

## **Some methodological aspects of computations of focal mechanisms for weak local earthquakes using waveform inversion method - application to data from Little Carpathians**

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**Abstract:** The Little Carpathians region represents one of the most important seismically active regions in Slovakia. Its seismicity is monitored by a local seismic network MKNET established in 1985. The network consists of 10 three-component short-period stations with the sampling frequency of 100 Hz and provides valuable detailed information on the seismicity in the region.

We have analyzed records of several earthquakes of magnitude between 2.0-3.4 that occurred during the last ten years in this area and calculated their focal mechanisms and moment tensors using the waveform inversion (Sokos and Zahradník 2009). The goal of the study was to complement the results of the waveform inversion obtained by Fojtíková et al. (2010) by finding an optimum frequency range of waves inverted for the focal mechanisms. The time-frequency analysis of the seismic records was performed using the continuous wavelet transform implemented in program package TF-SIGNAL (Kristeková 2006). Using this analysis, we were able to set up appropriate frequency intervals in the waveform inversion. We have investigated the influence of the

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selected frequency intervals on the resultant moment tensors and focal mechanisms. Since the studied area is rather complex from the geological point of view and the velocity model of the local geological structure is not yet well known, we also analyzed the influence of using an inaccurate velocity model on the focal mechanisms. We have considered several alternative velocity models and studied the sensitivity of the focal mechanisms on them.

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**Key words:** Little Carpathians, weak local earthquakes, time-frequency analysis, waveform inversion, focal mechanisms

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