

Operational forecast of foF2 above Tokyo using solar wind input to a neural network

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A new empirical prediction model of foF2 above Tokyo, Japan (Uchida et al., 2016, submitted), has started its forecast operation at National Institute of Polar Research. Solar wind parameters are used for the first time to the input of a neural network (NN) to predict foF2 in that study. The model showed better forecast results compared to an existing operational NN model (Nakamura et al., 2009) which forecasts foF2 using K-index to the input. The results support our expectation that the NN can represent the physics between the ionospheric variations and the solar wind better. The forecast is operated every day at 0 UT for next 24 hours. The model uses day of year, sunspot number, F10.7 solar proxies, solar wind proton velocity, IMF By and Bz to the input. Prior 24 hour values to the forecast are lined to the input at once. To represent the time dependences, 24 of individual NNs are constructed for each hour and concatenated at forecast. We introduce the operational model and report the summary of current operation, and discuss several possibilities to improve the forecast.

Keywords: Forecast, foF2, Neural network, Solar wind