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Session 32

Induced seismicity: observations, modelling, monitoring, discrimination and risk management strategies

Conveners:
E. Priolo[1], W.L. Ellsworth[2], A.P. Rinaldi[3], T.A. Stabile[4], S. Cesca[5], S. Shapiro[6]

[1] *OGS, Italy*
[2] *Stanford Univ., CA*
[3] *ETHZ, Switzerland*
[4] *CNR, Italy*
[5] *GFZ, Germany*
[6] *Frie Univ. Berlin, Germany*

Industrial activities perturb the balance between stresses acting on faults and their frictional strength can induce minor seismicity or trigger larger earthquakes. Most activities are related to development and production of energy (e.g. unconventional hydrocarbon and enhanced geothermal systems, underground gas storage, mining, water impoundment) while others are being developed in response to the climate change and global warming (e.g. underground CO2 sequestration).

Induced seismicity has become a global phenomenon with clear implications for seismic hazard and risk. Real concern exists about larger earthquakes that might be triggered, especially in densely populated areas or communities with high seismic vulnerability. Public and regulatory concerns about the potential hazard from induced earthquakes continues to evolve in response to a deepening scientific understanding of the underlying mechanisms and improvements to probabilistic seismic hazard models. Guidelines for monitoring are being revised and improved, in order to make more data available in the shortest time possible to feed analysis procedures aimed at understanding the possible connections between seismicity and activity, and take steps to reduce the hazard. In this framework, the integration of industrial, community and research infrastructures in the field of anthropogenic seismicity plays an important role.

This session focuses on theoretical, experimental and observational advances in understanding, detecting, discriminating the seismicity induced by industrial, as well as hazard management strategies for reducing the risk and actions for improving the synergy among research institutions, academy and industry.

We welcome contributions on advances in seismic and deformation monitoring (e.g., network deployment, sensors installation, automatic/real time detection and location methodologies including the application of machine learning, DInSAR analysis and optical fiber DAS); case studies and modelling of induced seismicity, as well as the triggering of existing faults, at different spatial and temporal scales; studies from laboratory and underground labs; discrimination between natural, triggered and induced seismicity; multidisciplinary studies combining different data types and observations; assessment of seismic hazard and seismic risk in areas where such activities are carried out; existing regulations and interface between monitoring, regulation and operations (in particular, cases of success or failure of the traffic light system); and public perception and concern.