

Present-day seismicity in and around the Matese Massif (Southern Apennines, Italy): inferring on the seismic hazard evaluation.

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The Matese Massif is the major mountain range of the Campania-Molise segment of the Southern Apennines and it is a part of the Sannio-Matese area, one of the most active seismogenic areas of the Italian peninsula. The Massif is located among the seismogenic sources of large destructive historical Earthquakes (e.g. 1349, MW = 7.0; 1688, MW = 6.6; 1805, MW = 6.8; DISS Working Group, 2015). Previously studies on the instrumental seismicity occurred in the last 20 years, but before 2013, have shown that the seismic activity along and close to the Matese Massif has been prevalently characterized by the occurrence of sparse few single events of low energy ($M < 2.5$) with hypocenters within the uppermost 15 km of the crust. In addition, low magnitude seismic sequences occurred in the south-eastern (1997-98, $M_{max} = 4.2$) and in the north-western (2001, $M_{max} = 3.6$) edges of the Massif, respectively. Between the late 2013-early 2014 a moderate magnitude seismic sequence (MW = 5.0) struck the internal part of the Massif in an area where no evidence of active faulting has been recorded so far. This sequence, confined in the 10-20 km depth range, is close to the 1805 Boiano Basin Earthquake and the epicenters formed a ~ 10 km long NNW-SSE trending alignment. After the sequence, the most relevant seismic activity occurred in September 2014 and in January 2016. The 2014 activity concentrated in two distinct small areas east of the Massif and showed a swarm pattern. One of these seismic swarms took place in proximity of the seismogenic source of 1688 Earthquake. The events ($1.2 \leq M \leq 2.9$) are roughly aligned along W-E direction at a depth between 10-17 km. The 2016 seismic activity, instead, is located close to north edge of the 1805 Earthquake. The events (~ 250 with $1.2 \leq M \leq 3.6$) do not show a preferred alignment and they have depth between 8 and 18 km. Of note, in 2012 a low magnitude seismic sequence ($M_{max} = 4.1$) occurred between the 1688 and 1732 seismogenic sources at depths between 10 and 20 km. These recent seismological results confirm the presence of unrecognized active fault segments, such as the 2013-14 Matese fault, close to the large faults which generated destructive Earthquake. The characterization of these active fault segments confined in the 10-20 km depth range in and around the Matese Massif can add new information to improve the valuation of the seismic hazard of the study area.