



Variation in Ionosphere due to 2005 Kashmir Earthquake- Implication from GPS Observation

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Abstract

In 2005, a major earthquake (Mw 7.6) struck the Kashmir region in the morning hour (03:50:40 UTC) of 8th October, and it was felt significantly up to far located cities of north-central India. The earthquake occurred in Pakistan, nearly 10 Km from east of Balakot and 19 km from northeast of Muzaffarabad. The epicenter of an earthquake is 34.493°N, 73.629°E. This earthquake has occurred due to the shallow reverse faulting between the Indian and Eurasian plates in the Indus Kohistan Seismic Zone (IKSZ) of the Northwest Himalaya. For the analysis of the Co-seismic Ionospheric Disturbances (CID) due to the 2005 earthquake, we have used cGPS data from 9 stations, namely, Soloman Islands (SOL1), Kazarman (KAZA), Naval station Newport (NPRI), Talas (TALA), Kumtor-2 (KMTR), NADI, Munsiyari (MUNS), BHTW and PAN2, which were geographically located within 1000 km of the epicenter. A prominent anomalous co-seismic CID was observed at three cGPS stations, viz., NADI, PAN2 and SOL1, which are located in the distance range of about 350 – 500 Km from the epicenter. However, other cGPS stations located beyond 500 km have not shown such anomalous changes. The Co-seismic ionospheric disturbances have been observed approximately 20 - 25 minutes after the occurrence of an earthquake. The similar time delay in co-seismic changes at NADI, PAN2 and SOL1 may be attributed to near identical distances of the stations from the epicenter, which can be studied extensively as one of the potential earthquake precursors.

Keywords: Co-seismic ionospheric disturbances (CID), Total electron content (TEC), Earthquake precursors