

LONGITUDINAL STRUCTURE OF THE MID- AND LOW-LATITUDE IONOSPHERE OBSERVED BY FORMOSAT-3/COSMIC AND GPS NETWORK

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This study presents longitudinal structure of the mid- and low-latitude ionosphere using the radio occultation observation of the FORMOSAT-3/COSMIC and network of ground-based GPS receivers. The longitudinal structure seen in the equatorial region is believed to be formed due to modification of the daily dynamo electric field at regions where lower atmospheric tides are generated by latent heat release of the tropical rain storms. Changes of the dynamo electric field result in modification of the equatorial plasma fountain and enhance the equatorial ionization anomaly (EIA). With capacity of three-dimensional global ionospheric observation, altitude range, local time, and monthly variations of this fascinating feature are obtained for further understanding of the underlying physical mechanism. Through comparison between electron densities at various altitudes, the longitudinal structure is prominently seen at upper part of the ionosphere during daytime while the feature can be identified discernibly at F-layer peak altitude during nighttime. Meanwhile, the low-latitude EIA plasma structure excurses poleward at some specific longitudes in summer hemisphere and forms the mid-latitude summer nighttime anomaly (MSNA). The MSNA consists of the already know Weddell Sea anomaly (WSA) and the similar anomalous feature occurred in the Northeast Asia. The seasonal, annual, and diurnal variations of this newly identified ionospheric structure are also discussed.

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