An extensive study of clustering features of seismicity in Italy during 2005 to 2016

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Compiled by INGV, the ISIDE catalog includes high quality recorders of the occurrence times, locations, and magnitude of earthquakes that occurred in the Italy region since 2005-4-16. To study the characteristics of seismicity in Italy, we use the space-time ETAS model and several extended forms. Our results show:

1. Seismicity clustering features are quite different from region to region. According to the ETAS parameters, the whole study region can be divided into four subregions.

2. The rupture geometries of large earthquakes, including the 2009-4-6 M6.3 L'Aquila, the 2012-5-20 M6.1 Emilia, the 2016-0-24 M6.0 Amatrice, the 2016-10-30 M6.2 Norcia earthquakes, control the spatial locations of their direct aftershocks. These direct aftershock aftershock mainly concentrate near, some parts close to the parts on the rupture plane with large slips but seldom overlap with them, indicating that aftershocks are the continuation of the rupture process of the mainshocks.

3. When the focal depth is considered in seismicity modeling, improved probability forecasting of seismicity and hazard assessment can be obtained.