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Non-poisson statistics of quiet times in seismic time series: a local test

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It is well known that in general the temporal evolution of seismicity in any given area is marked by clustering, however it is not clear how to quantify this process. Our approach aims to quantify the deviation from locally poissonian behaviour. In particular we define a local variable, based on inter-event intervals, whose distribution is uniform in case of locally poissonian processes. Any deviation from such a value will indicate local non-poissonian behaviour. Moreover it will be possible to quantify any eventual clustering and declustering. We applied this approach to general catalogues (global Harvard CMT, Southern California, Japanese NIED and Italian CSI) as well to selected seismic sequences (CSI) and volcanic swarms (NIED), all of them above their relative completeness threshold. In general all the catalogues and most of the sequences show a clear deviation from poissonianity even though sequences are less statistically sound given the small number of events involved. The most interesting case is that of Southern California that yields the smallest deviation from poissonianity while the other catalogues show a significantly stronger behaviour. This could be preliminary interpreted as due to the fact that in certain areas of the globe seismicity becomes poissonian to a temporal scale of few decades or a century at most (California) while in others it requires longer time intervals. To the temporal scale of available catalogues this results into a declusterized process. The global catalogue obviously shows an intermediate value of deviation, being the sum of all the various seismogenic areas of the world.