

Ionospheric perturbations associated with earthquakes, as based on subionospheric VLF/LF propagation

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There have been recently recognized that different kinds of seismogenic electromagnetic effects take place prior to an earthquake, but one of the most promising one for the short-term earthquake prediction is the ionospheric perturbations by means of subionospheric VLF/LF propagation. First of all, we present the first convincing evidence of seismo-ionospheric effect for the Kobe earthquake, and a shift in terminator time can be interpreted in terms of the lowering of the ionosphere. Then, we established the Japanese VLF/LF network, which has been continued for more than 15 years. Based on the long-term observation, we present a statistically significant correlation between the VLF/LF propagation anomaly (ionospheric perturbation) and earthquakes (with magnitude greater than 6 and with shallow depth). Finally, we go to the discussion on the mechanism why and how the ionospheric perturbation is generated, with taking into account the observational facts.