Geophysical Research Abstracts, Vol. 9, 04725, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-04725

A global plasmasphere electron density database determined from IMAGE RPI dynamic spectra

P. Webb (1), R. Benson (2), R. Denton (3), J. Goldstein (4), L. Garcia (5), and B. Reinisch (6)

(1) UMBC/GEST, Goddard Space Flight Center, U.S.A., (2) NASA, Goddard Space Flight Center, U.S.A., (3) Dartmouth College, U.S.A., (4) SwRI, U.S.A., (5) QSS, Goddard Space Flight Center, U.S.A., (6) University of Massachusetts, U.S.A.
(Phillip.A.Webb.1@gsfc.nasa.gov / Phone: +1-301-286-6172)

The magnetospheric electron density (N_e) is a fundamental space-physics parameter. It is often difficult to make N_e measurements to an accuracy better than a factor of two in low-density ($N_e \sim 1$ cm^{-3} or less) space plasmas due to problems associated with spacecraft/plasma interactions which become enhanced in such an environment. Plasma-wave techniques can provide accurate N_e measurements if the wave modes of the received signals can be properly identified. The amplitudes of the signals received by the Radio Plasma Imager (RPI) on the Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) satellite during passive observations are displayed as a function of frequency and time to form a dynamic spectrum. A semi-automated fitting technique has been developed to extract N_e from these dynamic spectra. The fitting method considers physical features found in the dynamics spectra, such as the upper-hybrid band, the continuum edge, and n+1/2 emissions. This technique is often able to provide in situ N_e measurements along extended portions of the orbit of IMAGE. With five years of data from 2001 to 2005, the 14-hour orbit of IMAGE resulted in $\sim$ 6000 separate inbound and outbound dynamic spectra. This semi-automated method allows the dynamic spectra to be fitted in a timely manner to determine N_e. The results have been used to form a plasmaspheric N_e database that is being made available to the scientific community.