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# Evidence of non-extensivity and complexity in the seismicity observed during 2011-2012 at the Santorini volcanic complex, Greece

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Since the middle of summer 2011, an increase in the seismicity rates of the volcanic complex system of Santorini Island, Greece, was observed. In the present work, the temporal distribution of seismicity, as well as the magnitude distribution of earthquakes, have been studied using the concept of Non-Extensive Statistical Physics (NESP; Tsallis, 2009) along with the evolution of Shanon entropy H (also called information entropy). The analysis is based on the earthquake catalogue of the Geodynamic Institute of the National Observatory of Athens for the period July 2011-January 2012 (http://www.gein.noa.gr/). Non-Extensive Statistical Physics, which is a generalization of Boltzmann-Gibbs statistical physics, seems a suitable framework for studying complex systems. The observed distributions of seismicity rates at Santorini can be described (fitted) with NESP models to exceptionally well. This implies the inherent complexity of the Santorini volcanic seismicity, the applicability of NESP concepts to volcanic earthquake activity and the usefulness of NESP in investigating phenomena exhibiting multifractality and long-range coupling effects.

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