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Seasonal Variations of Mid-Latitude Ionospheric Trough Structure Observed with DEMETER and COSMIC

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A b s t r a c t

The mid-latitude ionospheric trough is a depleted region of ionospheric plasma observed in the topside ionosphere. Its behavior can provide useful information about the magnetospheric dynamics, since its existence is sensitive to magnetospherically induced motions. Mid-latitude trough is mainly a night-time phenomenon. Both, its general features and detailed characteristics strongly depend on the level of geomagnetic disturbances, time of the day, season, and the solar cycle, among others. Although many studies provide basic information about general characteristics of the main ionospheric trough structure, an accurate prediction of the trough behavior in specific events is still understood poorly. The paper presents the mid-latitude trough characteristics with regard to the geomagnetic longitude and season during a solar activity minimum, as based on the DEMETER in situ satellite measurements and the data retrieved from FORMOSAT-3/COSMIC radio occultation measurements.

Key words: main ionospheric trough, ionosphere, electron density, DEMETER, FORMOSAT-3/COSMIC.