Evaluating the Accuracy of Plasmasphere Data Assimilation from Ground-Based Observations

Anders M. Jorgensen (1), Janos Lichtenberger (2), Jared Duffy (1), Reiner Friedel (3), Mark Clilverd (4), Balazs Heilig (5), Massimo Vellante (6), Tero Raita (7), Craig Rodger (8), Andrew Collier (9), Jan Reda (10), Robert Holzworth (11), Daniel Ober (12), Athanasios Boudouridis (13), Eftyhia Zesta (14), and Peter J. Chi (15)

(1) New Mexico Tech, Electrical Engineering, Socorro, United States (anders@nmt.edu), (2) Eotvos Lorand University, Budapest, Hungary, (3) Los Alamos National Laboratory, Los Alamos, United States, (4) British Antarctic Survey, UK, (5) Eotvos Lorand Geophysical Institute, Hungary, (6) University of L'Aquila, Italy, (7) University of Oulu, Finland, (8) University of Otago, New Zealand, (9) SANSA Space Science, South Africa, (10) Institute of Geophysics, Polish Academy of Sciences, Poland, (11) University of Washington, United States, (12) Air Force Research Laboratory, United States, (13) Space Science Institute, United States, (14) National Aeronautics and Space Administration, United States, (15) University of California Los Angeles, United States

VLF and magnetometer observations can be used to remotely sense the plasmasphere. VLF whistler waves can be used to measure the electron density and magnetic Field Line Resonance (FLR) measurements can be used to measure the mass density. In principle it is then possible to remotely map the plasmasphere with a network of ground-based stations which are also less expensive and more permanent than satellites. The PLASMON project, funded by the EU FP-7 program, is in the process of doing just this. A large number of ground-based observations will be input into a data assimilative framework which models the plasmasphere structure and dynamics. The data assimilation framework combines the Ensemble Kalman Filter with the Dynamic Global Core Plasma Model. Here we simulate the observations from these networks, with appropriate uncertainties, and use them to drive the data assimilation framework to recover the plasmaspheric configuration. We will discuss the level of accuracy that can be achieved.