

## **Regional Ionosphere Modeling in Support of IRI and Wavelet Using GPS Observations**

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### **A b s t r a c t**

Dual-frequency global navigation satellite systems (GNSS) observations provide most of the input data for development of global ionosphere map (GIM) of vertical total electron content (VTEC). The international GNSS service (IGS) develops different ionosphere products. The IGS tracking network stations are not homogeneously distributed around the world. The large gaps of this network in Middle East, *e.g.*, Iran plateau, reduce the accuracy of the IGS GIMs over this region. Empirical ionosphere models, such as international reference ionosphere (IRI), also provide coarse forecasts of the VTEC values. This paper presents a new regional VTEC model based on the IRI 2007 and global positioning system (GPS) observations from Iranian Permanent GPS Network. The model consists of a given reference part from IRI model and an unknown correction term. Compactly supported base functions are more appropriate than spherical harmonics in regional ionosphere modeling. Therefore, an unknown correction term was expanded in terms of B-spline functions. The obtained results are validated through comparison with the observed VTEC derived from GPS observations.

**Key words:** compactly supported base functions, global ionosphere map, global positioning system, international reference ionosphere, total electron content.