



Analysis of seismogenic ULF EM emissions observed at Teoloyucan geomagnetic station, Mexico, 1998-2001

A. Kotsarenko (1), J. A. López Cruz-Abeyro (1), R. Pérez Enríquez (1), R. D. Zúñiga-M. (1), S. Koshevaya (2), V. Grimalsky (3)

(1) Centro de Geociencias en Juriquilla, UNAM, Apdo Postal 1-742, Centro Querétaro, Querétaro, Mexico, C.P. 76001, (2) UAEM, Cuernavaca, Morelos, Mexico, (3) INAOE, Tonantzintla, P.O.51&216, , Puebla, Pue., Mexico, C.P. 72000

(kotsarenko@geociencias.unam.mx / Fax: +52-442-2381100 / Phone: +52-442 - 2381116)

Results of seismogenic ULF EM emissions observed at Teoloyucan station ($99^{\circ} 11' 35.735''$ W, $19^{\circ} 44' 45.100''$ N, 2280 m height) for the period 1998-2001 are presented. Intervals of 3 hours of daily data have been chosen for the study as a time domain. Variations of spectral densities for horizontal and vertical components, polarization densities and spectrograms of geomagnetic field, and their derivatives are analyzed in 5 frequency sub-bands as a part of traditional analysis in this study. The fractal characteristics of spectra were analyzed in the conception of SOC (Self-Organized Criticality). The spectra clearly express various segments that satisfy each a particular power law. The characteristic frequencies at which the differences between the segments arise, as well as their slopes (fractal indexes) are calculated. As a part of the analysis of the pulse component we made detailed analysis of geomagnetic micropulsations, not related to magnetospheric activity, possibly originated in the earthquake preparation site. In order to exclude the intervals with a high geomagnetic activity from our analysis, we referred to geomagnetic indexes, calculated for corresponding time intervals. The contribution of seismic events to geomagnetic emission was estimated by seismic index $k_s = 10^{0.75} \Phi_a M_s / 10D$, where M_s is the magnitude of the earthquake, D [km] is the distance from its epicenter to the station, and $\Phi_a \approx (1 + D/10^{M/2})^{-2.66}$ is an attenuation factor.