

## **LINEAR PREDICTION OF AGGREGATED SEISMIC AND SEISMOACOUSTIC ENERGY EMITTED FROM A MINING LONGWALL**

*J. Kornowski*

### **Abstract**

Possibilities and results of (a single channel) linear prediction have been investigated for a few long time series of hourly, logarithmic, total (seismic + seismoacoustic) emission energy, observed from the region of a longwall independently by seismic and seismoacoustic networks in a coal mine. Quality of prediction, measured by the normalized variance of prediction errors, has been of the order of 0,5 and it is concluded, that for reasonably well estimated energies of observed events (keeping errors within the limits of  $\pm 1$  logarithmic unit) prediction errors of size similar to observation errors are obtainable.

## **INVESTIGATION OF GROUND VELOCITIES DURING THE ROCKBURSTS**

*V. Petroš and K Holub*

### **Abstract**

This paper presents partial results of the ground velocities analysis which were observed during the rockbursts at three underground seismological stations situated in the Ostrava-Karviná coal mines. For the investigation records of 49 rockbursts were used, energy of which was within the range of 103 – 107 J and hypocentral distances varied from 500 to 6900 m. Using the method of linear regression, dependences for ground velocity  $v_i$  vs. scaled distance  $r_{red}$  for P and S waves were derived which were expressed by following equations:

$$\begin{array}{ll} P_{\max} \text{ -waves} & v_i = 1.243 \times 10^{-4} * r_{red}^{-1.016} \quad (\text{m.s}^{-1}) \\ S_{\max} \text{ -waves} & v_i = 5.167 \times 10^{-4} * r_{red}^{-1.185} \quad (\text{m.s}^{-1}) \end{array}$$

interrelations between individual parameters, i.e. ground velocity, hypocentral distance and seismic energy a nomogram was constructed. From experimental measurements implies that prevailing frequencies of P and S waves occur within the frequency bands of about 3 – 12 Hz and 2 – 6Hz, respectively.

## **THE NOVÝ KOSTEL EARTHQUAKE SWARM 2000 – KRASNET MEASUREMENTS**

*V. Nehybka, R. Tilšarová and P. Špaček*

### **Abstract**

Paper is devoted to seismic activity in the area of western Bohemia, Nový Kostel Swarm 2000 observed by the Krasnet seismological network in particular. System of data acquisition and data processing conducted at IPE is described in brief, main portion of the paper deals with detailed description of results obtained. In the framework of the Nový Kostel 2000 Swarm total of 3229 earthquakes were localized their magnitudes ranging from  $-0.9$  to  $+3.2$ . Statistical evaluation of earthquake occurrences, their magnitudes, energy released and some results of calculation of focal mechanisms are presented as well.

## **SEISMIC SOURCE MODEL FROM WEST BOHEMIA SEISMOGRAMS INVERSION – THE METHOD AND PRELIMINARY RESULTS FOR ML=2.0, JAN 17 1997 EVENT**

*P. Kolář*

### **Abstract**

The aim of this work was to determine a source model by inversion of seismograms. An event of 1997 West Bohemia swarm was processed; Boender - Csendes non-linear inversion method (Boender et al., 1982, Csendes, 1988) was used for inversion of records from 7 closest stations. A source model composed of one or two point sub sources was considered, pure double couple optionally extended with non-double couple components. We supposed 1D medium model, optionally amended to reflecting interface situated closely to the source (horizontally or almost vertically oriented reflecting interface was considered). We were looking for optimal values of source parameters; we also tried to determine statistical reliability of each solution and made an attempt of inverted parameters error estimation. In general, the models with more inverted parameters yield better fit between observed and synthetic data, however with different statistical reliability.

In the comparison with the simple DC point source the model composed of two double-couple point sub sources (with different mechanisms and different source time function - STF) fit the data more satisfactory and with sufficient statistical significance. The influence of non-DC components as well as of reflecting interface(s) was found to be smaller or under statistical significance even if the fit itself improved also.

## **ON SOME ANOMALIES OF VP/VS RATIO OF WEST BOHEMIAN SWARM 2000 – PRELIMINARY RESULTS**

*P. Kolář and A. Boušková*

### **Abstract**

Some irregularities of  $vP/vS$  ratio were observed in West Bohemia region during routine data processing. In the present work we try to quantify these variations in 9 time phases of seismic swarm 2000. We seek for azimuthal dependence of time residua, which fit observed data better than a constant  $vP/vS$  value. The search of particular values is preformed by (Boender - Csendes) non-linear inversion method. We are able to distinguish such residua and to observe their time dependency (however with lower reliability). In addition we try to interpret observed anomalies of arrival of S waves in term of (horizontal) S waves velocity variation (i.e. a sort of quazi anisotropy); the difference between maximal and minimal values was found to be about 2%, the maximum oriented in WSW - ENE direction. Our results can serve as an indication of composed geological structure and complexity of the processes in the area, which should be investigated in more detailed way.

## **INFLUENCE OF SOME WEBNET STATIONS ON LOCATION OF EARTHQUAKES IN WEST BOHEMIAN SUBREGIONS NOVÝ KOSTEL AND LAZY**

*J. Málek and J. Janský*

### **Abstract**

The influence of the nearest station and some more distant stations on hypocentral parameters estimation for two subregions of the West Bohemian earthquake swarm region is studied by deleting the data from these stations from the location procedure. One of the regions being situated well inside of the seismic network WEBNET, the other is outside. The results are given in Tables and Figures.

## **SEISMIC EVENT LOCATION IN THE VICINITY OF THE UNDERGROUND GAS STORAGE HÁJE- PŘÍBRAM**

*J. Málek and J. Brokešová*

### **Abstract**

The accuracy of location of a local seismic network was analyzed using two seismic events, a main shock and an aftershock, registered by local seismic network near the underground gas storage Příbram-Háje. Three velocity models, one homogeneous and two vertically inhomogeneous were tested. Four different definitions of the misfit function, based on L1 or L2 norm and using both P and S waves or P wave only, were considered. The accuracy of locations is better in the horizontal plane than in depth. Analysis of misfit functions showed that using S waves in the localization procedure does not necessarily improve the accuracy.

## **NOTE ON THE DIRECT COMPUTATION OF GEODETIC DISTANCES AND AZIMUTHS ON AN ELLIPSOID OF REVOLUTION**

*O. Novotný and J. Málek*

### **Abstract**

Thomas (1965) presented expansions of geodetic arc lengths and azimuths on a reference ellipsoid to second-order terms in flattening. We have adopted his formulae for geodetic distances, but for azimuths we propose a more accurate approach. According to Thomas's estimates, this approximation yields distances within a metre for geodetic lines up to at least 10 000 km, and azimuths within a second of arc.

## **ZEOLITE-BEARING TRACHYANDESITE FROM DOBRANKA, ČESKÉ STŘEDOHOŘÍ MTS.: PETROGRAPHY, GEOCHEMISTRY AND AMYGDALINE MINERALOGY**

*J. K. Novák, J. Ulrych, M. Chváta, A. Langrová, V. Cajz, J. Adamovič, R. Rychlý and T. Wiesner*

### **Abstract**

The Dobranka zeolite locality represents mildly feldspathoidal trachyandesite lava flow embedded into volcanoclastic pile of the Děčín Formation of the České středohoří Mts. Two distinct facies are present: (i) almost fresh trachyandesite with zeolitized feldspathoid (sodalite?), and (ii) conspicuously vesicular and analcimized one, rich in Na zeolites and Na-Ca zeolites in amygdales, accompanied by calcite and clay minerals. Reduction of both aqueous silica activity (lowered Si/Al ratio) and low temperature created a stability field for crystallization of natrolite, thomsonite, gismondine, barium-bearing phillipsite-Ca, and gmelinite-Ca to become the dominant zeolites in the amygdales. Two generations of analcime, calcite and clay minerals may evidence repeated thermal events during postmagmatic evolution of the lava flow. The simplified crystallization succession of amygdale minerals is as follows: (illite) – analcime I – gismondine – barium-bearing phillipsite-Ca – (saponite?) – (calcite I) – thomsonite – natrolite – opal – wad – analcime II – calcite II.