

Adaption and modification of Ionospheric model to improve model predictions in the Indian Equatorial Ionization Anomaly (EIA) region.

Sheetal P. Karia¹ and Surendra Sunda²

¹ S.V. National Institute of Technology, Surat, 395007, India email: sheetalkaria1@gmail.com

² Airport Authority of India, Ahmedabad, 380003, India email: s.sunda@gmail.com

Abstract

The ionospheric models like IRI and NeQuick2 are empirical models that rely largely on the data input to the model. The region where the data input is sparse (like the Equatorial Ionization Anomaly (EIA) region in the Indian sector) the model predictions are affected the most. Therefore, it would be interesting to use the data from the Indian region to the models through data ingestion (as described in Nava et al 2011). The data ingestion is the process of importing external data into a system of the model. This technique has a potential to improve the model specifications concerning the space weather and forecasting. The paper reports on the adaptation and modification of a climatological model, the International Reference Ionosphere (IRI-2016 model) with the use of total electron content (TEC) data derived from six different GPS receivers set up under GPS aided geo augmented navigation system (GAGAN) that covers the Equatorial Ionization Anomaly (EIA) in the Indian region. Figure 1 shows the location of GPS receivers used for the study. Validation of f_oF_2 derived by the model after ingestion with that observed by ionosonde stations located in the Indian sector and also from COSMIC FORMOSAT data are performed. The mean, standard deviation and percentage of difference between measured and modelled are obtained to precisely validate the data ingestion technique. IRI 2016 model derived f_oF_2 are close to ionosonde and radio occultation data after adaptation.

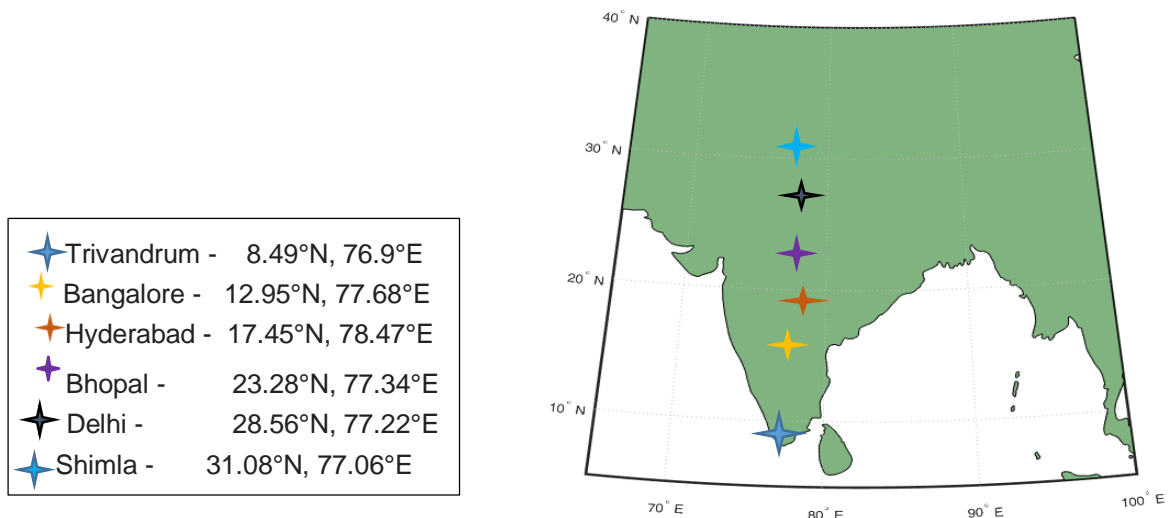


Figure1 A Geographic location of GPS receiver stations considered for the study

Reference:

Nava, B., Radicella, S.M., Azpilicueta, F., (2011). Data ingestion into NeQuick 2. Radio Sci. 46, RS0D17.