TOPSIDE PLASMA BUBBLES, SEEN AS He^+ DENSITY DEPLETIONS, AND THERMOSPHERE MERIDIONAL WIND INFLUENCE

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The study deals with the evaluation of the possible contribution of the thermosphere meridional/transequatorial winds in the diurnal occurrence probability of the equatorial and low-latitudinal plasma bubbles. It is suggested, that the plasma bubbles, produced by Rayleigh-Taylor instability at the bottomside of ionosphere and transported up by buoyancy to the topside ionosphere and plasmasphere, could be strong affected by meridional (poleward) wind during a generation due to inhibiting the growth of Reyleigh-Taylor instability and flux tube integrated conductivity. He^+ density depletions, considered as originating from equatorial plasma bubbles phenomena, or as possible fossil bubble signatures, are studied here. He^+ density depletions (or subtroughs) are usually observed during a high solar activity at the topside ionospheric altitudes deeply inside the plasmasphere (L~1.3-3). The diurnal He^+ density depletion statistics, obtained from ISS-b satellite data (1978-79) for the different months and averaged for the periods around the solstices and equinoxes, was compared with the velocity variations of the meridional thermosphere wind, calculated in the different models. The best amplitude correlation was found in the longitudinal region of 0˚-60˚W for winter solstice (R=0.72), when the model calculation of Maruyama (1996) was used. The magnetic meridional component of the thermosphere wind was calculated in this model for declination angle of 20˚. He^+ density depletion distribution as function of latitude-longitude, longitudinal statistics and the map of the magnetic declination angle, calculated from IGRF 1975, were involved for further analyses. It was concluded that the significant modulation effect is determined by season and declination angle of the earth magnetic field in the equatorial region.

He^+ density depletions, thermosphere meridional winds, coopling

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