

Analysis of low magnitude seismic sequences in Calabria

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Sequences of low magnitude earthquakes located at short distance to each other, likely produced by the same fault, are observed often along the Calabrian Arc (Southern Italy). In some cases they occur as swarms of hundreds of even thousands of small earthquakes, like the Pollino sequence from 2010 to 2013. In other cases tens to hundreds of small earthquakes are spread in time during years but located very near to each other. We selected some of such earthquake sequences and performed detailed analyses of their waveforms with the main aim of a precise relative and absolute location of the source. The normalized cross-correlation computed over signal windows much longer than the T_s - T_p time (therefore including the most of signal) permitted the identification of event clusters characterized by nearly identical waveforms. Their relative location shows some well defined fault patches that radiated the seismic energy. The clusters of similar earthquakes have also been used to improve the signal to noise ratio through the signal stacking. The improvement of the signal to noise ratio permitted the estimation of focal mechanisms of earthquake clusters of magnitude as small as about $M1$. Focal mechanisms of earthquake clusters are in good agreement with the fault plane direction inferred from the relative location hypocenters. We also estimated the source size by fitting the theoretical source model to the observed signal spectra. Results indicate fault size of few tens of meters for earthquakes of magnitude between 1 and 1.5, comparable with the size of fault patches which produced the clustered event. Here we show the results obtained from the analysis of some clusters identified in the Pollino sequence and one cluster identified in a sequence located in the Sila mountains.