Non-stationary background intensity and Caribbean seismic events

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We consider seismic risk calculation based on models with non-stationary background intensity. The aim is to improve predictive strategies in the framework of seismic risk assessment from models describing at best the seismic activity in the Caribbean arc. Appropriate statistical methods are required for analyzing the volumes of data collected. The focus is on calculating earthquakes occurrences probability and analyzing spatiotemporal evolution of these probabilities. The main modeling tool is the point process theory in order to take into account past history prior to a given date. Thus, the seismic event conditional intensity is expressed by means of the background intensity and the self exciting component. This intensity can be interpreted as the expected event rate per time and / or surface unit.

The most popular intensity model in seismology is the ETAS (Epidemic Type Aftershock Sequence) model introduced and then generalized by Ogata [2, 3]. We extended this model and performed a comparison of different probability density functions for the triggered event times [4]. We illustrate our model by considering the CDSA (Centre de Données Sismiques des Antilles) catalog [1] which contains more than 7000 seismic events occurred in the Lesser Antilles arc. Statistical tools for testing the background intensity stationarity and for dynamical segmentation are presented.

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