Recent instrumental seismicity of the southwest Matese Massif (Sannio-Matese area - Italy): a contribution on the seismotectonics setting.

Girolamo Milano
Osservatorio Vesuviano - INGV Napoli, Italy (girolamo.milano@ingv.it)

The Matese Massif is the major mountain range of the Sannio-Matese, which is the transition area between central and southern Apennines. The Massif is located among the seismogenic sources of large destructive historical Earthquakes (e.g. 1349, $M_W = 7.0$; 1688, $M_W = 6.6$; 1805, $M_W = 6.8$). Previous studies on the instrumental seismicity of the Sannio-Matese have shown that the seismic activity along and close to the Matese Massif is prevalently characterized by the occurrence of sparse low magnitude events ($M_L < 2.5$) and by seismic sequences with low to moderate magnitude ($M_{W_{max}} = 5.0$) with hypocenters within the uppermost crust. Last relevant seismic sequence occurred between the late 2013-early 2014 following an $M_W = 5.0$ earthquake. This sequence struck the internal southern side of the Massif in an area where no evidence of active faulting has been recorded so far. Multidisciplinary investigation on this sequence suggest that the sequence has developed along a SW dipping NNW-SSE striking normal fault, ~10 km long, confined in the 10-20 km depth range. The 1805 Earthquake affected the northern slope of the Massif whereas the 1349 and 1688 Earthquakes affected the southern side. The 1349 Earthquake, that includes at least three main shocks, given its age, stands out due to the lack of reliable and sufficiently vast historical documentation. Geological, geomorphological and historical analysis on this Earthquake evidenced a SW dipping 125 striking 22 km length normal fault, named Aquae Iuliae Fault (AIF), as responsible for one of the main shocks of this Earthquake. In order to provide further information on the seismotectonics setting of the southwest sector of the Matese Massif, here is analyzed the instrumental seismicity occurred in 2009-2019 time interval in the area of the 1349 Earthquake. The spatial distribution of the relocated seismicity mainly consists of single events with magnitude $M_L \leq 3.5$. The single events are localized prevalently nearby AIF and have foci falling generally in the first 15 km of the crust. The focal mechanisms of the most energetic events show normal dip-slip solutions, with NW-SE striking planes and NE-SW striking T-axes. The epicentral distribution of a low magnitude seismic swarm, triggered by an earthquake of ML 3.3 and constituted by about 120 events, shows a roughly WNW-ESE alignment. The hypocenters, confined in the range 5-15 km depth, roughly depict a SW dipping plane. The fault plane solutions of the very few events of this swarm with $M_L > 2.0$ show both normal dip slip solutions, with a minor strike component, and strike-slip solutions, with a minor dip component. The common element of these focal mechanisms is the presence of a SW dipping fault plane, striking from NW-SE to NNW-SSE. The preliminary results of this study, taking into account the dipping plane of the 2013-2014 sequence...
and that of the ALF, suggest that the release of seismic energy in the southwest side of the Matese Massif occur on very small fault segments, with SW dipping.