Pre-Earthquake Ionospheric Anomalies Observed Using Ground Based Multi-instruments

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Ionosphere is very sensitive to the seismic effects and the detection of ionospheric perturbations associated with the earthquakes seems to be very promising for short term earthquake prediction. Ionospheric anomalies possibly associated with the seismic activities have been discussed extensively since the Great Alaska earthquake in 1964 [1-2]. In this study, we have tried to find out the pre-earthquake signature for few major earthquakes using ground based measurements by ionosonde, GPS based TEC measurement and VLF wave analysis at various low latitude stations. We found that the critical frequency of ionospheric F2 layer foF2, show the variation few days before and after the shock. GPS based measurements show the anomalous variation in the vertical total electron content (VTEC) of the ionosphere [3].

Also VLF radio waves received from various VLF transmitter shows a sudden increase daytime amplitude of VLF signal 1-2 days prior to the earthquake along with a decrease in nighttime average amplitude [4]. Nighttime fluctuations in the VLF amplitude also exhibit a significant enhancement few days before the earthquake which is likely to be a precursor to the earthquake.

Keywords: Earthquake precursors, Seismo-electromagnetic, ionospheric TEC.

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