Geophysical Research Abstracts,
Vol. 10, EGU2008-A-05031, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-05031
EGU General Assembly 2008

A fine 2D seismic propagation model based on information theory for South Spain earthquakes

A. Posadas (1, 2); F. Vidal (2); M. Navarro (1, 2);

(1) Department of Applied Physics. University of Almer: Spain. (2) Andalusian Institute of Geophysics and Seismic Disaster Prevention. Spain.

The Cross Template Extended (CTE) model is a 2D extended model based on the Cross Template (CT) model. It starts from an active or inactive cell. If the initial cell is an active one, then the probability to be active in the future is P_1; the four nearest neighboring cells (cross cells) have a probability P_2 to be active ones; the four neighboring cells in the corners (corners cells) have a probability to be active equal to P_3 and, finally, the four extended cells have a probability to be active equal to P_4. In the other hand, if the initial cell is an inactive one, the cell and the four cross cells have a probability to be active in the future equal to P_5; the corners cells have a probability to be active in the future equal to P_6 and the four extended cells have a probability to be active in the future equal to P_7. We present a quantitative method for a probabilistic characterisation of the spatio-temporal seismic activity, with an application to Southern Spain. We show that a propagation model based on cross template extended, derived from mutual information, provides us with a criterion about the possibilities that a given area (the size of which is determined by the same model) can be expected to become seismically active in a previously fixed period of time. The method assumes i) a model of seismic propagation in space and time, ii) a criterion to declare a cell to be seismically active or not, and iii) that the maximum values of the mutual information is representative of the highest degree of correlation, linear as well as nonlinear, between past and future states. When the highest value of Mutual Information is reached, several possibilities associated with the propagation model characterise the spatio-temporal evolution of the seismic activity.