

IONOSPHERIC F-REGION RESPONSE DUE TO AN INTENSE GEOMAGNETIC STORM OCCURRED ON 07 SEPTEMBER 2002

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The main propose of this investigation is to study the ionospheric F-region response due to an intense geomagnetic storm which took place during 07-08 September, 2002, and the Dst minimum reached -181 nT at 01:00 UT on 08 September. In this study, we used observations from a chain of 12 GPS receivers and another chain of 5 digital ionosondes. All these instruments are located in the American sector (from equatorial region to mid latitude in both hemispheres). The 12 GPS receivers are spanned from Bermuda (32.4° N, 64.7° W, dip latitude 39.4° N), United Kingdom, to Rio Grande (53.8° S, 67.8° W, dip latitude 30.6° S), Argentina, and the ionospheric sounding data were obtained at Manaus (2.9° S, 60.0° W, dip latitude 6.4° N), Brazil, Jicamarca (12.0° S, 76.8° W, dip latitude 0.05° S), Peru, Palmas (10.2° S, 48.2° W, dip latitude 5.7° S), Brazil, São José dos Campos (23.2° S, 45.9° W, dip latitude 17.6° S), Brazil, and Port Stanley (51.6° S, 57.9° W, dip latitude 29.9° S). It should be mentioned that soon after the start of the storm, the GPS-TEC variations at mid latitude stations in both the hemispheres (Bermuda and St. Croix, U. S. Virgin Islands in the northern hemisphere and Bahia Blanca, Rawson, Porto Stanley and Rio Grande in the southern hemisphere) show positive storm phase. However, during the recovery a strong hemispheric asymmetry in the ionospheric response has been observed. While in the southern hemisphere the GPS-TEC variations were less affected by the geomagnetic storm, the northern hemisphere (Bermuda and St. Croix) observations show a strong and long negative storm phase starting at about 10:00 UT on 08 September (lasting for about 24 hours). A perusal of phase fluctuations of TEC and equatorial spread F (ESF; ionospheric sounding) data show that on the night of 06-07 September, the equatorial ionospheric irregularities were observed mostly in the low latitude region (from Recife to Rio de Janeiro, Brazil), but on the disturbed night of 07-08 September, the stations (St. Croix, Cuiabá and Manaus, Brazil, and Bahia Blanca, Argentina) show start of ESF at about 00:00 UT on 08 September, whereas the stations (Recife, Salvador, Brasília, Viçosa, and São José dos Campos, Brazil) show start of ESF much later 08:00 UT. This possibly indicates different mechanisms for the generation of ESF in different sectors during the disturbed night. Salient features from these multi-site multi-instrument observations will be presented in this communication.

Geomagnetic storm, Ionosphere, F-region

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