



Time series analysis of volcanic eruptions

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Long range prediction of volcanic eruptions is far from being obvious. We studied the freely available data list of world eruptions through modern time series analysis techniques, as those used in exotic physics fields like econophysics and sociophysics. The events are rare, but drastic, and then not much data is available. The first step is to use the rank Zipf-like plot of so called eruption magnitudes. Then, the distribution of time intervals between eruptions is studied and the question of a Poisson or not distribution is investigated. Taking into account the magnitude of flow a Gutenberg-Richter like law known for earthquakes is attempted. Recurrence plot analysis is also introduced. Several specific cases, e.g. Etna is considered in more detail. Some statistical modelisation is attempted along the lines of a Hamiltonian formalism, and of a Langevin-like diffusion equation.