DC Electric Fields and Associated Plasma Drifts Observed with the C/NOFS Satellite

R. Pfaff[1], H. Freudenreich[1], K. Bromund[1], D. Rowland[1]

1: NASA/Goddard Space Flight Center, Greenbelt, MD, USA (Robert.F.Pfaff@nasa.gov)

Initial DC electric field observations and associated plasma drifts are presented from the Vector Electric Field Investigation (VEFI) on the Air Force Communication/Navigation Outage Forecasting System (C/NOFS) satellite. We present statistical averages of the vector fields for the first year of operations that include both the zonal and radial components of the resulting **E** x **B** plasma flows at low latitudes. Magnetic field data from the VEFI science magnetometer are used to compute the plasma flows. The DC electric field detector reveals zonal and radial electric fields that undergo strong diurnal variations, typically displaying eastward and outward-directed fields during the day and westward and downward-directed fields at night. There is considerable variation in the large scale DC electric field data, in both the daytime and nighttime cases, with enhanced structures typically observed at night. In general, the measured zonal DC electric field amplitudes include excursions that extend within the 0.4 - 2 mV/m range, corresponding to **E** x **B** drifts of the order of 30-150 m/s. The average vertical or radial electric fields may exceed the zonal fields in amplitude by a factor of 1.5 to 2. Although the data compare well, in a general sense, with previous satellite observations and statistical patterns of vertical ion drifts, the **E** x **B** drifts we report from C/NOFS rarely show a pronounced pre-reversal enhancement after sunset. We attribute this to a combination of extreme solar minimum conditions and the fact that the C/NOFS orbit of 401 by 867 km carries the probes essentially above the lower altitude regions where the wind-driven dynamo might be expected to create enhanced upwards drifts in the early evening. Evidence for wavenumber 4 tidal effects and other longitudinal signatures have been detected and will be presented. We also discuss off-equatorial electric fields and their relation to the ambient plasma density.