Magnetotelluric investigation across the Agri Valley: preliminary results.

Marianna Balasco (1), Gerardo Romano (2,1), Agata Siniscalchi (2), and Tony Alfredo Stabile (1)

(2) Università degli Studi di Bari Aldo Moro, Bari – Italy, (1) Consiglio Nazionale delle Ricerche - Istituto di Metodologie per l Analisi Ambientale (CNR-IMAA), Tito, Italy

The Agri Valley is an axial zone of the Southern Apennines thrust belt chain with a strong seismogenic potential where two important energy technologies responsible for inducing/triggering seismicity are active: (1) the disposal at the Costa Molina 2 injection well of the wastewater produced during the exploitation of the biggest onshore oil field in west Europe (27 wells producing more than 80,000 barrels of crude oil per day), managed by the Eni S.p.A., and (2) the water loading and unloading operations in the Pertusillo artificial reservoir. It is recognized the possibility that the fluctuation of the water level inside the reservoir, due to the hydrological cycle for example, produces pressure perturbations at the bottom of reservoir, causing induced seismicity. Furthermore it is even more known the role of fluids in the rupture processes which could cause an increase of pore pressure specially at high rate of injection fluids and/or for the presence of weakening of preexisting faults.

With the aim to better characterize and understand the physical processes involved in the observed induced/triggered seismicity, in 2016 a broadband seismic network, covering an area of about 20 km x 20 km nearby the Pertusillo Dam and Costa Molina2 well has been installed in the framework of SIR-MIUR project INSIEME (INduced Seismicity in Italy: Estimation, Monitoring, and sEismic risk mitigation) and a MagnetoTelluric (MT) survey has been performed.

The MT investigation consists of 25 soundings aligned along $\sim$ 30 km profile oriented at about N40 direction, orthogonal with the strike of the major and noticeable geological structures and crossing both of the source that may induce/trigger seismicity. In this work, we present the preliminary 2D resistivity model which provides useful deep geophysical information for understanding the geological and structural setting of the Agri Valley. Moreover, the comparison of the resistivity model with the earthquake location as inferred from the analysis of the data collected by the INSIEME network may provide new insight on the possible presence of active faults and on the causative origin of the earthquakes.