C0.2-0045-18 REGIONAL ELECTRON DENSITY MODELING USING VARIOUS SPACE GEODETIC DATA

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The ionospheric delay is one of the most significant error sources in positioning using Global Navigation Satellite Systems (GNSS) data. Investigation and elimination of this effect requires an understanding of the distribution of ionospheric electron density. In addition, the ionosphere electron density and the Total Electron Content (TEC) along the line of sight between satellite and receiver are two important parameters in many fields, including ionosphere physics and telecommunication. The use of base-functions is one of the possible approaches for multi-dimensional modeling of the ionosphere parameters. On global scale, spherical harmonic functions are used to model the ionosphere parameters. However, on regional scale, using these functions will result in great errors. Therefore, in this research, the capability of using B-spline base-function along with Chapman profile function is investigated for regional ionospheric modeling over Iran. B-spline base-functions describe the electron density distribution horizontally and the Chapman profile function illustrates the electron density distribution in vertical. Due to the nonlinearity of mathematical model, the outputs of the International Reference Ionosphere (IRI-2012) model are used as initial values. The National Cartographic Center of Iran (NCC) has established a network of one hundred GPS stations: the Iranian Permanent GPS Network for Geodynamics (IPGN). The main task of the GPS stations is to collect and store raw GPS data and send them to Tehran processing center on a daily basis for final processing. The required data for our investigation are ground based measurements of the IPGN network and ionospheric information obtained from Formosat-3/Cosmic Radio Occultation data. We expect to increase accuracy and reliability of the final model by integrating these two observation techniques.

C0.2-0046-18 TEC VARIABILITY IN EQUATORIAL IONOSPHERE BASED ON BDS-GEO DATA

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With the development of GNSS systems, the coherent multi-frequency L band transmissions are now available from a number of geostationary satellites. These signals can be used for ionospheric TEC estimations in the same way as widely used GPS/GLONASS signals, taking the advantage of almost motionless ionospheric pierce points [1]. Among these geostationary satellites, Chinese BDS-GEO are of the peculiar interest, providing the best noise pattern in TEC estimations, which corresponds to those of GPS/GLONASS systems [2].

In this work we discuss the capabilities of BDS-GEO data for studying ionospheric variability driven by space weather and meteorological sources at different time scales. Analyzing data from a number of IGS receivers we present seasonal variations of geostationary TEC in near equatorial ionosphere and its relation to Solar activity, as well as day-to-day TEC variability driven by Solar flares, geomagnetic storms, SSWs and typhoon activity. We also discuss seasonal and diurnal variations of ROTI index constructed from geostationary TEC estimations and its relation to the EPB occurrence. Our results show large potential of geostationary TEC estimations with BDS-GEO signals for continuous monitoring of low-latitude and equatorial ionosphere.

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