



Detection of non-linear cross-correlation by means of the mutual information function, between electric self-potential time series monitored in a region of high seismicity in Mexico.

A. Ramírez-Rojas (1), J. R. Luévano-Enriquez (1)

(1) Departamento de Ciencias Básicas, Universidad Autónoma Metropolitana Azcapotzalco. Avenida San Pablo 180, Col. Reynosa. C.P. 02200, México D. F., México.

arr@correo.azc.uam.mx, jrle@correo.azc.uam.mx,

The principles of information theory are applied to electric self-potential time series monitored in the most important seismic region in Mexico. The aim of this paper is to compute the level of global, linear and non-linear, cross-correlation between two perpendicular components of the electric field measured. Both time series were monitored simultaneously in a period of time when an important seismic activity was registered including possibly an $M_s = 7.4$ earthquake occurred at September 14, 1995. Our calculations, based in the re-scaled average mutual information index $\lambda = \lambda(\mathbf{I})$, where \mathbf{I} is the mutual information function, suggest that the high level of global correlation observed between both components a few months before the event, is associated with the preparation of the EQ. Finally, the index λ is compared with the linear cross-correlation coefficient.