A study of short-term seismicityclustering features in Eastern Aegean Sea (Greece) by means of an epidemic type stochastic model

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The investigation of short term seismicity properties is one of the main tools for the development of stochastic earthquake occurrence models. These modelsare dealing with the tendency of earthquakes to be clustered in both space and time. Clustering properties are being investigated via the development of statistical models, combining well known laws of seismology (e.g. the Omori and Gutenberg and Richter laws). The basic assumption upon which these models are formulated is that each earthquake is capable to produce its own triggered events, depending on the previous earthquakes history. Over the years a large number of studies were also focused on the retrospective and/or the prospective forecast of both the aftershock evolution soon after the occurrence of large main shocks and the large earthquake occurrence.

The occurrence of the 2017 Mw=6.4 Lesvos, 2017 Mw=6.6 Kos and the 2020 Samos Mw=7.0 main shocks in the Eastern Aegean Sea, is offering the opportunity of the application and validation of a clustering model, namely the namely the Epidemic Type Earthquake Sequence (ETES), in their aftershock activity. The computations are performed in an earthquake catalog covering the period from 2008 to 2020, which is separated into two subcatalogs, corresponding the learning and the testing periods.

The retrospective evaluation of the model is examined through the three aftershock sequences, where lack of foreshocks resulted in low predictability of the mainshocks. Immediately after the mainshocks occurrence the model adjusts with notable resemblance between the expected and observed aftershock rates. This later result highlights the potential use of daily forecast estimates, that could allow the investigation of variations of seismicity leading to the detection of increased potential foreshock activity a few hours before the occurrence of a strong event and the evolution of the aftershock activity as well.