

Bayesian Analysis of Time Evolution of Earthquakes

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Abstract

We adopt a Bayesian approach to analyze the occurrence times of seismic events and their magnitudes. We follow Ogata (1988) by choosing an epidemic model for the process of occurrence times conditional on the observed magnitude values. The locations of, and dependencies between, the model parameters are determined on the basis of historical and physical information. The overall prior variability is deliberately made diffuse. We generate samples from the joint posterior distribution of the model parameters by using a variant of the Metropolis-Hastings algorithm (Tierney 1994). We use the results in a variety of ways including the construction of pointwise posterior confidence bands for the conditional intensity of the point process as a function of time.

Keywords: Point process; Epidemic model; Italian seismic catalog; Conditional intensity function; Confidence bands; Markov chain Monte Carlo sampling; Metropolis-Hastings algorithm.

Footnote

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