Forecasting of geomagnetic indices using system identification techniques

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We present the development of NARMAX based mathematical models for the evolution of geomagnetic indices under the influence of the solar wind. We compare the performance of various forecast models: discrete time single input single output model, discrete time multi input single output model, and continuous time single input single output model. We show that whilst the continuous time single input single output model has a straight forward interpretation that provides understanding of the underlying physical processes the discrete time multi input single output model provides the best forecast.