

Global features of ionospheric slab thickness derived from JPL TEC and COSMIC observations

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The ionospheric equivalent slab thickness (EST), defined as the ratio of total electron content (TEC) to F2-layer peak electron density (NmF2), describing the thickness of the ionospheric profile. In this study, we retrieve EST from Jet Propulsion Laboratory (JPL) TEC data and NmF2 retrieved from Constellation Observing System for Meteorology, Ionosphere and Climate (COSMIC) ionospheric radio occultation data. The diurnal, seasonal and solar activity variations of global EST are analyzed. During solstices, daytime EST in the summer hemisphere is larger than that in the winter hemisphere, except in some high-latitude regions; and the reverse is true for the nighttime EST. The peaks of EST often appear at 0400 local time. The pre-sunrise enhancement in EST appears in all seasons, while the post-sunset enhancement in EST is not readily observed in equinox. The dependence of EST on solar activity is related to the inconsistent solar activity dependences of electron density at different altitudes. Furthermore, an interesting phenomenon is found that EST is enhanced from 0° to 120° E in longitude and 30° to 75° S in latitude during nighttime, just to the east of Weddell Sea Anomaly, during equinox and southern hemisphere summer.

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