

Two-dimensional structure of the plasmasphere estimated by the ensemble transform Kalman filter

Shin'ya Nakano[1]; Mei-Ching Fok[2]; Pontus C:son Brandt[3]; Tomoyuki Higuchi[4]
[1] The Institute of Statistical Mathematics; [2] NASA/GSFC; [3] APL, JHU; [4] ISM

The ensemble transform Kalman filter (ETKF) is one of widely-used sequential data assimilation algorithms. The ETKF considers probability density functions on a sub-space spanned by ensemble members, which enables us to estimate a system state without consuming large computational resources. We apply the ETKF for estimating temporal evolution of the plasmasphere. The estimation is based on the imaging data of the extreme ultra-violet from the IMAGE satellite. Although the EUV image consists of more than 20,000 pixels, the ETKF enables us to efficiently estimate the two-dimensional structure of the plasmasphere efficiently. It is demonstrated how the ETKF works in the estimation of the plasmaspheric structure.