

# – Parallel Software for Shallow Seismic Events Joint Moment Tensor, Depth and Magnitude Determination

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The International Data Center is required to conduct expert technical analysis (ETA) and special studies to improve event parameters and assist States Parties in identifying the source of specific events, according to the Protocol to the Comprehensive Nuclear-Test-Ban Treaty. Source mechanism and event depth are two parameters which may be crucial for the event discrimination task. To introduce them into the Provisional Technical Secretariat commissioning, we have conducted testing and tuning of the ParMT branch of the SHI-ETA suite. The ParMT software is a new tool for shallow seismic event depth determination and source parameters characterization. Source properties are estimated via grid search over moment tensors. We follow Tape and Tape (2015) to uniformly discretize the moment tensor space, then determine the optimal moment tensor, magnitude and depth by comparing observed seismograms with synthetic waveforms. The software solves for the moment tensor for major types of sources (ISO, DC, CLVD) and source-receiver distances, as well as for the observed body and surface waves. A powerful user interface is included providing the whole analyst work cycle, from picking arrivals and polarity to final report generation. For ETAs, International Monitoring System as well as non-International Monitoring System data can be jointly used in processing.

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## Promotional text

This work improves understanding of event parameters for Expert Technical Analysis and Special Studies and thereby assists State Parties in identifying the source of a specific event according to the Protocol to the CTBT.

## Oral preference format

in-person

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