



MULTIDISCIPLINARY RESEARCH

CHANGES DETECTED IN THE BEHAVIOUR OF THE GRAN SASSO AQUIFER IN CONJUNCTION WITH THE AMATRICE 2016 EARTHQUAKE

Research within the scope of the study of the interactions between the Gran Sasso aquifer and seismic phenomena - conducted by INGV, National Institute for Geophysics and Volcanology, in collaboration with the INFN Gran Sasso National Laboratories and the Department of Civil and Environmental Engineering, Building and Architecture (DICEAA) of the University of L'Aquila - has found changes in certain physical parameters of the underground waters of the Gran Sasso massif, in conjunction with the seismic event that struck Amatrice in August 2016.

The study, recently published in the Scientific Reports journal by Nature, is based on continuous high sampling measurements (20 measurements per second) of hydraulic pressure, temperature and electrical conductivity of the water, measurements taken, from May 2015, on a horizontal drilling, called S13, made in the late '80s during the excavation work, and located near the motorway tunnel and the Gran Sasso Laboratories. The presence of S13 provided a unique opportunity to investigate the deepest part of the Gran Sasso calcareous aquifer, located in the seismically active area of the central Apennines. The data acquired, starting from May 2015, showed clear and interesting signals before, during and after the earthquake that occurred on 24 August 2016 (01:36:32 UT) with epicentre approximately 39 km away from the study site. Within the scope of the measurements taken, the researchers therefore focused their analysis on data relating to anomalies in hydraulic pressure starting from 19 August 2016, five days before the event, finding large and asymmetrical fluctuations: negative micropulsations, which had not been detected in the previous data and which continued until the end of August 2016. Now, further exploration of the relationship between earthquakes and changes in groundwater parameters in the vicinity of large seismogenic faults is needed for a full understanding of pre-seismic, co-seismic and post-seismic processes. ■