

## LEADER

by

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### SAFETY, SEISMICITY AND PREVENTION

Many times, we used the space of this Journal to discuss and analyse the role of natural events and their impacts on social dynamics. In Italy, the risks associated with natural events are largely widespread. Hence, pre- and post-event prevention should be an absolute priority for both the central and regional/local governments.

Since 24 August 2016, a seismic sequence has been occurring in the central portion of the Apennines, taking a heavy toll of casualties and damage. The events have once again brought to the fore the issue of prevention and management of geological risks, opening a critical debate around it.

In the past decades, central Italy experienced as many as three long seismic sequences: in 1997, 2009 and 2016. The best scholars in the world (including SMERAGLIA *et alii*, 2016; DI LUZIO *et alii*, 2009; BILLI *et alii* 2006; CAVINATO & DE CELLES, 1999; VALENSISE *et alii*, 2016) conducted post-seismic studies. Their findings confirmed and reiterated that, although complex and diversified, the features of the structural-tectonic setting from which these earthquakes originate are consistent with the recorded seismic sequences in terms of magnitude, depth and progression over time. This is quite reassuring in view of prediction/prevention activities, since greater understanding can be gained into ground motion levels and related return times. Indeed, the seismic classification of Italy (INGV, 2004; PRESTININZI *et alii*, 2005), based on data collection and interpretation and summarised in the Italian legislation, is perfectly in agreement with the recorded seismic motion levels.

The data recorded in central Italy from 1985 to date (Fig. 1) show that:

- all the events are NW-SE-trending, in line with the “geodynamic style” of the Apennine ridge;
- the magnitude and epicentral depth of the analysed sequences (Figs. 2, 3 and 4) are similar and consistent with the scientific knowledge acquired so far and widely reported in the scientific literature;
- the ground effects of these earthquakes, real-time updated by the Working Group of CERI, Sapienza University of Rome, in terms of surface fracturing, earthquake-induced landslides,

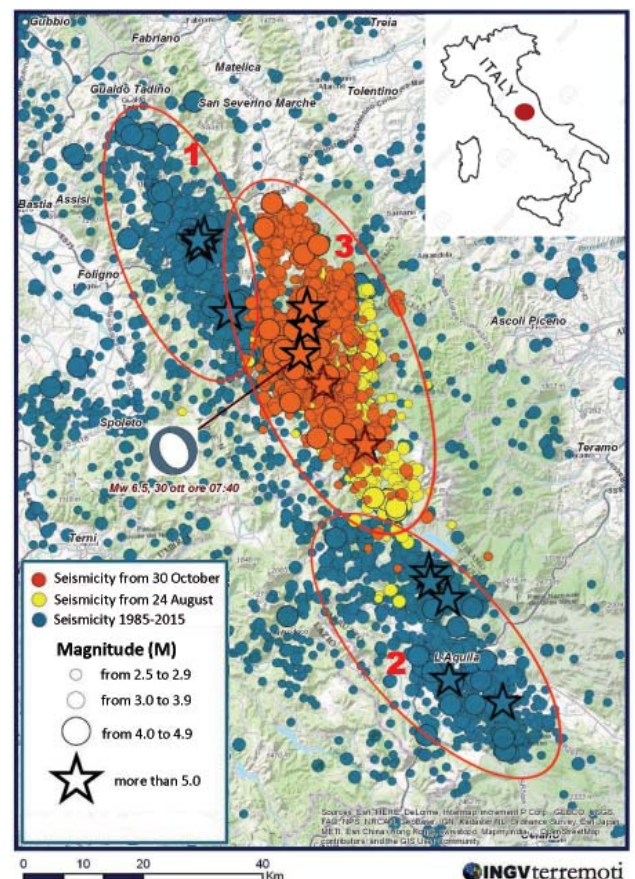


Fig. 1 - Seismicity of central Italy recorded from 1985 to 2016 (figure modified): circle 1 (1997 sequence); circle 2 (2009 L'Aquila sequence); circle 3 (2016 sequences): yellow epicentres (24 August-29 September); red epicentres (30 October-3 November); (Data sources: <https://ingvterremoti.wordpress.com/it-terremoti-in-italia>)

etc., are in line with those reported in the CEDIT Catalogue (Italian Catalogue of Earthquake-Induced Ground Effects, [http://www.ceri.uniroma1.it/index\\_cedit.html](http://www.ceri.uniroma1.it/index_cedit.html)).

These scientific data are in the official literature. Yet, most of the post-event comments and reactions in the media have had a tendency to stress the uniqueness and unpredictability of these earthquakes and of their origin. This has contributed to postponing the prevention initiatives that the research community and the

technical-administrative world have been urging for decades: a multi-year plan of seismic retrofits on structures and buildings, to improve their safety by adequately reducing their vulnerability and to conserve the outstanding historical and artistic heritage that is widely distributed throughout Italy.

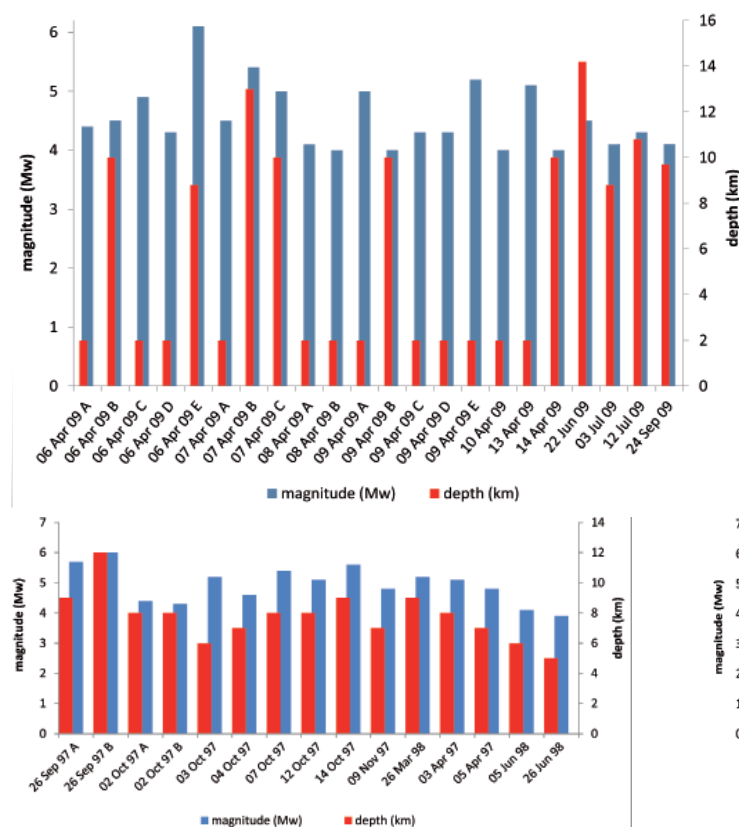


Fig. 3 - Umbria-Marche sequence (Central Italy) 1997

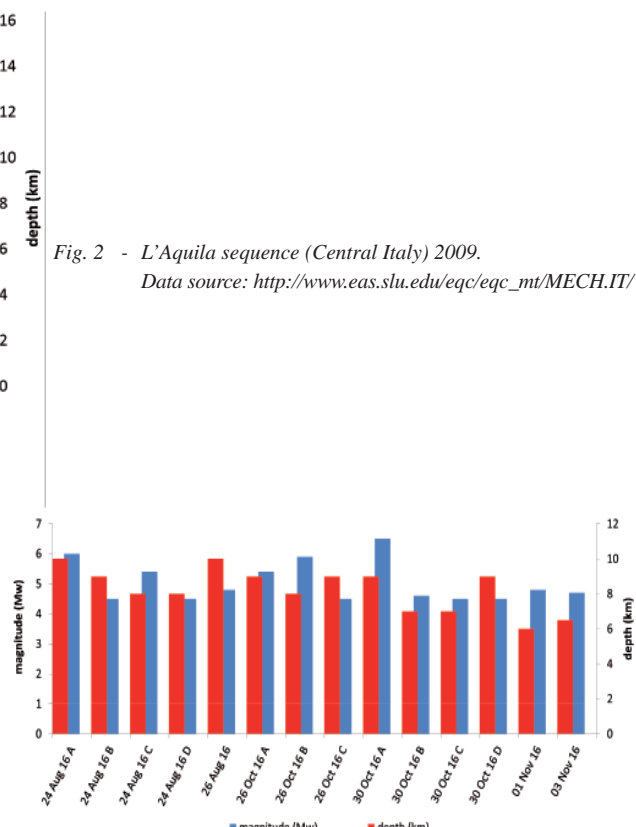


Fig. 4 - Amatrice-Accumoli-Norcia sequence (Central Italy) 2016

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