

Ionospheric Variability Associated with the Quasi-6-day Planetary Wave

*山崎 洋介¹

*Yosuke Yamazaki¹

1. ドイツ地球科学研究センター

1. GFZ German Research Centre for Geosciences

The state of the ionosphere varies from day to day. This is partly due to atmospheric waves that propagate to the upper atmosphere from below. The present study investigates the ionospheric variability associated with the quasi-6-day wave (Q6DW), which is a westward-traveling planetary wave with zonal wave number $s=1$ and period around $t=6d$. First, the Q6DW effect on the equatorial ionospheric electric field is examined using the equatorial electrojet measurements from CHAMP and Swarm satellites, as well as ground-based magnetometer and radar observations. Case studies are presented where westward-propagating disturbances with $s=1$ and $t\sim 6d$ are observed in the daytime equatorial ionospheric electric field. Geopotential height measurements from the Aura satellite confirm the presence of the Q6DW in the lower thermosphere during those events. Next, the impact of the Q6DW on the equatorial ionization anomaly (EIA) is assessed using global maps of total electron content (TEC) from Global Positioning System data. It is shown that the amplitude of the Q6DW in TEC is largest at the EIA crest latitudes and its intra-annual variability closely follows the Q6DW variability in the lower thermosphere.

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