



Lithosphere-Ionosphere Coupling Associated With Major Earthquakes Occurred Around Indian Subcontinent

Devbrat Pundhir⁽¹⁾ and Birbal Singh⁽¹⁾

(1) Department of Electronics and Communication Engineering, R.B.S. Engineering Technical Campus, Bichpuri, Agra-283105, India, e-mail: devbratpundhir@gmail.com

Earthquake prediction is a major issue for the scientific community. Several methods have been used but there is no full proof technique available for the earthquake prediction till now. In the last few decades, ionospheric precursors have been studied extensively in which especially the GPS based total electron content (TEC) measurements have achieved a great attention.

Keeping in view the above, we have studied in this paper the GPS-TEC variation by using well established statistical technique and found significant changes in TEC data prior to the major earthquakes ($M > 6.5$) which occurred around Indian Subcontinent. Firstly, we have analyzed the day to day variation of GPS-TEC data over Agra (27.2° N, 78° E) and other low latitude IGS stations data i.e. Lucknow (Geograph. Lat. 28.9° N, Long. 80.9° E), Hyderabad (Geograph. Lat. 17.4° N, Long. 78.5° E), Bangalore (Lat. 13° N, Long. 77.4° E), and Port Blair (Lat. 11.6° N, Long. 92.7° E) ± 15 days before and after the occurrence of the Indonesian earthquake of magnitude $M = 8.5$. The simultaneous occurrence of the anomalies in TEC data were detected prior to the occurrence of this earthquake. The strength of the TEC anomalies was maximum at Agra (farthest station) and minimum at PBRI (nearest station). Further, we examined the diurnal variations of GPS-TEC observed at two Indian stations of Agra (Geograph. Lat. 27.2° N, Long. 78° E) and Surat (Geograph. Lat. 21.16° N, Long. 72.78° E) and global ionospheric maps data (GIM-TEC) for the months of April and September 2013 in search of ionospheric precursors of three major earthquakes ($M > 6.5$) that occurred in Pakistan-Iran border region during these months. The significant enhancements are found before the occurrence of these earthquakes.

Finally, multi-stations data study has confirmed that the major earthquakes affected not only the epicenter area but also the adjoining region. This effect is larger away from the epicenter than nearer to epicenter. This result is explained in terms of generation of AGWs from the epicenter.