

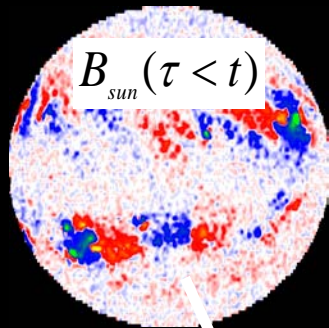
# Highly Relativistic Electrons and Early RBSP Publication Opportunities

Daniel N. Baker  
Laboratory for Atmospheric and Space Physics  
University of Colorado - Boulder

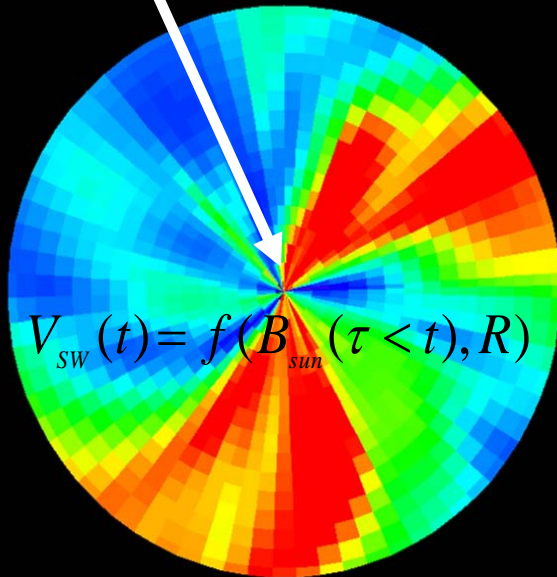
# Living With a Star Context

- RBSP is a key LWS Program
- We should be emphasizing the connected Sun-Earth System
- Capitalizing on solar wind stream and CME events that drive the radiation belts is a great example of “Low Hanging Fruit”
- We can build on modeling and forecast work that has been done in last decade

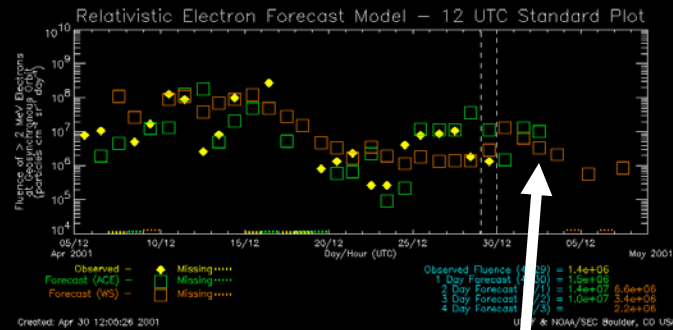
# We have developed models that go from Sun to magnetosphere



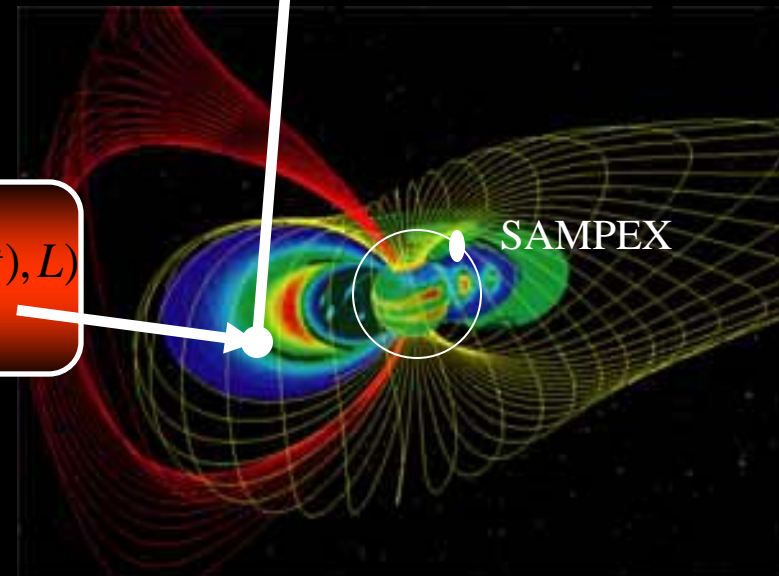
Mount Wilson  
Observatory Solar  
Magnetograms



$$J_e(t) = F(V_{SW}(\tau < t), L)$$



Baker et al. [1990]  
Method in use at  
NOAA/SWPC



# Linear Prediction Filter Description

$$J_e = F(V_{sw}, L)$$

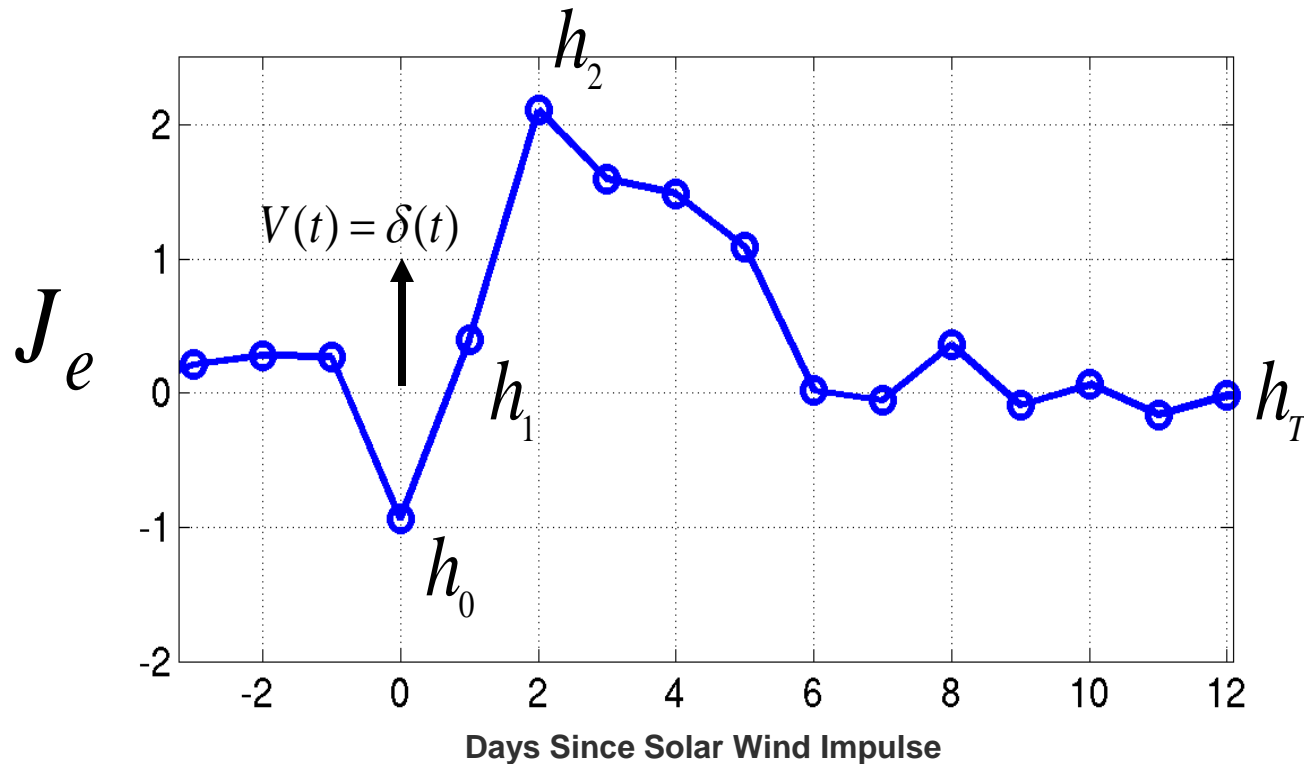
- Assume system dynamics can be represented by a linear ODE
- Derive system (given by parameters  $h_1, h_2, \dots, h_T$ ) directly from the data
- Impulse response filter coefficients ( $h_i$ ) give full model description

At fixed  $L$ ,

$$J_e(t) = h_1 V(t-1) + h_2 V(t-2) + \dots + h_T V(t-T)$$

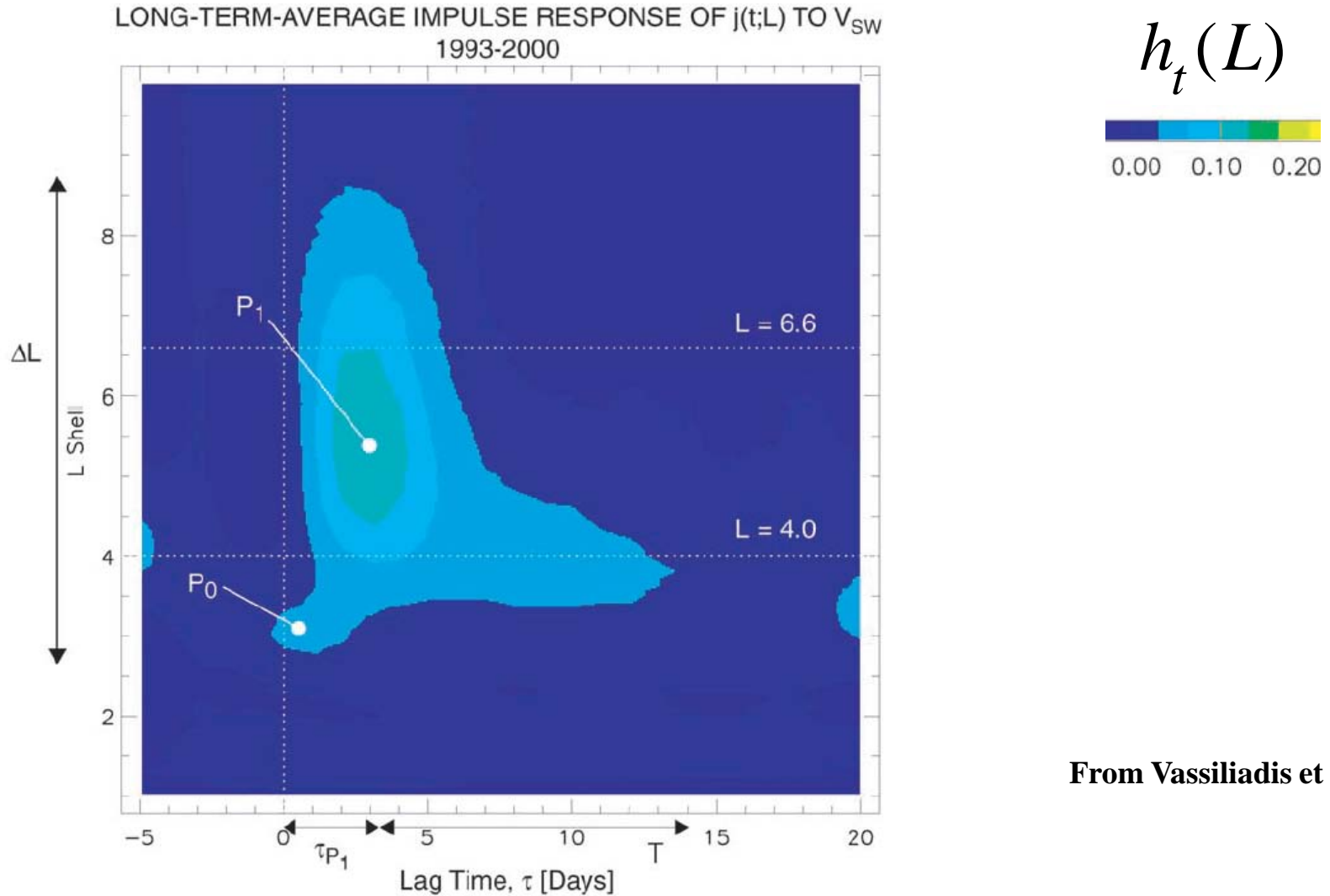
# GEO MeV Electron Filter

$$J_e(t) = h_1 V(t-1) + h_2 V(t-2) + \dots + h_T V(t-T)$$



[Baker et al., 1990]

# 1.1-10 R<sub>E</sub> MeV Filter



From Vassiliadis et al., 2002

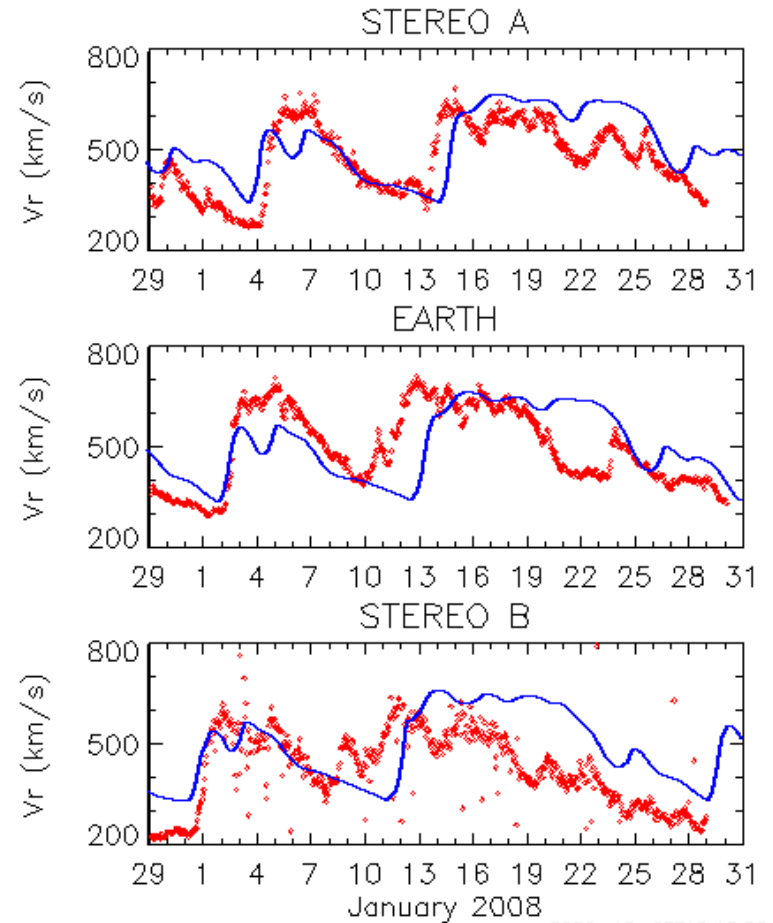
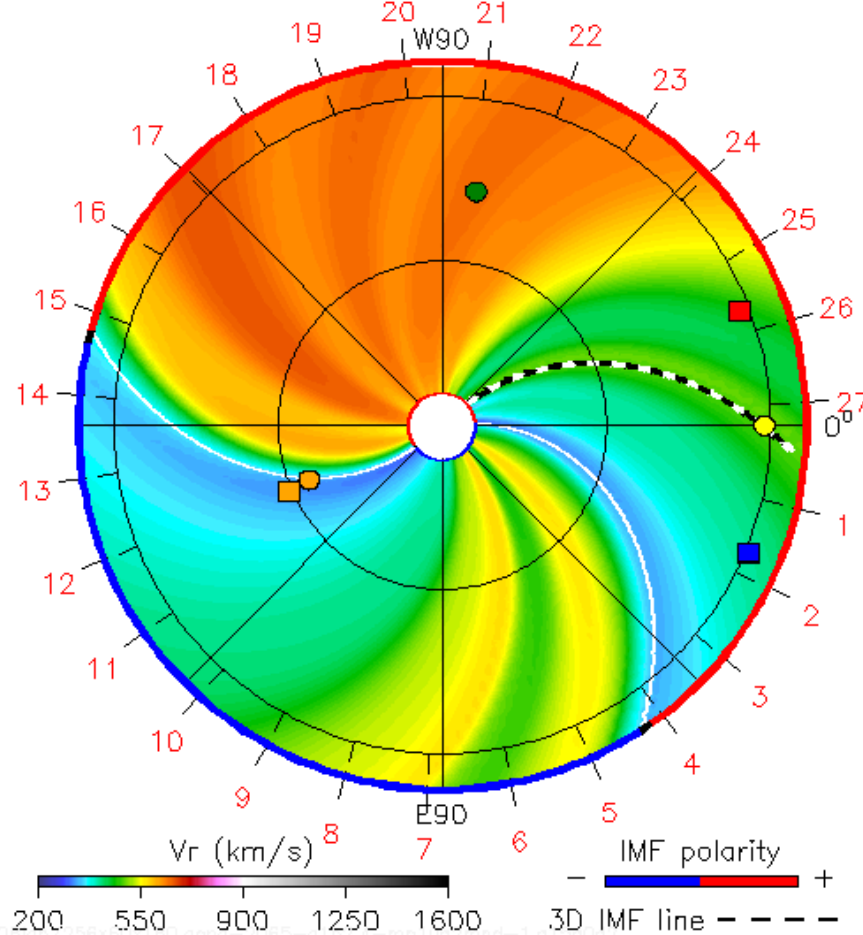
# Model-Data Comparison (M1 Flyby)

ENLIL-2.5 medres WSA-1.6 GONG

2007-12-29 03:08:26

2007-12-29 +0.00 day

Mercury Venus Earth Messenger Stereo\_A Stereo\_B



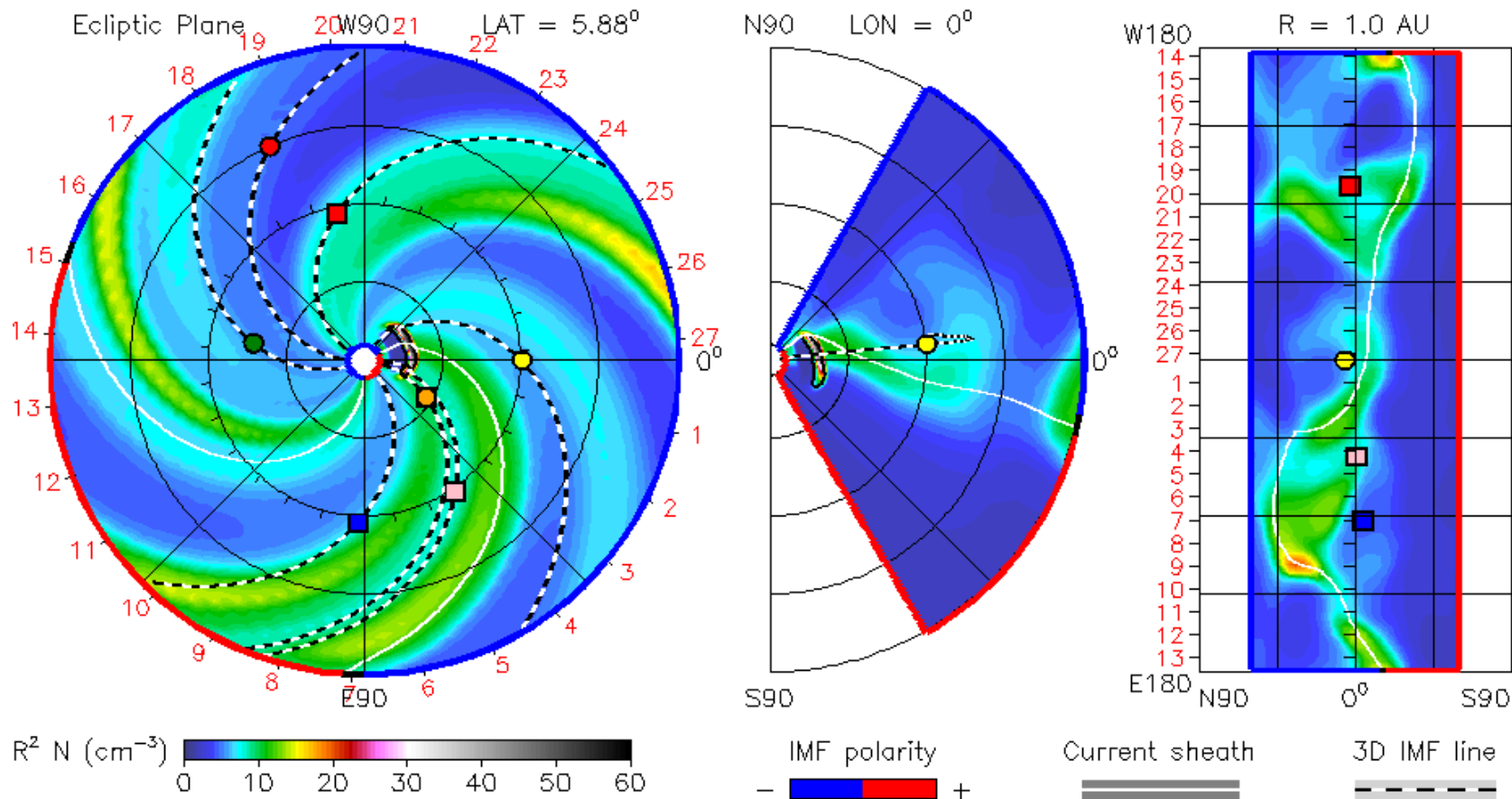
[Baker et al., JGR, 2009]

# Coronal Mass Ejections – August 2011

2011-08-03T00:00

2011-08-03T00 +0.00 day

● Earth    ● Mars    ● Mercury    ● Venus    ■ Messenger    ■ Spitzer    ■ Stereo\_A    ■ Stereo\_B





# Measurement Combination

Early publication: Use the first major CME event after RBSP commissioning; Use SDO, SOHO, and WSA-ENLIL to forecast Earth-impacting events: Then compare forecasted radiation belt response with RBSP (esp. REPT) obs.

