self-organized criticality
variability in solid earth geophysics

(TITLE MISSING!)

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Numerical simulations and a mean-field analysis of a sandpile model of earthquake aftershocks in 1d, 2d and 3d euclidean lattices determine that the average stress decays in a punctuated fashion after a main shock, with events occurring at characteristic times increasing as a geometrical series with a well-defined multiplicative factor which is a function of the stress corrosion exponent, the stress drop ratio and the degree of dissipation. These results are independent of the discrete nature of the lattice and stem from the interplay between the threshold dynamics and the power law stress relaxation. This novel mechanism of log-periodicity does not rely on a pre-existing discrete structural hierarchy of faults but is dynamical and reflects the existence of an approximately fixed stress drop together with the scale-free stress corrosion power law acting during inter-seismic phases. Empirical tests on aftershock time series will be also discussed.