

Field-Aligned Current Responses to Changing Solar Indices and Solar Wind Electric Field

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Modeling Field-Aligned Currents

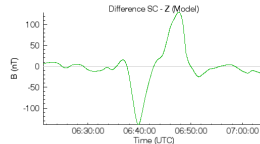
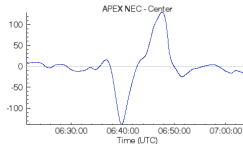
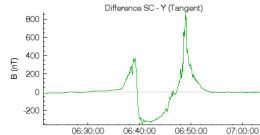
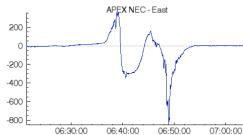
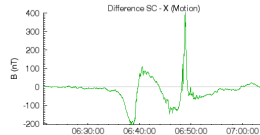
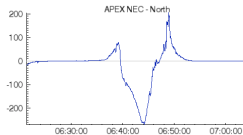
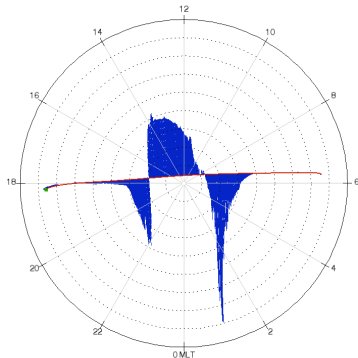
- Magnetometer data from 3 satellite missions is used: CHAMP, Ørsted, and Swarm.
- The International Geomagnetic Reference Field (IGRF) is subtracted from the magnetometer data to get $\Delta\vec{B}$.
- $\Delta\vec{B}$ data is then associated with solar wind data from ACE and solar index data ($F_{10.7}$, $S_{10.7}$, $M_{10.7}$, and $Y_{10.7}$).
- A statistical model for each $\Delta\vec{B}$ direction (North/East or Sunward/Dawnward) using Spherical Cap Harmonic Analysis (SCHA) is developed.
- Finally, use Ampere's law to get current:

$$\mu_0\vec{J} = \nabla \times \Delta\vec{B}$$

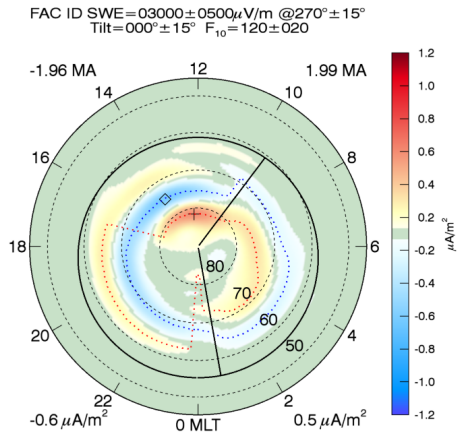
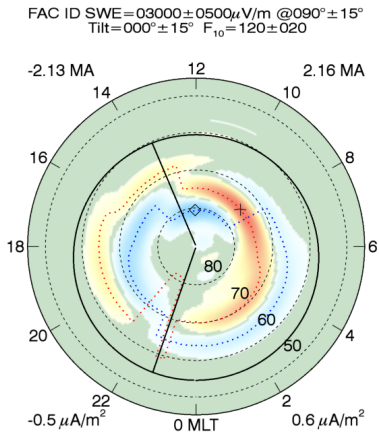
Sample Satellite Pass

Start Timestamp: 2002-08-03T06:21:21Z
End Timestamp: 2002-08-03T07:04:21Z

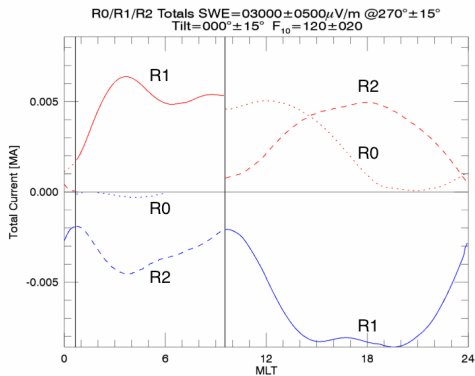
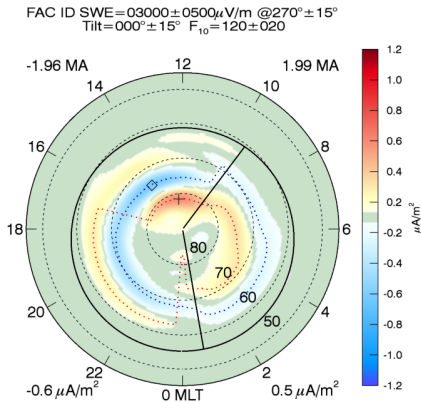
Single Pass, Plot in APEX coordinates.
Displaying 2581 records.



Field-Aligned Current Maps

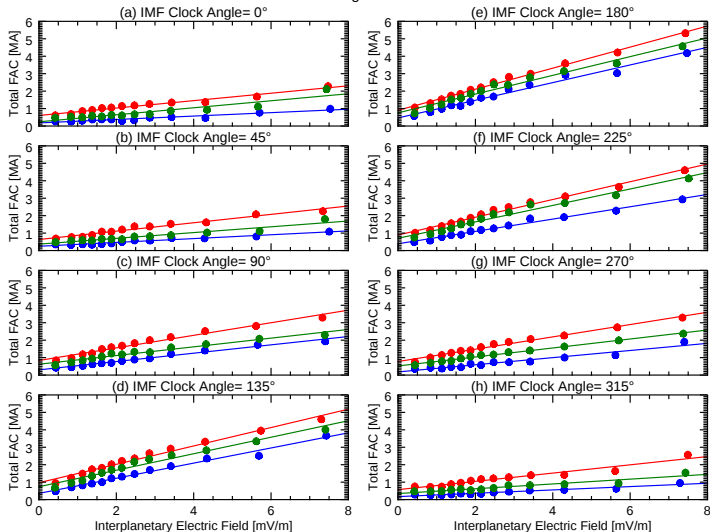


Region Totaling



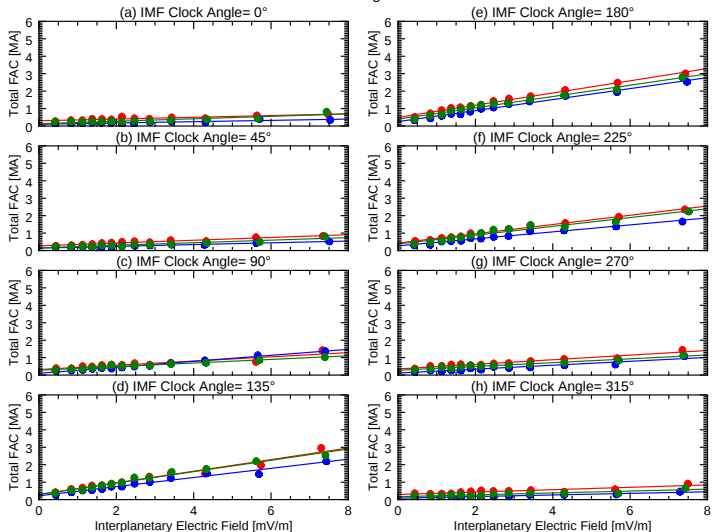
IEF/SWE Response

Mean Dawn and Dusk Region 0 and 1 Current vs. IEF

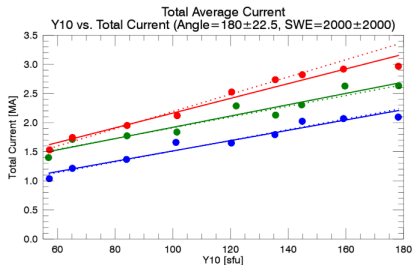
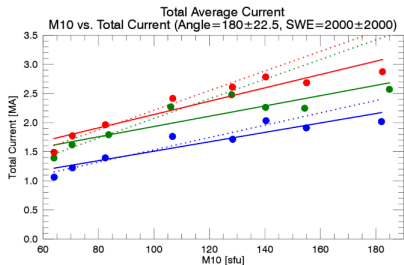
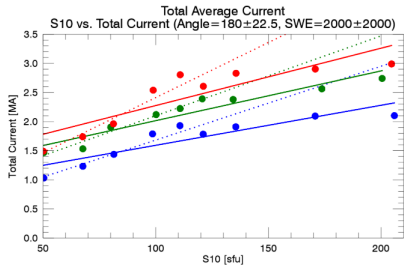
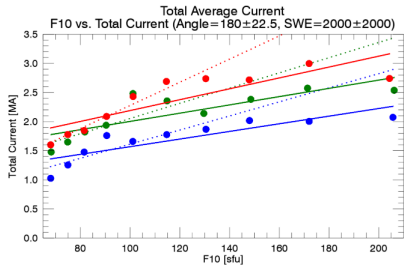


IEF/SWE Response

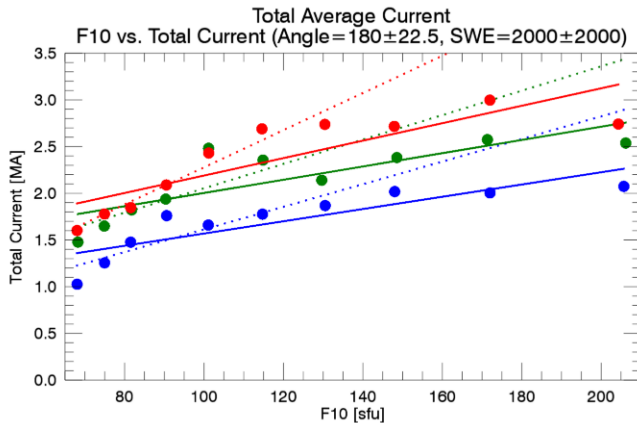
Mean Dawn and Dusk Region 2 Current vs. IEF



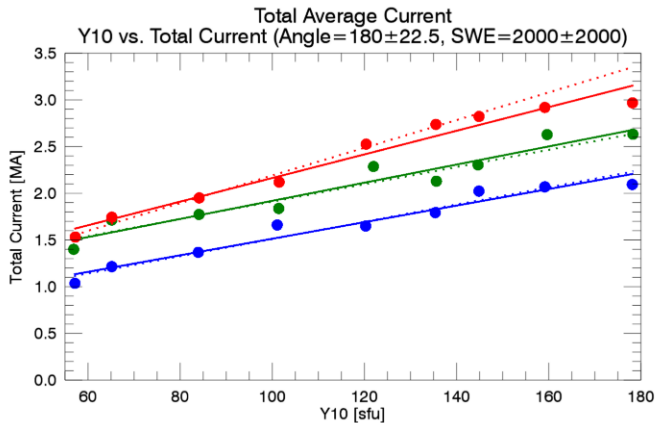
Solar Index Response



Solar Index Response



Solar Index Response



Questions?

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