Seasonal variation of the total electron content, maximum electron density and equivalent slab thickness at Wuhan station

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Half-hourly total electron content (TEC) from Faraday rotation measurement in the EST-II satellite and half-hourly foF2 ionosonde data obtained at Wuhan (114.4^{o}E, 30.6^{o}N)from 1980 to 1990 are analyzed to show the seasonal variation of TEC, NmF2 (maximum electron density of the F2-layer, proportional to square of foF2) and the equivalent slab thickness EST. The observed NmF2 values are used to check the validity of International Reference Ionosphere (IRI) and the single-station models using Fourier expansion and cubic-B splines approaches suggested by Liu to predict the seasonal variability of this parameter.

By analyzing and comparing, we get some conclusions.

1. The semiannual anomaly of TEC and NmF2 is obvious in high and low solar activity periods during 1980 and 1990 at Wuhan.

2. The season or winter anomaly of TEC and NmF2 is obvious in high solar activity periods during 1980 and 1990 at Wuhan. Jakowsky mentioned that during solar minimum the nighttime winter anomaly effect had been observed in the northern hemisphere, which is not observed at Wuhan.

3. The occurrence rate of night-time enhancements of NmF2 is a maximum in summer during high solar activity periods, but is a minimum during wintertime for low solar activity conditions.

4. EST is mainly between 200 and 800 kilometers, which is small change during daytime (7-18 LT) and is larger change in other periods.

5. Comparing with the validity of International Reference Ionosphere (IRI) and the single-station models using Fourier expansion and Cubic-B splines approaches suggested by Liu predicting the seasonal variability of NmF2, the effect predicted by three models of daytime is better than nighttime, and winter is not better than other seasons. In three models, the effect predicted by Cubic-B splines model is best, Fourier model is better, IRI model is good.