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Memory in the Occurrence of Earthquakes

V. Livina (1), S. Havlin (1), and A. Bunde (2)

(1) Minerva Center and Department of Physics, Bar-Ilan University, Ramat-Gan 52900, Israel,
(2) Institut für Theoretische Physik III, Justus-Liebig-Universität,35392 Giessen, Germany

We study the statistics of the recurrence times τ between earthquakes above a certain magnitude M in six (one global and five regional) earthquake catalogs. We find that the distribution of the recurrence times strongly depends on the previous recurrence time τ_0, such that small and large recurrence times tend to cluster in time. This dependence on the past is reflected in both the conditional mean recurrence time and in the conditional mean residual time until the next earthquake, which increase monotonously with τ_0. As a consequence, the risk of encountering the next event within a certain time span after the last event depends significantly on the past, an effect that has to be taken into account in any effective earthquake prognosis.

[1] V. Livina, S. Havlin, and A. Bunde, Phys. Rev. Lett. **95**, 208501 (2005).