

Electric Drift Morphology

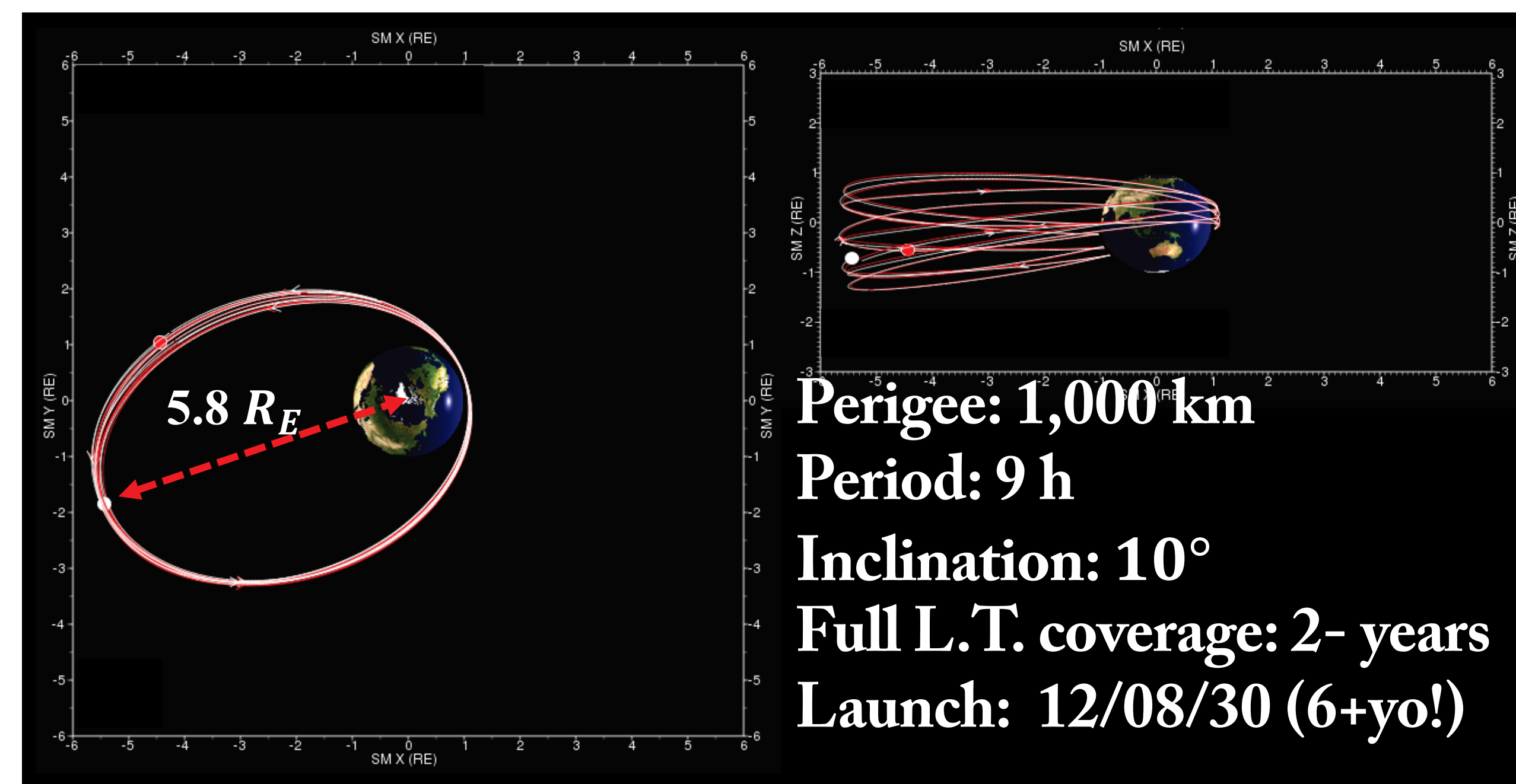
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Motivation

Van Allen Probes: reliable, near equatorial measurements of DC $E \times B / B^2$ in the plasmasphere (a 1st).
 What can we learn from this data?



Van Allen Probes Data

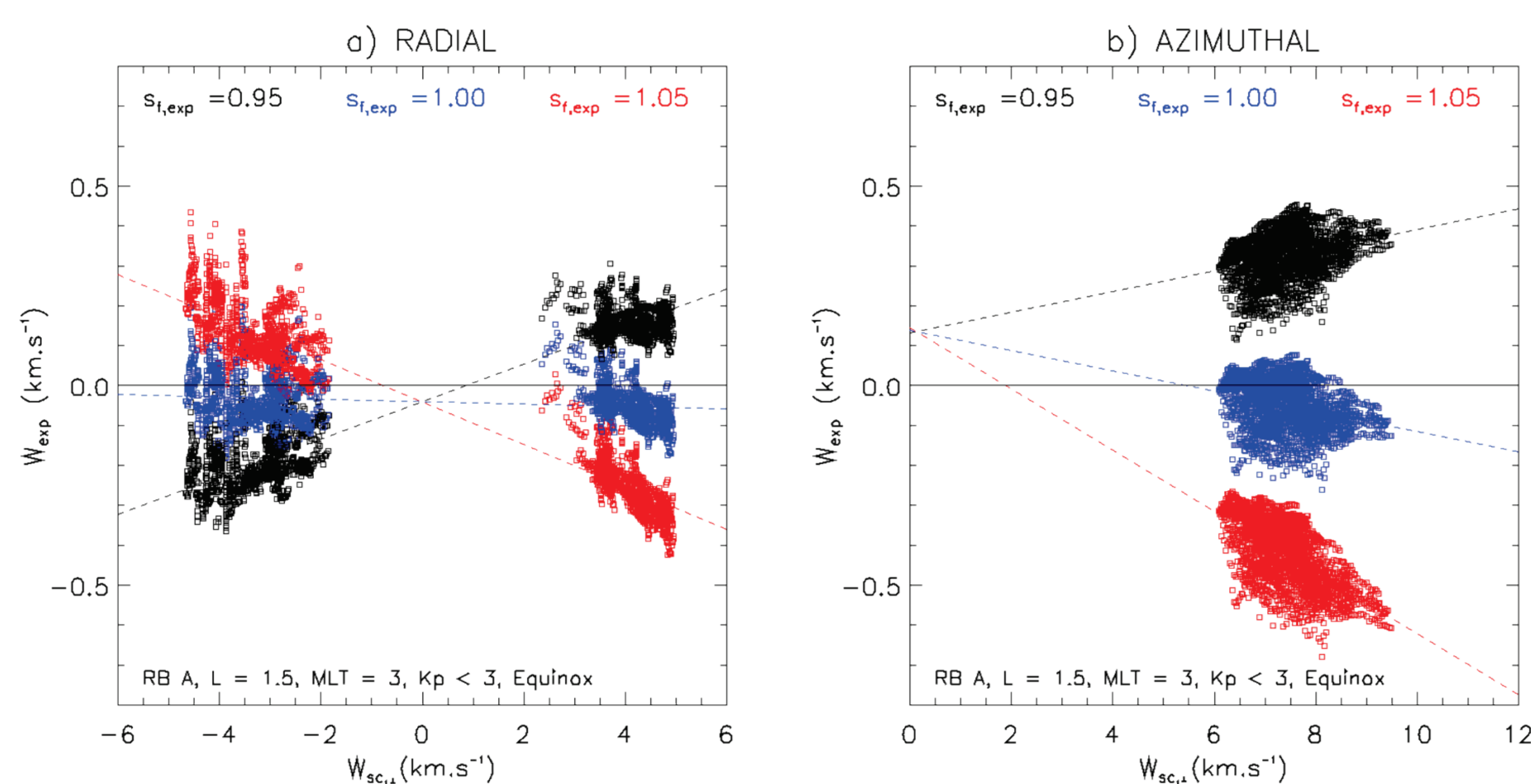


- Spin-Averaged E & B: ~ 12s Time Resolution
- Preprocessing : $sf = 0.994 E_{//} = 0$
- Spacecraft (SC) potential

Technical Feat!

$$sf \times E_m = E_i + V_{sc} \times B$$

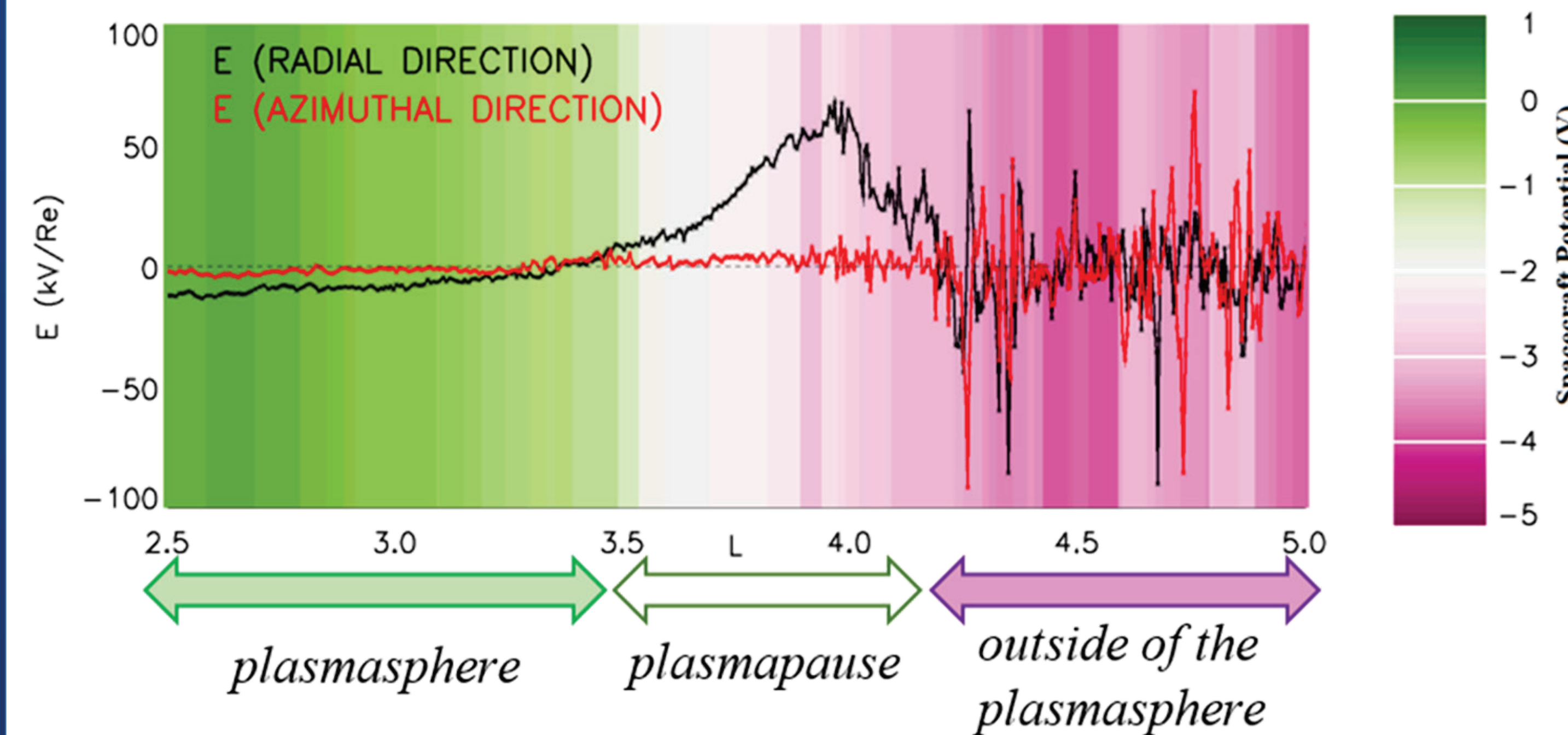
sf shorting factor
 E_m measured E field
 E_i E field of interest
 V_{sc} SC velocity
 B magnetic field



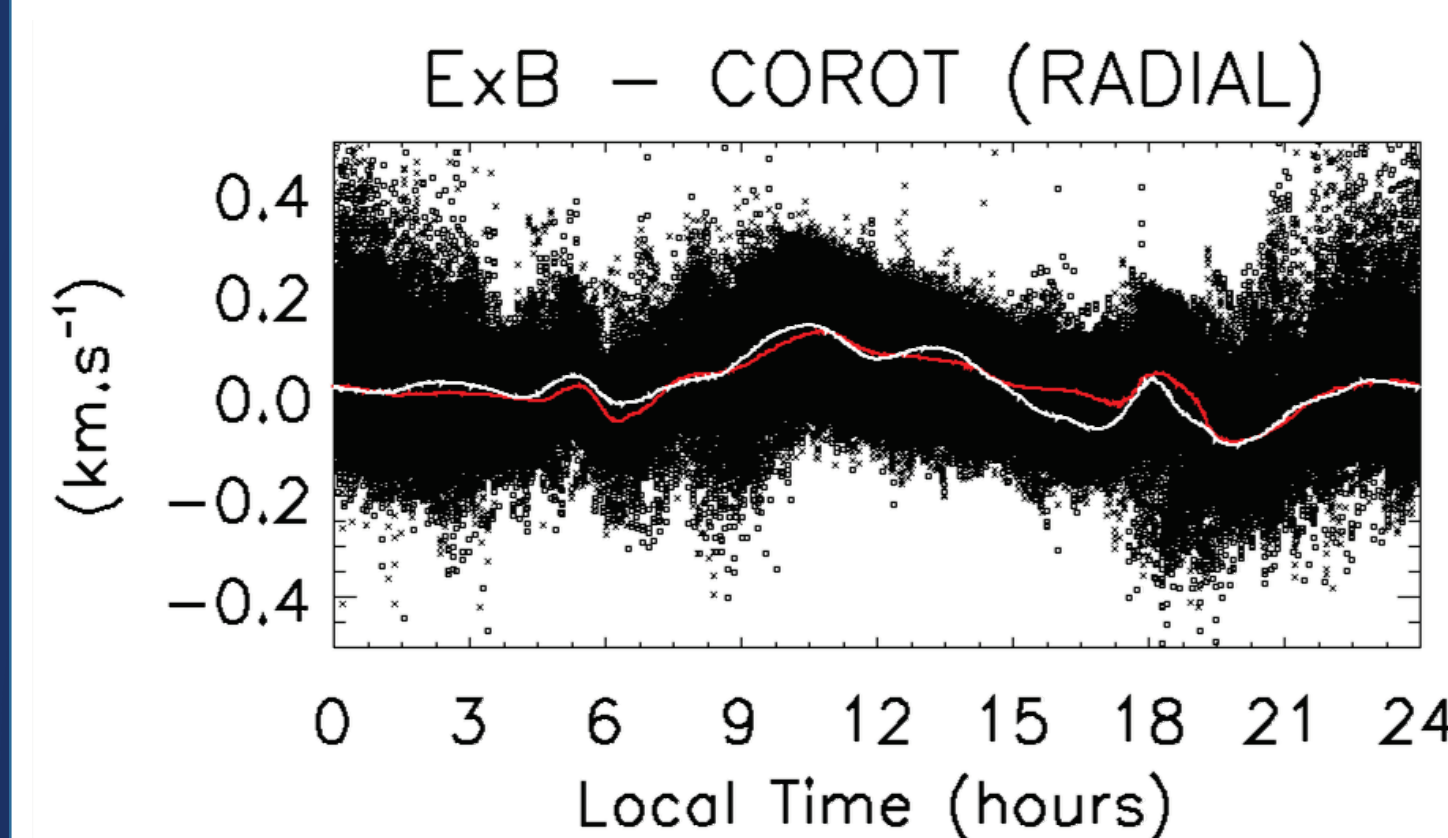
In-Flight Calibration of sf (Lejosne and Mozer, 2019)

First Results

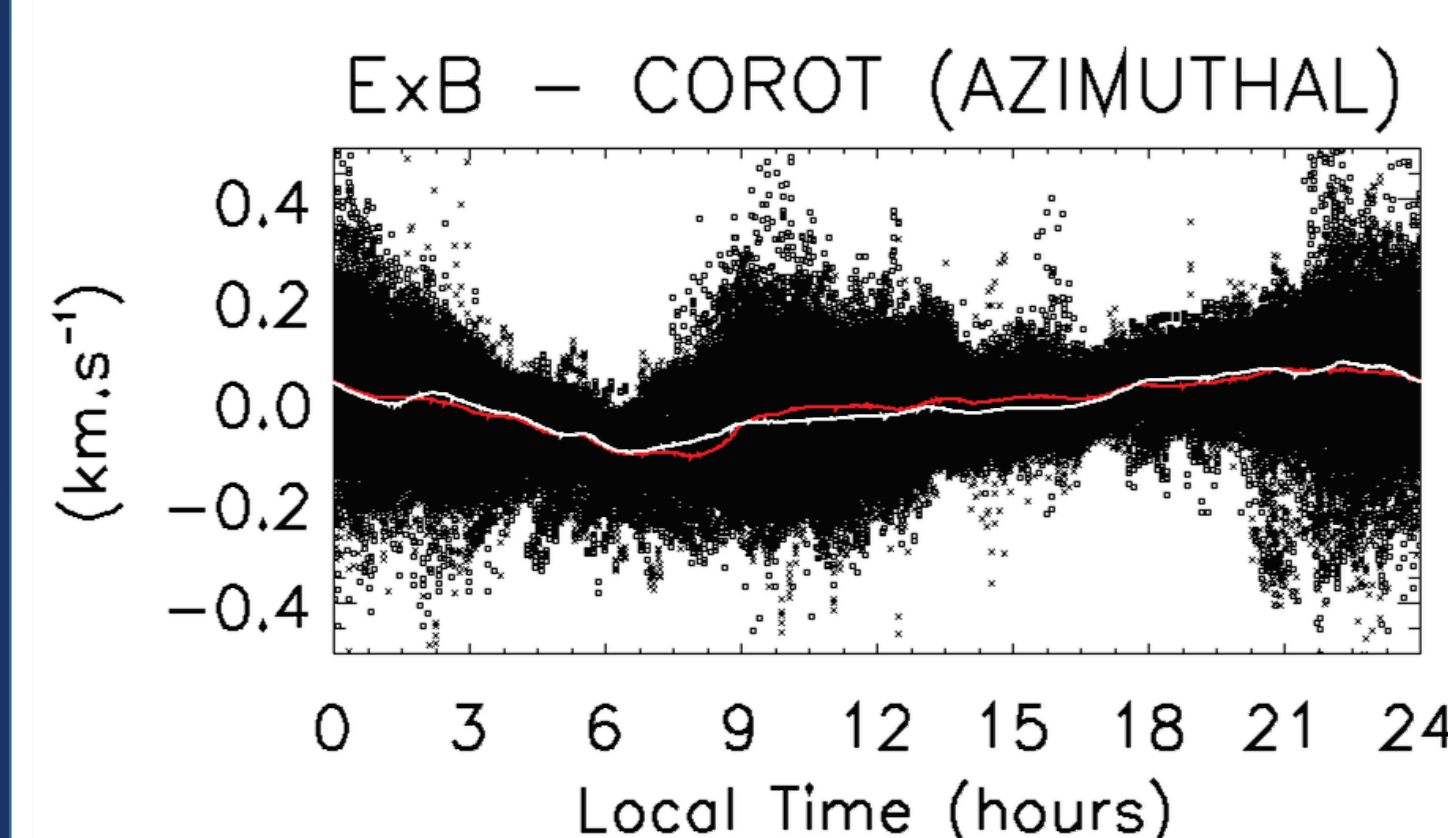
Van Allen Probe B, 03/03/2013 13:50 UT to 18:15 UT



Quiet Time ExB Below 3

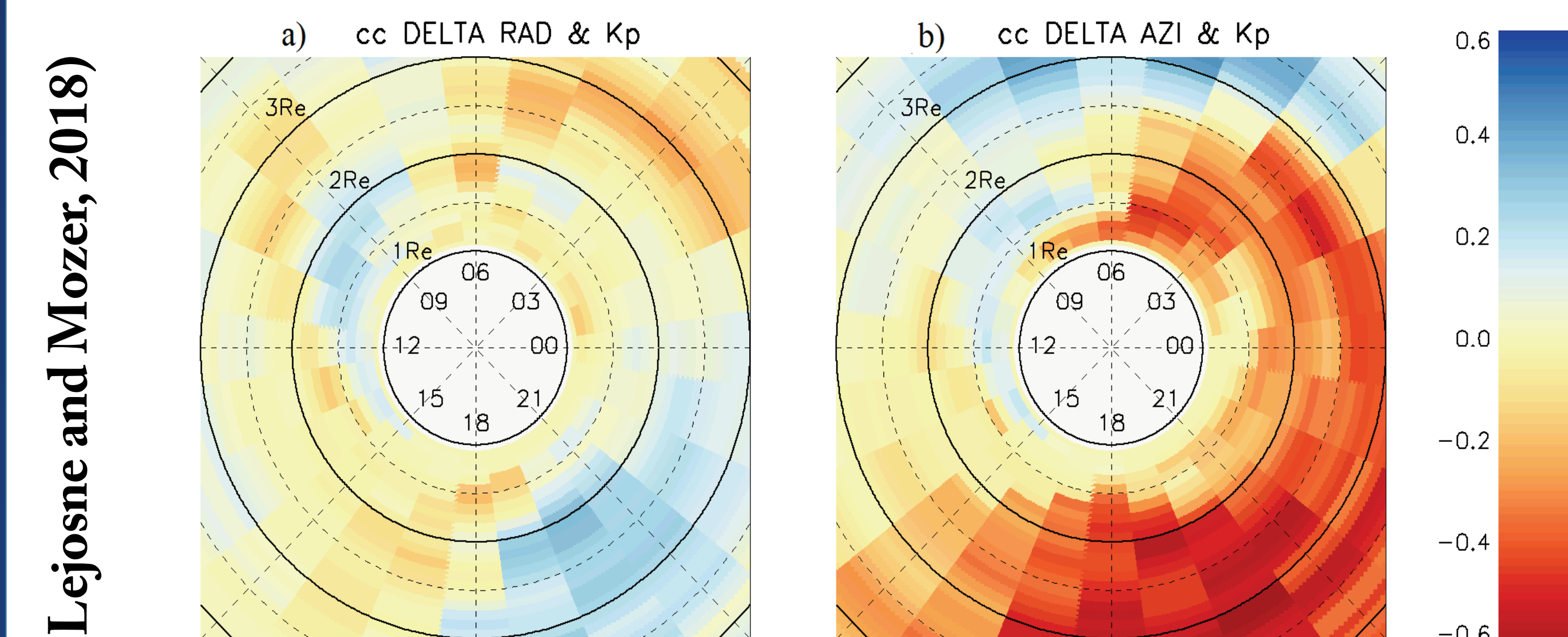


Typical deviations from corotation at the magnetic equator at L = 1.76 (St-Santin radar)



- Trends similar to ground
- Summer Project 1: ExB seasonal dependence
- Summer Project 2: Electric Drift Shell Splitting

Magnetic Activity & ExB Slowdown



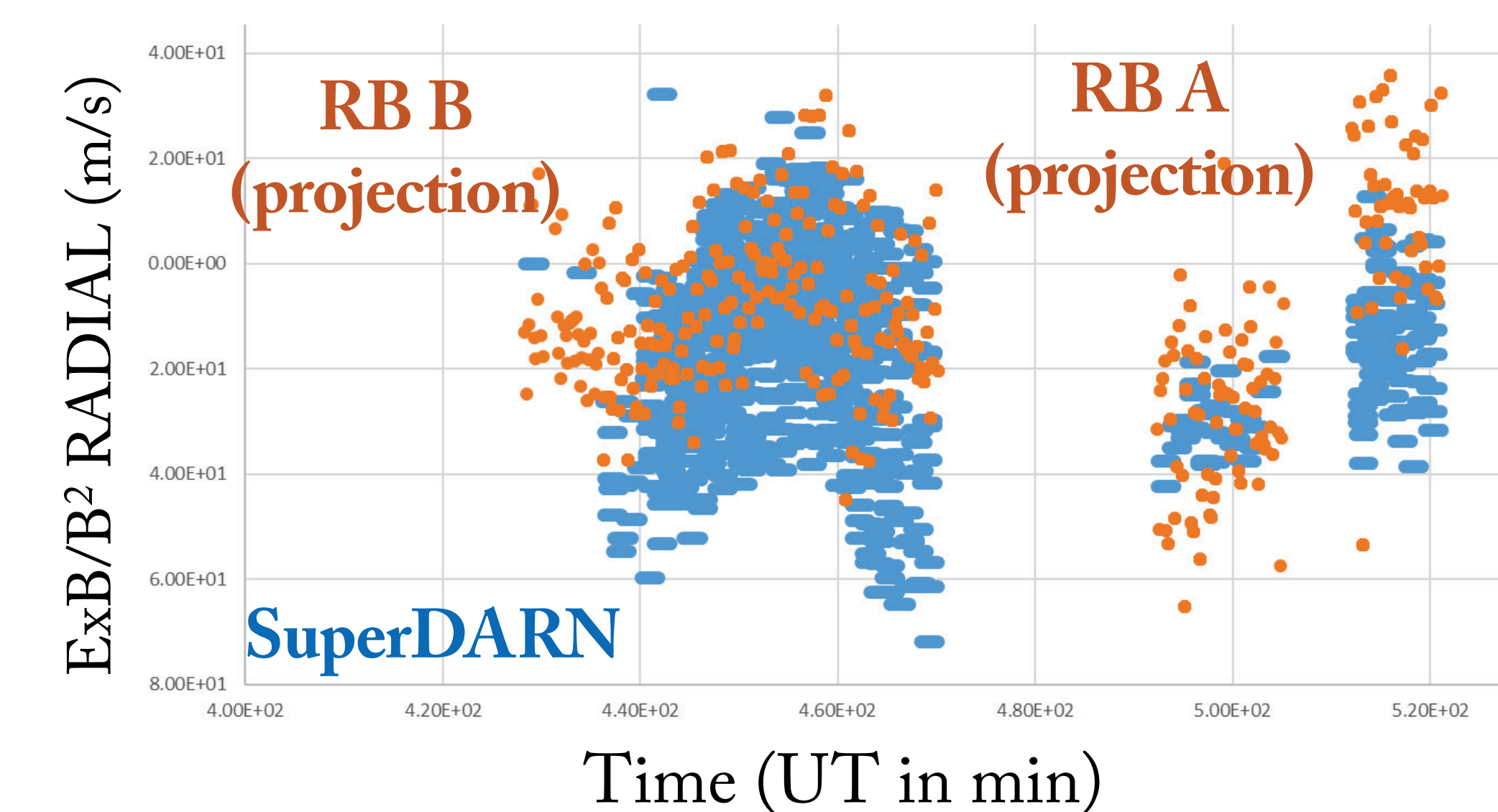
Correlation coefficients between Kp and the a) RADIAL and b) AZIMUTHAL components of $E \times B / B^2$

Project: ExB weather

- ExB “weather” = when there is a perturbation from “typical” conditions, how big? How widespread? For how long?
- Variations of E on timescales between ~1s and x hours = significant influence on radiation belt dynamics via radial diffusion (D_{LL})

SuperDARN + Van Allen Probes data: Consistency

Conjugate measurements on November, 24, 2014 between 6 and 9 UT (L = 3 – 4 around 00LT)



Project: Fast ExB variations

- Event Analysis: January 26, 2013
- Signatures on Van Allen Probes A and B at \neq LTs at L = 2

