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of Rotational Ground Motions for CTBT

Following classical theory in elasticity, the entire seismic wave-field caused by an infinitesimal deformation has three components of translation – standardly used in seismology – but also six components of strain and at least three components of rotation. Since decades the collocated measurement of translational and rotational ground motion is demanded. So far, it was hampered mainly due to the very small amplitudes of rotations. However, for about a decade, some strong-motion and quite very recently the first broadband rotational instruments have been becoming available. In several publications it has been shown that collocated measurement provides huge benefits in almost all research areas of observational and exploration seismology. Possible applications include sub-soil analysis and characterisations on various scales, wave-field separation and reconstruction, improved S-wave identification, source location and discrimination, as well as determination of the source mechanism (point and kinematic source). Furthermore, the studies showed that even single station analyses provide significantly more information on structure and source when data of six components are measured collocatively compared to only the three components of translation. In our presentation we are going to compile some of the major advantages and provide an outlook for possible applications within the framework of CTBT.

Primary author: GAEBLER, Peter Jost (Federal Institute for Geosciences and Natural Resources (BGR))

Presenter: GAEBLER, Peter Jost (Federal Institute for Geosciences and Natural Resources (BGR))

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