Prediction of geomagnetic storm using neural networks: comparison of the efficiency of the satellite and ground-based input parameters.

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Different kinds of neural networks have established themselves as an effective tool in the prediction of different geomagnetic indices, including the Dst being the most important constituent for determination of the effects of Space Weather on technology infrastructure. Feed-forward networks with one hidden layer is used to forecast the Dst variation, using separately the solar wind VBz, polar cap index, and auroral electrojet index as input parameters. It was found that in all three cases the storm-time intervals were predicted much more precisely as quite time intervals. The majority of cross-correlation coefficients between predicted and observed Dst of strong geomagnetic storms are situated between 0.8 and 0.9. Changes in the neural network architecture, including the number of nodes in the input and hidden layers and the transfer functions between them lead to an improvement of the forecast efficiency 10%.