

The SIR-MIUR project INSIEME: preliminary results of the first year of activities

Tony Alfredo Stabile (1) and the INSIEME Team

(1) Consiglio Nazionale delle Ricerche, Istituto di Metodologie per l'Analisi Ambientale, Tito Scalo, Italy (tony.stabile@imaa.cnr.it), (2) Istituto Nazionale di Oceanografia e di Geofisica Sperimentale, Trieste, Italy, (3) Institut de Physique du Globe de Paris, Paris, France, (4) Università degli Studi della Basilicata, Potenza, Italy, (5) Università degli Studi di Bari Aldo Moro, Bari, Italy, (6) Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Economico Sostenibile, Rotondella, Italy

By now, it is well known in the scientific literature that earthquakes can have both natural and anthropogenic causes. Seismicity induced or triggered by the human activity has been observed and documented since at least the 1920s. It is attributed to a range of energy technologies such as: impoundment of reservoirs behind dams, mining activity, underground nuclear tests, enhanced geothermal systems, injection/withdrawal of fluids into/from the ground associated with the gas storage, CO₂ sequestration, exploitation of oil and gas, wastewater disposal and shale gas recovery. Even if the basic mechanisms of induced or triggered seismic events by human activities are presently well understood, establishing a cause and effect link between recorded earthquakes and local energy technologies in operation is still difficult and controversial. Moreover, it is worldwide recognized that the types of information and data required to provide a robust hazard assessment would include pore pressures information, in situ stresses, information on faults, background seismicity, and data about the human operations whose accessibility is often denied.

In this framework, the research project INSIEME (INduced Seismicity in Italy: Estimation, Monitoring, and sEismic risk mitigation) has been approved by the SIR (Scientific Independence of young Researchers) program of the Italian Ministry of Education, Universities and Research (MIUR). The project is carried out by the following national and international public research institutes: the "Consiglio Nazionale delle Ricerche - Istituto di Metodologie per l'Analisi Ambientale" (CNR-IMAA), the "Istituto Nazionale di Oceanografia e di Geofisica Sperimentale" (OGS), the "Institut de Physique du Globe de Paris" (IPGP), and the "Università degli Studi della Basilicata" (UNIBAS).

The main goal of the project is to make significant progress in understanding the mechanics of the physical processes involved in the induced/triggered seismicity applying an integrated and multidisciplinary approach and to provide the scientific community with new high quality data, allowing a step forward of the research in this topic. The discrimination between induced and natural seismic events and the hazard and vulnerability assessment of the study areas are also essential objectives of the research project. The following Italian test sites, characterised by different structural-geological settings and human activities, have been selected:

- the High Agri Valley (Basilicata Region), site of important human activities such as the Eni S.p.A. oil and gas production field (hosting also an injection well for the wastewater disposal) and the presence of the Pertusillo water reservoir;
- the Collalto area in the municipality of Susegana (Veneto Region), site exploited by Edison Stoccaggio S.p.A. for the storage of the natural gas.

Here we present the planned activities and the preliminary scientific results of the first year of the project, which is started on 23rd September 2015 and has duration of three years. A particular focus will be placed on the design and installation in the High Agri Valley test site of a new microseismic network composed by 8 broadband borehole stations, one of them hosting also a 6-channels magnetotelluric station.