



Data Assimilation in the Solar Wind: Challenges and First Results

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Data assimilation (DA) is currently underused in the solar wind field to improve the modelled variables using observations. Data assimilation has been used in Numerical Weather Prediction (NWP) models with great success, and it can be seen that the improvement of DA methods in NWP modelling has led to improvements in forecasting skill over the past 20-30 years. The state of the art DA methods developed for NWP modelling have never been applied to space weather models, hence it is important to implement the improvements that can be gained from these methods to improve our understanding of the solar wind and how to model it.

The ENLIL solar wind model has been coupled to the EMPIRE data assimilation library in order to apply these advanced data assimilation methods to a space weather model. This coupling allows multiple data assimilation methods to be applied to ENLIL with relative ease.

I shall discuss twin experiments that have been undertaken, applying the LETKF to the ENLIL model when a CME occurs in the observation and when it does not. These experiments show that there is potential in the application of advanced data assimilation methods to the solar wind field, however, there is still a long way to go until it can be applied effectively. I shall discuss these issues and suggest potential avenues for future research in this area.