The International Beacon Satellite Symposium *BSS2010*
P. Doherty, M. Hernández-Pajares, J.M. Juan, J. Sanz and A. Aragon-Angel (Eds)
Campus Nord UPC, Barcelona, 2010

DATA INGESTION INTO NEQUICK 2

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Key words: Ionosphere electron density, Data Ingestion, NeQuick 2, GPS, Ionosonde, TEC, foF2.

Abstract: NeQuick 2 is the latest version of the NeQuick ionosphere electron density model developed at the Aeronomy and Radiopropagation Laboratory of the Abdus Salam International Centre for Theoretical Physics (ICTP) - Trieste, Italy with the collaboration of the Institute for Geophysics, Astrophysics and Meteorology of the University of Graz, Austria. It is a quick-run model particularly designed for trans-ionospheric propagation applications that has been conceived to reproduce the median behaviour of the ionosphere. To provide 3-D specification of the ionosphere electron density for current conditions, different ionosphere electron density retrieval techniques based on the NeQuick adaptation to GPS-derived Total Electron Content (TEC) data and ionosonde measured peak parameters values have been developed.

In the present paper the technique based on the ingestion of TEC global vertical TEC map into NeQuick 2 will be validated. For this purpose hourly global vertical TEC maps and hourly foF2 values from about 20 ionosondes corresponding to one month in high solar activity and one month in low solar activity period will be used. The performance of the NeQuick 2 in reconstructing the 3D electron density of the ionosphere will be analyzed in terms of statistical comparisons between experimental and retrieved critical frequencies of the F2 layer. An assessment of the capability of the model to reproduce the current status of the ionosphere day-by-day will also be performed. Therefore a complete analysis concerning the foF2 monthly median values and the inter-decile range of the difference of experimental and

the reconstructed foF2 values will be done. The self consistency of the ingestion scheme will be assessed through a statistical comparison between experimental and reconstructed slant TEC values, where the slant TEC data used for the statistics will be selected among those that have been used for the construction of the vertical TEC maps considered.

For comparison purposes, the performance of the electron density retrieval method based on the NeQuick 2 adaptation to slant TEC data at a single station will also be indicated. Furthermore, in a selected case, the effectiveness of the ingestion technique based NeQuick 2 adaptation to GPS-derived TEC data and ionosonde measured peak parameter will be shown.