

A statistical study on the correlation between lower ionospheric perturbations as seen by subionospheric VLF/LF propagation and earthquakes

M. Hayakawa^{1,2)}, Y. Kasahara^{2,3)}, T. Nakamura^{2,3)}, F. Muto^{2,3)}, T. Horie^{2,3)}
S. Maekawa^{2,3)}, Y. Hobara^{2,3)}, A. A. Rozhnoi⁴⁾, M. Solovieva⁴⁾, and O. A. Molchanov⁴⁾

- 1) *University of Electro - Communications (UEC), Advanced Wireless Communications Research Center (AWCC), Chofugaoka, Chofu, Tokyo, JAPAN*
- 2) *UEC, Research Station on Seismo Electromagnetics, Chofu, Tokyo, JAPAN*
- 3) *UEC, Department of Electronic Engineering, Chofu, Tokyo, JAPAN*
- 4) *Institute of Physics of the Earth, Russian Academy of Sciences, Moscow 123910, RUSSIA.*

The subionospheric VLF/LF propagation is extensively used to investigate the lower ionospheric perturbation in possible association with earthquakes. An extensive period of data over 7 yr from January 2001 to December 2007 and a combination of different propagation paths in and around Japan are used to examine the statistical correlation between the VLF/LF propagation anomaly (average nighttime amplitude, dispersion, and nighttime fluctuation) and earthquakes with magnitude > 6.0 . It is then found that the propagation anomaly exceeding the 2σ (standard deviation) criterion indicating the presence of ionospheric perturbation is significantly correlated with earthquakes with shallow depth ($< 40\text{km}$). Finally, the mechanism of seismoionospheric perturbations is discussed.