



TEC AND FOF2 OBTAINED FROM GNSS SIGNALS AND ASSIMILATED BY A PHYSICAL MODEL

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ABSTRACT

In this work, we use the vertical total electron content (TEC) calibrated with the Boston College code and the ionospheric critical frequency extracted from such TEC (foF2^{*}). The data are only for the day March 24, 2015. Three latitudinal ranges covering -30° to 30° degrees, which are distributed along the magnetic meridian crossing Jicamarca (Geog. Longitude: -77°), Boa Vista-Campo Grande (Geog. Longitude: -57°) and São Luís (Geog. Longitude: -44°), respectively. First of all, our assimilation data consist of a latitudinal adjustment of the electron density calculated by the Sheffield University Plasmasphere Ionosphere Model at INPE (SUPIM-INPE) applying the same proportion as obtained from the ratio between the observed TEC and calculated by SUPIM-INPE. After that, if it is identified discrepancies between calculated and foF2^{*} values, a second adjustment is applied considering also the proportional difference between calculated and extracted critical frequency (foF2^{*}). Observational data of F-region critical frequency (foF2) and TEC from digisondes operating at Boa Vista, São Luís and Campo Grande were also used in the result validations. In general, TEC values obtained with Boston College code show good agreement with those from digisondes for all locations, except over São Luís near 00 and 12 UT and over Campo Grande after 14 UT. The direct results from SUPIM-INPE, i.e., the results without data assimilation, for both foF2 and TEC have not shown good agreement with the observational data. On the other hand, it was found excellent results (the results match with observations), mainly for foF2, after applying the data assimilation.