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NeQuick 2 adaptation to GPS and ionosonde data

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NeQuick 2 is the new version of the NeQuick ionosphere electron density model recently implemented 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. As in the previous version of the model, the NeQuick 2 is able to describe the vertical electron density profile of the ionosphere as a sum of 6 semi-Epstein layers modeled in terms of the ionosonde parameters foE, foF1, foF2 and M(3000)F2. It also includes specific routines to compute the Total Electron Content (TEC) along any ground-to-satellite ray-path by means of numerical integration. Using the previous version of the model, electron density retrieval techniques based on NeQuick adaptation to TEC data have already been developed. At present, taking advantage of the model structure and of the experience gained with the use of the model driving parameter Az (ionization level), a procedure to simultaneously adapt the NeQuick 2 to GPS-derived TEC data and ionosonde measured peak parameters has been defined. In this paper the proposed adaptation method is described and the capabilities of the model to give time-dependent specifications of the three-dimensional electron density of the ionosphere are illustrated.