



Possibility of earthquake prediction by using VLF signals

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Very Low Frequency (VLF) is one of the bands of Radio waves having frequencies lying between 3-30 KHz. It propagates through the Earth-ionosphere wave-guide. Normally, patterns of VLF signal depend on regular solar flux variations. However, an extra source of ionization can change height of ionospheric layers and/or ion densities and these changes can perturb VLF signal amplitude. By measuring amplitude and phase of radio signals reflected from the ionosphere, it is possible to detect various kinds of energetic phenomena. Recently, scientists have noticed that prior to any seismic event a huge amount of energy is released which may create disturbances in the lower part of the ionosphere and hence the VLF signals which propagate through the ionosphere, may be perturbed. In this regard, we have analyzed the night time amplitude of the VLF signals and found that it anomalously fluctuated 3-4 days before seismic events. We have studied the behavior of the terminator times of the VLF signals and found that the 'VLF day length' which is defined as difference of two terminator times of the VLF signals, increased anomalously few days before an earthquake. We also observed that the D-layer preparation time (DLPT) and D-layer disappearance time (DLDT) become anomalous a few days prior to the Earthquakes. By analyzing VLF signals for multiple propagation paths, we found evidences which indicate that it may also possible to predict epicenters of earthquakes in future by analyzing VLF signal propagation through multiple propagation paths.