

He⁺ density distribution in the topside ionosphere during high and low solar activity periods: comparison with IRI

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Empirical modeling the relative He⁺ density distribution is presented and compared with IRI model prediction. Study based on the AEROS, AE-C, AE-D, AE-E satellite observations during low solar activity period (1973-76, F_{10.7}=70÷100) and on ISS-b satellite observations during a high solar activity period (1979, F_{10.7}=170÷220). The topside ionosphere altitudes (low solar activity – 770±100 km, high solar activity – ~1100 km) were under consideration. Relative He⁺ density profiles, obtained from satellite data, were drawn as the surface and counter plots in the interval of invariant latitudes from 10° to 70°. The profiles as function of invariant latitude and month were analyzed under nighttime (20-04 LT) and daytime (08-16 LT) conditions. It was revealed that for low solar activity the averaged satellite data are in good enough/satisfactory accordance with IRI model prediction for daytime/nighttime, respectively. However, for high solar activity the IRI model overestimates the seasonal profiles by a factor of up to 5. The obtained dataset could be useful for the recently developed topside ion composition models improved IRI.