Geophysical Research Abstracts,
Vol. 10, EGU2008-A-06509, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-06509
EGU General Assembly 2008

Study of ELF/VLF ionospheric emissions observed by DEMETER/ICE experiment over seismic regions

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We report on the analysis of ELF/VLF emissions observed by the ICE experiment on board the DEMETER micro-satellite, and their associations, or not, to earthquakes events. We consider principally the selected seismic events published recently by Molchanov et al. (2006). These authors studied the VLF signals radiated by ground transmitters and received on board of the DEMETER satellite. They revealed a drop of the signals (scattering spot) connected with the occurrence of large earthquakes.

In our investigations, we proceed to a spectral analysis of these events with the aim to find if the natural ionospheric VLF/ELF emissions show, or not, a similar 'drop' in the intensity as it is the case of the VLF transmitter signals. We combine our results with those of Molchanov et al. (2006), and we discuss their proposed model which is mainly based on an upward energy flux of atmospheric gravity waves induced by the gas-water release from the earthquake preparatory zone.

Reference: O. Molchanov, A. Rozhnoi, M. Solovieva, O. Akentieva, J. J. Berthelier, M. Parrot, F. Lefeuvre, P. F. Biagi, L. Castellana, and M. Hayakawa, Global diagnostics of the ionospheric perturbations related to the seismic activity using the VLF radio signals collected on the DEMETER satellite, Nat. Hazards Earth Syst. Sci., 6, 745-753, 2006.