

Study of the interaction structure of the East Sicily Seismicity: global and local scale

Marianna Siino, Giada Adelfio, Marcello Chiodi, Antonino D'Alessandro

ABSTRACT

To predict seismic events in space and time, a proper characterization of both the intensity function and the second-order properties of the generator process is a crucial issue.

In the literature, several space and space-time models have been proposed, but since the complexity of the seismic generator process, even better attempts are possible to further describe the phenomena.

In fact, earthquakes present an intrinsic inhomogeneity since their concentration in space is observed along faults, and more in general in the neighbourhood of seismic sources.

Moreover, they have a multidimensional and multiscale interaction structure.

In this work, we aim to characterize under several aspects the interaction structure observed in the catalog events occurred in the East Sicily with a magnitude greater than 2.5, between 1985 and 2016. The study area presents a high degree of seismicity that is continuous in time with multiple sources of seismicity (both tectonic and volcanic) and heterogeneous geological features.

After describing the main seismic characteristics in the area, we describe the global complex interaction structure using properly second-order summary statistics, spatial hybrid of Gibbs point process model (Baddeley, 2013, Siino et al. 2016), that account simultaneously both for the attractive and repulsive nature of interaction, and the space-time Epidemic Type Aftershock Sequence model (Ogata, 1998).

In addition, due to the dependence among events in all the domains and in large scale, we try to get more information focusing on aftershock sequences and their properties, using the same statistical tools, in order to provide also a characterization of the study area in a local scale.

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