# 惑星間空間シンチレーションデータを用いた内部太陽圏データ同化

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# Data assimilation of the solar wind in the inner heliosphere using InterPlanetary Scintillation data

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We develop a technique for predicting variations of the solar wind and source functions by incorporating wind velocity data from interplanetary scintillation (IPS) into a three dimensional magneto-hydrodynamic (MHD) solar wind model in the context of data assimilation using the Ensemble Kalman filter. In the data assimilation process, we constrain the solar wind source function which relates the observable magnetic field on the solar surface and terminal solar wind velocity. We have confirmed our method using the twin experiences, and we apply our method using real observation in this study.

Our solar wind model covers from 25 Rsun (radius of the Sun) to 1 AU. We assimilate observed IPS wind velocity data into the model every 6 hours. Output parameters here we focus are solar wind parameters at Earth and source function coefficients. As an initial result, using data from September 1 to December 1, 1998, the source function coefficients show variation. The solar wind velocity also varies representing observed velocity trend well but with larger value than the observation. This tendency would be caused by global source function modified by IPS observations of high velocity wind at high latitudes. We will discuss improvement of the model coefficients setting and the variation of coefficients in this presentation. The number of the state of a system is 21 (radial) x 360 (longitude and latitude) x 8 (MHD parameter) + 2 (source function coefficients) = 60,482, while SOHO/MDI magnetic field data is referred at inner boundary and IPS observation ˜40 per day is assimilated.