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Non-extensivity and complexity in the earthquake activity at the West Corinth rift (Greece)

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Earthquakes exhibit complex phenomenology that is revealed from the fractal structure in space, time and magnitude. For that reason other tools rather than the simple Poissonian statistics seem more appropriate to describe the statistical properties of the phenomenon. Here we use Non-Extensive Statistical Physics [NESP] to investigate the inter-event time distribution of the earthquake activity at the west Corinth rift (central Greece). This area is one of the most seismotectonically active areas in Europe, with an important continental N-S extension and high seismicity rates. NESP concept refers to the non-additive Tsallis entropy Sq that includes Boltzmann-Gibbs entropy as a particular case. This concept has been successfully used for the analysis of a variety of complex dynamic systems including earthquakes, where fractality and long-range interactions are important. The analysis indicates that the cumulative inter-event time distribution can be successfully described with NESP, implying the complexity that characterizes the temporal occurrences of earthquakes. Further on, we use the Tsallis entropy (Sq) and the Fischer Information Measure (FIM) to investigate the complexity that characterizes the inter-event time distribution through different time windows along the evolution of the seismic activity at the West Corinth rift. The results of this analysis reveal a different level of organization and clusterization of the seismic activity in time.

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