Last 12 months of WP4

Task 4.1. Advanced processing of induced seismicity data (GFZ, AMRA, KNMI):

- Assessment of the detection performance at the Wysin fracking site (Lopez Comino et al. 2017 GJI)
- Development/application of waveform-based detector to real data at the Wysin site (May-September 2016)
- Detection, location, and characterization of acoustic emissions induced by hydraulic fracturing in a mine (Lopez Comino et al. Submitted).
- Development of methods to estimate borehole sensor orientations (Hofman et al. Submitted) and invert for enhanced seismograms at borehole location, improving detection/characterization of weak events.
- Accurate estimation of dynamic stress drop (through the apparent stress), static stress drop, radiation efficiency and rupture velocity for induced microearthquakes at The Geysers.

Task 4.2. Statistical description of the induced seismic processes and assessment of relationship with technological/operational parameters (IGF-PAS, AMRA, KNMI):

- Analysis of statistical significance of temporal changes in the static stress drop of induced seismic events and its distribution in relation to injection rates (The Geysers)..
- Investigation and quantification of the correlation between spatio-temporal seismicity evolution and variation of the injection data from The Geysers.
- Multi-dimensional cluster analysis for The Geysers geothermal field data.
- Analysis of probability distributions of magnitude and interevent times (Oklahoma and the Geysers datasets).
- Seismic interferometry applied for monitoring the changes in geological medium due to hydrofracturing at Wysin.

Task 4.3. Multi-physical modelling of the fracturing process (KeU, AMRA):

- Extension of the sensitivity analysis modelling to include the effects of pore pressure and injection fluid properties have on the fluid migration and local stress (ongoing work)

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Task 4.4. Time-Dependent Seismic Hazard Assessment (AMRA, IGF-PAS, KNMI):

- Analysis of the time-distribution of induced seismic events taking into account industrial information as fluid injection rates and volumes. development of tools for non-stationary hazard assessment.