

Magnetosheath jets and their effects under different IMF orientations



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Magnetosheath jets: enhancements of $P_{\text{dyn}} = \rho v^2$

- A jet triggering magnetopause reconnection (Hietala et al., 2018)
- Jets linked to triggering tail reconnection and a substorm during northward IMF (Nykyri et al., 2019)

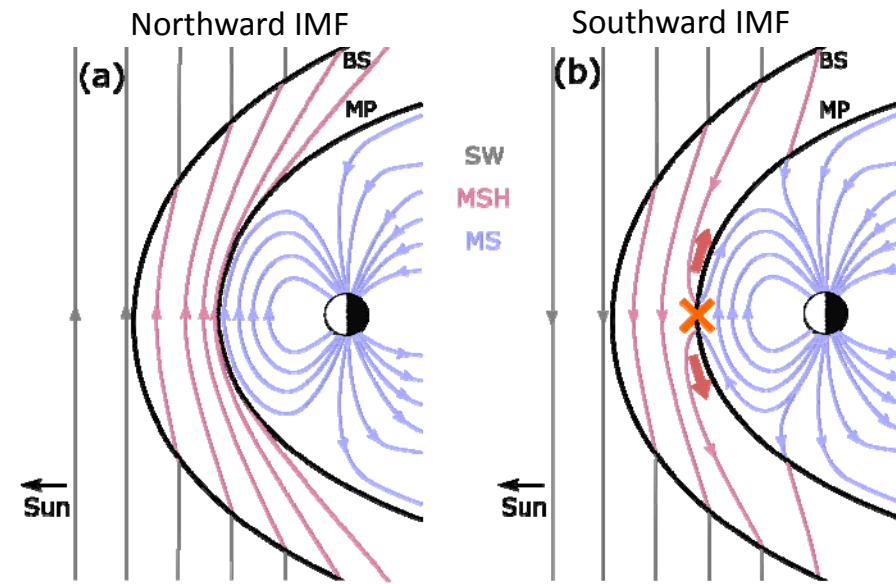
Could jets statistically affect the occurrence of magnetic reconnection at the subsolar magnetopause?

Statistical study:

- 2,736.9 hours of THEMIS 2008—2011 data from the subsolar magnetosheath (Angelopoulos, 2008)
- 2,859 jets with Plaschke et al. (2013) criterion of earthward P_{dyn} going above $\frac{1}{2}$ SW P_{dyn}
- OMNI solar wind data (King and Papitashvili, 2005)

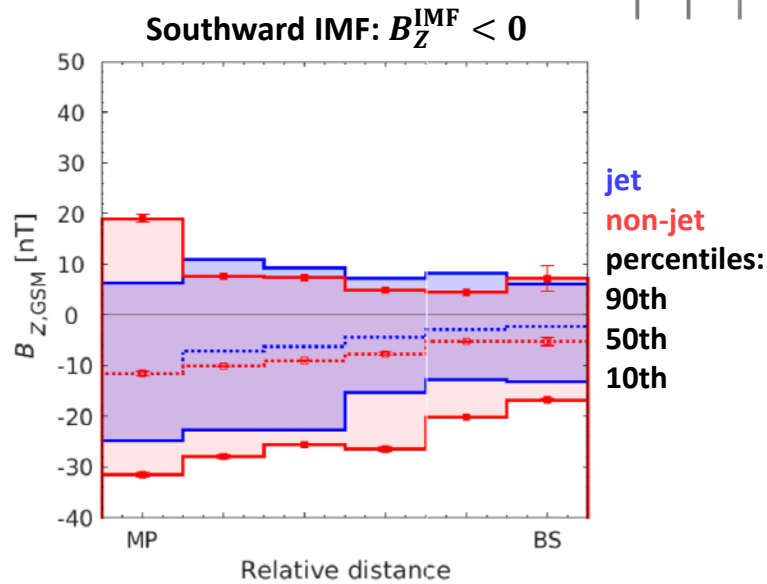
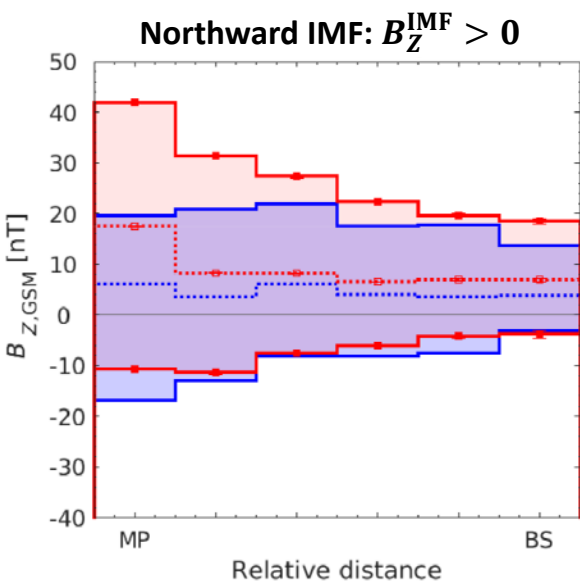
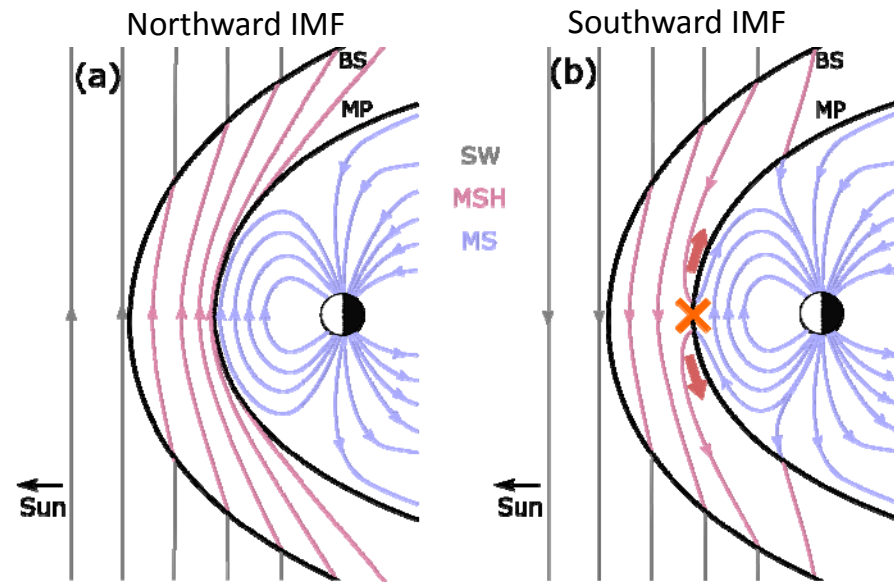
Could jets affect reconnection at the subsolar magnetopause?

- **GSM B_z** is the most important parameter for reconnection in this region
 - Comparison of B_z within **jets** and **ambient magnetosheath samples** during similar IMF cone angle conditions



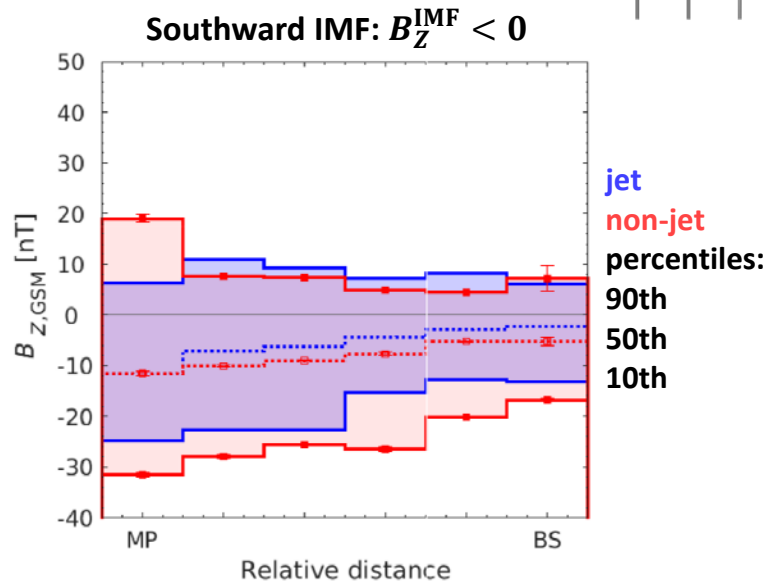
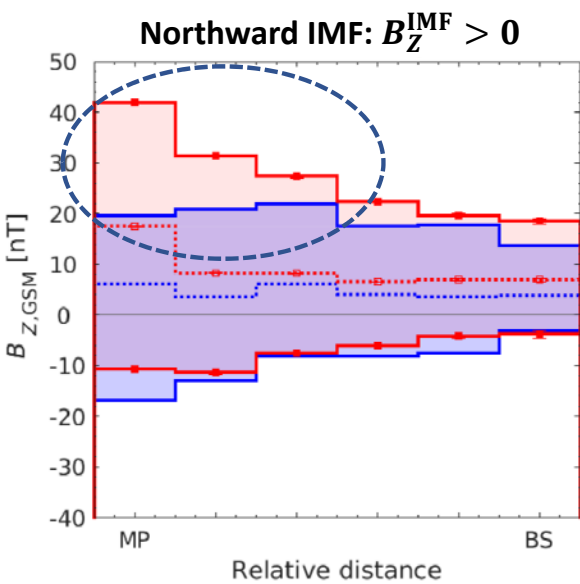
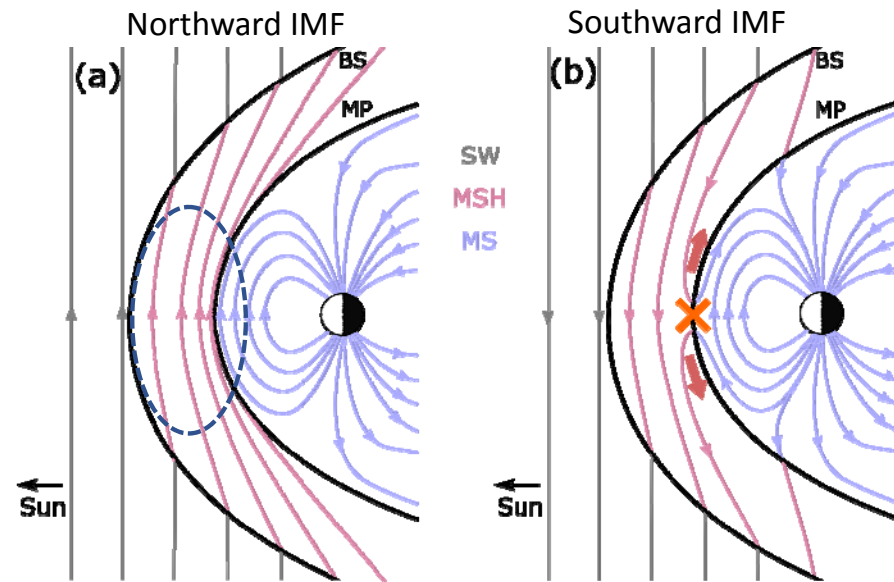
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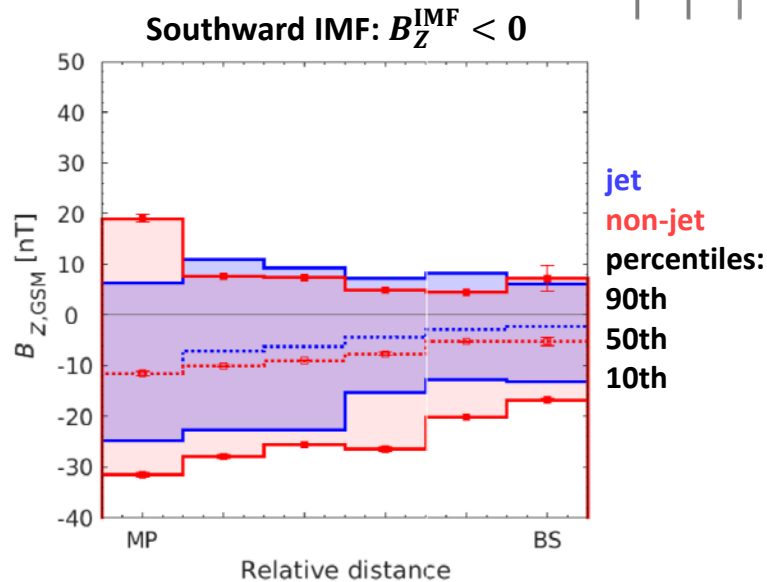
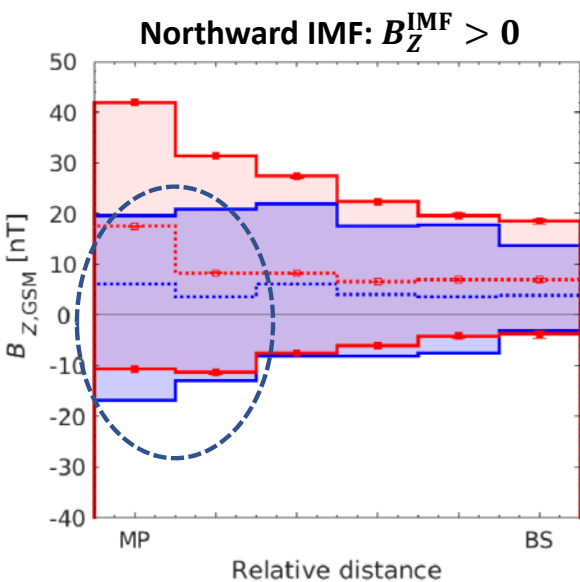
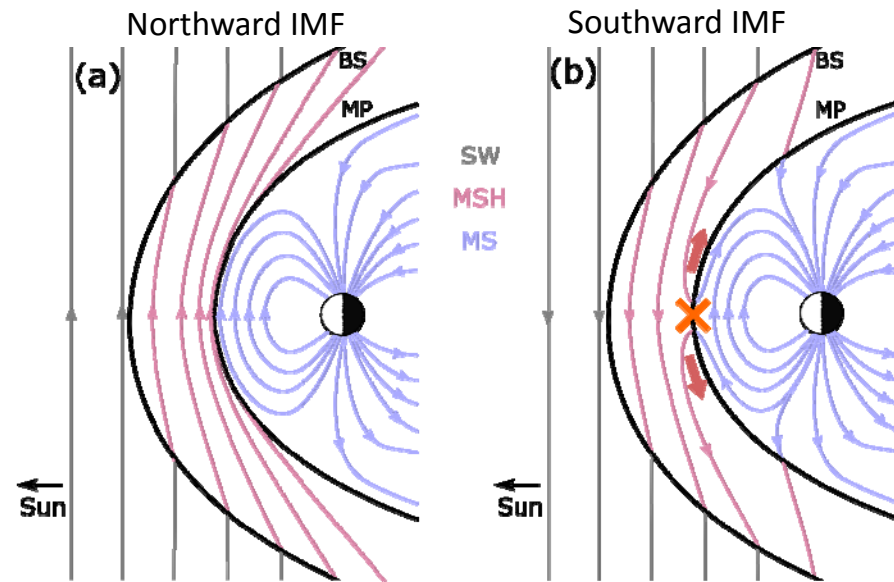
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Magnetic pile-up during northward IMF

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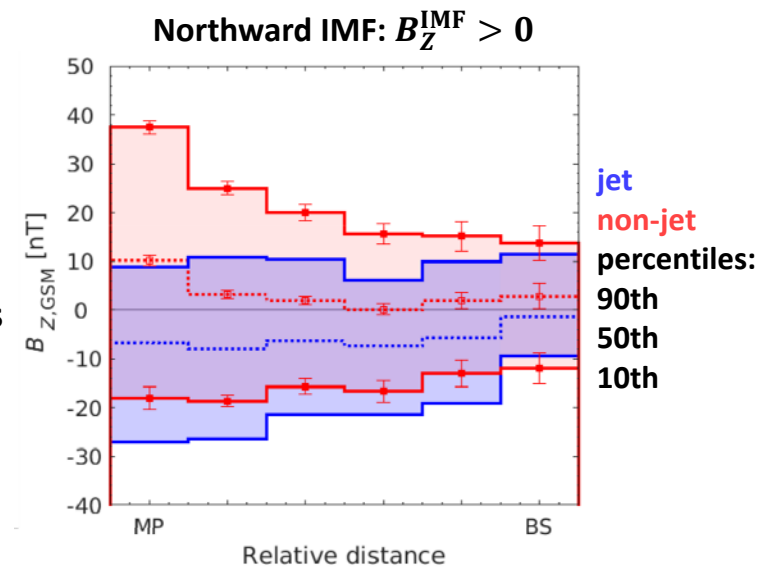


During northward IMF, more southward fields in jets close to the magnetopause
 → Favorable for enhancing reconnection

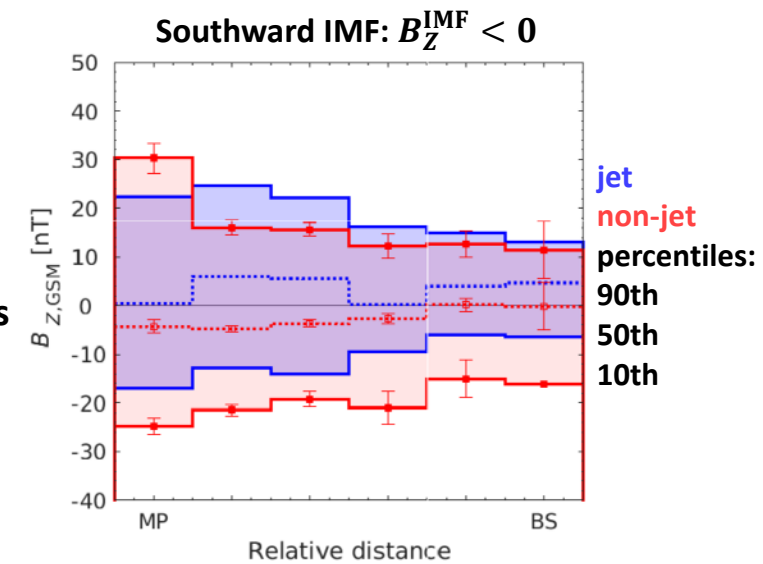
Could jets affect reconnection at the subsolar magnetopause?

Are the variations in jets larger than in similar intervals within the ambient magnetosheath?

Interval
minimums



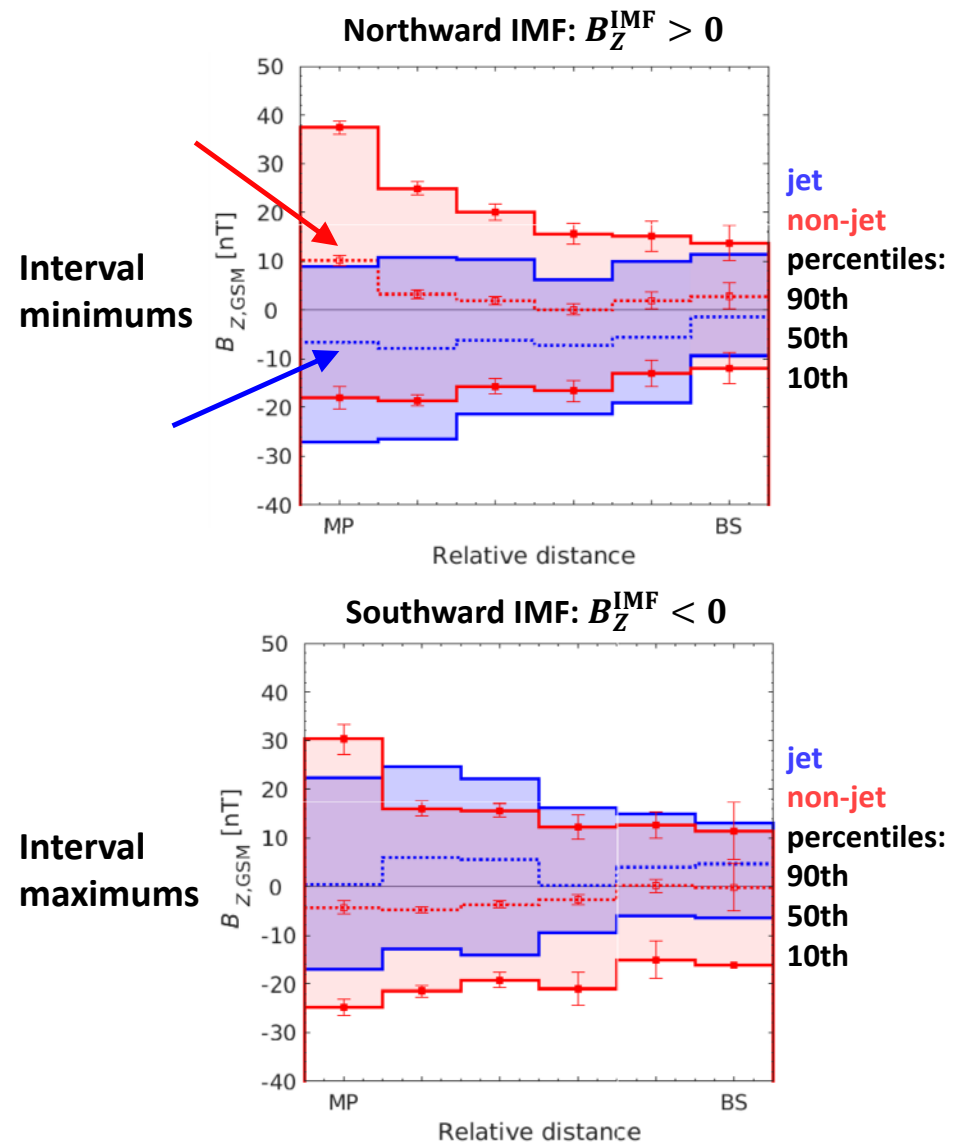
Interval
maximums



Could jets affect reconnection at the subsolar magnetopause?

During northward IMF, jets exhibit more southward fields than similar magnetosheath intervals. Over half of the jets exhibit southward fields!

Are the variations in jets larger than in similar intervals within the ambient magnetosheath?

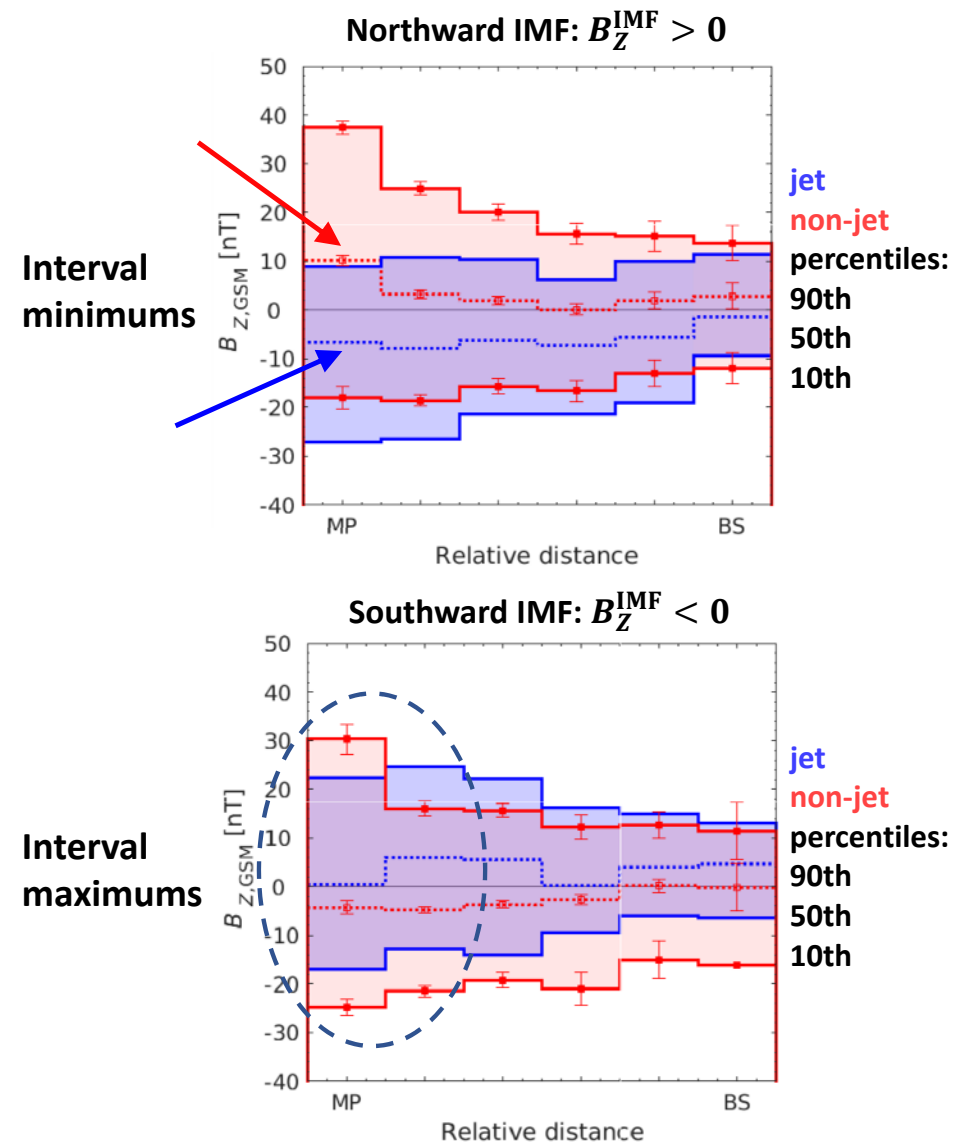


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Are the variations in jets larger than in similar intervals within the ambient magnetosheath?

During southward IMF, there is more variation within the similar magnetosheath intervals.



Could jets affect reconnection at the subsolar magnetopause?

During northward IMF, jets exhibit more southward field than in similar magnetosheath intervals. The magnitude of the jet is

Are the variations in intervals with

Magnetic field in jets statistically favorable for enhancing reconnection during northward IMF but no statistical effect expected during southward IMF

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