 2001,
- BISK – on a stone watchtower at the Biskupská kupa hill near Zlaté Hory, in operation since 2001,
- MARI – on the chimney of building in Mariánská village near Jáchymov located at the eastward wing of the seismoactive Mariánské Lázně tectonic zone, in operation since 2003,
- POST – at a roof of panel house in Poustka village near Františkovy Lázně situated at the opposite westward wing of the same tectonic zone, in operation since 2003, and
- VACO – at a roof of panel house in Vacov near Vimperk, in operation since 2004.

The observatories SNEC and BISK are linked to WEST and EAST SUDETEN regional geodynamic networks to ensure reasonable movement evaluations detected on network sites during individual annual epoch GPS measurements. The observatories MARI and POST are close to the German GPS observatories Grünbach (GRNB) and Neustadt (NEUS) to monitor geodynamic motions along the seismoactive Mariánské Lázně fault zone in the west part of the Bohemian Massif. The observatory VACO is located on an opposite side of the shear zones of the Bavarian Pfahl with respect to the EPN German observatory Wettzell (WTZR). All IRSM observatories are equipped with Ashtech Z-18 receivers and precise choke-ring Ashtech antennas that allow both NAVSTAR and GLONASS satellite signals to be monitored. Moreover, the BISK observatory is equipped with meteorological sensors for temperature, atmospheric pressure and relative humidity registrations. The observatories are connected on-line to the IRSM centre to transmit hour-data observed to the centre. The remote control of the observatories, continual GPS data transmission from observatories to IRSM server and routine data processing will be presented.

KEYWORDS: permanent GPS observations, EUREF network, the Bohemian Massif, geodynamics

CONTRIBUTION OF GPS PERMANENT STATIONS IN CENTRAL EUROPE TO REGIONAL GEO-KINEMATICAL INVESTIGATIONS

Ján HEFTY*, Miroslava IGONDOVÁ and Michal HRČKA

Department of Theoretical Geodesy, Slovak University of Technology, Faculty of Civil Engineering, Radlinského 11, 813 68 Bratislava, Slovak Republic,

Tel: +421 2 5927 4533, Fax: +421 2 5292 5476

**Corresponding author's e-mail: jan.hefty@stuba.sk*

(Received March 2005, accepted August 2005)

Abstract

At the Slovak University of Technology (SUT) in Bratislava we continuously analyse permanent GPS network comprising of more than 30 stations situated in Central Europe, designed mainly for European Terrestrial Reference Frame maintenance and regional geodynamic investigations. The purpose of such analysis is a detailed inspection of coordinate repeatability, systematic effects, and regional geodynamic phenomena influencing the behaviour of permanent stations. We present the mathematical model for referencing the regional network with aim to reduce global effects in evolution of station coordinates and to give detailed information about relative local effects. Station behaviour is then modelled by residual velocities and seasonal variations. The numerical outputs are results of the analysis of two-year interval of daily coordinates.

KEYWORDS: permanent GPS network, coordinate time series, relative site velocities, seasonal variations

COMBINING GPS AND VLBI MEASUREMENTS OF CELESTIAL MOTION OF THE EARTH'S SPIN AXIS AND UNIVERSAL TIME

Jan VONDRÁK* and Cyril RON

Department of Galaxies and Planetary Systems, Astronomical Institute, Academy of Science of the Czech Republic, Boční II, 141 31 Prague

**Corresponding author's e-mail: vondrak@ig.cas.cz*

(Received January 2005, accepted February 2005)

Abstract

GPS and VLBI are used to measure global parameters of Earth's orientation in space – polar motion, celestial motion of the spin axis, and universal time (defining the Earth's angle of rotation around the spin axis). Polar motion (i.e., the motion of the spin axis with respect to terrestrial frame) is observed by both methods. However, only VLBI is capable to observe the latter two components directly (i.e., with respect to celestial frame); GPS, because of simultaneously determined orientation of the satellite orbits, can observe only their time derivatives. The method of “combined smoothing”, recently developed at the Astronomical Institute in Prague, is used to provide a unique combined solution that fits well both to the values observed by VLBI and their rates observed by GPS. Two solutions are presented here:

Celestial pole offsets (observed by VLBI) combined with their rates (observed by GPS); Universal time (observed by VLBI) combined with length-of-day changes (observed by GPS).

The results of these combinations, covering the last decade, are analyzed. It is demonstrated that the combination improves both resolution and accuracy of the results with respect to VLBI-only solution.

KEYWORDS: geodynamics, Earth orientation, space techniques, combinations

THE HYPOTHESIS ON THE EARTH'S EXPANSION IN THE LIGHT OF SPACE GEODESY RESULTS

Tereza BAJGAROVÁ^{1)*} and *Jan KOSTELECKÝ*^{2,3)}

¹⁾ *Department of Mapping and Cartography, Faculty of Civil Engineering, Czech Technical University in Prague, Thákurova 7, 166 29, Prague 6, Czech Republic*

²⁾ *Department of Advanced Geodesy, Faculty of Civil Engineering, Czech Technical University in Prague, Thákurova 7, 166 29, Prague 6, Czech Republic, tel: +420 224354797, fax: +420 224354343*

³⁾ *Research institute of Geodesy, Topography and Cartography, 250 66, Zdiby 98, Czech Republic, tel/fax: +420 284890250*

**Corresponding author's e-mail: franciska@centrum.cz*

(Received February 2005, accepted June 2005)

Abstract

The hypothesis on the Earth's expansion is shortly reviewed in this article. Its quantification based on the Blinov theory is performed and compared with recent results of space geodesy methods. These results based on measurement interpretation lead us to rejection of the Blinov hypothesis, but considering measurement itself – if we use strict statistical criteria – we cannot decide if the Earth expands or not.

KEYWORDS: space geodesy, geodetic reference systems, Earth's expansion theory, plate tectonics

METHODOLOGY OF PERIODIC GRAVIMETRIC INVESTIGATIONS IN MONITORING GEODYNAMIC PROCESSES - SELECTED EXAMPLES

*Monika ŁÓJ**, *Janusz MADEJ* and *Sławomir PORZUCEK*

AGH University of Science and Technology, Faculty of Geology, Geophysics and Environmental Protection, Department of Geophysics al. Mickiewicza 30, 30-059 Cracow, Poland

**Corresponding author's e-mail: mloj@geol.agh.edu.pl*

(Received January 2005, accepted April 2005)

Abstract

This paper presents preliminary results from two geodynamic research areas; one located in the Polish segment of the Western Outer Carpathians (multidisciplinary geophysical - gravimetric and geoelectric, geodetic, geologic and morphostructural investigations) and the other being the research area of the "Dębina" salt dome in Bełchatów.

Inner and Western Outer Carpathian shows contrast tendencies characteristic of young tectonic movements. Gravity network cuts through this fragments of Polish Outer Carpathian Mountains that was most uplifted in Quaternary.

"Dębina" salt dome separates Bełchatów deposit from Szczerców deposit. Currently, the exploitation on the Bełchatów field approaches the salt dome limits and at the same time the construction of the new Szczerców strip mine has been started, which influences the dynamics of the phenomena occurring in the salt dome.

The idea behind this research project is to attempt to quantitatively interpret the results received from the gravimetric investigations i.e. to link temporal gravity changes with geodynamic processes in the earth's crust and dynamic processes on "Dębina" salt dome

KEYWORDS: gravity measurement, geodynamic processes, temporal gravity changes

**DISCUSSION ON THE RESULTS OF ANALYSES OF YEARLY OBSERVATIONS
(2003)
OF PLUMB LINE VARIATIONS FROM HORIZONTAL PENDULUMS AND
LONG WATER-TUBE TILTMETERS**

Marek KACZOROWSKI

*Space Research Centre, Polish Academy of Sciences, Bartycka 18A, 00-716 Warsaw,
Poland*

Corresponding author's e-mail: marekk@cbk.waw.pl

(Received January 2005, accepted April 2005)

Abstract

In the paper we present the results of analyses of plumb line variations measurements from long water-tube tiltmeter during the first year of its work (2003). At the same time we made analysis of the yearly series of plumb line variations from horizontal pendulums. The results of the observations analyze from the long water-tube and horizontal pendulums enabled us to compare both instruments. We found significant discrepancies between phases of main tidal waves obtained on the basis of the long water-tube observations, as well as quartz horizontal pendulums. In our opinion, the reasons of the phases discrepancies are systematic errors of azimuth determination of pendulums measurements. We also compared mean square errors of the adjustment of data from both instruments. The ratio of mean square errors is close to 0.8. This result is unexpected on account of large difference between precisions of both instruments measurements. Possibilities of registration of the Earth's free oscillations phenomenon with help of the long water-tube tiltmeter were noticed during very strong earthquake (8.6 magnitude), which took place on 25 September 2003 near Japanese coast. The instrument registered two hours long anomaly of plumb line variations of the order of milliseconds of arc, caused by long surface waves which periods were at interval from one to tens of minutes. These plumb line variations were produced by phenomenon of the Earth's free oscillations originated by the earthquake. Because of the resonance effect most of the standard instruments, such as seismographs, gravimeters, and tiltmeters are not able to register phenomena associated with the Earth's free oscillations. Introduction to the hydrodynamic system of the long water-tube elements which suppress water waving caused that the resonance effect was not present.

KEYWORDS: Geodynamics, the Earth tides, earthquake, the Earth's free oscillations, tidal deformations, tilt effect, tiltmeters, horizontal pendulums, long water-tube

APPLICATION OF GEOPHYSICAL METHODS IN THE STUDY OF LANDSLIDE MOVEMENTS, TAKING INTO ACCOUNT GEOLOGICAL CONDITIONS IN THE SUDETY MOUNTAINS

Jaroslav BÁRTA, Dušan DOSTÁL, Vojtěch BENEŠ and Michal TESAŘ

G IMPULS Praha spol. s r.o., Přístavní 24, 170 00 Praha 7, Czech Republic

Telephone and fax No.: +420 266712779

**Corresponding author's e-mail: post@gimpuls.cz*

(Received January 2005, accepted April 2005)

Abstract

Geophysical department of G IMPULS Praha systematically deals with the issues of landslide movements and possibilities of their detection by geophysical methods. The geophysical measurement is able to inform both about common geological condition and about geotechnical features of an area. We want to call your attention to the fact that these methods can be useful also in systematic investigation (including the monitoring) in the Sudety Mountains and adjacent areas.

KEYWORDS: geophysical measurement, geophysical method, landslide

ELECTROMAGNETIC PHENOMENA IN LANDSLIDES

Andrzej PRAŁAT¹⁾, Krzysztof MANIAK¹⁾ and Ivan POMPURA²⁾*

¹⁾ Institute of Telecommunication and Acoustics, Wrocław University of Technology, Wybrzeże Wyspiańskiego 27, 50-370 Wrocław, Poland, Tel. +48-713202580, +48-713203118

²⁾ Slovenské Magnezitové Závody, akciová spoločnosť, 049-16 Jelšava, Slovenská Republika, Tel. +421-584822434

**Corresponding author's e-mail: andrzej.pralat@pwr.wroc.pl*

(Received January 2005, accepted May 2005)

Abstract

The nature of the electromagnetic phenomena, which occur in active landslides, is explained. The mechanism of electromagnetic emission generation in active landslides and EE measuring techniques are described. Special attention is given to pulsed electromagnetic emission (PEE) fields. The authors propose an original system for measuring both continuous and pulsed electromagnetic emission of landslides. For such measurements boreholes must be drilled in the landslide. It is essential that the tubing constituting the borehole's lining be made of a material, which does not attenuate electromagnetic fields. Besides its primary function, i.e. the registration of landslide electromagnetic activity, the system can be used for the examination of the structural inhomogeneity of rock strata subjected to considerable stresses. The results of EE examinations of the Kawiory landslide in south-western Poland and of the post-extraction cave in the SMZ Jelšava Mine in Jelšava in Slovakia are presented.

KEYWORDS: electromagnetic emission, landslide, landslides monitoring, PEE (Pulsed Electromagnetic Emission), slope stability

INTERPRETATION OF HIGH RESOLUTION SEISMIC DATA FROM THE "PIAST" COALMINE, POLAND

Katarzyna MIREK

Department of Geoscience Informatics, Faculty of Geology, Geophysics and Environmental Protection AGH University of Science and Technology, al. Mickiewicza 30, 30-059 Kraków, Poland

phone: +48 (12) 617 47 58; fax: +48 (12) 633 29 36

**Corresponding author's e-mail: kmirek@geol.agh.edu.pl*

(Received January 2005, accepted May 2005)

Abstract

The High-Resolution Seismic (HRS) method is a method that can be used successfully to recognize complicated tectonic and geological formations in coalmining areas. This method is quick and relatively cheap, therefore it allows for the exploration of large geographical areas. Seismic sections obtained in this way, correlated with borehole data, give complete information about the geo-tectonic situation.

This article presents the results of a HRS investigation conducted on the area of the "Piaśt" coalmine in the Upper Silesian Coal Basin (USCB), Poland. This investigation was designed to observe the course of the Bojszowski fault, and to determine if this fault cuts the carboniferous roof and transmits water from the tertiary layers.

Interpretation showed three other faults, secondary to the main Bojszowski fault. Analysis by the FAPS system, used during the interpretation of the HRS data allowed for a precise description of the Bojszowski and secondary faults.

KEYWORDS: faults, tectonics, High-Resolution Seismic

STRONG GROUND MOTION MONITORING NETWORK IN THE LEGNICA-GŁOGÓW COPPER MINING DISTRICT

Janusz MIREK

AGH University of Science and Technology, Faculty of Geology, Geophysics and Environmental Protection, Al. Mickiewicza 30, 30-059 Kraków, Poland

**Corresponding author's e-mail: jmirek@geol.agh.edu.pl*

(Received February 2005, accepted May 2005)

Abstract

Some of mining areas are characterized by occurrence of mining tremors induced by exploitation. Ground motion caused by mining tremors may be dangerous for people and surface structures and should be monitored especially in the highly urbanized areas. We can observe such a case in the Legnica-Głogów Copper District. The monitoring network in this area was initiated in 2001 by connecting to the SEJS-NET system two measuring stations. At present dozen of measuring station comprise the network to control vibration level of the ground and buildings localized in the mining areas and nearby its boundary.

The monitoring network makes use of Internet technologies for data collection and distribution. Authorized users access the system using web browsers, palmtops and cellular phones. Moreover, the stations can be configured logically in the so-called 'projects', being under control of independent groups of users, respectively.

KEYWORDS: strong ground motion, accelerometer monitoring

LEVELLING AND SEISMIC REFRACTION MEASUREMENTS OF GROUND SUBSIDENCE IN A MINING AREA

Krzysztof JOCHYMCZYK

*Faculty of Earth Sciences, University of Silesia, Będzińska 60, 41-200 Sosnowiec, Poland
Corresponding author's e-mail: jochym@ultra.cto.us.edu.pl*

(Received January 2005, accepted May 2005)

Abstract

Surface deformations are one of the most disadvantageous effects resulting from coal mining exploitation. Changes of stress in rock mass causing such deformations have a significant impact on variations in values of physical parameters of rocks. In these cases applying some geophysical methods seems to be very useful and practical.

The analysis of two-year cyclic levelling and seismic refraction measurements carried out in area of mining exploitation is presented in this paper. The application of complex researches and the detailed study of head wave velocity and mining subsidence allowed to describe much more accurately the deformation process occurring in a shallow subsurface.

KEYWORDS: subsiding trough, levelling, velocity of head wave, seismic refraction