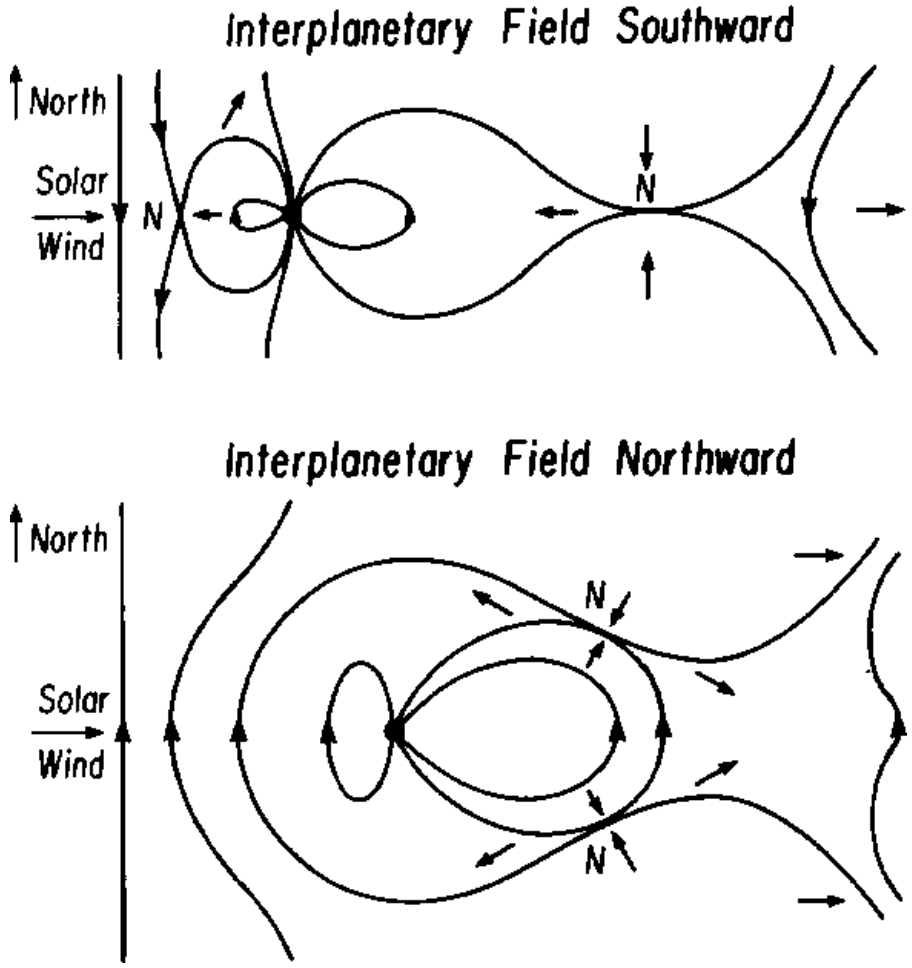
Storm Impact on Magnetosphere

Magnetosphere for Southward and Northward IMF Orientation

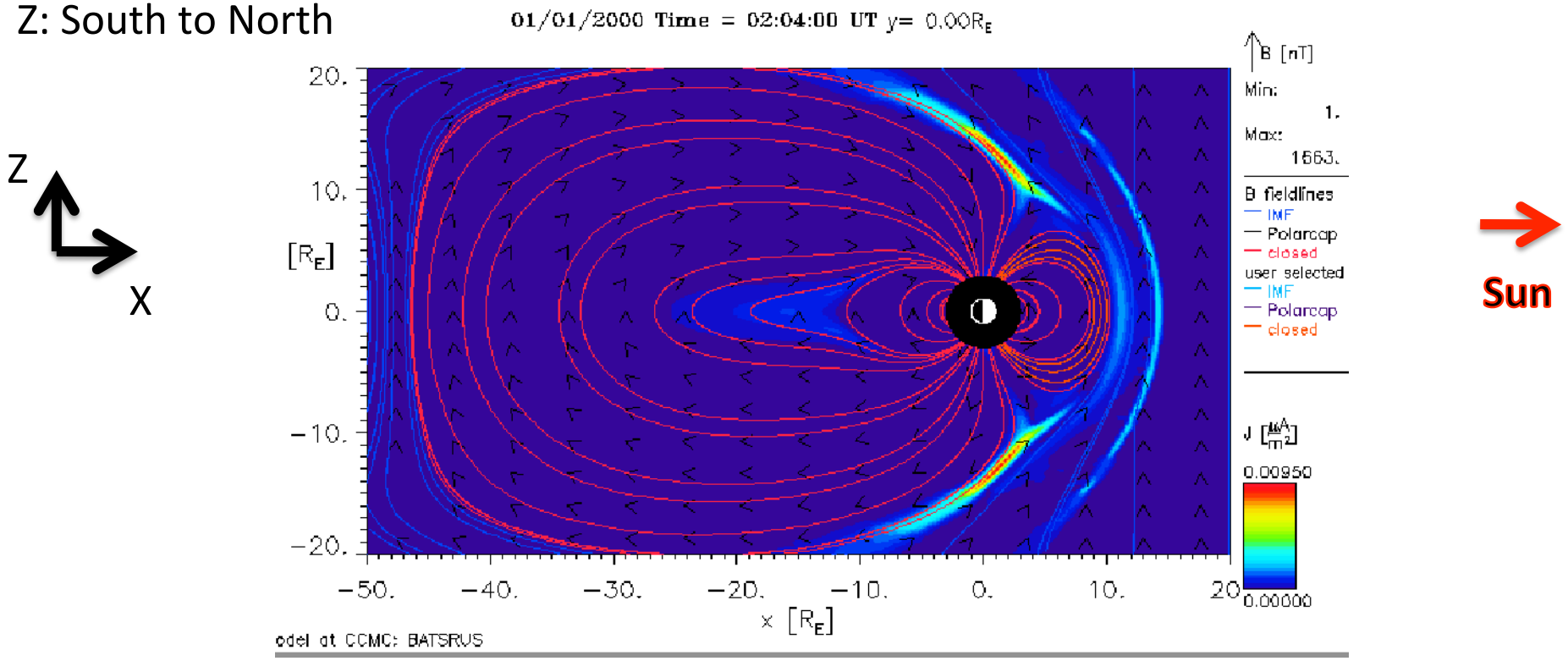


Magnetic reconnection plays a critical role in magnetosphere dynamics.

Magnetosphere:
Northward IMF

X: Earth to Sun

Z: South to North

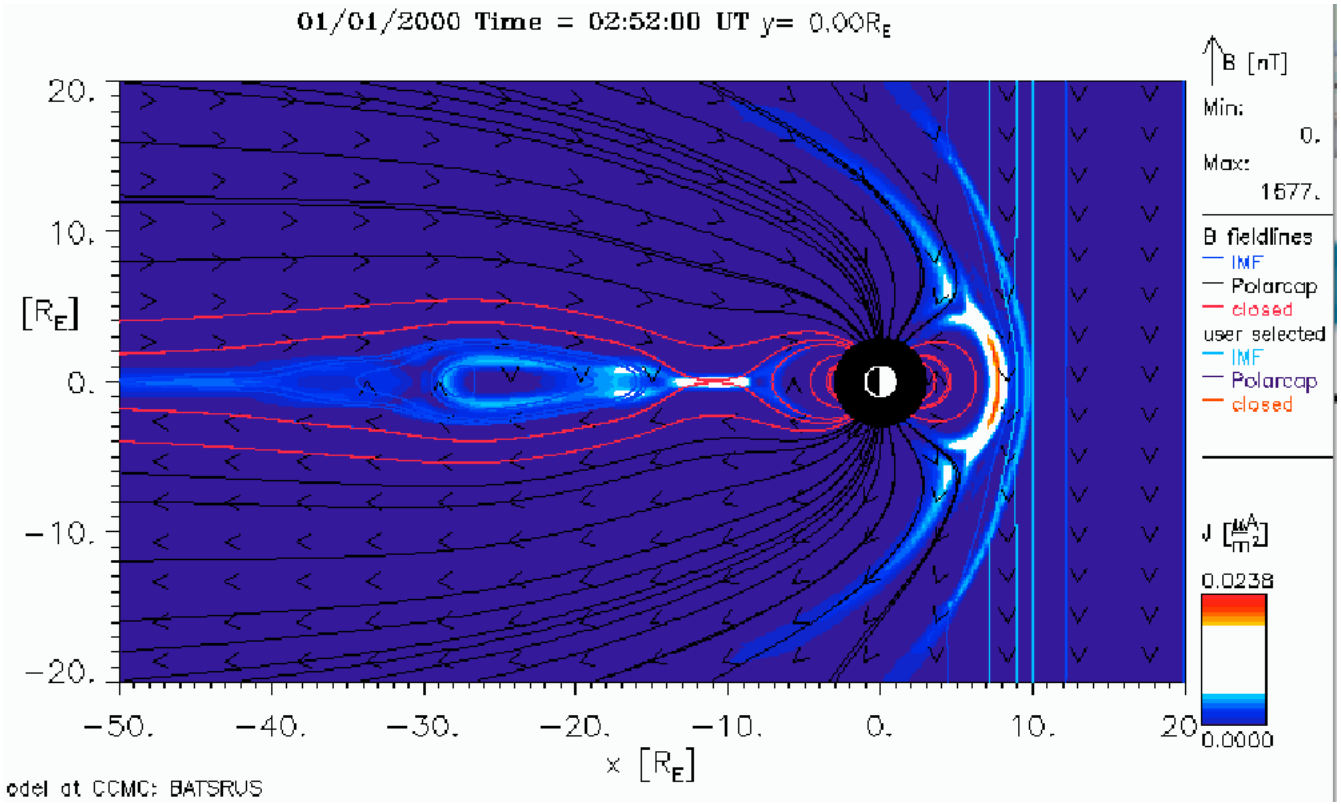


Red lines (closed): Magnetic field (MF) lines with both ends connected to the Earth

Black lines (open): MF lines with only one end a the Earth

Blue lines (interplanetary): MF lines with both ends in the interplanetary space

Magnetosphere:
Southward IMF

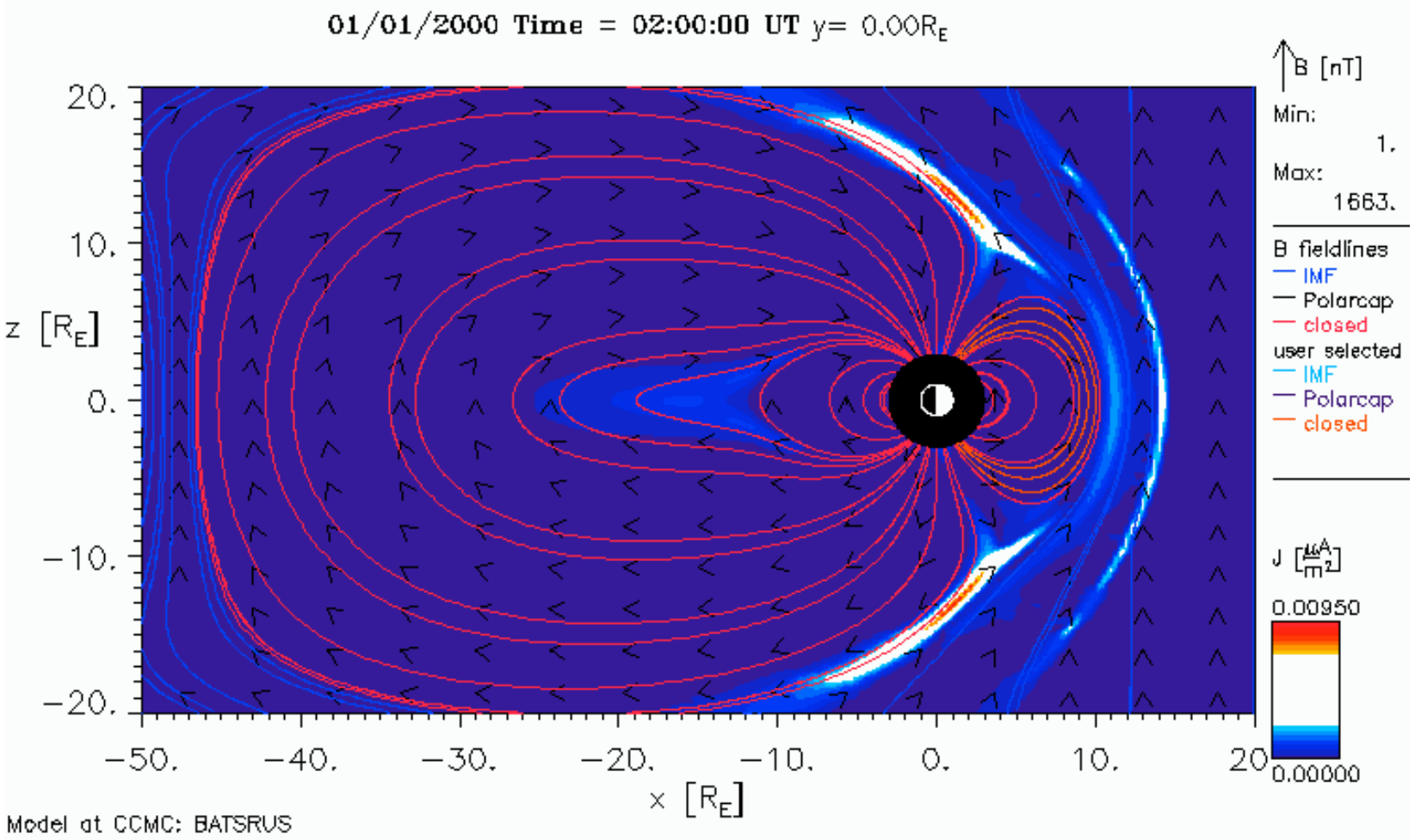


Red lines (closed): Magnetic field (MF) lines with both ends connected to the Earth

Black lines (open): MF lines with only one end a the Earth

Blue lines (interplanetary): MF lines with both ends in the interplanetary space

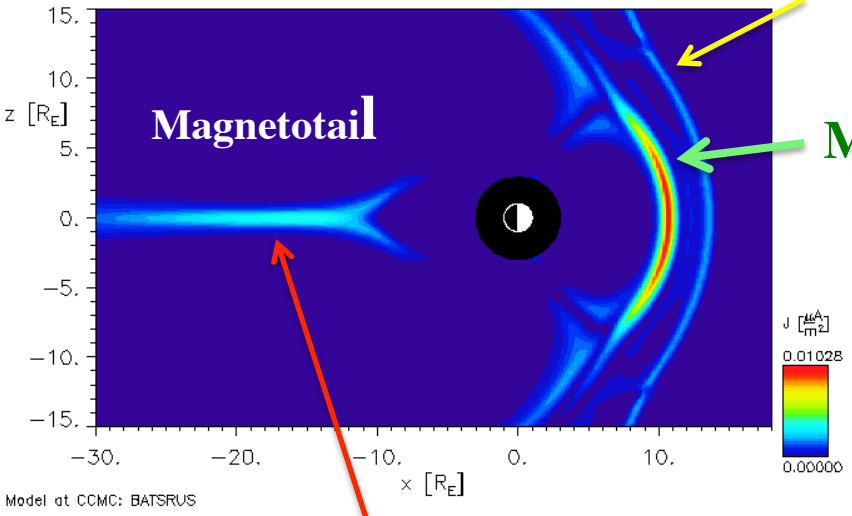
Magnetosphere:
North to South Turning



Magnetosphere in Different Cut Planes

meridional cut Y=0

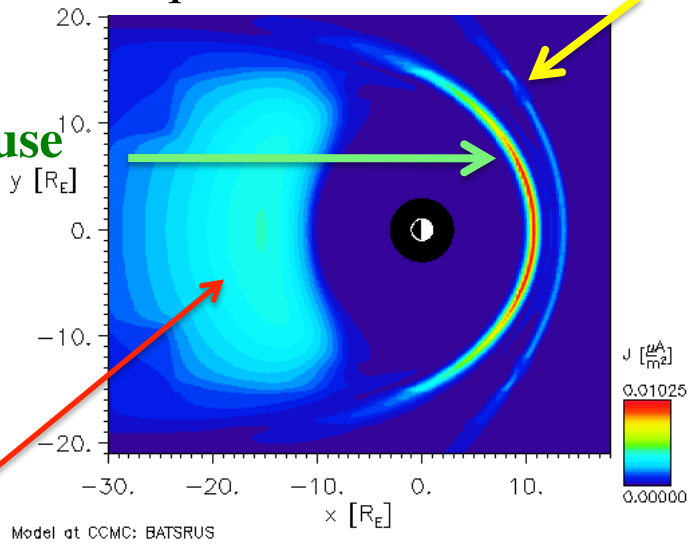
Bow shock



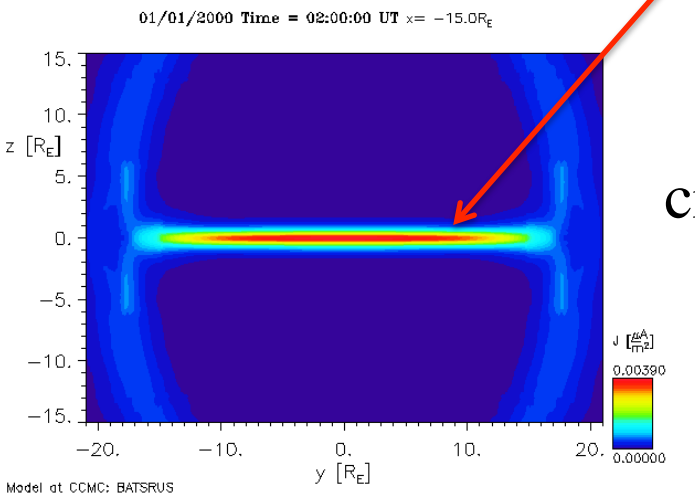
Magnetopause

equatorial cut Z=0

Bow shock



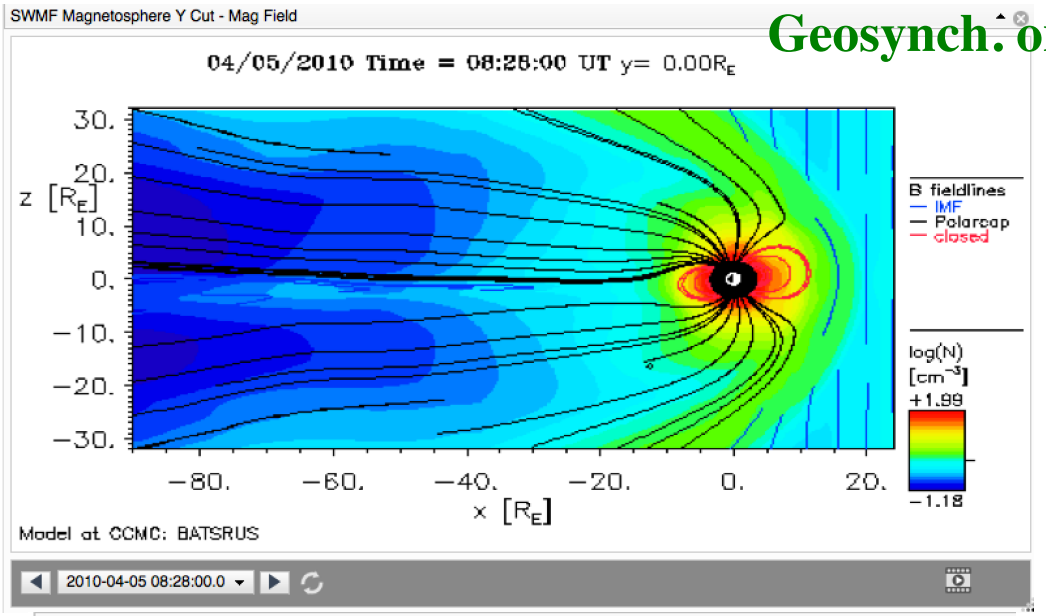
Magnetotail current sheet

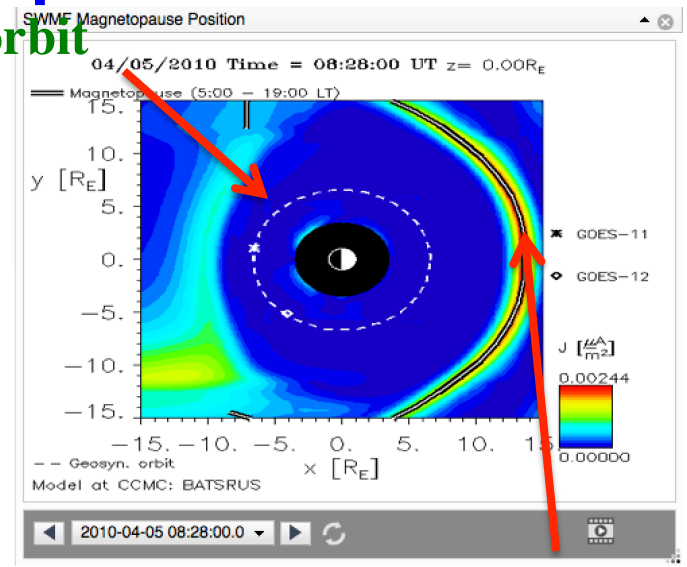


cross-tail cut X= -15 R_E

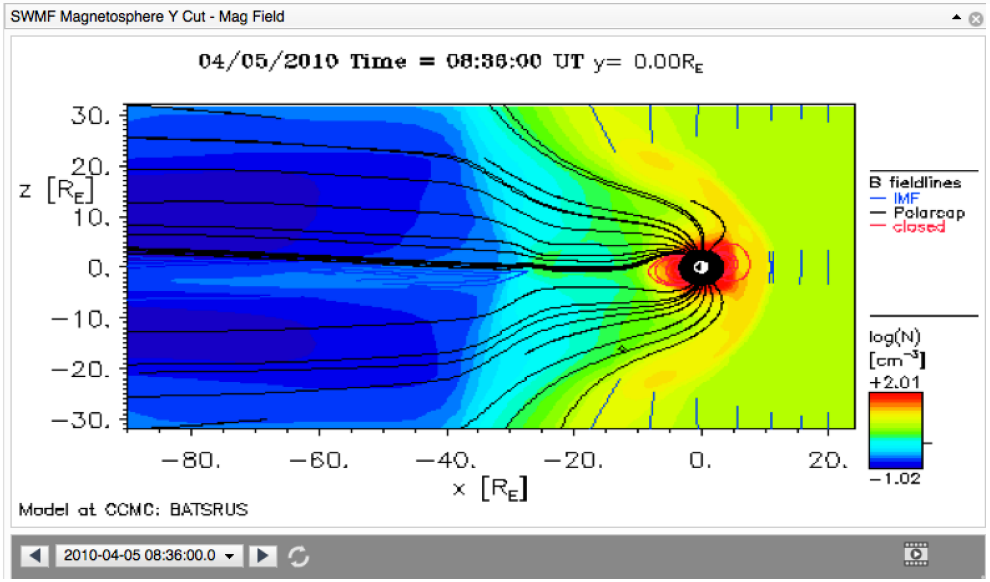
Magnetosphere:
Quiet vs. Compressed

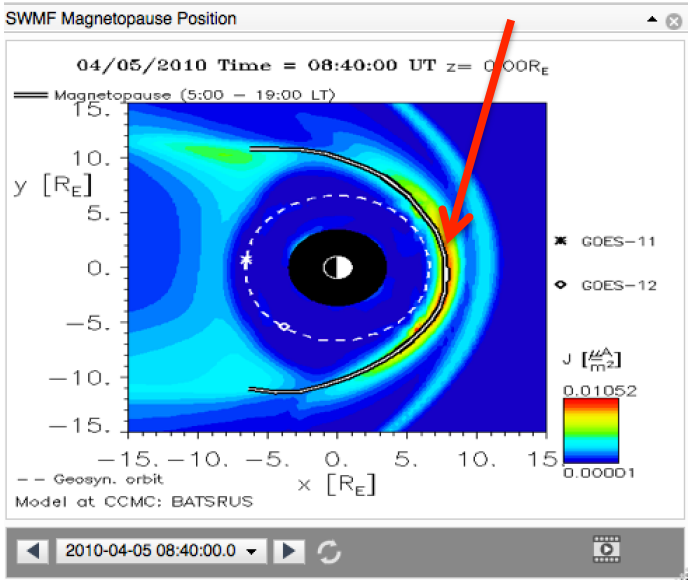
Geosynch. orbit





Magnetopause





Magnetopause Stand-off Distance

Degree of compression of MP
Due to Pdyn of solar wind
(interplanetary shock or HSS)

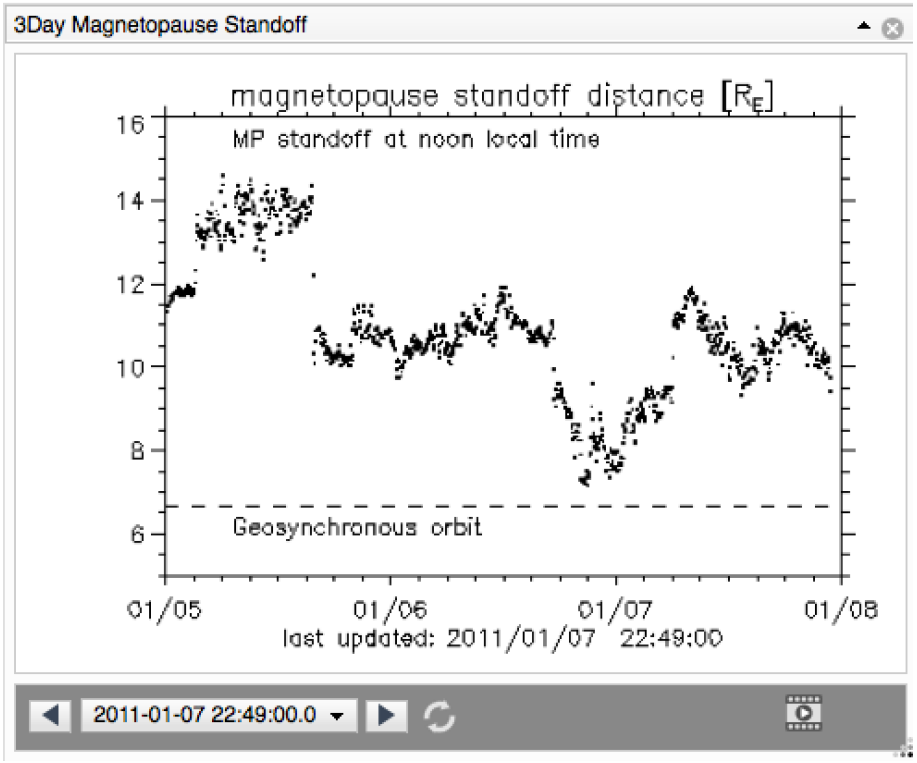
r0 <=6.6 Re – model product

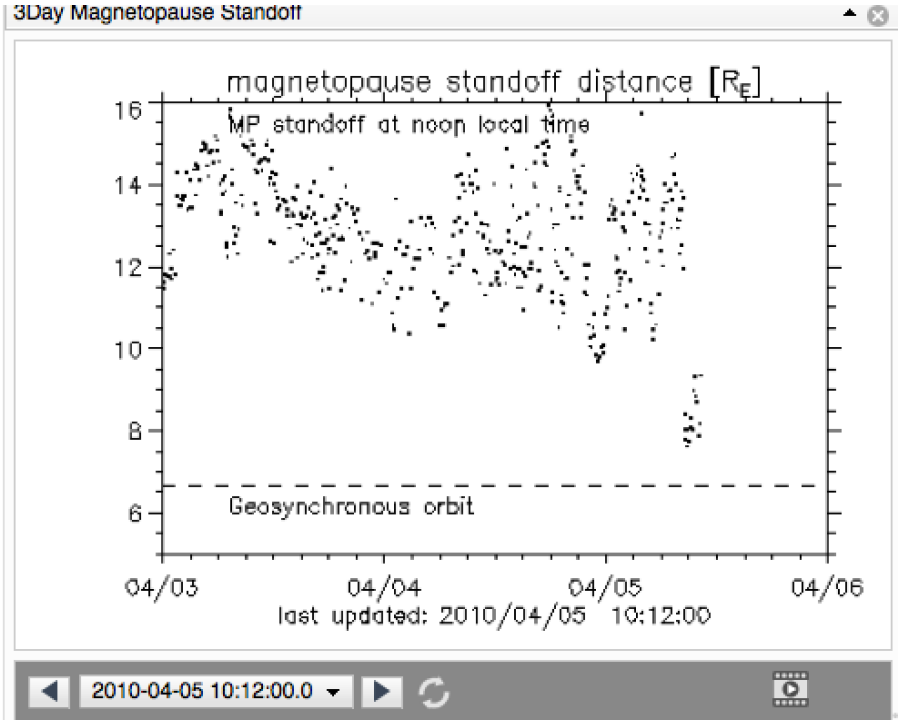
Events: Apr 5, 2010,

Dec 28, 2010

Jan 6, 2011, 22:30 UT

Non-event: Dec 1 – 7, 2010





Kp

"*p*lanetarische *K*ennziffer" (= planetary index).

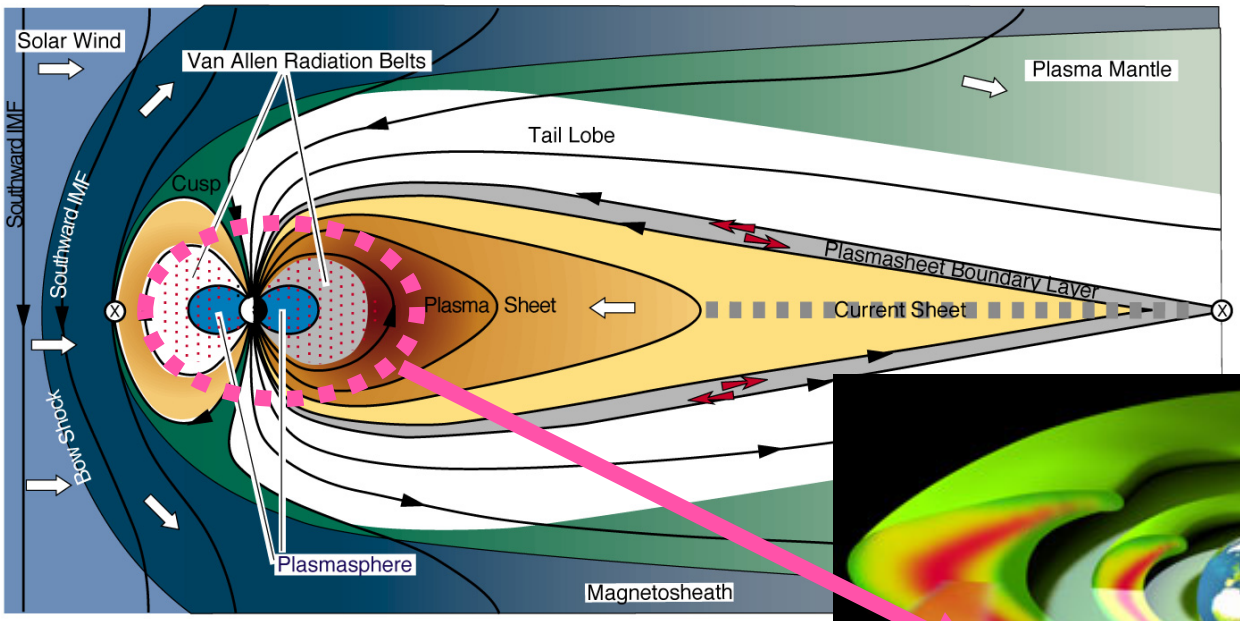
- Geomagnetic activity index

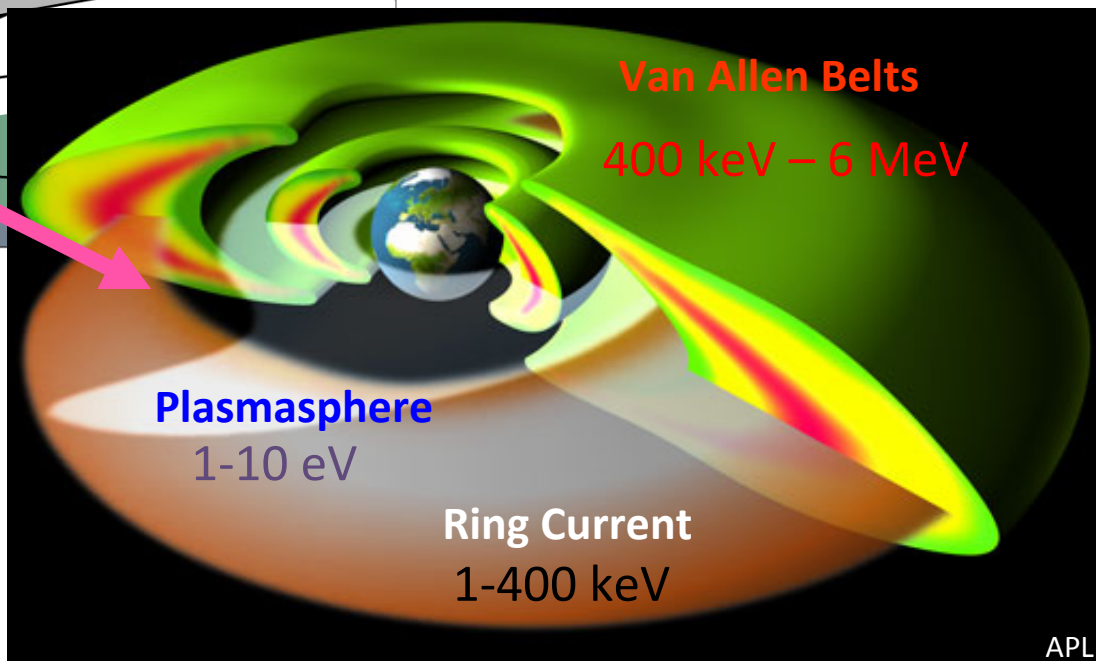
  range from 0-9 disturbance levels of magnetic field on the ground - currents

1. Non-event - period of 12/01/2010 – 12/7/2010
2. Moderate event – April 5, 2010
3. Extreme event - Oct 29 – Oct 31, 2003

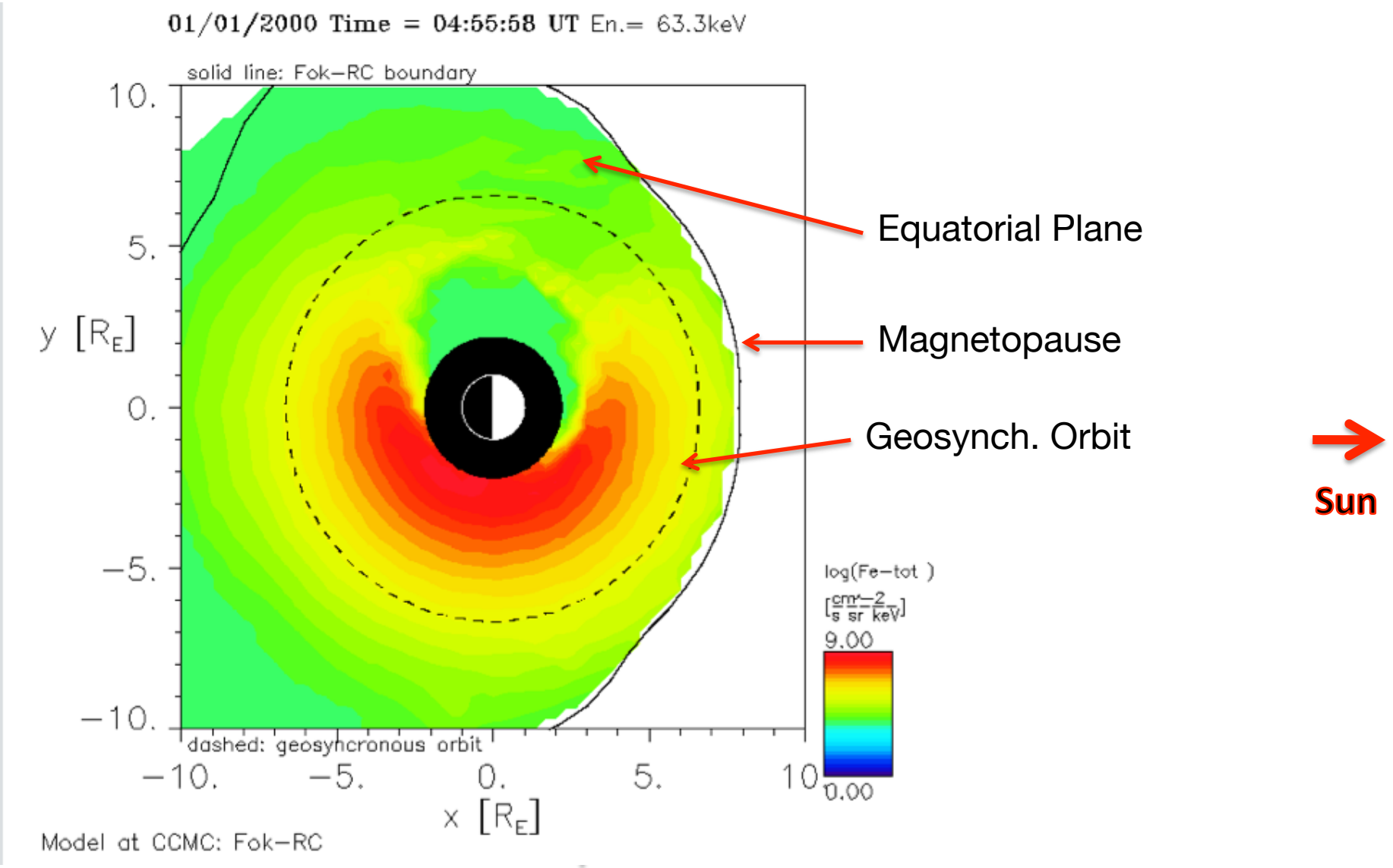
http://bit.ly/Kp_layout

Inner Magnetosphere (up to ~ 10 RE)





Electron Total Flux.
Energy 63.3 keV. Color Contour



Earth radius