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DESIGNING NETWORK UPGRADE TO IMPROVE LOCATIONS AND MOMENT-TENSOR INVERSIONS

Lucia Fojtíková[1], Miriam Kristeková[2], Jiří Málek[3], Jaroslav Štrunc[4], Kristian Csicsay[5] and Jiří Zahradník[6]

Expansion and upgrade of seismic networks is usually governed by a number of economic, logistic and other factors. The optimum case is when the upgrade meets also quantitative scientific criteria aiming at optimizing the source-station configuration to improve determination of earthquake source parameters. The network optimization with respect to the event location has been studied since 70's (e.g. Kijko, 1977a, 1977b; Uhrhammer, 1980; Rabinowitz and Steinberg, 1990). We use an innovative approach in which error bodies of general polyhedron shape are calculated using relative double differences of travel times (Fojtíková et al., in preparation). The network optimization with respect to the focal-mechanism determination is new. We use the method of Zahradník and Custódio (2012) to produce maps representing the uncertainty of focal mechanisms for various source-station configurations and various frequency ranges. The analysis is made with a code recently added into ISOLA software (Sokos and Zahradník, 2008 and 2013). The objective of our work is to justify a preliminarily planned extension of the Dobra Voda, Slovakia network by adding new stations. To this goal we apply several quantitative methods to analyze resolvability of the hypocenter position and to make a prior assessment of the moment-tensors uncertainty.

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[1] Dr, Slovak Academy of Sciences, Bratislava, geoflufo@ savba.sk
[2] Dr, Slovak Academy of Sciences, Bratislava, kristekova@savba.sk
[3] Dr, Academy of Sciences of the Czech Republic, Prague, malek@irsm.cas.sk
[4] Dr, Academy of Sciences of the Czech Republic, Prague, strunc@irsm.cas.sk
[5] Dr, Slovak Academy of Sciences, Bratislava, kristian.csicsay@savba.sk
[6] Prof, Charles University in Prague, Prague, jz@karel.troja.mff.cuni.cz

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