

SOME ASPECTS OF THE APPLICATION OF THE WIECHERT-HERGLOTZ METHOD TO REFRACTION DATA FROM WESTERN BOHEMIA

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Abstract

The Wiechert-Herglotz method assumes the medium to be laterally homogeneous, and the travel-time curve of refracted wave to be continuous with monotonous derivatives. It is usually difficult to satisfy these requirements in refraction studies of shallow structures as a consequence of lateral inhomogeneities and large scatter of observed data. Nevertheless, we shall demonstrate that the Wiechert-Herglotz method can be used even in geologically complicated regions if the observed data are selected from identical geological units and smoothed considerably. For the smoothing, polynomial and rational approximations are analyzed in greater detail. The procedure is applied to P-wave travel times from the Libá refraction profile in western Bohemia. The derived velocity model is characterized with very low superficial velocities. This significant low-velocity zone was not recognized by the previous deep seismic soundings.

KEYWORDS: West-Bohemia, upper crust, refraction measurement, Wiechert-Herglotz method, polynomial approximation, rational approximation

SURFACE WAVES DISPERSION CURVES OF EURASIAN EARTHQUAKES: THE SVAL PROGRAM

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Abstract

A summary of seismic surface waves and time-frequency analysis theory is presented here. The main goal is to introduce the multiple-filter technique, which is to be used for processing of records. The SVAL program has been built and tested. The SVAL computes the spectrogram of a given signal, a filtered spectrogram, a filtered seismogram and group velocity dispersion curves of Rayleigh and Love fundamental modes. Filtered seismograms reveal also other wavegroups contained in a record of each component. The dispersion of overtones and Rayleigh waves at a transverse component and Love waves at vertical and radial component is also studied. The function of the program is demonstrated on Asian earthquakes recorded at the Praha seismic station.

KEYWORDS: surface waves, dispersion, group velocity, time-frequency analysis, multiple-filter technique

ASSESSMENT OF MINING TREMOR INFLUENCE ON THE TECHNICAL WEAR OF BUILDING

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Abstract

The paper presents an analysis of mining tremor influence on the technical wear of buildings in Legnica-Głogów Copper District. The introduced index of this influence, accounts for both the intensity and number of tremors, which affected objects throughout the whole period of their lifetime. Results of the investigations for 351 traditionally structured buildings are also presented.

KEYWORDS: mining tremors, mining effects, technical wear of buildings, building damage

SEISMICITY AND SEISMOTECTONICS OF THE WEST KOM OMBO AREA, ASWAN, EGYPT

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Abstract

The study area is located about 40 km north of Aswan City in the Western Desert, between longitude from 32° to 32.9° E and latitude from 24.2° to 24.8° N. On March 22, 2003 an earthquake (MD 4.0) occurred in the west Kom Ombo area and it was felt in the area and its surroundings. The event was followed by two aftershocks with magnitude 2.7 and 3.0. Due to the importance of Kom Ombo city as a main trade center in Aswan Governorate, in addition to the probability of discovering Oil and Gas in the Kom Ombo area, this study carried out. Rou software program is used to locate the earthquakes of the west Kom Ombo area. The results showed that the spatial distribution of these earthquakes are located roughly in the N-S direction, approximately parallel to the Nile River concordant with the main trend of Gebel el-Barka fault. The frequency-magnitude plot for the data located in the west Kom Ombo area gave a fairly good fit to a line with the form $\log N = (2.9 \pm 0.07) - (0.7 \pm 0.04) M$. The focal mechanism of the largest earthquake (March 22, 2003) is evaluated by using the polarity of the first arrival P-wave technique. The fault plane solution indicates strike-slip faulting with a normal fault component. The fault plane strikes 355° and dips 57° was taken in consideration because it is nearly parallel to Gebel el-Barqa fault and the spatial distribution of earthquakes in the area. The seismic activity in the west Kom Ombo area may be related to the Gebel el-Barka fault that is one of the Western Desert fault systems. The results of this study may be used for seismic hazard analysis for purposes of land use planning and policy-making.

KEYWORDS: Kom Ombo, seismicity, seismotectonics and focal mechanism

DETERMINATION OF BASIC PHYSICAL SOURCE PARAMETERS AND SCALING RELATIONS FOR KALABSHA EARTHQUAKES, ASWAN, EGYPT

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Abstract

Seismically the study area was considered aseismic till the occurrence of the main shock of 14 November 1981 (MD 5.3) that occurred in Kalabsha area, west of Aswan reservoir. Installation of the telemetered network around the northern part of Aswan reservoir played an important role in monitoring the seismic activity in the area. That activity concentrated in Kalabsha area appears to be from different sources. The seismic activity can be grouped into five different seismic zones clustering in position and depth (A, B, C, D, and E). Earthquakes recorded by Aswan telemetered network with duration magnitude M_D ranging from 1.5 to 3.1 representing the different seismic zones have been spectrally analyzed. Source parameters were determined using MAG software program. The seismic moment (M_0) ranged from 4.97×10^{11} to 1.11×10^{14} dyne/cm, the source radii (r) spanned from 91.4 to 312 m, whereas the stress drop ($\Delta\sigma$) varied from 0.57 to 74.55 bar and the seismic energy (E) ranged from 8.78×10^4 to 6.41×10^7 J. The scaling relations between the different parameters such as $M_0 - M_D$; $M_0 - \Delta\sigma$; M_0 - corner frequency (f_0) and moment magnitude (M) - M_D were made and the empirical relations were obtained which will help in the fast calculation of the different source parameters for the earthquakes in the region without any need of running any spectral analysis programs.

KEYWORDS: Source parameter; scaling relation; seismic moment; source radius stress drop; moment magnitude; Kalabsha; Aswan.

NEWLY IDENTIFIED FAULTS INSIDE THE VOLCANIC COMPLEX OF THE ČESKÉ STŘEDOHOŘÍ MTS., OHŘE/EGER GRABEN, NORTH BOHEMIA *Vladimír CAJZ*¹⁾, *Jiří ADAMOVIČ*¹⁾, *Vladislav RAPPRIČ*^{2),3)} and *Leoš VALIGURSKÝ*^{2),3)}

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Abstract

Recent geological survey in the area of the České středohoří Mts. allowed to identify new fault structures inside the volcanic complex. Dip-slip faults were mostly detected, but strike-slip and combined movements were also observed, especially on faults parallel to graben margins. Fault plane geometries and the importance of strike-slip movements on the faults indicate the dominance of shear stress over the whole Ohře/Eger Graben structure rather than pure extension in the synvolcanic and postvolcanic periods. The newly identified structures are described in this paper, including their assumed kinematic function. An assessment of previously known tectonic structures in this area is also given.

KEYWORDS: Surface-detected faults, deep-seated faults, České středohoří Mts. volcanic complex, Ohře/Eger Rift, Cenozoic

**CARBON-CARBON FILMS AND COMPOSITES BASED ON POLYIMIDES:
PROCESSING AND PROPERTIES**

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Abstract

Film-forming polyimides were synthesized by transacylation of diacetylic derivatives of aromatic diamines (IDA) by bis-phthalic anhydrides of tetracarboxylic acids. Mechanical and calorimetric properties of these films were investigated. The microporosity texture parameters of C-C films obtained by the IDA method were measured. The possibility to obtain C-P and C-C composites based on this type of polyimides was shown.

KEYWORDS: Polyimides, polyimides films, carbon plastics, carbon films, carbon-carbon composites, mechanical properties, microporous texture parameters

**INTERACTIONS OF CHLORINE AND SULPHUR COMPOUNDS IN THE COKING
PROCESSES OF COAL BLENDS**

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Abstract

Chlorine and sulphur present in hard coal evolve during coal blend coking process in the similar range of temperatures and can interact between each other. These could also competitively interact with other components of a coal matter and crude coke-oven gas. In the piece of research impact of addition of selected sulphur compounds on chlorine emission in the process of laboratory coking of coal blends through determination of its content in produced cokes was observed. Significant impact of increase of sulphur content in the coal blend designed for coking on the amount of chlorine remaining in coke was found. Impact of increase of chlorine content in the coal blend designed for coking on the amount of sulphur remaining in coke was also observed. These phenomena show that interactions between chlorine and sulphur compounds do exist in the process of laboratory coking of coal blends.

KEYWORDS: cokemaking, chlorine emission, sulphur emission, interactions of chlorine and sulphur

THERMAL REACTIONS OF COAL WITH POLYAMIDES

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Abstract

Kinetics of thermal reactions of coal with polyamide 6 by TGA and DSC methods was studied. In the range of about 350 – 500 oC the thermal degradation of coal proceeds, and gas and tar are evolved. Simultaneously, the thermal decomposition of polyamide 6 occurs and mainly ϵ -caprolactam is formed. The ϵ -caprolactam formation is promoted by reaction water from the coal degradation and coal hydrogen, because coal is a strong H-donor. Under high-temperature conditions carbon oxides, ammonia, aliphatic hydrocarbons, simple aromatics, and stable oil are formed during copyrolysis of coal with polyamide 6. The yields of gas and tar from copyrolysis with waste polyamides are then higher in comparison with those from pyrolysis of coal alone.

KEYWORDS: coal, kinetics, polyamides

POSSIBLE ORGANOMETALLIC STRUCTURES IN THE COAL SUBSTANCE OF CZECH COALS

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Abstract

Modes of occurrence of metal elements in coal substance of coals from Ostrava-Karviná District and North Bohemia Basin and the element affinities to organic and mineral part of coal are evaluated. On this basis and by means of described reactions of metals with organic structures the possible organometallic complexes are presented. As other types carbon-metal and metal carboxyl compounds are considered. In the case of metal phenol structures with oxygen-metal bond a model compound is considered and bonding energies are calculated and discussed. On this basis the metal phenol structures in coal substance are suggested.

KEYWORDS: coal, organometallic compounds, complexes

REPRESENTATIVE STRUCTURES OF THE DUKLA COAL FROM UPPER SILESIAN COAL BASIN

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Abstract

¹³C CP/MAS NMR structural parameters of the Dukla coal from Upper Silesian Coal Basin, Ostrava-Karviná District were determined. Aromatic-cyclanic structures were expressed and discussed. It was found that representative structures of the Dukla coal are the clusters with mainly with 1 – 2 aromatic rings, 1 OH groups and five- or six-membered cyclanes with methyls and quaternary carbons. As basic structures of bituminous coals from Upper Silesian Coal Basin are the clusters with mainly 3 – 4 aromatic rings, the clusters with mainly with 1 – 2 aromatic rings exist in the Dukla coal polymers as prevailing form of aromatic-cyclanic basic units.

KEYWORDS: coal, ¹³C CP/MAS NMR, coal structures

MODELLING OF EFFECTS OF OPERATING CONDITIONS AND COAL REACTIVITY ON TEMPERATURE OF BURNING PARTICLES IN FLUIDIZED BED COMBUSTION

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Abstract

Two simplified models for estimation of temperatures of smaller, low ash char particles and bigger high ash char particles burning in fluidized bed (FB) have been formulated and solved in our study. For smaller, low ash char particles constant temperature across char particles was assumed. In the case of bigger, high ash char particles with reaction zone moving from surface to the inner part of the char radial profile of temperature within the particles was considered. Results of the model solutions have shown, that the temperature of burning char particles increases significantly with increasing oxygen concentration in flue gas, with increasing operating pressure, decreasing char particle size and increasing reactivity/porosity of the char. The temperature difference between burning char temperature and FB temperature can attain values between 40 and 150°C for atmospheric conditions and values between 200 and 500°C for pressurized FB combustion. Solution of the model for temperature of bigger, high ash char particles revealed, that under specific conditions (e.g. lower operating pressure, low thermal conductivity of porous, surface ash layer, low resistance in ash layer for oxygen diffusion) the temperature within the burning char particle, on the reaction sphere, can be even higher than the temperature in the stage of surface char burning.

Theoretical estimates of temperatures of burning char particles are important for forecasting and avoiding ash particle agglomeration in FB combustion and in modeling of emissions.

KEYWORDS: modelling, char temperature, fluidized bed combustion

CRITICISM OF PREDICTION OF COAL SELF-IGNITION

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Abstract

Regarding difficulty of theoretical clarification of coal self-ignition, from purely practical reasons, particularly economic and ecological ones, interest has been focused on prediction of tendency of coal to self-ignition. A test should be available for this purpose which would enable, based on testing a small sample of coal extracted from a seam or collected from a coal store, using an easy technique, to generalize self-ignition ability of the whole coal contained in systems given. At the choice of method expected to describe this process with a single, preferably simple mechanism, direct oxidation of coal with a gaseous medium, either pure oxygen or air oxygen, was preferred. In this case, two tests are most often referred to, Olpinski's method and adiabatic method, which also need to be critically assessed, since the self-ignition of coal should be considered as a uncertain phenomenon which in its complex nature cannot be unambiguously determined in time and space.

KEYWORDS: coal self-ignition; methods of prediction; sense of laboratory test

EMISSIONS OF CARBON DIOXIDE OF GASEOUS FUELS CALCULATED FROM THEIR COMPOSITION

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Abstract

The combustion of gaseous fuels contributes significantly to the overall emission of carbon dioxide. The IPCC methodology is generally used for national inventory of greenhouse gas emissions. On the other hand, for monitoring of CO₂ emissions from individual sources, it is more convenient to draw on the carbon content of the combusted fuel and its consumption. The paper describes the computation procedures for determining carbon dioxide emissions from known compositions of gaseous fuels, the estimation of CO₂ emissions from incomplete data and estimating uncertainty.

KEYWORDS: gaseous fuels, CEF, carbon dioxide, emissions, monitoring, emission factor

SEISMIC EFFECTS OF THE QUARRY BLASTS ON THE TERRITORY OF BOHEMIA

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Abstract

Quarry blasts can be exploited as a source of seismic waves for structural studies of upper crust. For these studies, accurate origin times are necessary. During years 2002 and 2003 the origin times of 48 blasts at 39 quarries were measured and the results are presented. Typical features of seismograms are demonstrated on a broadband seismic record. Parameters of all active quarries on the territory of Bohemia (western part of the Czech Republic), in which blasts are performed, are listed.

KEYWORDS: quarry blasts, broadband seismograms, list of quarries