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Finite seismic source of West Bohemia earthquakes inferred from stopping phases

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Seismic activity in West Bohemia region is the most important seismic phenomenon in the territory of the Czech Republic. It is continuously monitored by WEBNET seismic network and consequently, the seismic records are object of intensive studies. However, due to "continuous" data flow and remarkable event number (up to 10E4), data processing is mostly oriented on routine and/or semi-automatic operation (events identification, location, bulletin compilation, etc) or on some global statistic features as e.g. temporal-spatial distribution of released energy. Detailed study on seismic source maybe therefore performed on selected sets of relatively strong events: We have identified and interpreted stopping phases. Stopping phases theory supposes radiation of seismic waves from a planar finite source in such a way, that effectively only 3 points along the source area contribute to the waveform: (i) first arrival wave, which corresponds to the start of the rupture process, and (ii) two so called stopping phases, which correspond to stopping points situated on the edge of the ruptured source area. Following inversion is based on kinematic principles, since timing of stopping phases and first arrivals must hold relations given by the geometry of the seismic source, measuring geometry, and by delays introduced by the considered velocity model (approach by Imanishi and Takeo, 1998, 2002).
We have developed computer code based on above mentioned theory, and performed calculations of real data. The data (picked arrival times of onset and stop phases) are inverted either for finite circular source (2 parameters: radius and rupture velocity) or for finite elliptical source (4 parameters: radius, eccentricity, rupture velocity and orientation).
During the work on the project, it has appeared alternative way of determination of parameters of finite source: if follows from higher seismic moment tensor theory, that some terms of second order MT can be interpreted in term of geometrical characteristic of finite source. It opens possibility to compare results obtain by independent way.
The aim of the project is not only to model finite seismic source but also to, if possible, contribute to understanding of geodynamic regime of the region under the interest.