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Investigation of the Quality of a new Regional Model of the Ionospheric Electron Content

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The ionosphere is part of the upper atmosphere which affects electromagnetic waves by its ionization. The resulting propagation delay is frequency dependent, so it can be determined with dual frequency measurements. In case of single frequency users ionospheric models are used to correct the measurements.

At the Institute of Geodesy and Geophysics (Vienna University of Technology) a new ionospheric model, labeled Multilayer Model, is under development. It consists of nine horizontal equidistant electron layers within the height range of the F2 layer, where the maximum of the ionization can be found. The remaining ionospheric layers are currently not considered. The electron content of each of the nine layers is obtained from a simple model with very few parameters, like the current maximum VTEC and weighting functions to account for the spherical distance between coordinates of the sub-sun point and the points of interest. All parameters are calculated with hourly time resolution from global and regional GNSS observation data.

The IRI (International Reference Ionosphere) is a joint project of the Committee on Space Research (COSPAR) and the International Union of Radio Science (URSI). An empirical standard model of the ionosphere is provided which is based on a worldwide network of ionosondes, incoherent scatter radars and other data sources. The most recent available IRI model is version IRI2011.

In this presentation slant TEC-values calculated with the Multilayer Model are compared to the results of IRI in order to evaluate the new model. The research is done within the project GIOMO (next Generation near real-time IOnospheric MOdels) which is funded by the Austrian Research Promotion Agency (FFG).