C/NOFS Measurements of Stormtime Magnetic Perturbations in the Low-latitude Ionosphere

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The Vector Electric Field Investigation suite on the C/NOFS satellite includes a fluxgate magnetometer to monitor the Earth's magnetic fields in the low-latitude ionosphere. Measurements yield full magnetic vectors every second over the range of ± 45,000 nT with a one-bit resolution of 1.37 nT (16 bit A/D) in each component. The sensor's primary responsibility is to support calculations of both **V×B** and **E×B** with greater accuracy than can be obtained using standard magnetic field models. The data also contain information about large-scale current systems, that, when analyzed in conjunction with electric field measurements, promise to significantly expand understanding of equatorial electrodynamics. We first compare *in situ* measurements with the POMME (POtsdam Magnetic Model of the Earth) model to establish in-flight sensor "calibrations" and to compute magnetic residuals. At low latitudes the residuals are predominately products of the stormtime ring current. Since C/NOFS provides a complete coverage of all local times every 97 minutes, magnetic field data allow studies of the temporal evolution and local-time variations of stormtime ring current. The analysis demonstrates the feasibility of using instrumented spacecraft in low-inclination orbits to extract a timely proxy for the provisional Dst index and to specify the ring current's evolution.