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On the empirical model of F2 peak electron density for the European Region

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In this work the applications of the Neural Networks has been employed with an attempt to develop an empirical model of the F2 region ionospheric parameters, foF2 and M3000F2, for the European sector. Experimental data of foF2 and M3000F2 spanning the periods 1976 to 2008 from the European sector ionospheric stations have been used to train neural network. Input vectors such as Universal time (UT), solar zenith angle, day of the year, modified dip angle (Modip), solar radio flux (F10.7), three-hourly magnetic index (Ap) and storm time index (Dst) that are known to contribute to variability of the ionosphere are used as input parameters. A comprehensive comparison of the results obtained with the ITU-R coefficients (former CCIR) has been carried out to test for the predictability of this model. Also included in the analysis is the predictive ability of these models during magnetically disturbed periods. The present results show that neural network model is able to capture the variability of these parameters better than the IRI storm model. An improvement can be achieved if stations from the boundary region of the European sector are included in the training data.