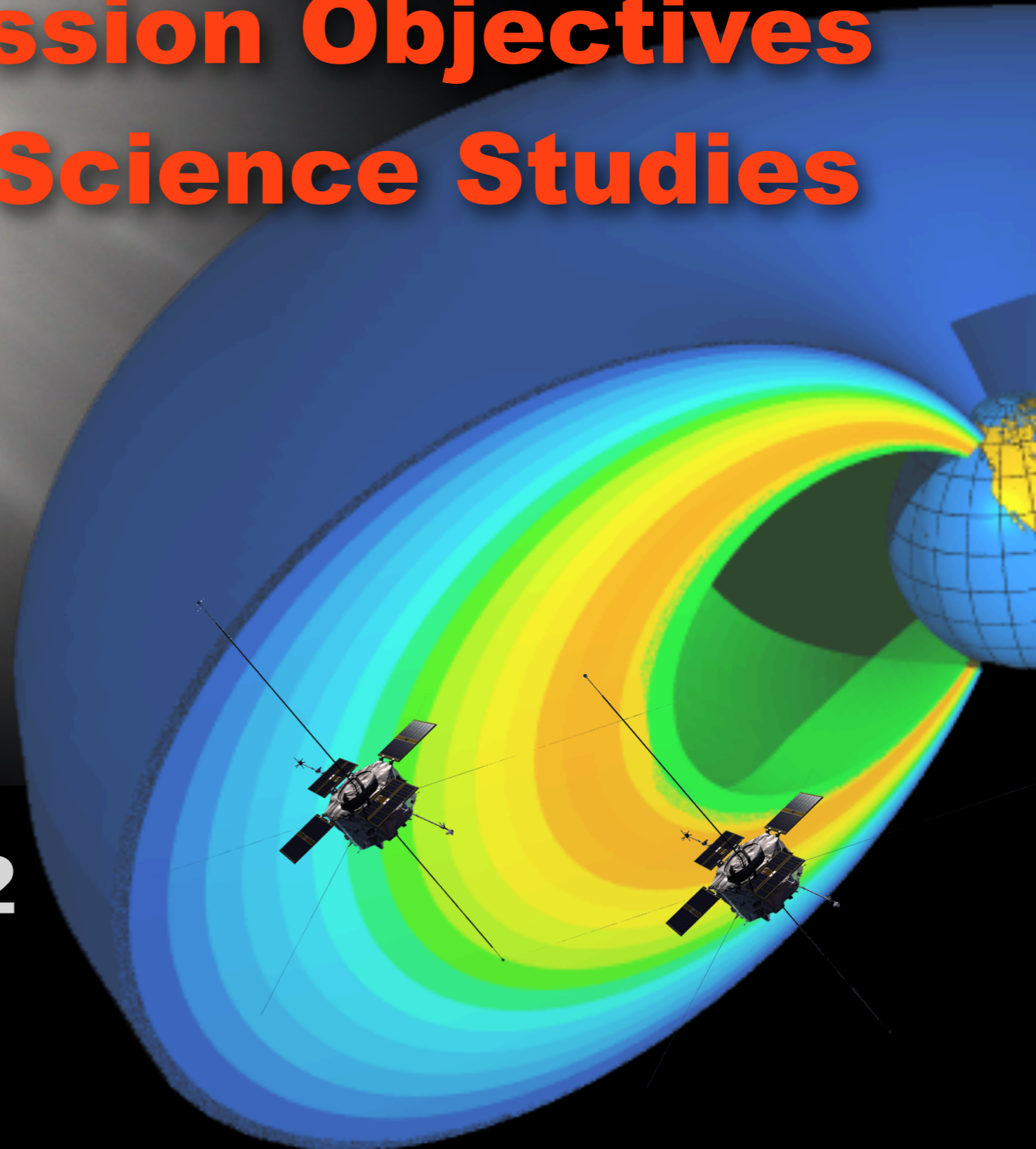




# **RBSP**

## **Mission Objectives & Science Studies**



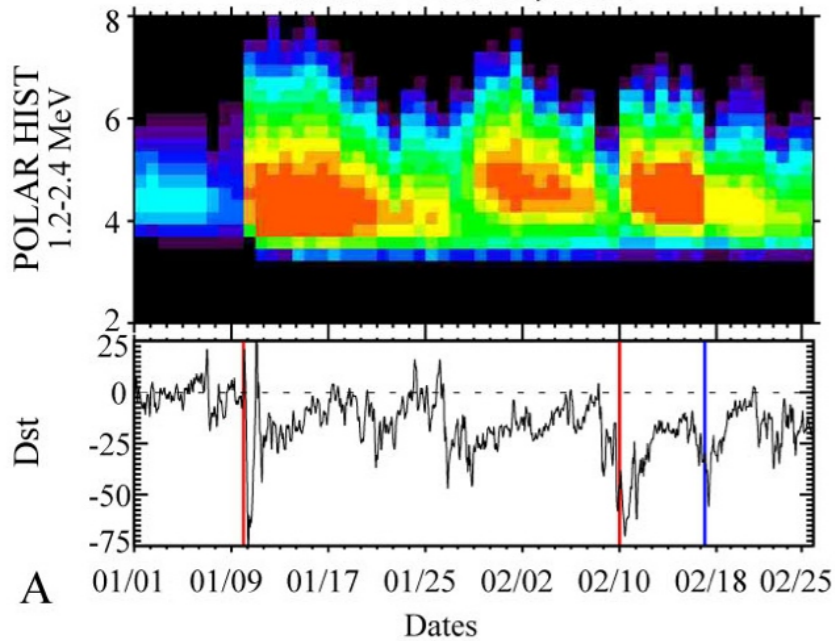
**CEDAR, Santa Fe, June 25, 2012**

Geoff Reeves  
reeves@lanl.gov

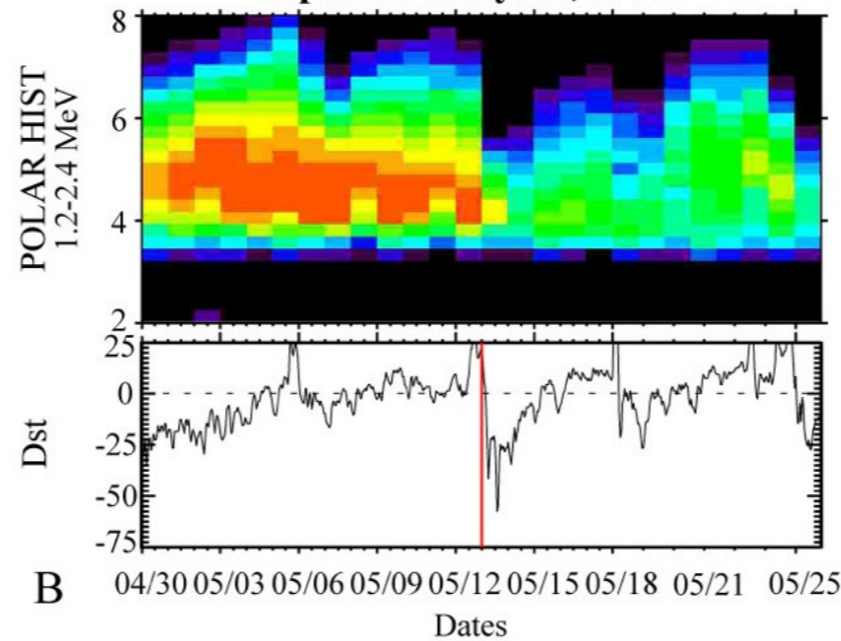


# If You've Seen One Storm...

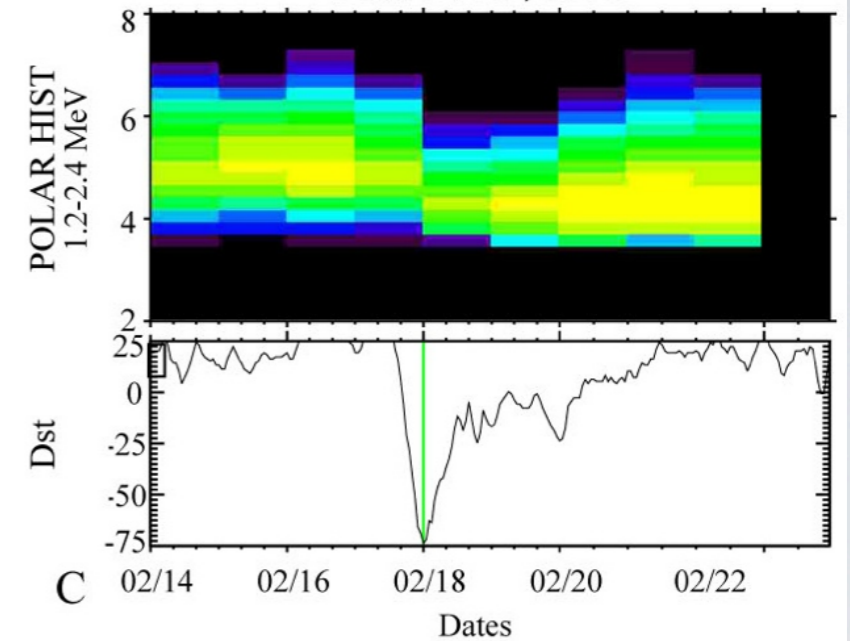
Jan. 1-Feb 25, 1997



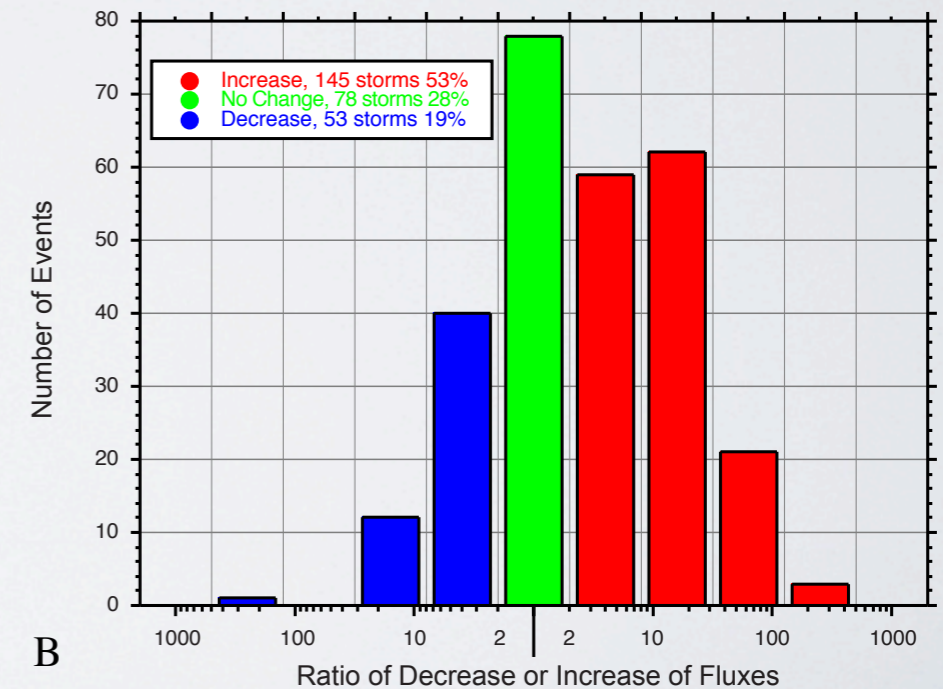
April 30-May 25, 1999



Feb. 14-23, 1998



- The radiation belts respond to geomagnetic storms
- Strong storms do not imply strong radiation belt intensity
- Storms don't always produce intensifications at all
- Radiation belt structure and dynamics result from a delicate balance of processes





# RBSP Mission in a Nutshell

- RBSP consists of 2 satellites with an extensive complement of particle and fields instruments
- Elliptical, near-equatorial orbit with apogee  $\sim 5.7$  RE
- Satellites are in near-identical, lapping orbits with a full range of radial separations in each LT quadrant
- During the 2-year mission apogee will precess through all local times starting  $\sim 6$  MLT
- Launch: August 23, 2012 + 60 day commissioning
- Mission web site: [rbsp.jhuapl.edu](http://rbsp.jhuapl.edu)
- RBSP-ECT web site: [www.rbsp-ect.lanl.gov](http://www.rbsp-ect.lanl.gov)

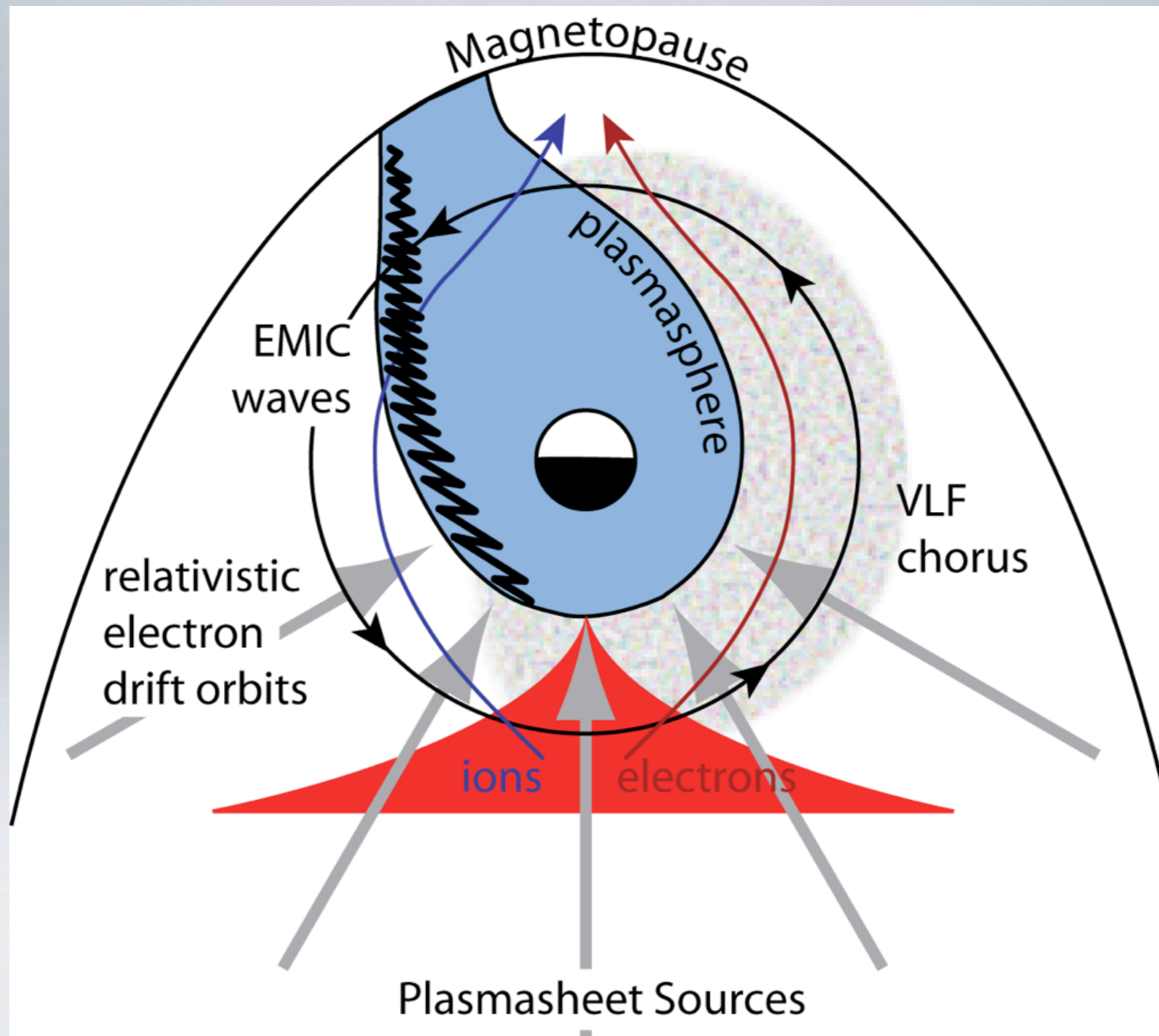


# RBSP Mission Objectives

- Discover which processes, singly or in combination, accelerate and transport radiation belt electrons and ions and under what conditions.
- Understand and quantify the loss of radiation belt electrons and determine the balance between competing acceleration and loss processes.
- Understand how the radiation belts change in the context of geomagnetic storms.



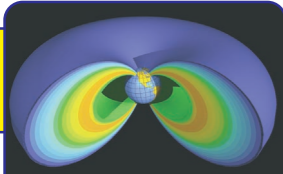
# A Rich & Complex Environment





# GEM Science Goals 2000

## WG2: Radiation Belts



**GEM**

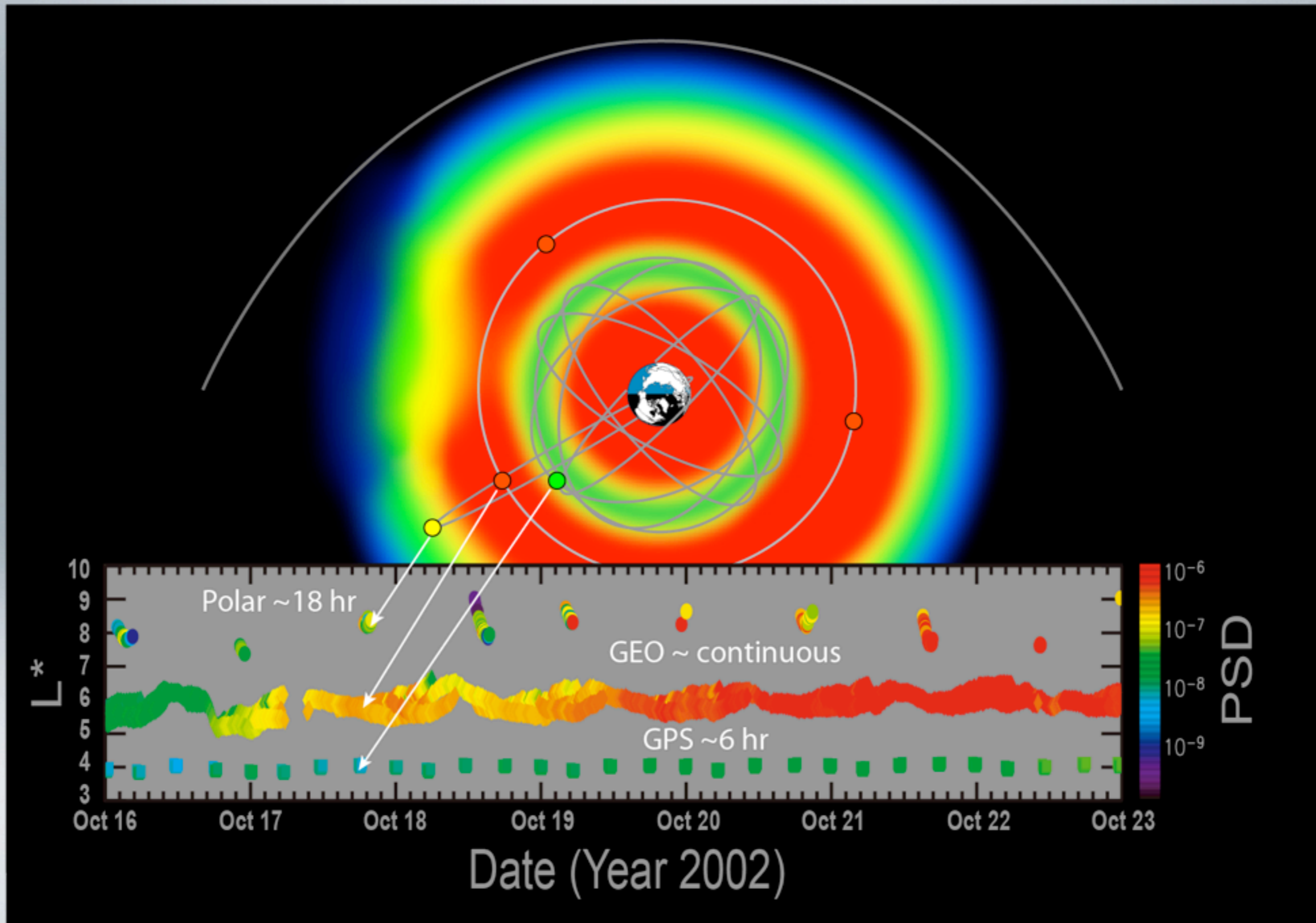
Inner Magnetosphere  
Storms Campaign

### Three Principal Objectives

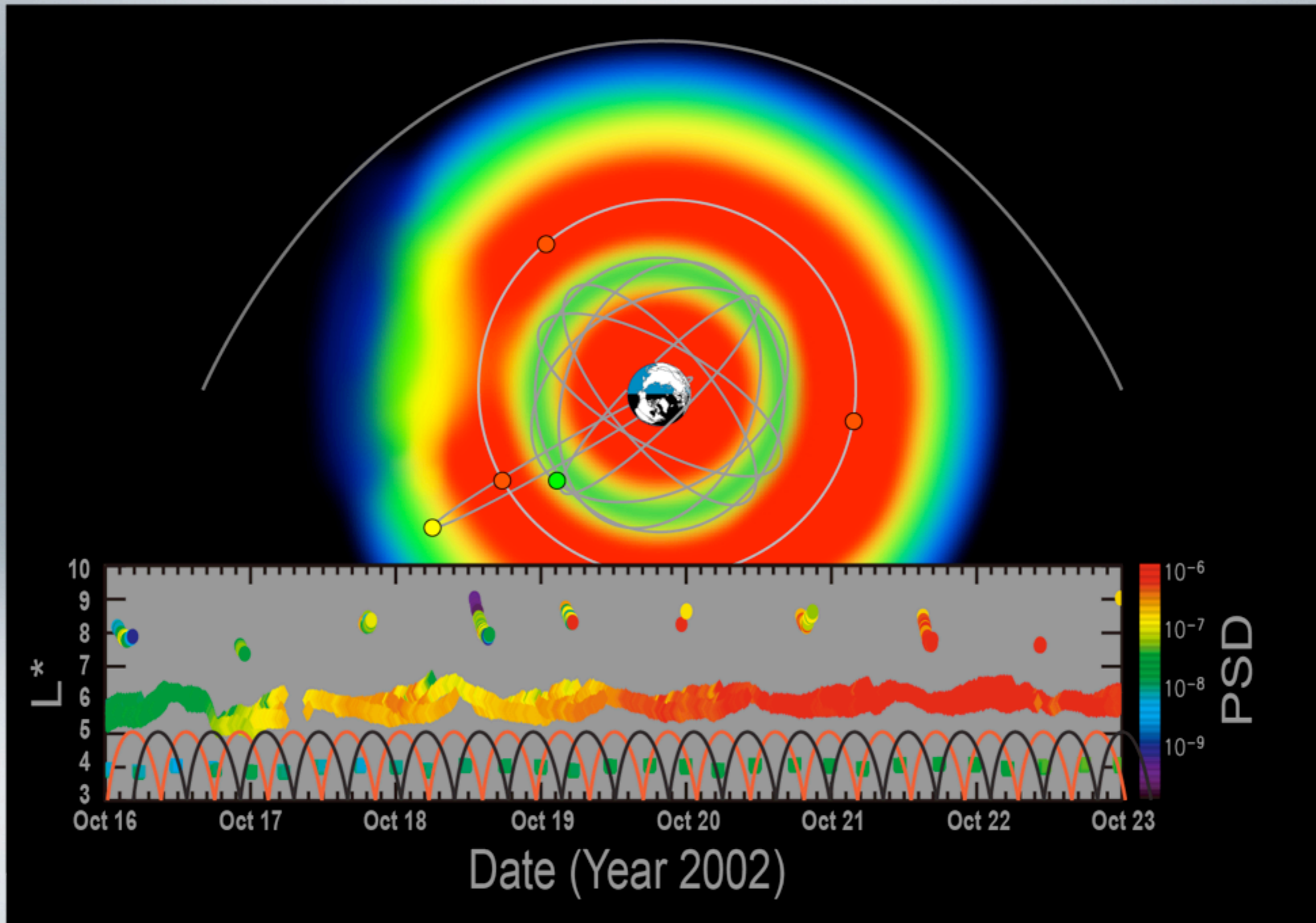
- 1) To evaluate the relative contribution of various proposed acceleration and loss processes through theory, modeling, and comparison with data
- 2) To create time-dependent phase space density profiles of the radiation belts that will more accurately represent their structure and dynamics than fixed energy profiles
- 3) To define and specify the specific requirements for a Radiation Belt module



**RBSP  
2012**

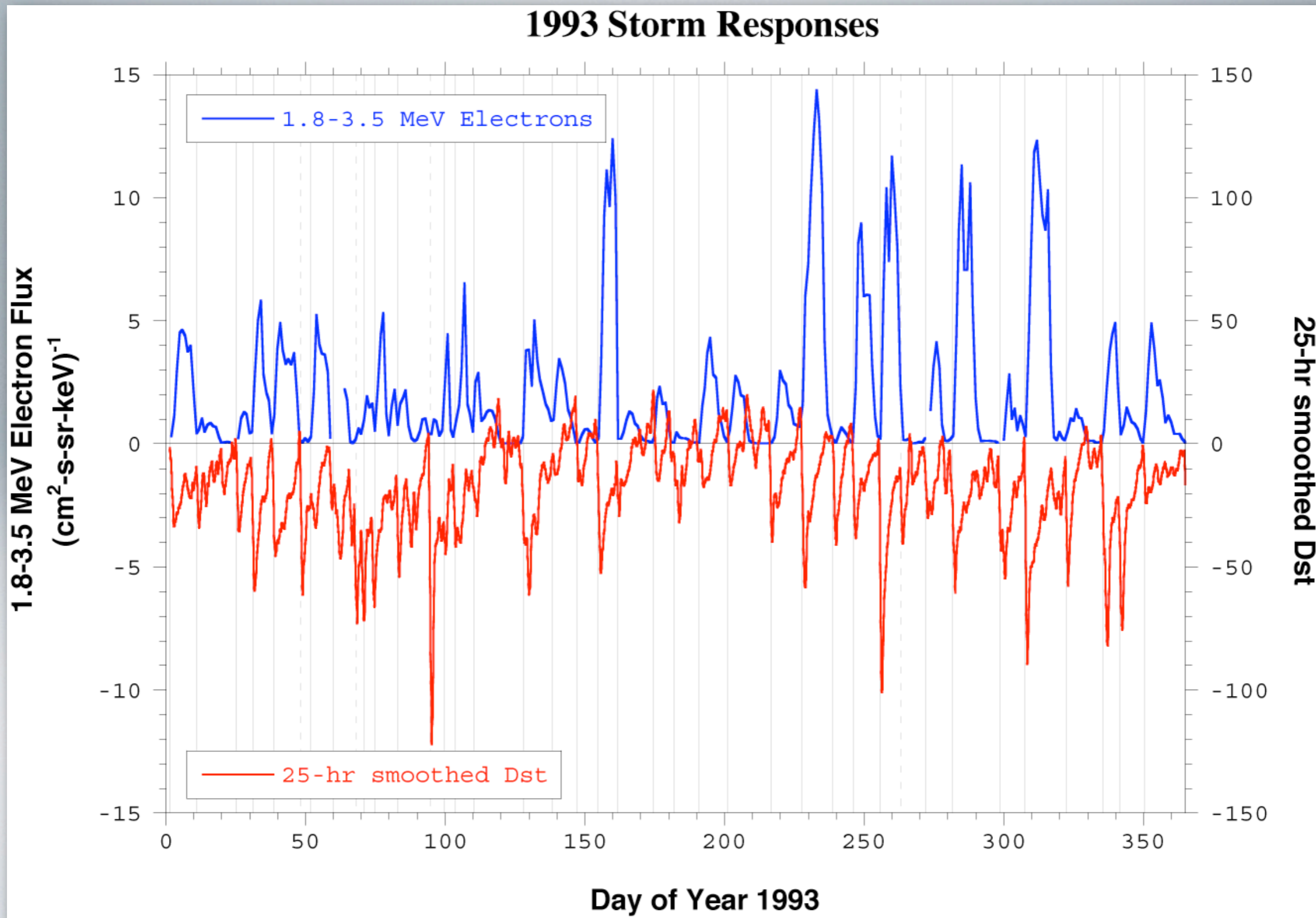






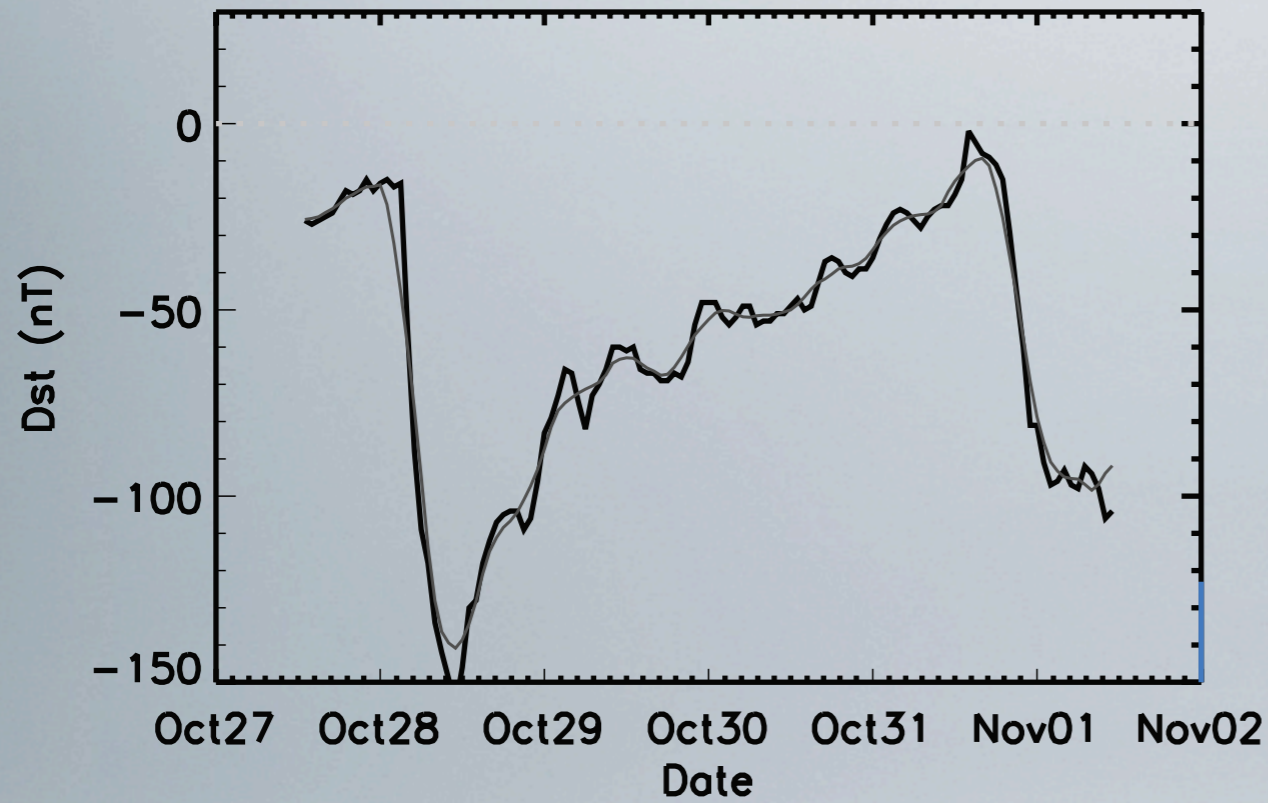


# Radiation Belts & Storms

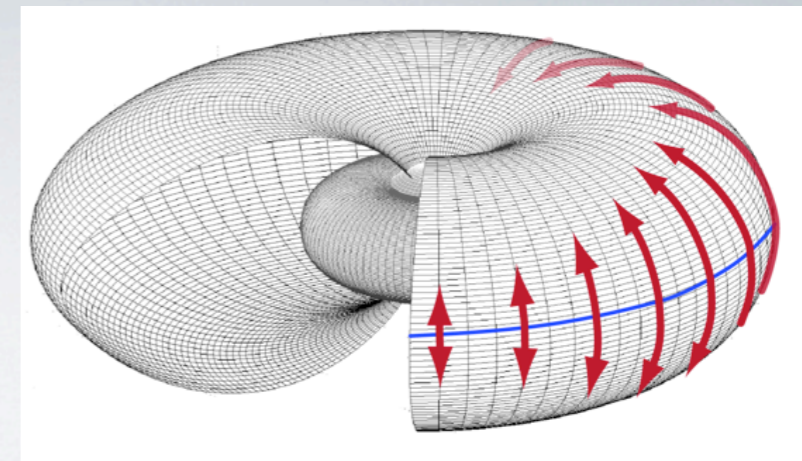
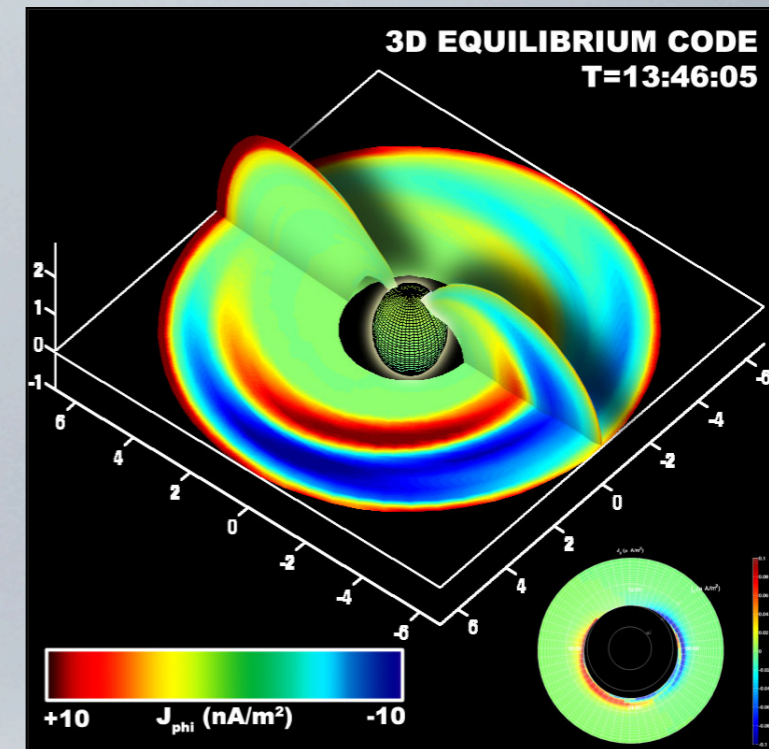
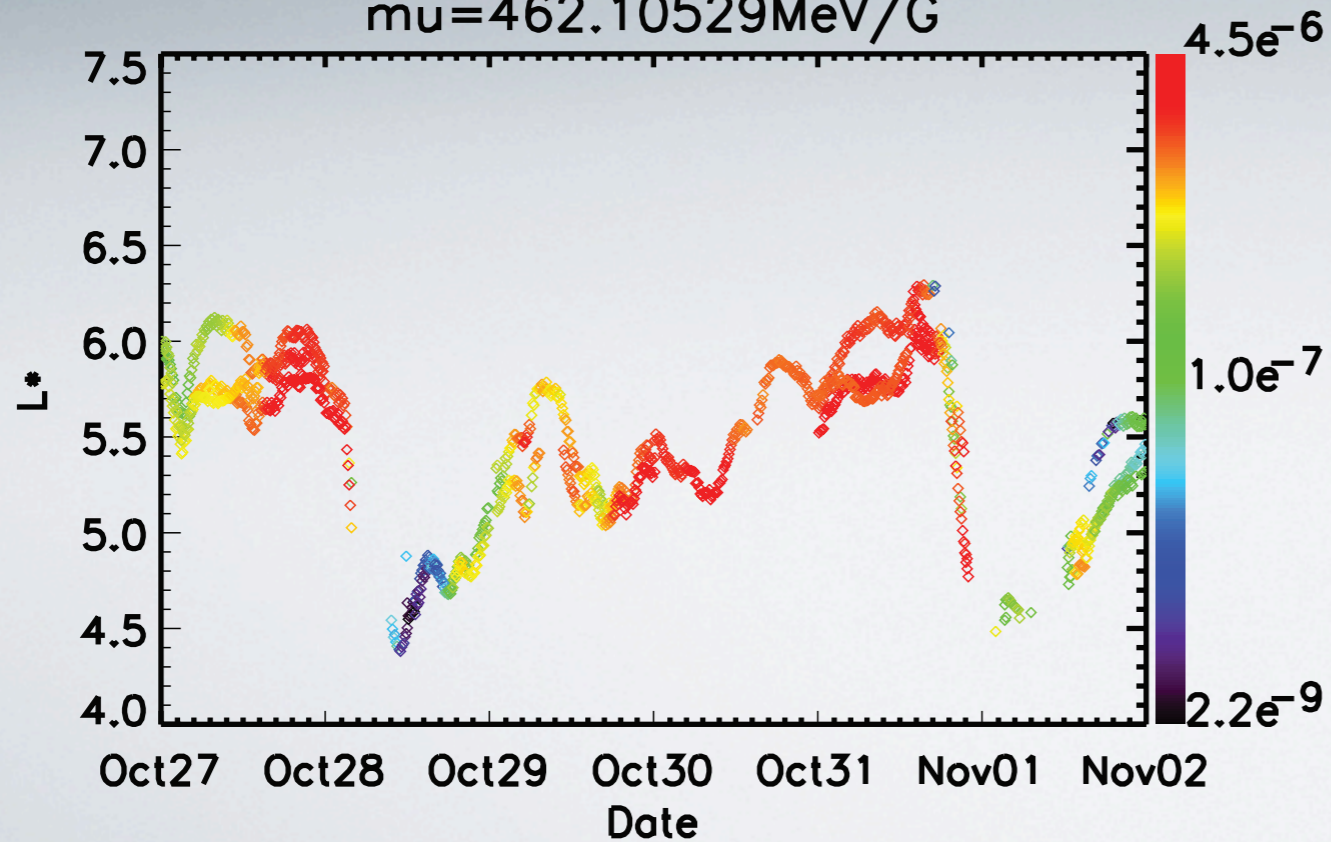




# The Global Magnetic Field

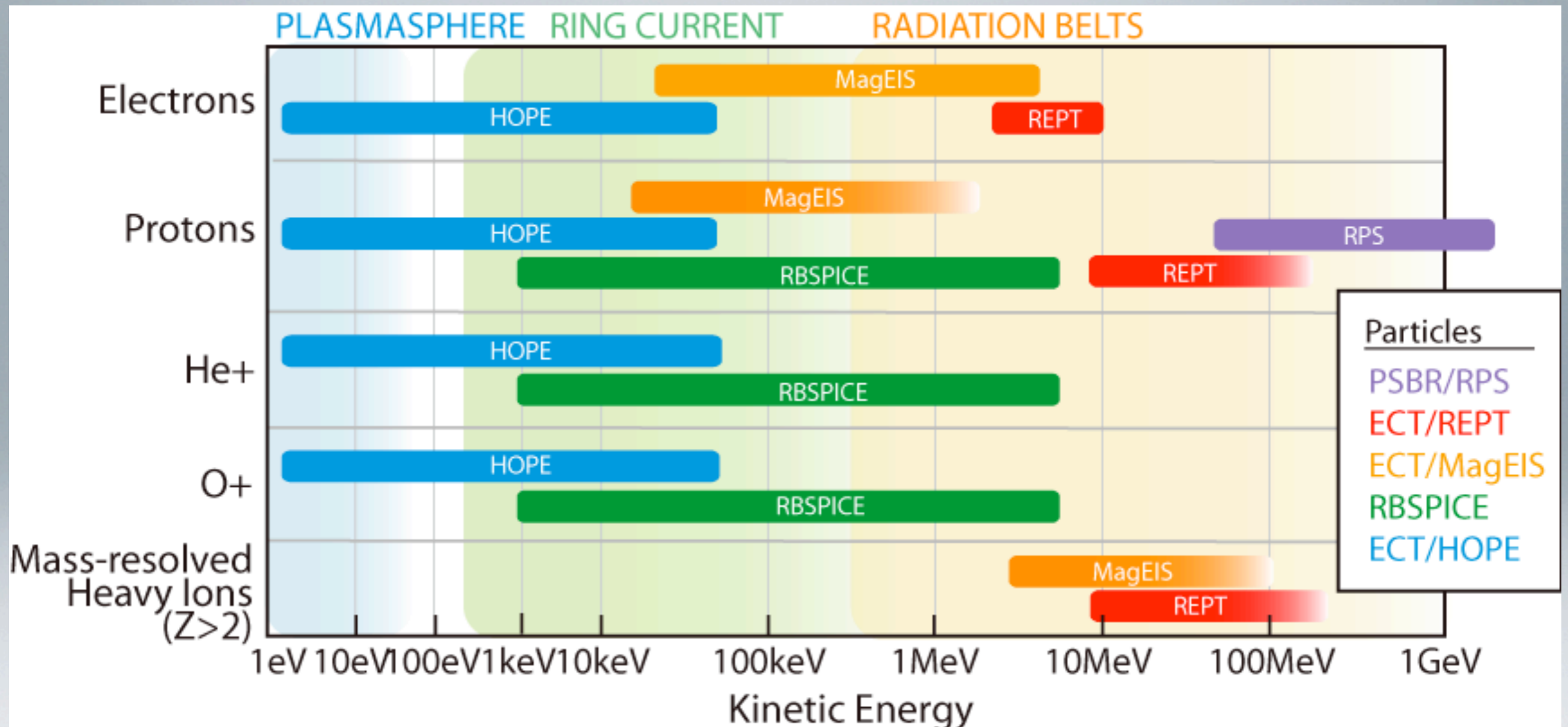


$\mu = 462.10529 \text{ MeV/G}$



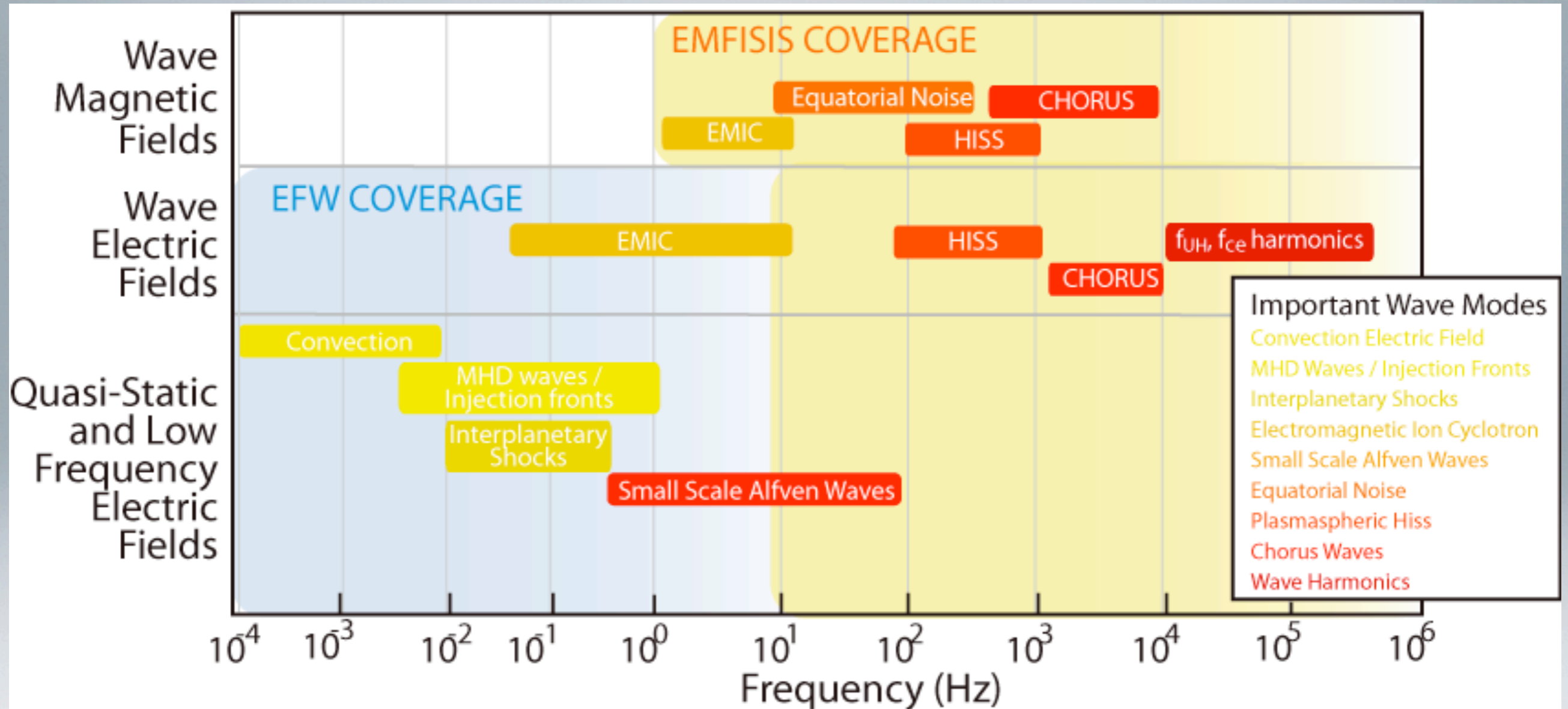


# RBSP Particle Measurements



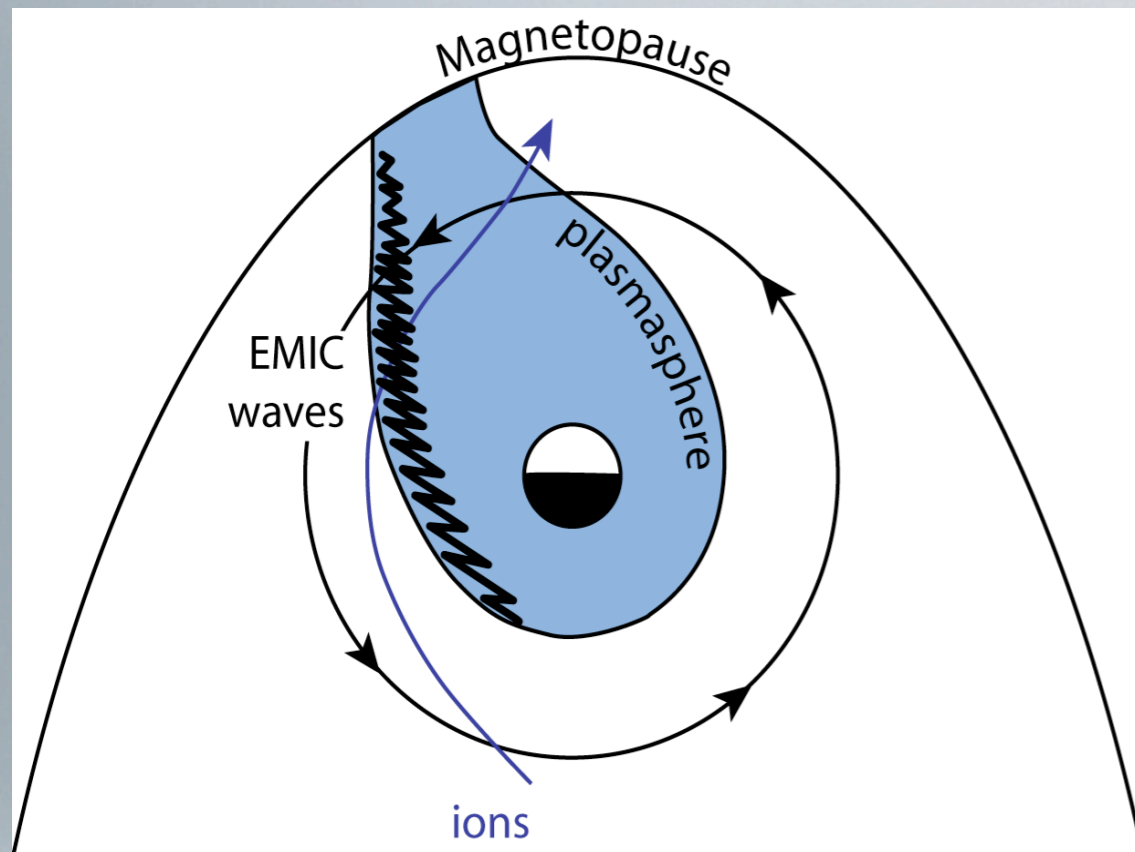


# Fields & Waves Measurements





# Multi-Faceted Science Objectives



One topic -e.g. EMIC waves - has many questions embedded in it

- Plasmasphere + Plasmasheet structure & dynamics
- Ring current plasma injection
- Unstable distributions that produce EMIC waves
- Densities & Composition
- Wave propagation & ducting
- Electron & Ion Precipitation



# Thank You

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