# Data assimilation of EUV imaging data for modeling the plasmasphere

○S. Nakano[1], M.-C. Fok[2], P. C. Brandt[3], and T. Higuchi[1,4]

*1. The Institute of Statistical Mathematics, ROIS, Japan;*
*2. NASA Goddard Space Flight Center, USA;*
*3. The Johns Hopkins University, Applied Physics Laboratory, USA;*
*4. Japan Science and Technology Agency;*

The Earth's plasmasphere plays important roles in various processes in the inner magnetosphere. The structure of the plasmasphre is mainly controlled by the electric field imposed on the inner-magnetosphere, and it is highly variable especially during geomagnetic storms. In order to model the temporal evolution of the plasmasphere, it is crucial to know the spatial distribution of the electric potential in the inner magnetosphere. We are now developing a data assimilation technique for estimating the structure of the plasmasphere and the spatial distribution of the inner-magnetospheric electric potential simultaneously. The estimation is carried out by using imaging data of extreme ultra-violet (EUV) from the IMAGE satellite. First, the initial condition of the plasmasphere is estimated by using a linear inversion of the EUV image. The temporal evolution of the plasmaspheric structure and the distribution of the electric potential is then estimated using the data assimilation of the EUV data into a numerical simulation model of the plasmasphere. The data asimilation is performed by the particle filter. In order to evaluate how well the EUV data assimilation approach works, data assimilation experiments using artificial data sets were performed. The experimental result suggests that the data assimilation of the EUV imaging data provides a reliable estimate of the spatial structure of the plasmasphere and the electric potential distribution in the inner magnetosphere.