



Contribution ID: 91

Type: Oral Presentation

A study of EIA behavior during geomagnetic storms

Tuesday, 4 July 2023 14:40 (20 minutes)

This research study investigates the behavior of equatorial ionization anomaly (EIA) during geomagnetic storms over the African sector (40° S – 50° N and 20° E - 40° E) using a global navigation satellite systems (GNSS) derived total electron content (TEC) within the period of 2008 to 2013. To identify the geomagnetic storms, the criteria of the disturbance storm time, $Dst \leq -30$ nT, and the planetary K $Kp \geq 4$ indices are used in the study. To establish the behavior of EIA, the two - dimensional maps of TEC derived from GNSS data are generated during geomagnetic storm periods.

This study also focuses on investigating the role of electrodynamics (vertical $E \times B$ drift magnitude) in EIA's variability especially its expansion beyond the crest of about $\pm 15^{\circ}$ towards mid-latitudes during geomagnetic storms. Due to the absence of observed vertical $E \times B$ drift data over the longitude sector of interest, we have utilized the equatorial electrojet (EEJ) from ground-based observations based on the well-established differential magnetometer approach. The differential magnetometer approach is used to derive the difference in changes in the horizontal component of the Earth's magnetic field (ΔH) using a magnetometer located at the equator and another one approximately 6° to 9° away from the equator. Specifically for this study, ΔH is derived from a pair of magnetometers at Addis Ababa (0.18° N, 110.47° E, geomagnetic) and Adigrat (6.0° N, 111.06° E, geomagnetic) in Ethiopia.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

PhD

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