Use of multivariate relevance vector machines in forecasting multiple geomagnetic indices

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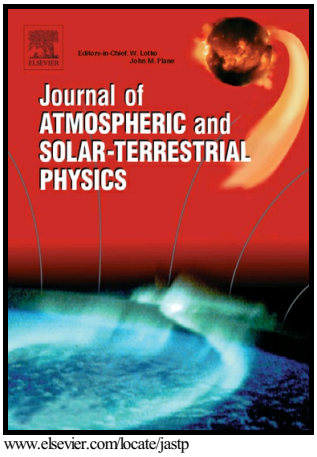

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Use of multivariate relevance vector machines in forecasting multiple geomagnetic indices

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Abstract

The forecasting ability of Multivariate Relevance Vector Machines (MVRVM), used previously to generate forecasts for the *Dst* index, is extended to forecast the *Dst, AL*, and PC indices during the years 1975-2007. Such learning machines are used in forecasting because of their robustness, efficiency, and sparseness. The MVRVM model was trained on solar wind and geomagnetic activity data sampled every hour with activity periods of various intensities, durations, and features. It was found that during the training phase, for a given error threshold, 14.60% of the training data was needed to explain the features of the data. The trained model was then tested on 177 different storm intervals, at various levels of geomagnetic activity, to generate simultaneous forecasts of the three indices at a lead time of one hour (1-h). The focus of the modeling was to assess the forecasts during main storm (MS)

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