

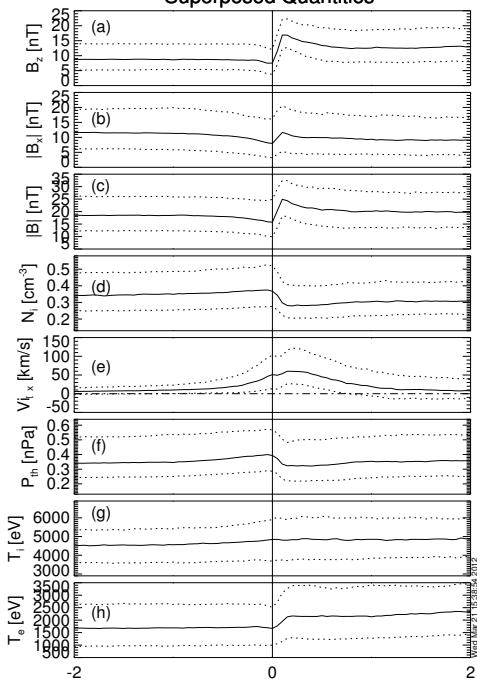
The Properties of the Dipolarization Front Current Sheet (DFCS): Statistics

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Superposed Quantities

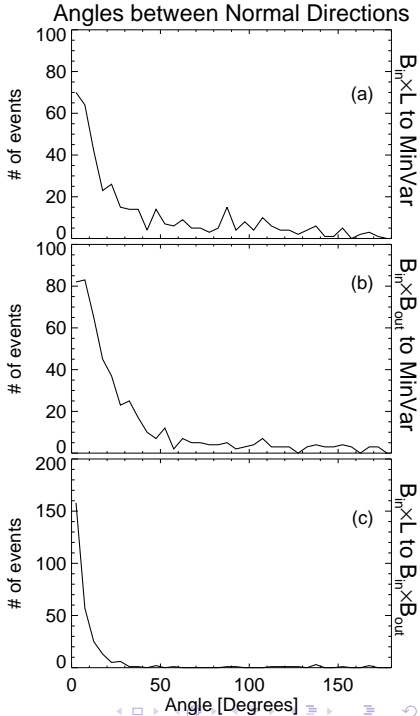
- Event selection on 4 THEMIS tail seasons:
 - $dB_z/dt > 0.5 \text{ nT/s}$ (3-point smoothed data). The first point that meets this criterion is the event's t_0 .
 - The maximum B_z of $[t_0, t_0+30 \text{ seconds}]$ should be greater than that of $[t_0-30 \text{ seconds}, t_0]$ by 5 nT.
- Make sure the plasma sheet is quiet before the events.
- The database contain ~ 1300 events.

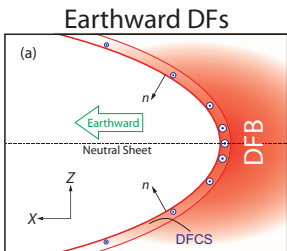


Three methods to determine the dipolarization front (DF) normal direction \mathbf{n} :

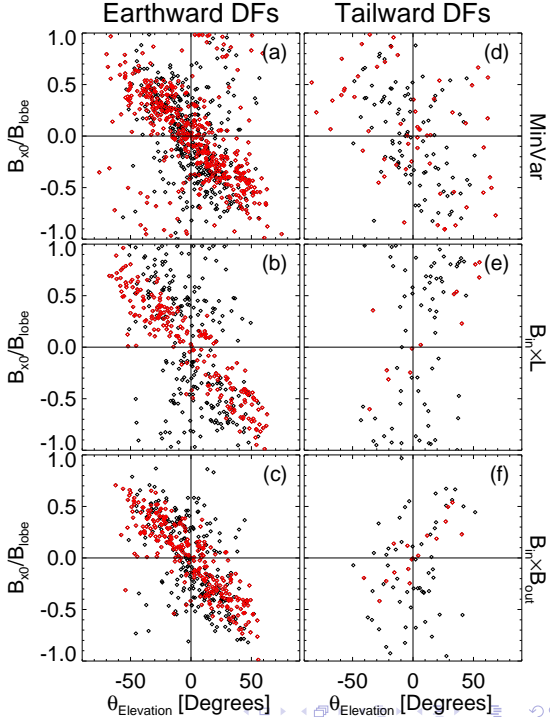
- 1 Minimum \mathbf{B} Variance direction.
 - Traditionally used.
- 2 $\mathbf{B}_{in} \times \mathbf{B}_{out}$.
 - Assuming the DF is a tangential discontinuity.
- 3 $\mathbf{B}_{in} \times \mathbf{L}$.
 - \mathbf{L} is the maximum \mathbf{B} variance direction.
 - The maximum \mathbf{B} variation direction created by a sheet current is parallel to the current sheet.

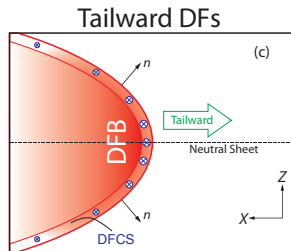
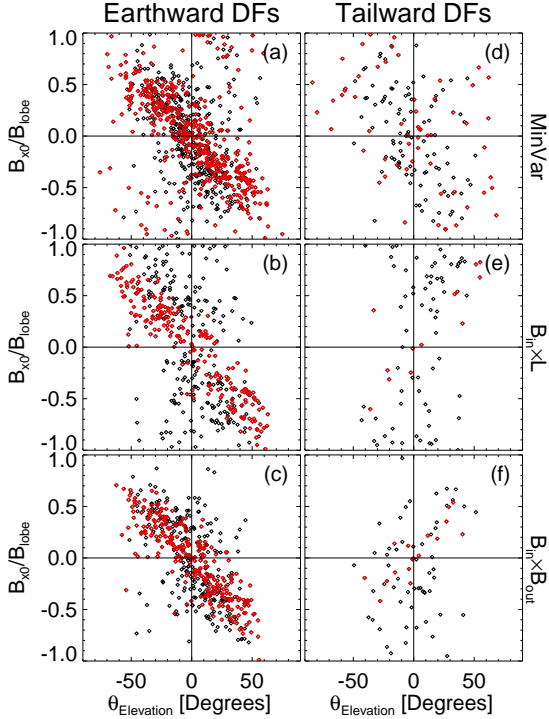
We force \mathbf{n} of Earthward/tailward propagating DFs to point Earthward/tailward.

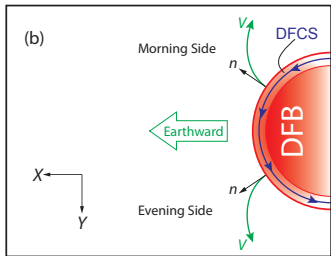




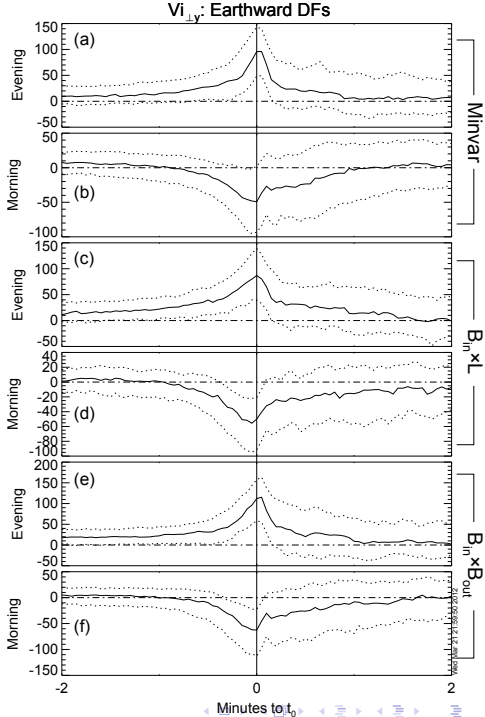
- $\theta_{Elevation} = \sin^{-1} n_z$
- Red points: $n_y < 0.5$







- Evening side:
 $n_y > 0.2$
- Morning side:
 $n_y < -0.2$



$V_{i,y}$ Tailward DFs

