



GLOBAL MOMENT TENSOR COMPUTATION AT GFZ POTSDAM

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As part of its earthquake information service, GFZ Potsdam published seismic moment tensors for significant earthquakes world-wide since 2011. The software used to compute the moment tensors is a GFZ Potsdam in-house development, which uses the framework of the software SeisComP 3 (Hanka et al., 2010). SeisComP 3 (SC3) is a software package for seismological data acquisition, archival, quality control and analysis. SC3 is developed by GFZ Potsdam with significant contributions from its user community.

The moment tensor inversion technique uses a combination of several wave types, time windows and frequency bands depending on magnitude and station distance. Wave types include body, surface and mantle waves, as well as the so-called "W-Phase" (Kanamori and Rivera, 2008). The inversion is performed in the time domain. Moment tensors are currently computed in a semi-automatic fashion. Inversions are performed automatically in near-real time, followed by analyst review prior to publication. Automatic results are often good enough to be published without further improvements, sometimes in less than 30 minutes from origin time. In those cases where a manual interaction is still required, the automatic inversion usually does a good job at pre-selecting those traces that are the most relevant for the inversion, keeping the work required for the analyst at a minimum.

GFZ moment tensors are generally in good agreement with those published by the Global Centroid-Moment-Tensor (GCMT) project for earthquakes above a magnitude of about Mw 5. Additionally we publish solutions for smaller earthquakes in Europe, above about Mw 4, that are not analyzed by the GCMT project.

817 moment tensor solutions were published by GFZ in 2013 (2012: 731), including 76 solutions for earthquakes in and around Europe (2012: 72).

The GFZ earthquake bulletin is located at <http://geofon.gfz-potsdam.de/eqinfo>

For more information on SeisComP 3 visit <http://www.seiscomp3.org>

REFERENCES

- Kanamori, H., and Rivera, L. (2008) "Source inversion of W phase: speeding up seismic tsunami warning", *Geophys. J. Int.*, 175, 222-238, doi:10.1111/j.1365-246X.2008.03887.x
- Hanka, W., Saul, J., Weber, B., Becker, J., Harjadi, P., Fauzi, and GITEWS Seismology Group(2010) "Real-time earthquake monitoring for tsunami warning in the Indian Ocean and beyond", *Nat. Hazards Earth Syst.Sci.*, 10, 2611-2622, doi:10.5194/nhess-10-2611-2010

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