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Statistical Behaviour of Time Occurrences and Magnitude of Aftershock Sequences

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The negative exponential distribution of the magnitude (that is the well-known Gutenberg-Richter relation) and the negative exponential distribution of interarrival times constitute the backbone of the seismic hazard analysis.

Our goal is to check if these two distributions could be considered an acceptable model also for aftershock sequences.

We analysed several aftershock sequences, with mainshocks ranging from $M=5.45$ to $M=7.3$; six sequences of Californian earthquakes selected from the SCEC database and an Italian sequence, selected from INGV-CNT Catalog.

The results show that the G-R relation fits remarkably the data, with a β value ranging from -1.8 to -2.4 . The temporal behaviour shows an acceptable fit to the negative exponential distribution: all the sequences exhibit a good fit for $\Delta t > 2.5$ hours, on the contrary for $\Delta t < 2.5$ hours Weibull distribution is more suitable.