Osvanny Ramos, ESPCI

Criticality in earthquakes. Good or bad for prediction?

The parallel between classical critical systems and slowly driven systems evolving through power-law distributed avalanches is revised. The correlation length is calculated at every step during the simulations of an earthquake model (OFC modified). In contradiction with the view imposed by the Self-organized Criticality, the correlation length calculated over the entire simulation is rather small, indicating that in average the dynamics are local. This also suggests the possibility of prediction, and a "sandpile" experiment is presented where the prediction of large avalanches distributed following a power-law is achieved. The analysis of the predictability in the context of critical phenomena suggests that the critical properties of the system in a small time window can be use as a precursor to catastrophic events.