



Analysis of NeQuick topside TEC over the Antarctic Region

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In the present work the NeQuick 2 capabilities to estimate the ionospheric topside Total Electron Content (TEC) in the Antarctic Region have been investigated. The topside TEC at a given location has been determined as the difference between a GNSS-derived vertical TEC and the corresponding integrated bottomside electron density profile, as obtained by a co-located ionosonde.

In particular, the relevant electron density profiles have been provided in the framework of the AUSPICIO (AUto-matic Scaling of Polar Ionograms and Cooperative Ionospheric Observations) project by the Adaptive Ionospheric Profiler (AIP) applied to ionograms recorded at selected high-latitude and polar ionosondes. The GNSS-derived vertical TEC have been obtained from single receivers belonging to the IGS Network.

To allow a direct comparison between the NeQuick and the GNSS-derived topside TEC, a matching for the peak density and height is needed. Therefore a data ingestion technique has been implemented in order to adapt the NeQuick model to the measured foF2 and hmF2 values.

The performance of the NeQuick 2 in reconstructing the electron density above the F2 layer peak height has been evaluated in terms of statistical comparisons between experimental and model-retrieved ionospheric topside TEC. The analysis results indicate that the model tends to slightly underestimate the topside TEC, especially during periods of high solar activity. Indeed, considering the inhomogeneity of the data sets, it is not possible to infer a general trend of the NeQuick performance as a function of latitude. Thus the statistics related to individual stations will be presented.