Geophysical Research Abstracts
Vol. 19, EGU2017-16420-1, 2017
EGU General Assembly 2017

Swarms and swarm-like seismic sequences in central Italy: implication for silent seismogenic sources

Rita de Nardis (1,3), Giusy Lavecchia (1), Maria Adelaide Romano (2), Laura Peruzza (2), Enrico Priolo (2), Federica Ferrarini (1), Daniele Cirillo (1), and Francesco Brozzetti (1)

(1) CRUST, DiSPUTer, Università "G. d'Annunzio" Campus Universitario, 66013 Chieti Scalo, Italy, (3) Dipartimento della Protezione Civile, Via Vitorchiano, 4, 00189 Rome, Italy, (2) Centro Ricerche Sismologiche, Ist. Nazionale di Oceanografia e Geofisica Sperimentale, Borgo Grotta Gigante, 42/C, 34010, Sgonico (TS), Italy

Central Apennines in Italy are a high seismic risk zone, undergoing present SW-NE tension with rate up to 2-3 mm/yr. They host small intra-mountains Quaternary tectonic depressions bounded by well-exposed active SSW to WSW-dipping fault systems. Geological data and historical seismicity prove that the fault structures are able to produce earthquakes with magnitude also greater than 6.5. In fact, the region was struck by 14 among the largest earthquakes (MW> 6.5) of the Italian territory since 1349.
The instrumental seismicity, better recorded since 1981, shows that a different behavior of seismic release characterizes the northern and southern portions of the Central Apennines.
The instrumental seismicity, recorded since 1981, shows that a different behavior of seismic release characterizes the northern and southern portions of the Central Apennines.
The northern portion (Umbria and Marche regions) is affected by the occurrence of seismic sequences (i.e. Norcia, 1979, Gubbio, 1984, Colfiorito, 1997, L'Aquila, 2009, Central Italy, 2016), with main events with magnitude between 6.0 and 6.5 and high rate of background seismicity. Conversely, the southern portion (Abruzzo and Molise regions) shows low level of scattered background seismicity, relatively stable in the size and time domains, and low energy seismic swarms. In this sector, if we exclude the Barrea 1984 seismic sequence and very minor background seismicity, the seismic episodes account for most of the total seismic activity.
We analysed in detail the seismicity of the southern part of Central Apennines, relocating the events occurred in the time interval from 2005 to 2012, calculating new focal mechanisms, identifying clusters as swarm or swarm-like seismic sequence. The performed investigation shows that many areas are affected by repeated transient episodes. Generally, the identified clusters occur along and on the tip of known active normal faults, in between significant past earthquakes. Nevertheless, some of the clusters did not correlate with any known structure, suggesting the existence of still unknown faults. New field investigations performed in key areas (Morrone-Porrara-southern Porrara fault alignment) did effectively allow us to point out evidences for missing individual master faults, potentially capable of major earthquakes.