EGU General Assembly 2021

Gisola

Real-Time Moment Tensor Computation

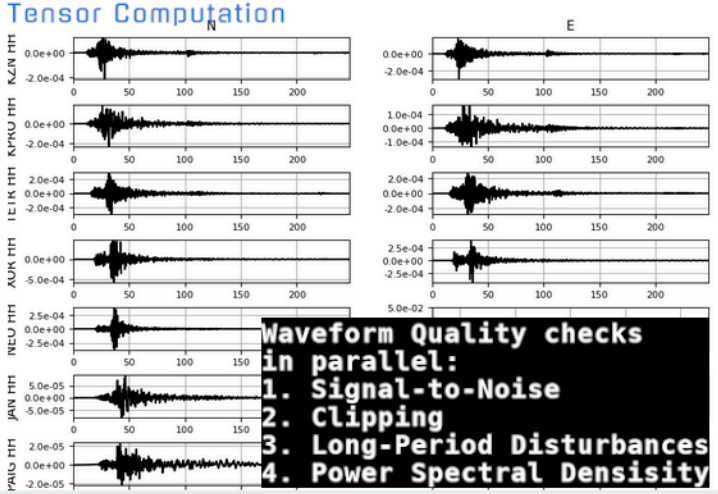
Process Flowchart

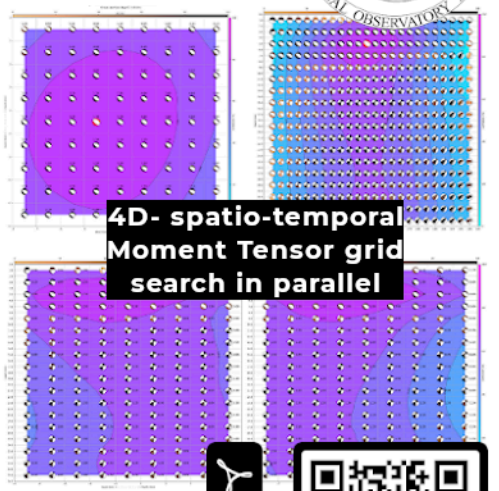
1. Check for new Events
2. Select Inventory
3. Select Waveforms

- Monitor **FDSNWS-event** for new seismic events
- **Filter** events based on magnitude characteristics, origin quality metrics and geographical restrictions

- Retrieve Inventory from **FDSNWS-station** and/or file in **StationXML** format
- **Filter** inventory based on station priority, specified in configuration
- Select inventory based on **distance rules**

- Retrieve Waveforms from **SeedLink** and/or **SDS** mseed archiving and/or **FDSNWS-dataselect**
- **Filter** waveforms by quality check modules: clipping, signal-to-noise, "mouse", psd (power spectral densities), in **parallel** CPU processing
- **Remove instrument response** in **parallel** CPU processing





View PDF

SCAN ME!

Real-Time operation in NOA

Moment Tensor Solutions

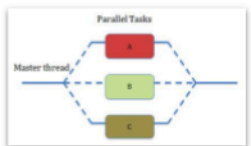
Select Year: 2021

Date - Time	Latitude	Longitude	Depth (km)	Mw	Mo (Nm)	Focal Mechanism	Map	Quality
2021-04-18 16:26:24	36.4033	27.1701	6	4.4	5.015e+15			A1
2021-03-04 09:36:17	39.7911	22.1063	6	4.5	5.990e+15			A1

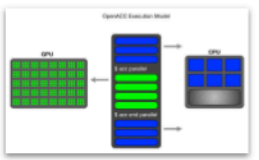
Process Flowchart

4. Compute Green's Functions
5. Compute Inversions
6. Distribute Results

- Calculate Green's Functions of one or more adjustable **3D spatial grids,** specified in configuration, in **parallel** computation with CPU threads



- Calculate Moment Tensor Inversions for one or more adjustable **4-D spatio-temporal grids**, specified in configuration, in **parallel** computation with **GPU** or **CPU** threads



- Render an **HTML** webpage with the evaluated results
- Publish results in different formats, e.g. **QuakeML**, ASCII text format
- **E-mail Notification** with the best Moment Tensor solution
- Apply user-defined script e.g. Focal Mechanism computation ingestion in **SeisComP**

Triantafyllis, N., Venetis, I., Fountoulakis, I., Pikoulis, E.-V., Sokos, E., and Evangelidis, C.
Gisola: Real-Time Moment Tensor computation optimized for multicore and manycore architectures,
EGU General Assembly 2021, online, 19–30 Apr 2021, EGU21-15888, https://doi.org/10.5194/egusphere-egu21-15888, 2021.

Photography encouraged