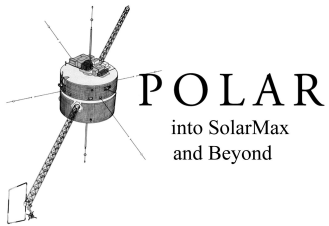
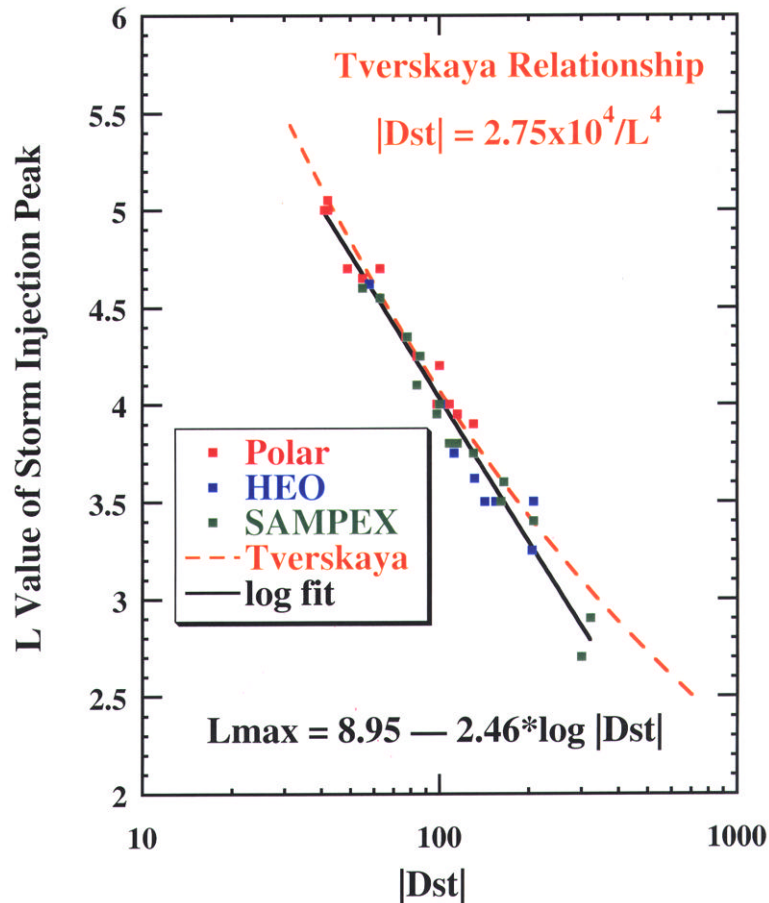


CEPPAD Science Report

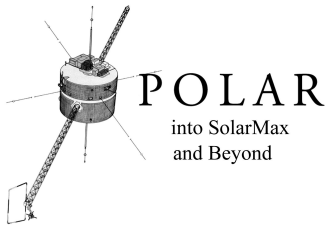
- **Relativistic electrons**
- **New opportunities for Polar CEPPAD science**



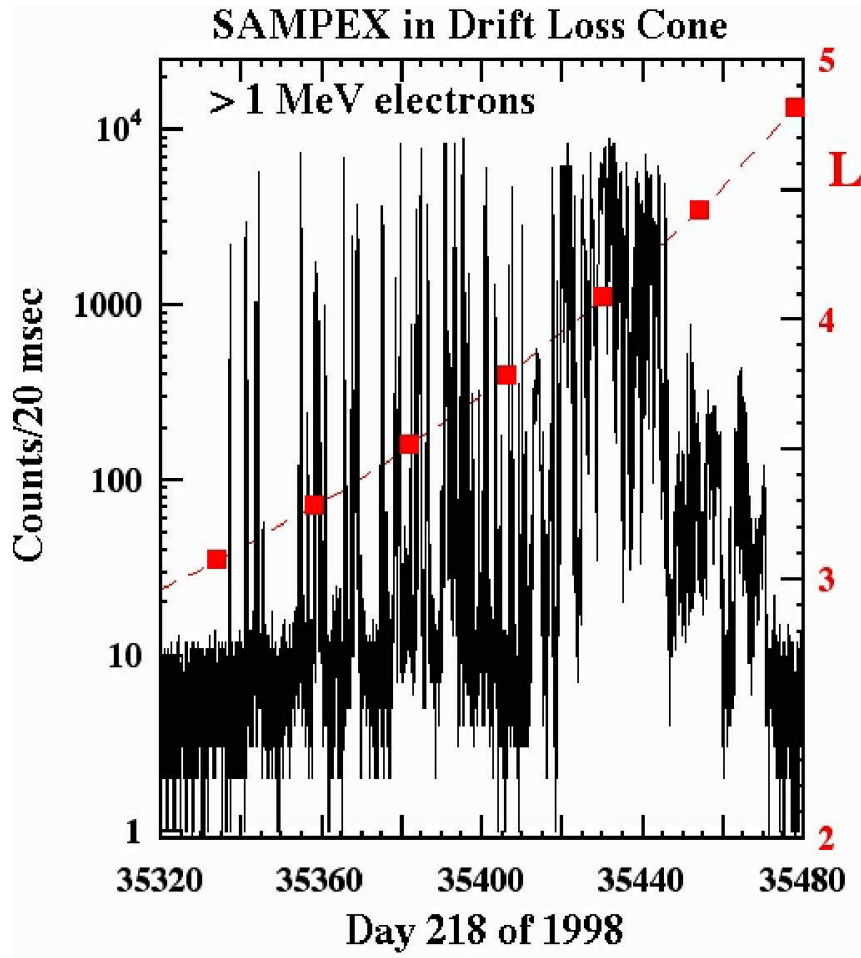
Relativistic Electron Injection Location



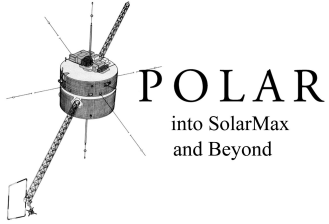
- Excellent correlation with |Dst|
- Correlation holds for all pitch angles
- Intensity increases most rapidly at peak location (not shown)
- Intensity increases more slowly as electron energy increases (not shown)



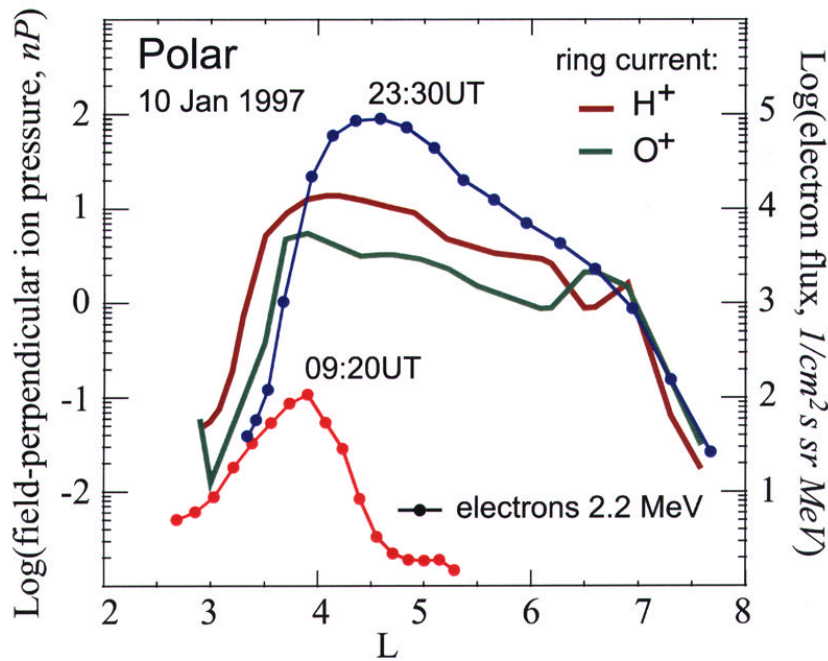
Pitch-angle Scattering Highly Bursty



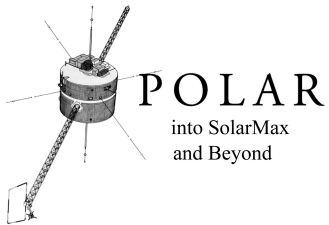
- SAMPEX sees bursts with a time structure substantially shorter than one second
- Burst seen in 25% of passes during storms
- Dawn sector favored



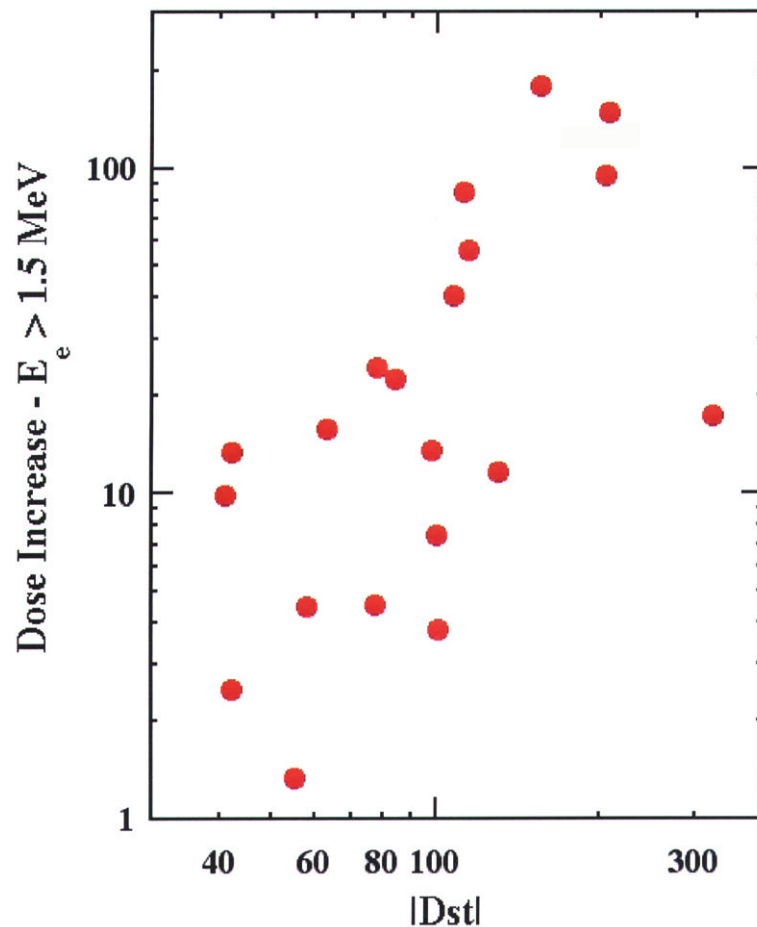
Example of Correlation with Polar Ring-Current Measurements



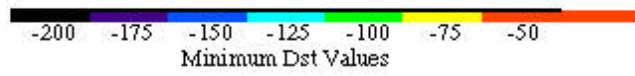
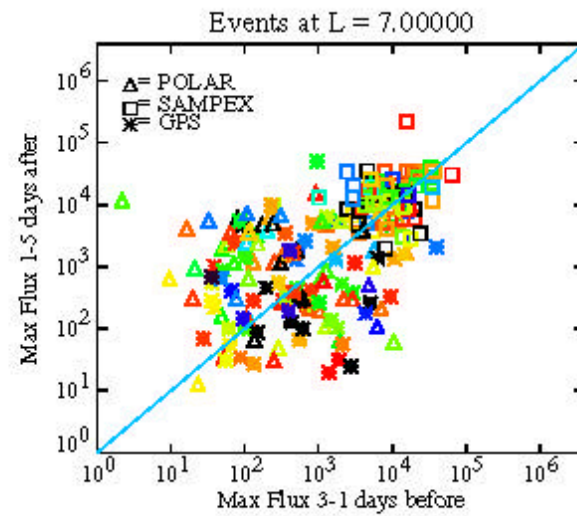
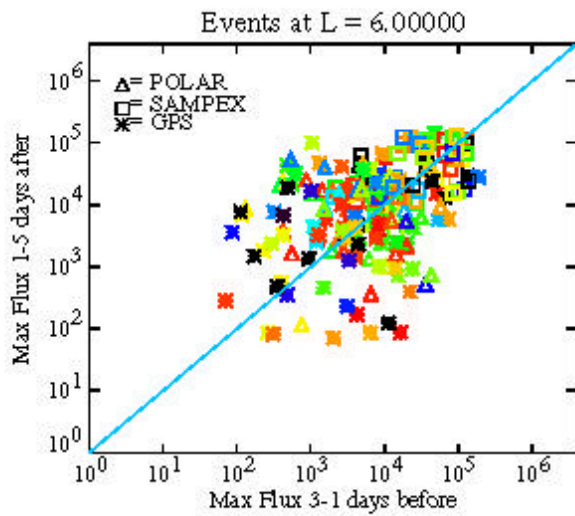
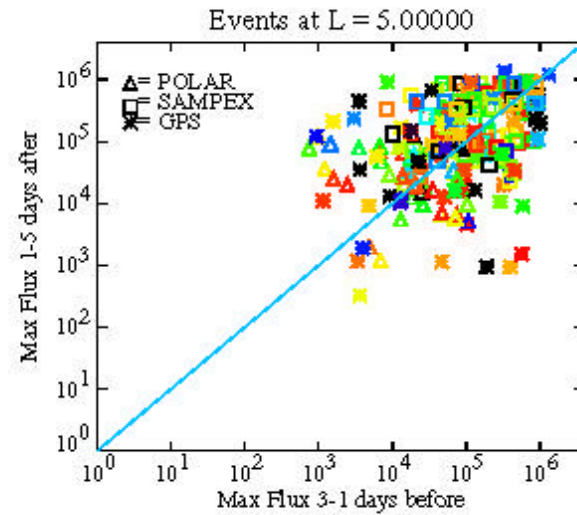
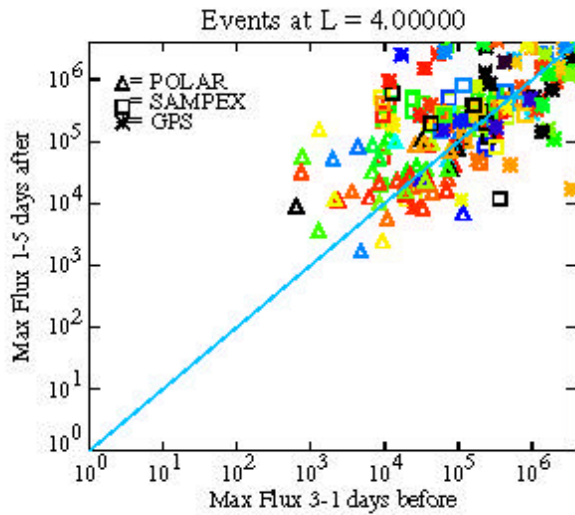
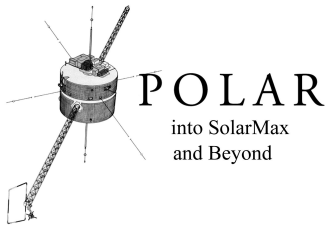
- Electron intensity peak near region of peak pressure
- Only a few such measurements analyzed to date
 - Polar infrequently in region on interest around max $|Dst|$
 - After electrons appear, MICS background is high

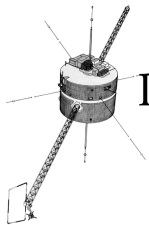


Correlation of Electron Intensity with $|Dst|$ Poor



- Large scatter; largest storms in particular have not yielded largest injections
- Only ~ 50% of storms lead to relativistic electron enhancement

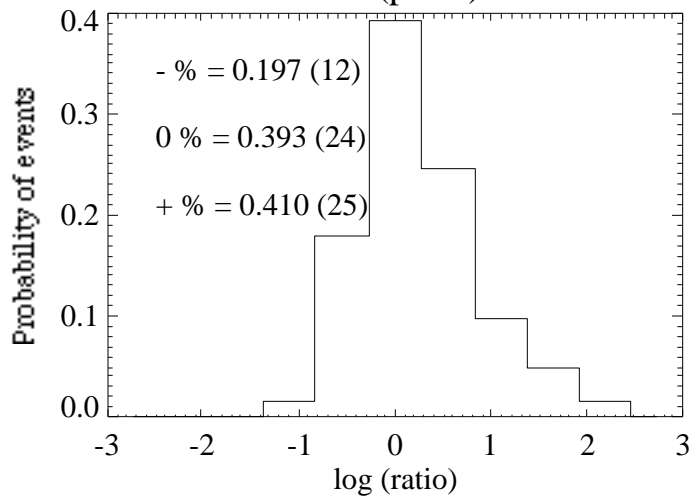




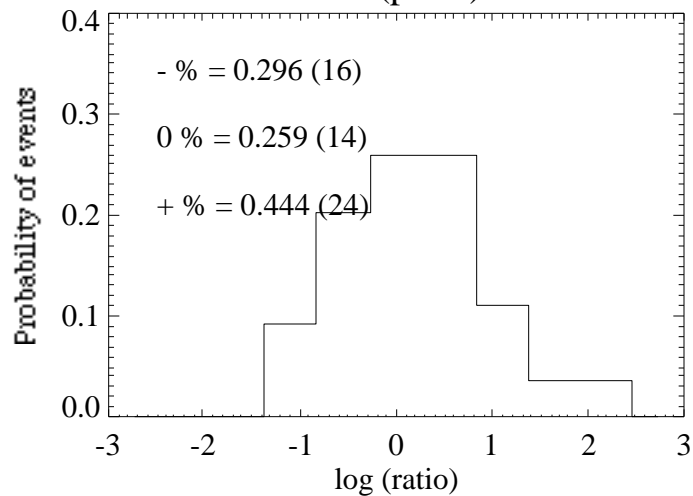
POLAR

into SolarMax
and Beyond

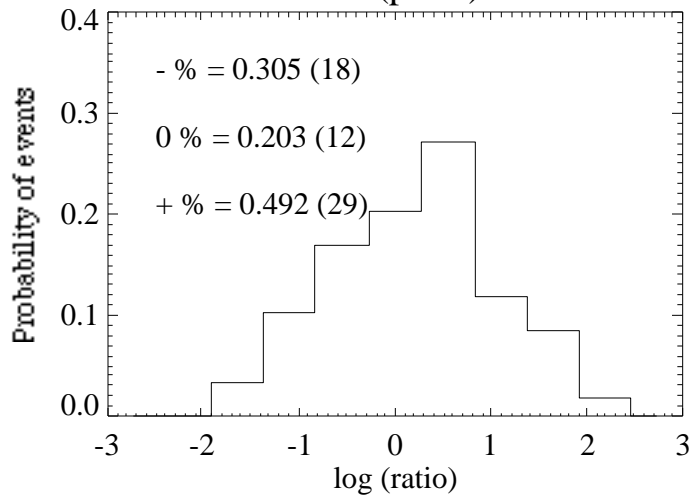
Post Flux / Pre Flux (polar) at $3.8 < L < 4.2$



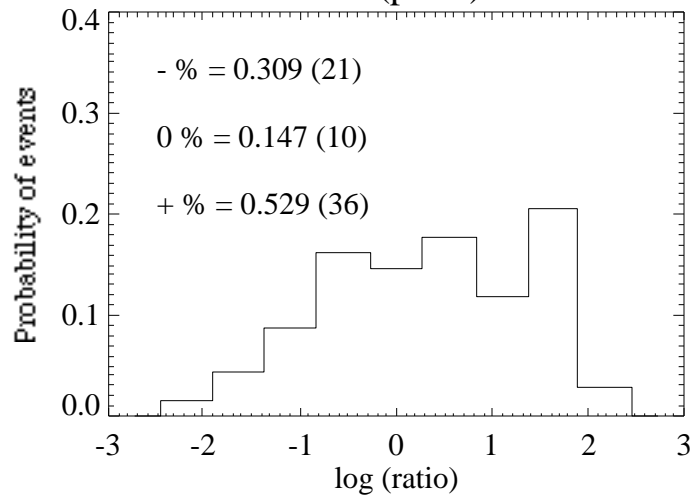
Post Flux / Pre Flux (polar) at $4.8 < L < 5.2$

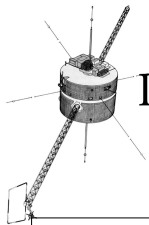


Post Flux / Pre Flux (polar) at $5.8 < L < 6.2$



Post Flux / Pre Flux (polar) at $6.8 < L < 7.2$



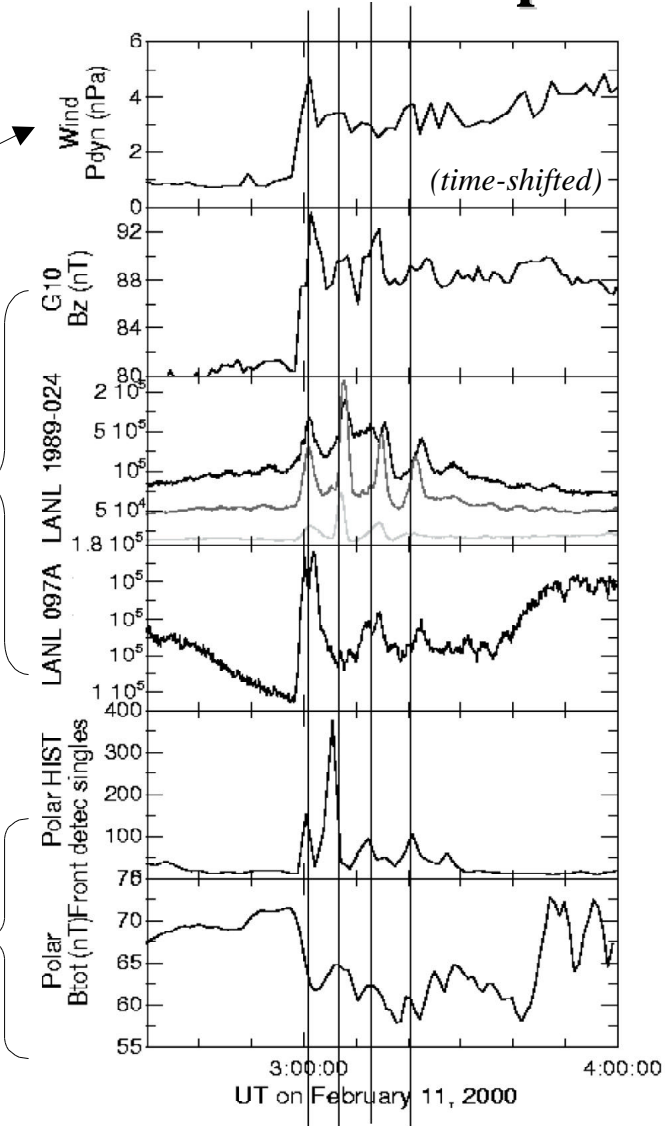
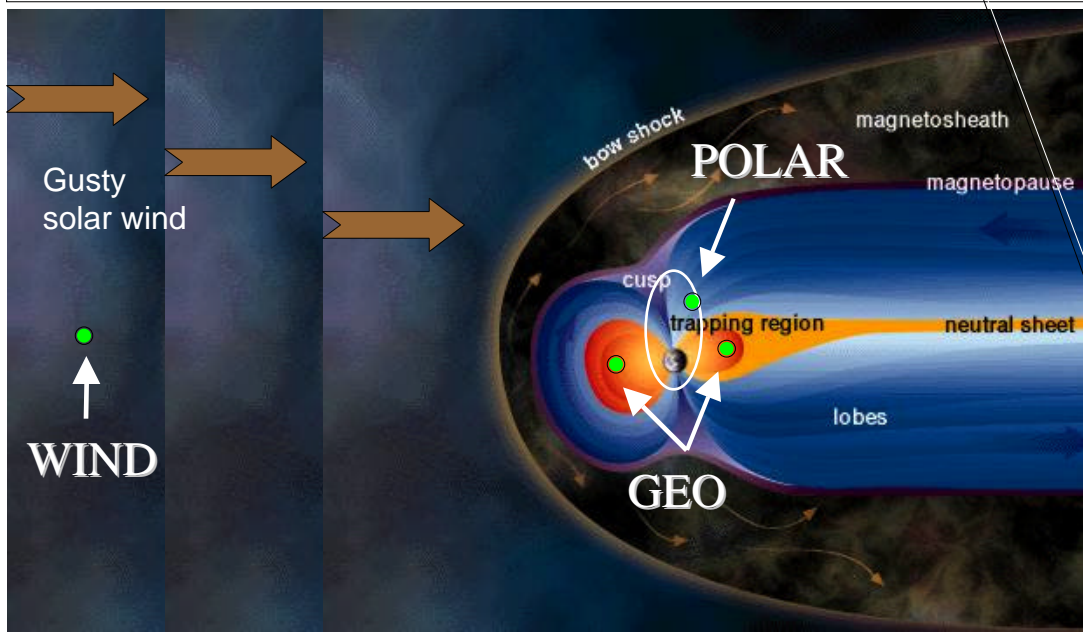


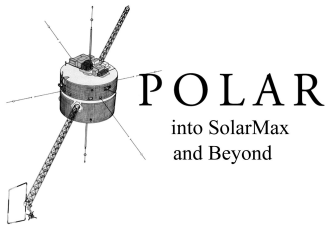
POLAR
into SolarMax
and Beyond

GGIS Reveals Direct Connection Between Solar Wind and Magnetospheric Waves: A Global Driven Response

A typical event – 11 February 2000

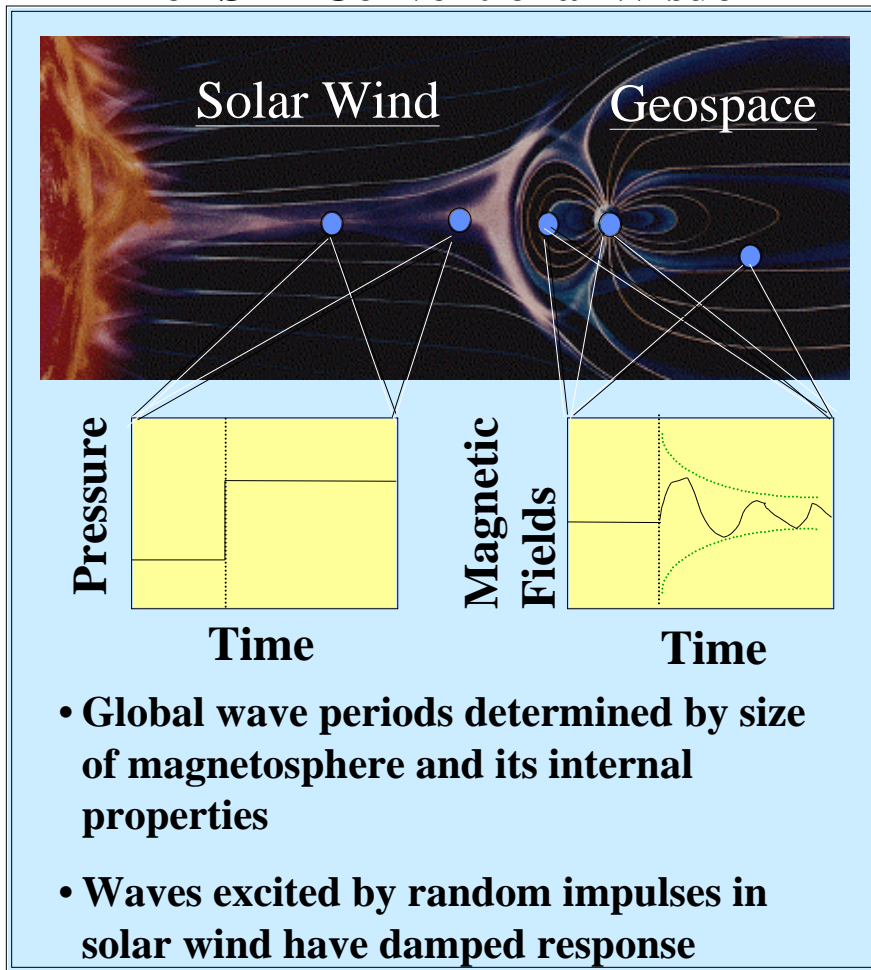
- WIND SWE observes a small shock and associated dynamic pressure waves well upstream of Earth
- GOES/LANL spacecraft see ULF wave response at driver period in particles and magnetic fields
- POLAR CEPPAD and MFE observations reveal coherence and extent of global oscillations



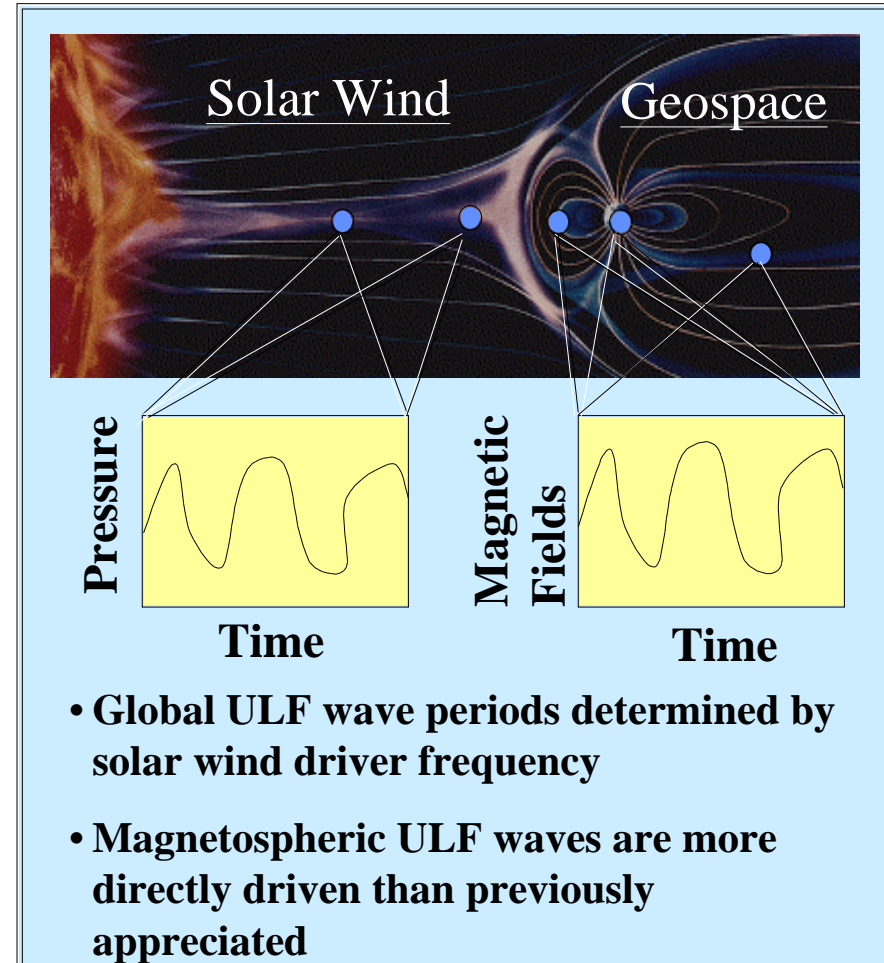


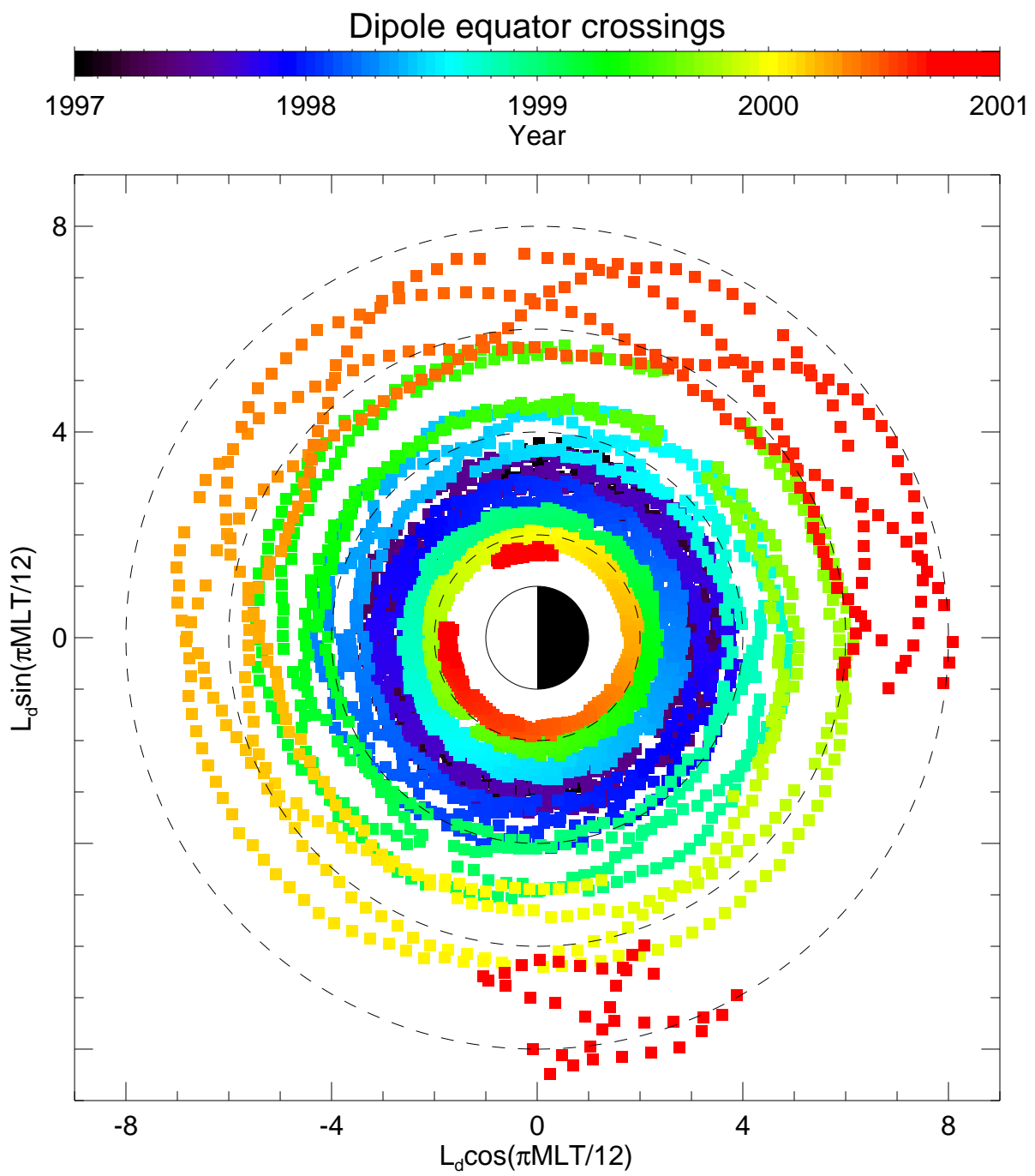
Revisiting an Old Sun-Earth Connection: Solar Wind Pressure Pulses Can Directly Drive ULF Magnetosphere Waves

Pre-ISTP Conventional Wisdom

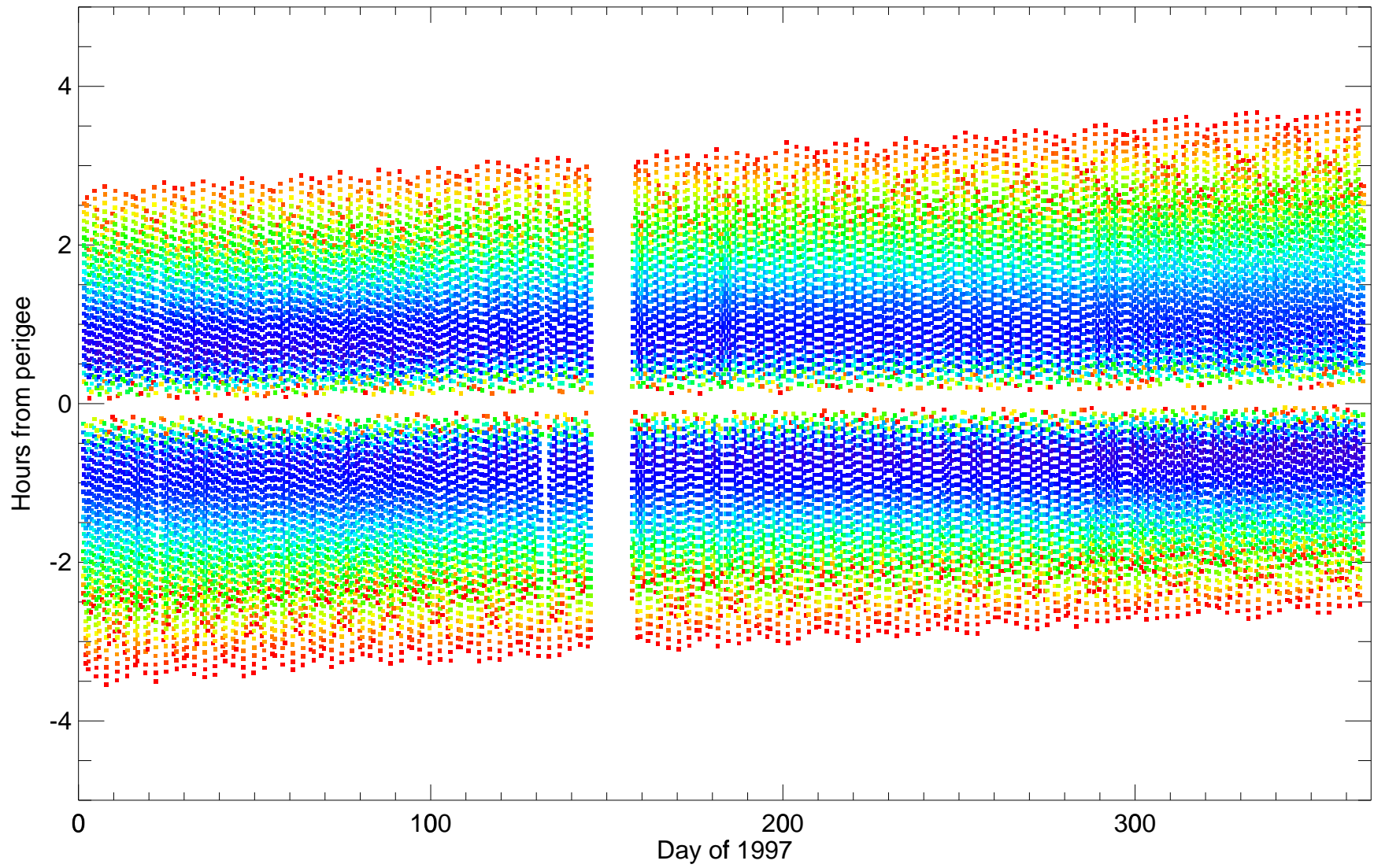
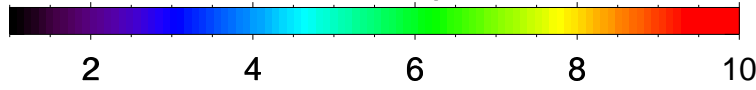


GGG View

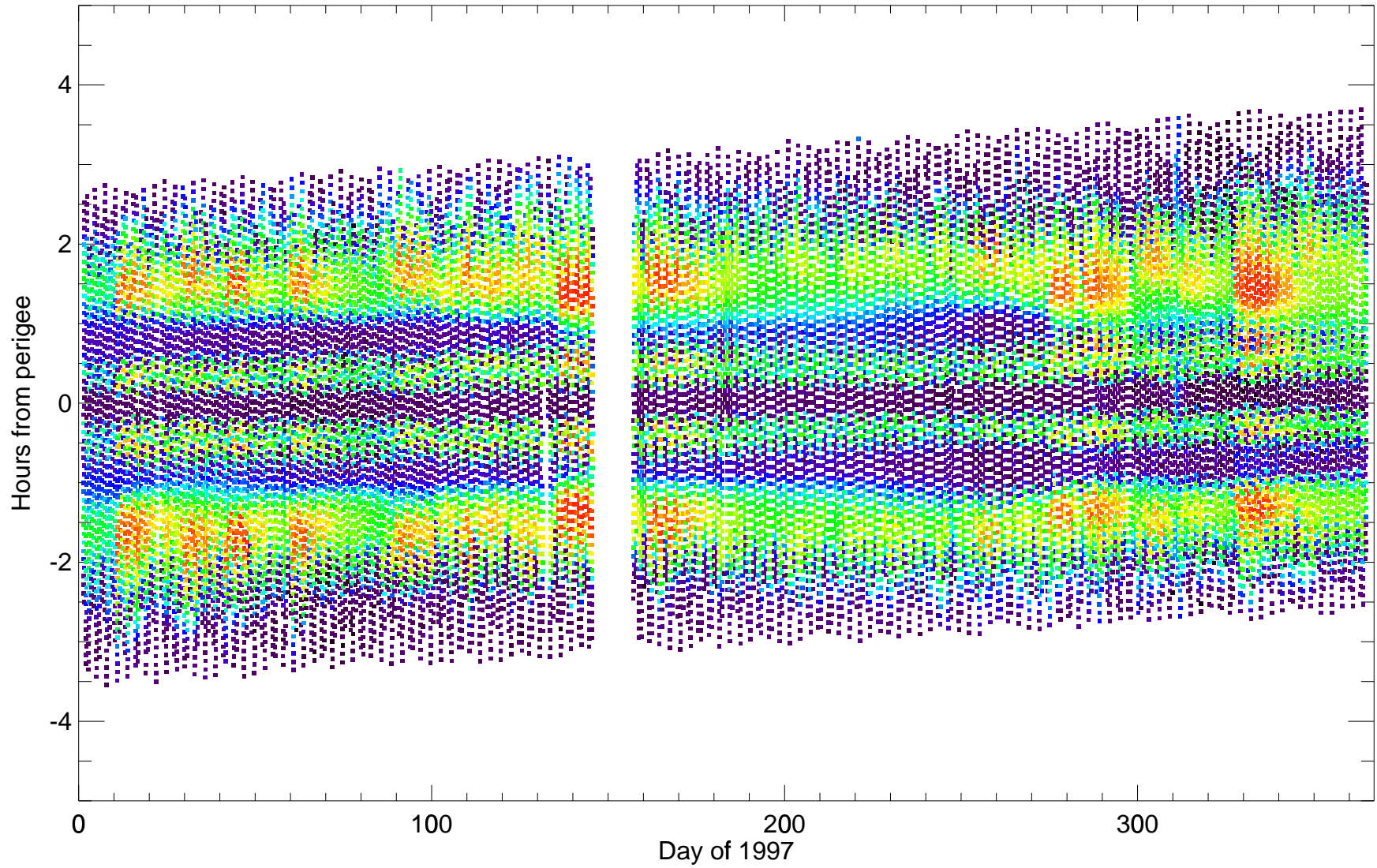
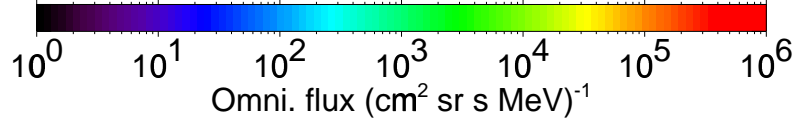




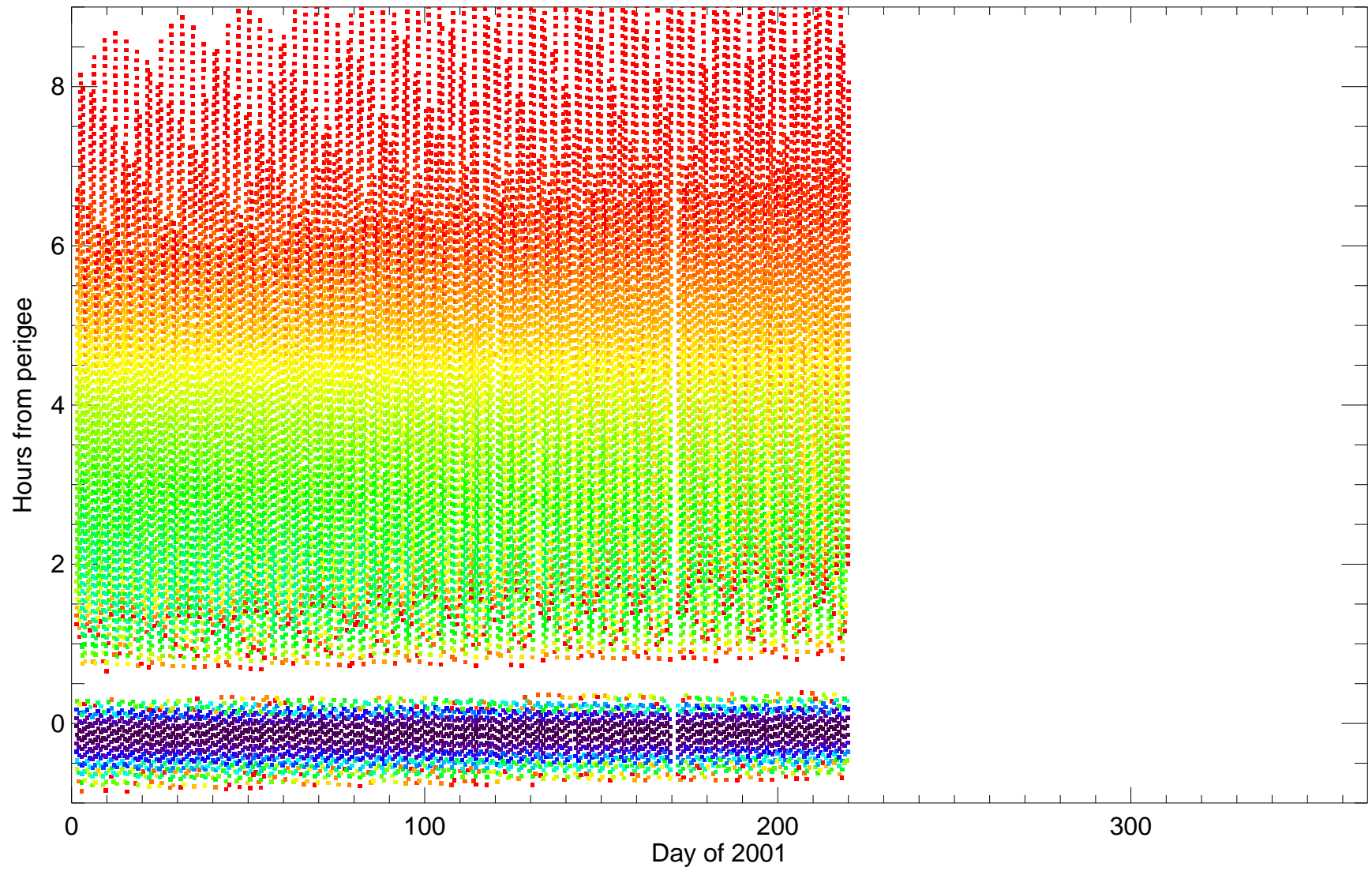
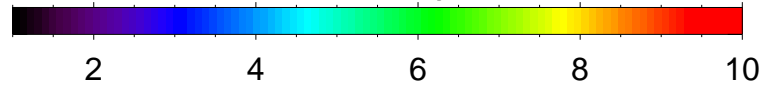
Polar orbit dipole L



Polar/HIST 1.6 MeV electrons



Polar orbit dipole L



Polar/HIST 0.8 MeV electrons

