generally occurs during geomagnetic quiet time during solar minimum and declining phase of the solar cycle. This work presents an analysis of the effects of penetration of interplanetary electric field to the equatorial ionosphere during a HILDCAA event. Then, we examine how the equatorial ionosphere over the Brazilian region behaves in terms of the peak height of the F2 layer (hmF2) during the occurrence of a series of events HILDCAA. For this purpose,

Digisonde data from the equatorial station São Luís (44,6O, 2,33S, dip angle 1,5S) observed during the occurrence of the three distinct periods of HILDCAA events in the year of 2006 will be used.

J18-27p EVALUATION OF AN IONOSPHERIC 3D-INTERPOLATION PARAMETERS FOR THE BRAZILIAN IONOSPHERE DYNAMICS FORECASTING SYSTEM BASED ON RADIO OCCULTATION DATA

Petry, Adriano; Mattos, Everson; Leopoldino, Thaygoro Minuzzi; de Souza, Jonas Rodrigues
Instituto Nacional de Pesquisas Espaciais (INPE); INPE; INPE/UFSM; INPE
adriano.petry@crs.inpe.br

The Brazilian operational ionosphere dynamics forecasting system, developed at National Institute for Space Research by the Space Weather team (INPE/EMBRACE) has made predictions of the 3-dimensional ionosphere behaviour in terms of the concentrations, field-aligned fluxes, and temperatures of the electrons and the O+, H+, N+, He+, N2+, O2+ and NO+ ions, and provides vertical total electronic content (TEC) maps for South America region with almost 24 hour ahead. Recently, efforts have being made to simulate the predictions in a global scale.

A first principles model is used to estimate ionospheric parameters aligned with geomagnetic field lines. This spatial grid becomes non-homogeneous when converted to geographic coordinates. To generate TEC maps, a 3-dimensional homogeneous grid is used, and for every grid location, Inverse Distance Weighting (IDW) interpolation procedure is applied using the simulated values in the neighbourhood. The grid altitude ranges from 90km to 1000km with step of 10km, and the grid latitude and longitude covers the hole Globe using step of 1 degree. The problem that arises from this procedure concerns the number of nearest neighbours that should be used in the interpolation. We have experienced that different number of neighbours used in grid interpolation leaded to very different TEC maps.

In this study we have used Radio Occultation (RO) remote sensing technique, that measures physical properties of a planetary atmosphere, including electron density. Data from Constellation Observing System for Meteorology, Ionosphere and Climate (COSMIC) was compared with several grids interpolated using different number of nearest neighbours for IDW interpolation. Considering observations at the same Coordinated Universal Time (UTC), with 5 minutes of tolerance, every RO measurement was compared with its closest grid value. Mean Squared Error (MSE) was then calculated for all available data, since the most representative grid minimizes the MSE.

Preliminary results for julian day 80 of 2012 indicate that a wide range, between 100 and 500, for the number of nearest neighbours used in IDW shows an approximately equal and maximal similarity when interpolated grid values are compared with RO observations. In order to minimize the computational load, an appropriate IDW interpolation would consider around 100 nearest neighbours.

J18-28p RADIO OCCULTATION METHODS FOR MONITORING ATMOSPHERE AND IONOSPHERE OF THE EARTH

Ríos, Víctor; Leal, Sebastian; Esquivel Hernán
Department of Physics, Universidad de Tucuman; CONICET
vhrios@uolsinectis.com.ar

The remote sensing satellite radio occultation method elaborated for monitoring of the Earth's atmosphere and ionosphere with a global coverage is described. Comparison of theoretical results with experimental observations of radio wave propagation effects in the Earth's atmosphere and ionosphere in the communication links satellite-to-satellite is provided. Directions in application of the radio occultation method are discussed: measuring vertical gradients of the refractivity in the atmosphere and electron density in the lower ionosphere, determination of the temperature regime in the stratosphere and troposphere, investigation of the internal wave activity in the atmosphere, and study of the ionospheric disturbances on a global scale. The radio occultation technique may be applied for investigating the relationships between processes in the atmosphere and mesosphere, study of thermal regimes in the intermediate heights of the upper stratosphere-lower mesosphere, and for analysis of influence of space weather phenomena on the lower ionosphere. Radio-holographic methods are considered as a tool for determination of the altitude profiles of temperature, pressure, refractivity, internal wave activity in the atmosphere, and electron density in the ionosphere with usage of the radio links satellite-to-satellite. Results of radio occultation measurements of the atmospheric and ionospheric parameters are described. Comparative analysis of effectiveness of the radio occultation and other remote sensing methods is conducted.

Key words: ionosphere, satellite, interactions, radio ocultation