

# Moment Tensor Inversions for Rapid Seismic Source Characterization: From Nuclear and Regional Seismicity Monitoring to Tsunami Warning

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Rapid full source characterization provides useful information after the occurrence of an event of interest such as a nuclear test. Techniques using full moment tensor inversions based on long-period seismic waveforms recorded at regional distance helps to confirm the isotropic component of a seismic source, if any. Used on a grid of potential locations and by scanning continuous seismic waveforms, it is possible to implement a rapid detector of seismic events providing the full information of the sources (origin time, location, magnitude, mechanism). The applications of such implementation are numerous and range from rapid nuclear monitoring to seismic monitoring for seismological laboratories, to detection of large magnitude earthquakes for tsunami warning centers. Here, we present the developments made for the tool developed at CEA for the seismic monitoring of the North Korean region using only a limited number of seismic stations. We show its overall performances on past DPRK nuclear tests and regional earthquakes. We also show further advancements toward improving the monitoring of small magnitude (3.5 and less) earthquakes in France. On the opposite side, the approach is also under implementation at the French National Tsunami Center for rapid detection of potentially tsunamigenic earthquakes located in the Mediterranean Sea.

## E-mail

aurelie.trilla@cea.fr

## Promotional text

Presentation of a near-realtime tool for rapid detection and characterization of nuclear tests and other regional earthquakes using seismic source inversion. Numerous applications from nuclear screening to tsunami warning.

## Oral preference format

in-person

**Primary author:** Ms GUILHEM TRILLA, Aurelie (Commissariat à l'énergie atomique et aux énergies alternatives (CEA))

**Co-author:** Ms MENAGER, Marine (Commissariat à l'énergie atomique et aux énergies alternatives (CEA))

**Presenter:** Ms GUILHEM TRILLA, Aurelie (Commissariat à l'énergie atomique et aux énergies alternatives (CEA))

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