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## Characterization of Earthquake clusters in Italy

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We perform an analysis of the earthquake clusters associated with  $M \ge 4.5$  earthquakes that occurred in Italy from 1980. We characterized the occurrence of the largest foreshock and aftershock, in terms of magnitude, time of occurrence and distance from the mainshock. We used the homogeneous catalogue of Lolli and Gasperini (2006) obtained by merging complementary catalogues, mainly based on data recorded by the Italian Telemetered Seismic Network (ITSN) managed by the Istituto Nazionale di Geofisica e Vulcanologia. To identify the clusters, we used a window-based method proposed by Uhrhammer (1986).

We analysed the occurrence of the largest foreshock and aftershock in terms of magnitude, depth and focal mechanism of the mainshock. A peculiarity of the strongest magnitude mainshocks ( $Mm \ge 5.8$ ) is that they have a tendency to be followed by large aftershocks of magnitude similar or even stronger. With respect to the focal mechanism, most mainshocks with strike slip and inverse mechanisms are followed by aftershocks having a magnitude Maft $\le M - 1$  whereas, for normal faults, the magnitude of the largest aftershock depend on the region where the mainshock occurred. We found a persistence of the characteristics of the clusters in different seismotectonic areas with several regions, as the North-Eastern Alps, the Central Apennines, the Southern Apennines and Sicily, each characterized by a homogeneous behaviour of the difference in magnitude between the mainshock and the largest aftershock.