

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

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An attempt to extract the shape factor ( $f$ ) of the electron density ( $Ne$ ) profile 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  $Ne$  profile. The results are compared with each other. In the TEC estimation, a Chapman- $\alpha$  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- $\alpha$  ( $f=0.5$ ) or Chapman- $\beta$  ( $f=1.0$ ) 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  $Ne$  profile fit factors. Further investigation suggests this difference comes from two aspects. The TEC-based fit and the  $Ne$  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).

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