

The Earthquake sequence of 2016-2017 in Central Italy

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Thursday, October 26th 2017 11:30am

GSC (588 Booth Street)

Gamble Hall (01-111)

Jeudi le 26 octobre 2017, 11h30

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The earthquake sequence which struck Central Italy starting on August 24, 2017 was composed by around 10 earthquakes with magnitude $M_w \geq 5.0$ and covered a portion of the Apennine chain about 100 km long. It filled in the gap between the sequence of 1997, to the north, and the L'Aquila, 2009 sequence to the South. The damaged area was included among the highest seismic hazard areas of Italy. While the first earthquake (August 24, M_w 6.0) ruptured a fault segment which could have been responsible of a similar earthquake which happened in 1639, the next largest events, at the end of October, with epicentres near Visso and Norcia, ruptured a well know fault segment where the date of the last event remain questionable. It has to be pointed out that the area of Norcia falls in a very active region, suffering frequent destruction such as in 1703, 1730, 1859, 1979.

Peak ground accelerations reached values greater than 1g, although in a limited part of the spectra. Damage was heavy since the first earthquake in many villages and especially in Amatrice: intensities were assessed between 10 and 11 on the European Macroseismic Scale (EMS). The next earthquakes broadened the damage area, mostly towards the North, where the performance of many buildings repaired and retrofitted after the 1997 earthquakes showed contradictory behaviour. It is to be pointed out that the historical centre of Norcia, built according to a very strict code issued by the Papal State short before its end in 1861, suffered minor damage (with the exceptions of the monumental churches) with respect to the new parts of the city where some reinforced concrete buildings lost some floors. The earthquakes of January 2017 (four events larger than 5.5 in two days) shook the area between Amatrice and L'Aquila, giving rise to a lot of anxiety for the fear of a new M_6 event which could have damaged a dam nearby and the city of L'Aquila again. Lot of discussion followed, at both a scientific and a political level, restoring in some way the debate which accompanied the so-called "L'Aquila trial" to seismologists, engineers and public officials, six out of seven of whom were finally free of all accusations in 2015, after the three degrees of the Italian justice procedure.