CO-SEISMIC AND POST-SEISMIC CHANGES IN GROUNDWATER DISCHARGE: FIRST RESULTS FROM THE EPICENTRAL REGION OF THE CENTRAL ITALY 2016 EARTHQUAKE

Silvia FABBROCINO[1], Marco GIACOPETTI[2], Marco MATERAZZI[2]

[1] Department of Earth, Environment and Resourcers Sciences (DiSTAR), University of Naples Federico II, Largo San Marcellino 10-80138 Naples, Italy, silvia.fabbrocino@unina.it
[2] School of Science and Technology, University of Camerino, Via Gentile III Da Varano-62032 Camerino, Italy, marco.giacopetti@unicam.it; marco.materazzi@unicam.it

Short and mid-term effects of earthquakes on groundwater flow were documented in several studies. Water level fluctuations in wells (Manga et al., 2012), temperature changes, increases in stream flow (Muir-Wood and King, 1993) and changes in groundwater flow (Amoruso et al., 2011; Carro et al., 2005) were observed in response to seismic events. The hydrogeological response of groundwater flow systems to earthquakes is very complex and due to significant changes in permeability. Such hydrologic changes may occur even at great distances from the epicenter (Amoruso et al., 2011; Carro et al., 2005) and their magnitude may be related to the proximity to the earthquake focus (Muir Wood and King, 1993; Hartmann and Levy, 2005). Central Italy has been hit by several large earthquakes since August 2016. On August 24th 2016 a Mw=6.0 earthquake struck a large area located among the Lazio, Marche, Abruzzi and Umbria regions. In the following six months, more than 1000 shocks were recorded (the main, Mw=6.5 on October 30th 2016). With reference to the carbonate aquifers located in the epicentral region, the following short term effects were observed: a significant increase of the spring discharges; several perched springs dried up and a number of comparable springs flowed again; a great increase in the Nera river flow. The deep-seated fault movements and fluid redistribution may cause water-level fluctuations as well as changes in groundwater discharge and composition. This study debates a preliminary characterization of such processes.

References

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