



Prediction of Solar Wind Parameters at 1AU using an Artificial Neural Network

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In this research, we present a hybrid intelligent source surface model (HISS), which applied an artificial neural network (ANN) with observational and theoretical input, to predict solar wind parameters at 1AU. The model is a hybrid system merging various observational and theoretical information as input. Different inputs are tested including individual parameters and their combinations in order to select an optimum. Then, the optimal model is implemented for prediction. The modeling results are validated by both error analysis and event-based analysis from 2007 to 2016. Our results demonstrate that the HISS model can predict the large-scale solar wind speed at 1AU well, with an RMSE of 68 km/s, and a correlation coefficient of 0.74 for year 2007 to 2016. The HSE analysis shows our model can predict 68.2% of the observed HSEs. The artificial intelligent techniques have been greatly improved in the last few years, with the explosion of deep learning. It can be expected that the solar wind prediction will be greatly improved with more advanced machine learning techniques and more observational data collected.