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Evolution and strengthening of the Calabrian Regional Seismic Network during the Pollino sequence

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In the last three years the Calabria-Lucania border area is affected by an intense seismic activity generated by the activation of geological structures which be seat of clusters of microearthquakes, with energy release sufficient to be felt and to generate alarm and bother. Besides to the historical memory of the inhabitants of Mormanno (the town most affected of macroseismic effects) there are some historical documents that indicate the occurrence of a similar seismic crisis in 1888. A more recent seismic sequence, the first monitored by seismic instruments, occurred in 1973-1974. In the last case, the activity started in early 2010 and is still ongoing. The two shocks of ML = 4.3 and 5.0 and the the very long time duration differs this crisis from the previous ones.
Given this background, in 1981 was installed at Mormanno a seismic station (MMN) belonging to Regional Seismic Network of the University of Calabria (RSRC), now also a station of the Italian National Seismic Network of the Istituto Nazionale di Geofisica Vulcanolgia (INSN-INGV). This seismic station made it possible to follow the evolution of seismicity in this area and in particular the progressive increase in seismic activity started in 2010. Since 2010, some 3D stand-alone, was installed by the University of Calabria. Further stations of INGV were installed in November 2011 after a sharp increase of the energy release and subsequently by the INGV and the GeoForschungsZentrum (Potsdam) after the main shock of the whole sequence.
Seismic networks are powerful tools for understanding active tectonic processes in a monitored seismically active region. However, the optimal monitoring of a seismic region requires the assessment of the seismic network capabilities to identify seismogenic areas that are not adequately covered and to quantify measures that will allow the network improvement. In this paper we examine in detail the evolution and the strengthening of the RSRC in the last years analyzing the noise level at the stations, the precision and accuracy of the hypocenter location and the magnitude detection threshold. The performance of a seismic network is strongly influenced by the noise level of its stations. The accuracy of phase picks depends on the quality of the signals within the frequency range typical of local and regional events. To evaluate the performance of the RSRC we have first estimated the background noise level of each station. The noise spectra was used to mapping the average power of noise and to study the spatial and temporal variability. To determine the location performance of the RSRC we used the Seismic Network Evaluation through Simulation (SNES) method. By means of the SNES method we investigate the improvement of the RSRC after the installation of some stand-alone stations. For this purpose we compare the location errors and the magnitude detection threshold of the RSRC before and after the installation of these temporary stations.