

LONGITUDINAL STATISTICS OF THE TOPSIDE He⁺ DENSITY DEPLETIONS AND THE EQUATORIAL F-REGION IRREGULARITIES: COMPARISON STUDY

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He⁺ density depletions, considered as originating from equatorial plasma bubbles, or as fossil bubble signatures, were involved in this study. He⁺ density depletions, obtained from ISS-b spacecraft data, were observed during a high solar activity (1978-80, F_{10.7}~200) in the topside ionosphere (~1000 km) deeply inside the plasmasphere (L~1.3-3) (Sidorova, Adv. Space Res., 2004, 2007). He⁺ density depletion statistics with respect to longitude is considered for the post-sunset hours under winter, summer and equinoctial conditions within of $\pm 35^\circ$ invariant latitudes. The map of He⁺ density depletion distribution as function of latitude- and longitude was also derived. The statistics and the map were compared with the longitudinal statistics of the equatorial F-region irregularities (EFI), obtained from the AE-E spacecraft data (McClure et al., J. Geophys. Res., 1998) for the same period (1978-80). Plasma bubble distribution and range spread-F statistics, obtained by Maruyama and Matuura (J. Geophys. Res., 1980) from ISS-b spacecraft data for the same period, plasma bubble statistics, obtained by Watanabe and Oya (J. Geomagn. Geoelectr., 1986) from Hinotori spacecraft data (1981), were taken for comparison. Moreover, the longitudinal EFI statistics, obtained by Basu et al. (Radio. Sci., 1976) from OGO-6 data and by Su et al. (J. Geophys. Res., 2006) from ROCSAT data, were also taken for comparison study. Comparison shows good conformity in statistics/spatial distributions of all mentioned irregularities. Their predominant occurrence area for all seasons and both hemispheres covers the region of Brasilia, Atlantic Ocean and Africa (270°-0°-30°), where the range of magnetic field declination angle varies from 0° to 20°.

He⁺ density depletion, longitudinal statistics, equatorial F-region irregularities

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