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In the declining phase of the solar cycle the polar coronal holes on the Sun expand and form non-axisymmetric extensions toward the equator. These extensions enhance the occurrence of high-speed solar wind streams (HSS) and related co-rotating interaction regions (CIR) in the low- latitude heliosphere, and cause moderate, recurrent geomagnetic activity affecting the ionosphere and thermosphere (IT). A combination of Vertical Total Electron Content (VTEC) measurements from two equatorial Global Positioning System (GPS) receivers hosted on ocean surface buoys, dawn and dusk total mass density observations from the Swarm-C satellite near 460 km, and output from the Whole Atmosphere Community Climate Model with thermosphere and ionosphere eXtension (WACCM-X) reveal the impact of prominent quasi-9-day recurrent geomagnetic activity driven by three sequences of HSS/CIR events during December 2018 - February 2019. Satellite and terrestrial observations indicate a significant response in thermospheric neutral density and equatorial TEC associated with these HSS/CIR events. The maximum TEC and neutral density response is found to persist for several days after the onset of the activity. The results suggest that CIR/HSS events can have significant effects on the IT for several days after the CIR has ended, with effects that during solar minimum are comparable to those of coronal mass ejections (CME) events.

Presentation file

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