

Topic: 'Global Thermospheric Nitric Oxide (NO) Response to the three major geomagnetic storms of 2024'

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Abstract

The year 2024 witnessed three major geomagnetic storms during May 10-11, August 11-12, and October 10-11. The May 2024 was the strongest geomagnetic storm in the last 20 years with a minimum symH of -518 nT. In comparison, the August and October storms were relatively weaker with symH indices reaching lows of -216 nT and -390 nT, respectively. In this study we investigate how the thermospheric NO responded to each storm. For this purpose, we utilise the NO VER (vertical emission rates) derived from the SABER (Sounding of the Atmosphere using Broadband Emission Radiometry) instrument on the TIMED (Thermosphere-Ionosphere-Mesosphere Energetics and Dynamics) satellite. Recent studies suggested that on May 11, 2024, the global power radiated by nitric oxide (NO) was the largest single day global power radiated by nitric oxide (NO) in 22 years as seen by SABER. In our study, we primarily looked into altitudinal and latitudinal variability of NO during the three major geomagnetic storms. The maximum NO enhancements were observed during the May 2024 storm. Major effects were observed around extended auroral latitudes. However, the dawn sectors showed some effects far away from the auroral oval regions.