A 3D-hypocentral ETAS model for the Japan CSEP project and initial results

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In this study, we present a realization of a 3D-hypocenter ETAS model to fulfil the requirements of models for forecasting seismicity in the Kanto testing region in JAPAN CSEP project, where the focal depth is emphasized. In this model, we assume that the focal depths of earthquakes follow a beta distribution.

We also carry out some retrospective test on the seismicity in the Kanto region and compared the results with a simple 3D Poisson model and an 2D ETAS model with a location dependent depth distribution. The results showed that taking into consideration the correlation of depths between each triggering pair of earthquakes significantly improves our forecasting of seismicity in 3D dimensional and can provide us real-time or short-term seismicity forecasting with higher resolution, which is indispensable for earthquake hazard mitigation in metropolitan areas like Tokyo.

Keywords: 3D ETAS model, CSEP, earthquake probability forecasting

