

GPS accomplished ionospheric total electron content response over Mumbai, India due to super-intense geomagnetic storms

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The present paper indicates response of ionosphere over Mumbai due to super-intense geomagnetic storms during 2003 to 2005, by analysis of dual frequency permanent GPS station at Indian Institute of Technology Bombay, Mumbai, India (Geographic, 19.13256° N, 72.91623° E; Geomagnetic, 10.78° N, 146.70° E). Although storms occur less frequently, but the intense ones may cause potential threat to sophisticated ground- and space-based technological systems. With the phase and pseudorange observation from all available GPS satellites, the 2-sigma iterated mean total electron content (TEC) is estimated at every 0.1 hr interval. The maximum value of mean vertical TEC as estimated from the GPS observables are ~132.4 on 29th October (Disturbance storm index in nano tesla, Dst = -353 nT) and ~92.9 on 20th November (Dst = -383 nT) in the year 2003. Similarly, the estimated TEC on 7th November (Dst = -374 nT) and 9th November (Dst = -263 nT) of the year 2004 are overblown to ~63.7 and ~83.3 units respectively. The super storm during 15th May 2005 (Dst = -247nT) also shows the corresponding value of ~81.6 units. The consequences of TEC variation is then correlated with 4-minute averages of interplanetary magnetic field and 3-hourly geomagnetic K-indices to analyze the storm effects and its abnormal variations due to interaction between interplanetary magnetic field and geomagnetic field. The anomalous behavior of TEC during the occurrence is compared with outcome of previous and successive quiet days to estimate its influence during positioning measurements.

Biography

Mr. Sampad Kumar Panda has completed masters in Physics and Remote Sensing & GIS. Presently he is pursuing PhD. in ionospheric applications of GPS signals. His research interests include earth-space weather interactions, global navigation satellite system, surveying and geodesy. He is a life member of Indian Society of Remote Sensing and Indian Society of Geomatics.

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Trace fossils and microbial mat-induced sedimentary structures from the Girbhakar sandstone of marwar supergroup, Bhopalgarh area, Jodhpur, Rajasthan, India

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Well-preserved trace fossils (Thalassinoides isp., Planolites isp., and Palaeophycus isp.) and Microbial mat-induced sedimentary structures are reported from Girbhakar Sandstone, the upper sequence of Jodhpur Group of Marwar Supergroup. Marwar Supergroup is 1000m thick lithostratigraphic unit occupies a large area in north western Rajasthan that is unconformably overlies on Ca 779-681 Ma old Malani igneous suites. It is subdivided in three groups viz., lower Jodhpur Group, middle Bilara Group and upper Nagaur Group, where as Jodhpur and Nagaur Group have argilla-aranaceous sequences and Bilara Group has calcareous sequence. The trace fossils are preserved in fine grained sandstone and ferruginous sandstone, where as Mat-induced sedimentary structures are, occurs in patches on the top of fine grained sandstone bedding surface. The area under present investigations lies around Bhopalgarh, which is 70 km northeast of Jodhpur. All these ichnogenera shows marine and shallow marine depositional environment. No age can be assigned on the basis of these trace fossils as they range from Cambrian to Recent but the presence of microbial mat-induced sedimentary structures is possibly Ediacaran affinity and can be assigned Ediacaran age to Jodhpur sandstone of Bhopalgarh area named as Girbhakar Sandstone Formation.

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