



Performance evaluation of F-layer peak height models in IRI-2016 over the Indian equatorial and low latitudes

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The performance of different height models (BSE-1979, AMTB-2013, and SHU-2015) introduced in the International Reference Ionosphere (IRI-2016) is evaluated over the Indian equatorial and low latitude sectors. The impact of deviations in the modelled h_mF_2 on the estimation of the Total Electron Content (TEC) is examined using the three different h_mF_2 methods in IRI-2016. For this study digisonde observations over Trivandrum (8.5 °N, 76.9 °E) and Ahmedabad (23.0 °N, 72.5 °E) along with GPS observations over Colombo (6.8 °N, 79.8 °E) and Ahmedabad during a high solar activity year 2014 are analyzed. A comparison of electron density profiles between digisonde and IRI-2016 revealed significant deviations both at the equatorial station, Trivandrum, and the low latitude station, Ahmedabad, with higher deviations in the post sunset hours at the equator. The three height methods have shown significant differences among their predictions of h_mF_2 at both locations. At the equator, the SHU-2015 method shows better estimates than the other two methods except at PRE time, during which the AMBT-2013 method shows better performance. At the low latitude station, both the newly added methods (SHU-2015 and AMBT-2013) do not indicate any improvements in estimating h_mF_2 . However, in general, deviations in h_mF_2 among the three different height models do not affect the estimation of TEC values. The present analysis further reveals that, the estimation of TEC in the model outputs can be affected only if there are large deviations in the modelling the h_mF_2 , which is noted during daytime and post-sunset hours over the equator. These results will be discussed in detail.