Advances in near real-time moment tensor determination at the SED

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Rapid and accurate knowledge of an earthquake's magnitude and fault characteristics are vital for estimating the damage caused by a major event, for emergency response, and determining the potential for tsunami generation. The Swiss Seismological Service (SED) at ETHZ has been producing moment tensor solutions following moderately large regional and small local earthquakes since 1999. During this period, 3 separate broadband inversion methods - developed both internally and by other research groups - have been used and made publicly available.

Recent work has focused on developing near-real time solutions (<15mins) using the same basic inversion algorithm (Dreger, 2003) for local Swiss-Alpine and regional European-Mediterranean and Indonesian events. The goal is to reduce the time taken to produce a solution, whilst maintaining or improving the solution quality. In order to rapidly obtain high quality solutions from the large amount of available waveforms, and minimize the need for post-processing, we use an iterative approach that selects subsets of optimally spaced stations until the waveform fits reach a predefined quality. Catalogues of recent events are generated to compare magnitudes and mechanisms with the previous manual and automated (but slow, >90mins after event) SED solutions as well as solutions from other agencies.

This presentation summarises the method, the datasets and solution dissemination, as well as examining the quality/robustness, of the new SED moment tensor solutions.