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Inversion for seismic moment tensors from 6-component waveform data

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Waveform inversion for the seismic moment tensor nowadays is a well-established standard method in teleseismic distances. Nevertheless, several difficulties remain, especially for shallow and/or regional/local distances. These difficulties include e.g. the resolution of the mechanism, especially the non-double-couple components and the resolution of the centroid depth but also the uncertainty of a determined moment tensor.
During the last decade, the observation of rotational ground motions gained increasing attention amongst seismologists. So far, studies were based on one (vertical) component ring laser data but 3-component ring laser data and even data from portable rotation sensors are in reach. These new developments can contribute to solve the difficulties in waveform inversion for moment tensors.
Here, we present results for moment tensors, mainly in the regional distance range, derived from collocated translational and rotational ground motion measurements. These results are based on numerical and real-data studies. We inverted the ground motions recorded by a network of stations but also addressed the question of how reliable the inversion for moment tensors is from a single 6-component measurement.