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## Improving the Resolution of the Isotropic Seismic Moment Tensor using Rotational Ground Motions

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Seismic moment tensors provide information not only about the geometry of a seismic source (tectonic – DC – part) but also with non-tectonic information such as volume changes (isotropic – ISO – part). This feature is crucial to discriminate explosive sources from others, which can hint to a nuclear test. However, that part is often not well resolved by standard methods. Measuring rotational ground motions might help to obtain more reliable results.

Six components of ground motion are needed to entirely describe the seismic wave-field, three translational and three rotational. Just recently, portable rotation sensors dedicated for seismological applications are available. In previous studies, we show that by inverting both ground motions together, the resolution of the moment tensor can be improved significantly.

In a synthetic set-up for the Korean peninsula we analysed the 2013 nuclear test of the Democratic People's Republic of Korea. Applying a Bayesian inversion method, we tested three frequency bands. We also tested the inversion with Green's functions based on one- and three-dimensional structural models. The reliability of the source mechanism benefits from both, the three-dimensional structure and rotations, even more in the higher frequency ranges. Thus, also the reliability of the ISO part is increased.

### Promotional text

Rotational ground motion recordings contribute significantly to the reliable determination of moment tensors. Thus, discriminating explosive sources is better resolved. Therefore, rotational ground motions constitute a new opportunity for improving nuclear test verification.

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