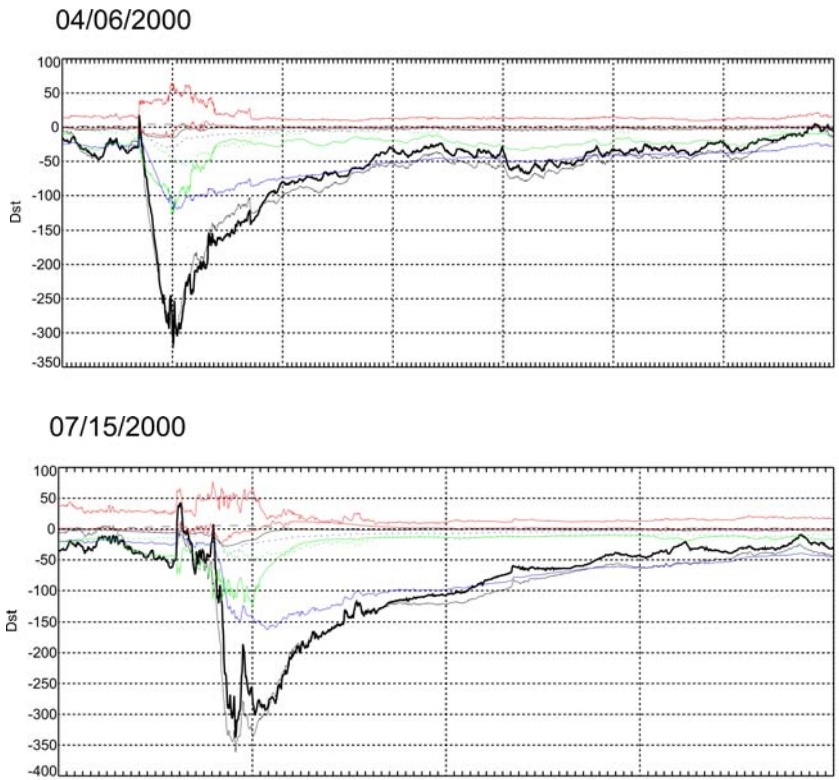
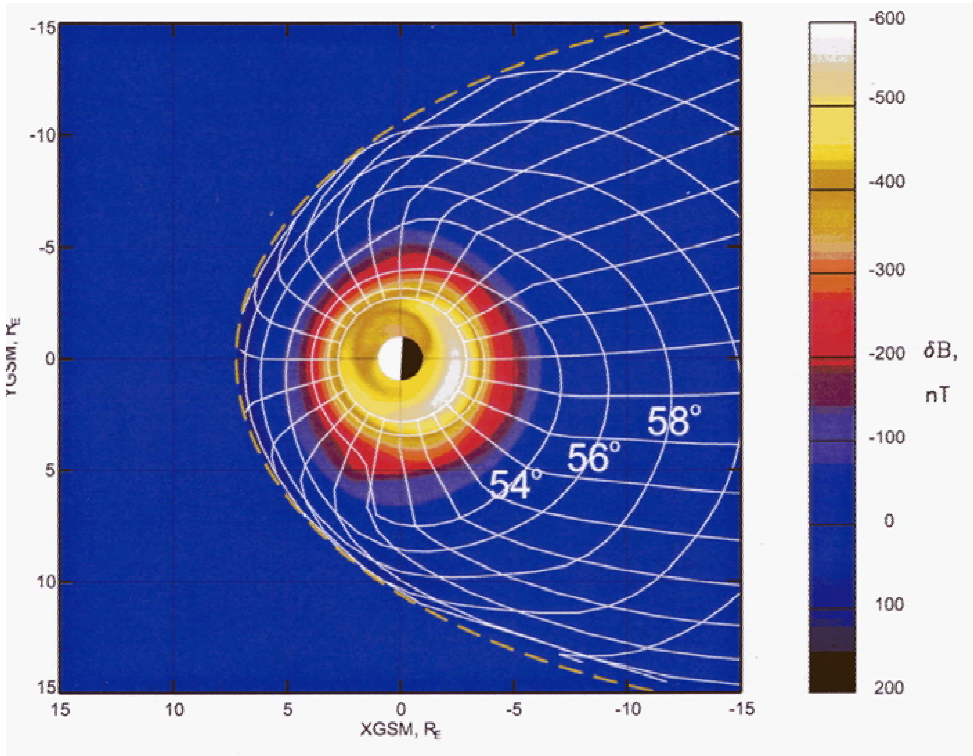
# NAG5-12185 “Global modeling of near and distant geomagnetic field”.




Comparison of the observed and modeled Dst-index during two superstorms in 2000. (Color traces show contribution from individual magnetospheric currents)

Deformation of the inner magnetosphere during space storm of March 31, 2001 (white lines are geomagnetic latitudes & longitudes mapped to equatorial plane).

# Principal results and findings

- A data-based model of the inner geomagnetic field developed, based on observations during 37 major storms in 1996-2000.
- During great space storms, the inner magnetosphere becomes extremely distorted and asymmetric, even at very close distances from Earth. Night-side field lines starting at latitudes as low as 53-55$^{o}$ get stretched into the tail, which explains the expansion of auroras to unusually low latitudes.
- A new approach developed, making it possible to reconstruct the dynamics of the geomagnetic field during space storms, based on interplanetary and ground data and taking into account the entire history of the solar wind driving.
- At the peak of a storm, the largest contributors to the ground magnetic field disturbance at low latitudes are the symmetrical ring current, the inner tail current, and the magnetopause, while other sources are less important. This finding is confirmed by a good agreement between the observed Dst-index and its reconstruction from the model.
- Our results demonstrate that, once continuous interplanetary data are available, it is possible to dynamically reconstruct the process of a storm in its entirety, as it unfolds in time.