



The shape factors of the electron density profile in topside ionosphere at two low-mid latitude stations in Asia

Xiaoli Luan (1), Libo Liu (2), Weixing Wan (2) and Tao Yu (1)

(1) National Satellite Meteorological Center, Chinese Meteorological administration, Beijing 100081, China, (2) Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China (luanxl@nsmc.cma.gov.cn, Fax: +86 010-68406943 Phone: +86-010-68409943)

An attempt to extract the shape factor (f) of the electron density (N_e) in topside ionosphere is carried out based on the ionosonde data and the TEC observation with Faraday technique over Wuhan (114.4°E, 30.6°N). The similar shape factor f is also extracted from the nearby incoherent scatter radar, MU in Shigaraki (136.1°E, 34.9°N) by best match to the observed N_e profile. The results are compared with each other. In the TEC estimation, a Chapman- α layer with scale height equal to atomic oxygen scale height (CHOEA) has been reported to be an alternative way to some models including IRI (Ezquer et al., 1994; 1997). Based on the CHOEA method, we apply a Chapman-type layer with a new shape factor f to fit the topside TEC rather than the one in Chapman- α ($f=0.5$) or Chapman- β ($f=1.0$) layer. The topside TEC is taken out by subtracting the bottom side part of the IRI prediction from the observed TEC, and the observed F_2 layer peak height and the density is used as inputs. The results show the TEC-based shape factors are generally lower by 0.2-0.3 than the ISR observed N_e profile fit factors. Further investigation suggests this difference comes from two aspects. The TEC-based fit and the N_e profile-based fit up to the same height can lead to a difference of about 0.1-0.15. The other part of the difference may results from the different height range of the Faraday TEC (up to 1000 km) and the MU radar (up to ~600 km).

Acknowledgments. MU radar data is downloaded from Madrigal Database which is assembled and maintained by the Haystack Observatory Atmospheric Sciences Group.

The MU radar belongs to and is operated by Radio Atmospheric Science Center of Kyoto University.