

## Temporal Clustering of Mega Subduction Earthquakes

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In this presentation we show that a statistical test is not guaranteed to determine whether a stochastic process is Poissonian when it is applied to a single data series of limited duration, as is the case with the global earthquake catalogue. In particular, we are interested to know whether these tests can determine if the earthquake clusters that appear in the historical record have occurred by chance or not. We do this by providing a counter-example in the form of a stochastic process that is clustered by construction. We simulate the detection of Poissonian properties by generating many 110 years event catalogues which are clustered - this is comparable to the duration of the best available historical records. To each one of these series we apply a Kolmogorov-Smirnov test. We show that under certain circumstances this test is not capable of rejecting the hypothesis that inter-event times follows an exponential distribution, which is characteristic of a Poisson process - not when applied to a single trajectory. We show that longer time series are necessary to determine with greater certitude whether or not the global earthquake catalogue is Poissonian

Keywords: earthquakes, statistics, clustering, Poissonian processes