Storm-time pressure distribution

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Abstract

We present pressure distributions during geomagnetic storms derived from energetic neutral atom (ENA) images by using a constrained linear inversion technique. The ENA images were obtained from the high energy neutral atom (HENA) imager in the 10-200 keV (hydrogen) and 52-180 keV (oxygen) on board the IMAGE spacecraft. We discuss morphology throughout the storm but focus on the main phase configuration, which displays a pressure peak around midnight. The pressure driven, three-dimensional current system is derived and the ionospheric field aligned currents (FACs) are compared with the FAC patterns derived from magnetometer data obtained by the Iridium satellites. The inversion algorithm assumes a dipole field and isotropic pitch angle distribution (PAD). Therefore, we investigate the effects of choosing anisotropic PADs, based on statistical measurements, and a stretched magnetic field model. We find a systematic underestimation of the current intensities which indicates that the pressures obtained from the HENA data may be oversmoothed.