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A TIME-DEPENDENT STATISTICAL DISTRIBUTION FOR WORLDWIDE LARGE EARTHQUAKES

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The main goal of our work is to characterize the temporal distribution of large earthquakes in a region. While it is commonly accepted that the time distribution of small earthquakes (aftershocks sequence) is strongly governed by short-term (in space and time) triggering effect, the distribution of larger earthquakes is still matter of debate. Presently, different and antithetic models are commonly used, leading to contradictory results. This high level of uncertainty is testified by the fact that nowadays the stationary Poisson model is still widely used in hazard assessment even though clear evidence of time dependence at different time scales have been found. In particular, there are evidence of short-term clustering also for large earthquakes, and many authors assume opposite long-term time variation models (seismic gap, periodicities, long-term clusters, nonstationarity, etc...). Here, we analyze and discuss all of these issues by means of statistical tests and stochastic modeling of stationary and nonstationary branching processes, with isotropic and anisotropic interactions. The purpose is to find the main temporal features of earthquake occurrence in order to move away from Poissonian towards a time-dependent modeling.