



Equivalent ionospheric currents from the GIMA, Greenland, MACCS, and THEMIS ground magnetometer arrays

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With data from the GIMA, Greenland, MACCs, and THEMIS ground magnetometer arrays, we obtain maps of equivalent ionospheric currents (EIC) over North America using the state-of-art technique based on SECS (spherical elementary currents systems) developed by Amm and Viljanen [1999]. The EIC maps can be calculated with the same time resolution as the magnetometer data, which will be 1 sec. The results thus show in detail the dynamic evolution of the currents over the whole THEMIS ground network. The EIC maps can further be compared and quantitatively combined with near simultaneous images of the THEMIS all sky imager mosaics, SuperDARN RADAR data, and THEMIS spacecraft data. For this study we will first demonstrate the validity of the technique when used with the mentioned magnetometer arrays by applying it to a synthetic model case, and then examine the equivalent ionospheric currents associated with substorm events on March 1, 2008 and January 5, 2008.