

# Some extensions in space-time LGCP: application to earthquake data

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**Abstract.** In this paper we aim at studying some extensions of complex space-time models, useful for the description of earthquake data. In particular we want to focus on the Log-Gaussian Cox Process (LGCP, [1]) model estimation approach, with some results on global informal diagnostics. Indeed, in our opinion the use of Cox processes that are natural models for point process phenomena that are environmentally driven could be a new approach for the description of seismic events. These models can be useful in estimating the intensity surface of a spatio-temporal point process, in constructing spatially continuous maps of earthquake risk from spatially discrete data, and in real-time seismic activity surveillance. Moreover, covariate information varying in space-time can be considered into the LGCP model, providing complex models useful for a proper description of seismic events. LGCP is a Cox process with  $\Lambda = \exp S(x)$ , where  $S$  is a Gaussian process. This construction has some advantages, related to the multivariate Normal distribution features, since the moment properties  $\Lambda(x)$  are inherited by the Cox process. In particular, both estimation and diagnostics, can deal with some higherorder properties [2], expressed for instance by the intensity and the pair correlation function of the LGCP.

**Keywords:** LGCP, Space-time Point Processes, second-order functions, diagnostics .

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## References

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