

Ionosphere lithosphere interaction analysis for earthquake precursor analysis

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The geographic location of Pakistan has surrounded by multiple seismically active region; these seismic regions are the result of ongoing tectonic collision. The seismic prospective of these zones has potential of producing destructive higher magnitude earthquake. The society resilience to such geologic hazard is poor to such calamity caused by underdevelopment. The enormous destructive potential of an earthquake could be softened in its damaging effect if perceived through some precursor technical analysis prior to its occurrences. it is always the desire of each seismologist to identify some technically analyzable precursor to an earthquake occurrence. This study was conducted for an ionosphere atmospheric anomalies detection prior to the earthquake main event through the Total Electron Content (TEC) anomaly detection. The disruption caused by seismically active zones has been extensively documented both before and after earthquakes. This analysis offers crucial insights into the fundamental mechanisms of the lithosphere-ionosphere interaction. The detection of short- and long-term seismic anomalies before the occurrence of the main shock has been reported from ionosphere and atmospheric indices including Global positioning system TEC data and other remote sensing data. The tectonic forces are responsible for the generation of earthquakes inside the earth during the earth preparation period. These tectonic stresses create high level pressure which ultimately create a rupture, at the time of these tectonic stress drop, the total electron content in the atmosphere shows an anomaly/disturbance. In this study we tried to notice the anomalies to predict or forecast the earthquake before the main event occurrence. This study analyzes earthquake precursor data from Honshu, Japan, to gain a better understanding of anomalies observed five days after and fifteen days before two significant seismic events: a 7.3 magnitude earthquake and a 7.1 magnitude earthquake. The results identify specific precursory signals that can enhance our ability to forecast and broaden our knowledge of seismic activity, and to be adopted in higher rated seismic active region like Pakistan.

Keywords: Ionosphere; atmosphere; earthquake; precursor; Japan; seismic activity