



An Overview of Scientific Results from the Flux-gate Magnetometer on the C/NOFS Satellite

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The instrument suite that comprises the Vector Electric Field Investigation (VEFI) onboard the Communication/Navigation Outage Forecasting System (C/NOFS) satellite includes a sensitive fluxgate magnetometer to measure DC and ULF magnetic fields in the low latitude ionosphere. The instrument includes a DC vector measurement at 1 sample/sec with a range of $\pm 45,000$ nT whose primary objective is to enable accurate measurements of both $V \times B$ fields and $E \times B$ drifts. The magnetic field data also address a variety of important scientific research topics involving magnetospheric and ionospheric current systems. For example, the magnetic field residuals allow studies of the temporal evolution and local-time asymmetry of the storm-time ring current, typically studied as Dst signatures using ground-based magnetometer data. Because of C/NOFS's low inclination of 13 degrees, the in situ magnetometer data provide continuous local time measurements of the ring current every 95 minutes. The C/NOFS magnetometer data also provide information concerning low latitude ionospheric currents, such as the equatorial electrojet and its variations with longitude. The VEFI magnetometer includes an AC-coupled vector measurement in the 0.05 – 7 Hz frequency range sampled at 16 samples/sec with an output range of ± 900 nT in order to measure small-scale filamentary currents, diamagnetic currents, and Alfvén waves associated with low latitude plasma depletions, enhancements, and structures. When analyzed in conjunction with the electric field data, the combined magnetic and electric field signatures reveal Poynting flux energy flow associated with depleted magnetic flux-tubes that are directed poleward in the northern and southern hemispheres. These data are used to advance our understanding of the electrodynamics of low latitude plasma instabilities and large scale plasma structures. This talk presents an overview of a number of scientific results gathered with the flux-gate magnetometer on the C/NOFS satellite.