Universal Earthquake-Occurrence Jumps, Correlations with Time, and Anomalous Diffusion

A. Corral

Departament de Fisica, Facultat de Ciencies, Universitat Autonoma de Barcelona, E-08193
Bellaterra, Spain (alvaro.corral@uab.es)

Spatiotemporal properties of seismicity are investigated for a worldwide (WW) catalog and for Southern California in the stationary case (SC), showing a nearly universal scaling behavior. Distributions of distances between consecutive earthquakes (jumps) are magnitude independent and show two power-law regimes, separated by jump values about 200 km (WW) and 15 km (SC). Distributions of waiting times conditioned to the value of jumps show that both variables are correlated in general, but turn out to be independent when only short or long jumps are considered. Finally, diffusion profiles reflect the shape of the jump distribution and are found to be independent on the magnitude, contrary to what the waiting-time distributions suggest.

Reference: A. Corral, Phys. Rev. Lett. 97, 178501 (2006)