

**DETERMINING A 1-D VELOCITY MODEL OF THE UPPERMOST CRUST  
FROM P AND S ARRIVAL TIMES USING THE NEIGHBOURHOOD  
ALGORITHM: SYNTHETIC TEST**

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**Abstract**

Using synthetic data we study the possibility of determining 1-D velocity models of the upper crust from P- and S-wave arrival times in the case of a narrow depth interval of seismic sources and sparse distribution of stations. The test is tailored to a similar real situation in one subregion of the western part of the Corinth Gulf, Greece. Two kinds of models are studied: (i) models composed of layers with constant velocity gradients, and (ii) models composed of homogeneous layers. To derive the structural models from arrival times, the Neighbourhood Algorithm of Sambridge (1999) is used, combined with the grid search for source locations. Weighted P- and S-wave arrival time residuals are used as the misfit function. Accurate and perturbed synthetic arrival times are used. The velocities at medium depths, with a fast velocity increase, are well determined in both models for the accurate data. However, the determination of velocity is less certain in the uppermost 5 km for the gradient model, and in the deepest layer for the model composed of homogeneous layers for the perturbed data. The presence or absence of hypocentres in the uppermost or in the second layer influences notably the obtained velocity in these layers in both models.

**KEYWORDS:** synthetic test, uppermost crust, arrival-time inversion, Neighbourhood Algorithm, grid search

**HOW MUCH CAN WE TRUST SOME MOMENT TENSORS OR AN ATTEMPT  
OF SEISMIC MOMENT ERROR ESTIMATION**

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**Abstract**

During routine processing of selected events of an active KTB experiment it has appeared doubts concerning data reliability and consequently the reliability of results based on them. In the paper 3 events are studied in detail, full seismic moment tensors, as well as their errors, are determined (by non-linear inversion of P/SH waves ratios). It is shown that for the processed low constrained data moment tensor (MT) can be determined, however the relative error is of order of first tens of percent; the results also considerably depend on the way of data picking, used medium model, way of Cost function construction, etc. Any subsequent geophysical interpretation therefore should take into account this uncertainty. MTs are finally decomposed into DC and non DC parts, MTs errors are also transformed.

**KEYWORDS:** seismic moment tensor inversion, error estimation, seismic moment decomposition

## INTERACTIVE SEISMIC VIEWER “OP” – SHORT REVIEW

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### Abstract

We introduce an interactive seismic viewer “OP” (developed in MATLAB platform), primary designated for detailed processing of selected events. Few examples of graphical outlook are presented (main display window, particle motion diagram, etc.), available tools are briefly described, uncommon special tools (simultaneous display of original and filtered signal or time spatial correlation of seismogram components) are emphasized. Features of the viewer are discussed, some programming solutions are also mentioned.

**KEYWORDS:** interactive seismic viewer, seismogram processing, MATLAB

## FRACTURE BEHAVIOUR OF THE BASALT FIBRE REINFORCED COMPOSITES WITH POLYSILOXANE-DERIVED MATRIX

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### Abstract

Selected mechanical properties of unidirectional composites with polysiloxane-derived matrix and continuous basalt fibres reinforcement are presented. A special attention is devoted to the impact of long term exposition in hot air (aimed as a simulation of the anticipated operating conditions) to the composite failure under flexural load. The investigated composites worsened their properties after treatment in air at elevated temperature (650 – 750 °C). The originally non-catastrophic flexural failure changed to a brittle fracture, which was accompanied with a flexural strength decrease. The coalescence of fibres and their strong interaction with the matrix are probably the main reasons for the onset of brittleness. Unless these drawbacks are resolved the service temperature of the composites in air will probably not exceed approximately 500 °C.

**KEYWORDS:** basalt fibre, composite, fracture behaviour, polysiloxane, precursor

## CO-PYROLYSIS OF COAL/WASTE POLYMERS MIXTURES

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### Abstract

Mixtures of coal/waste tires, coal/waste plastics and coal/waste cotton were pyrolyzed in the laboratory pyrolytical unit built in IRSM AS CR Prague. Non-caking hard coal (mine Lazy) and its mixtures with some organic wastes were pyrolyzed in a quartz reactor inserted in a vertical tube furnace. The main product yields (coke, tar, gas and reaction water) documented exhibit entirely different influence of added waste. Results demonstrated that co-pyrolysis is meaning full in case of waste tires and plastics. However, in case of co-processing with waste cotton (natural textile), the results are not promising.

**KEYWORDS:** coal, co-pyrolysis, wastes, cotton, tires, plastics

## THE MINERALOGICAL RESEARCH OF MANGANESE-PHOSPHATE CRUSTS IN THE REGION OF HODUŠÍN – BOŽETICE AT MILEVSKO

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### Abstract

A mineralogical study of the weathering crusts rich in P and Mn from the locality Hodušín – Božetice at Milevsko is presented. The locality belongs to the central part of the variegated group of Sušice and Votice in the Moldanubian Unit. From the analytical methods used, the IR-spectroscopy yielded satisfactory results. The main crust components subjected to weathering are apatite (of a CarHap B – dahllite type) and Mn-minerals (massive black psilomelane, the needle-aggregates probably comprise a poorly recrystallized psilomelane). Disintegrated rocks consist of a mixture of clay minerals, calcite and relicts of primary minerals (quartz, K-feldspars, albite, pyroxene and rutile). The origin and the source material of these crusts rich in P and Mn can not be unambiguously determined. Apatites without CL-effects indicate that the weathering crusts have originated in a strongly oxidative environment.

Well documented neighbouring occurrences of phosphate minerals in the variegated group of Sušice and Votice are associated with graphitic rocks. Optical and quantitative chemical analyses of the rocks suggest that the source of apatite could possible be calc-silicate rocks (erlans) close to the graphitic rocks. Hypothetically, the metaphosphorite layers in the variegated Moldanubian Unit can also be considered a possible source of phosphorus.

**KEYWORDS:** Czech Republic, Moldanubicum, Hodušín, Božetice, variegated rock group of Sušice and Votice, apatite, phosphates, weathering crusts, Mn-minerals