

Supporting Information for

On the Relation Between Jupiter's Aurora and the Dawnside Current Sheet

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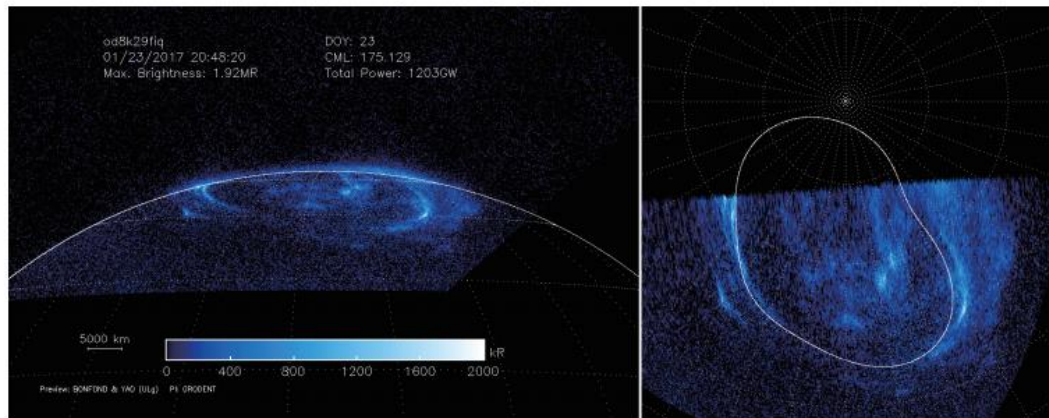
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Quiet



b

eXternal

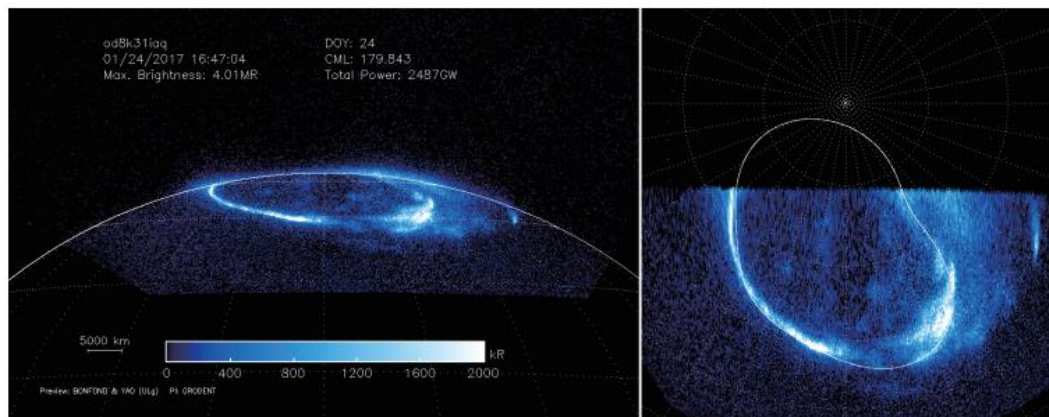


Figure S1. HST observations of auroras under quiet conditions and under external perturbations reproduced based on the data used in Yao et al. (2022).

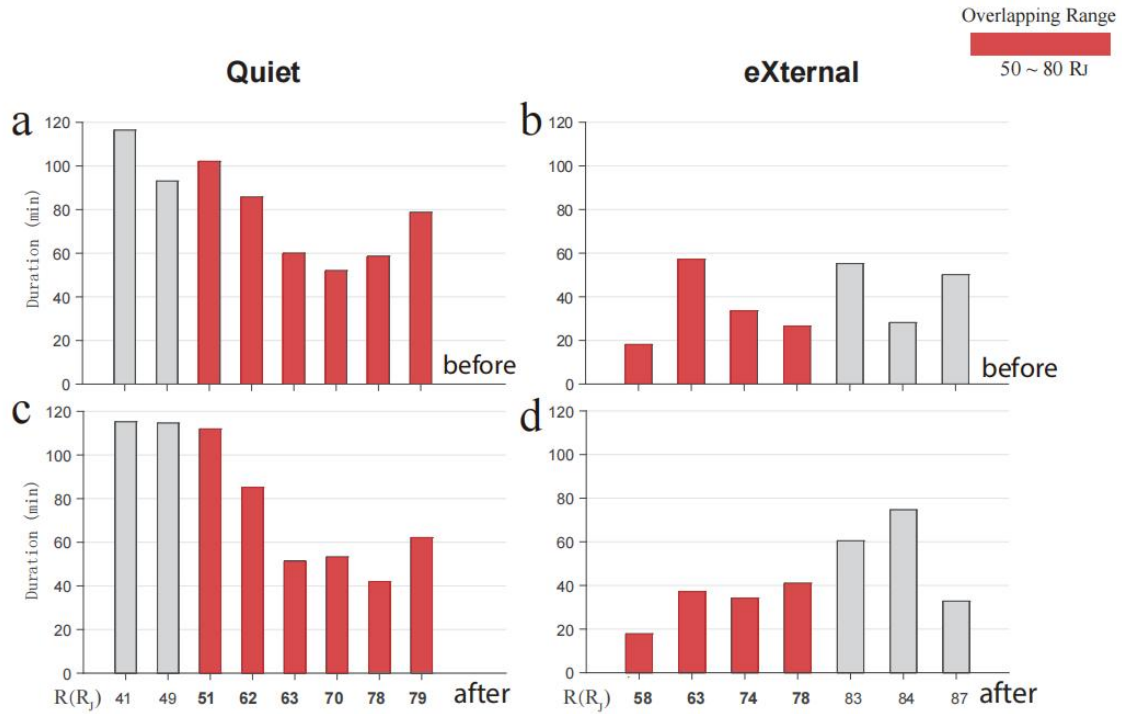


Figure S2. Distribution of the current sheet crossing durations before and after each auroral event at different radial distances (a, c) under quiet conditions and (b, d) under external perturbation conditions. (a, b) and (c, d) show the crossing durations before and after each aurora observation, respectively. The y-axis coordinates and colour scale both provide the duration of the current sheet crossing. The red regions represent the overlapping regions (50-80 R_j).

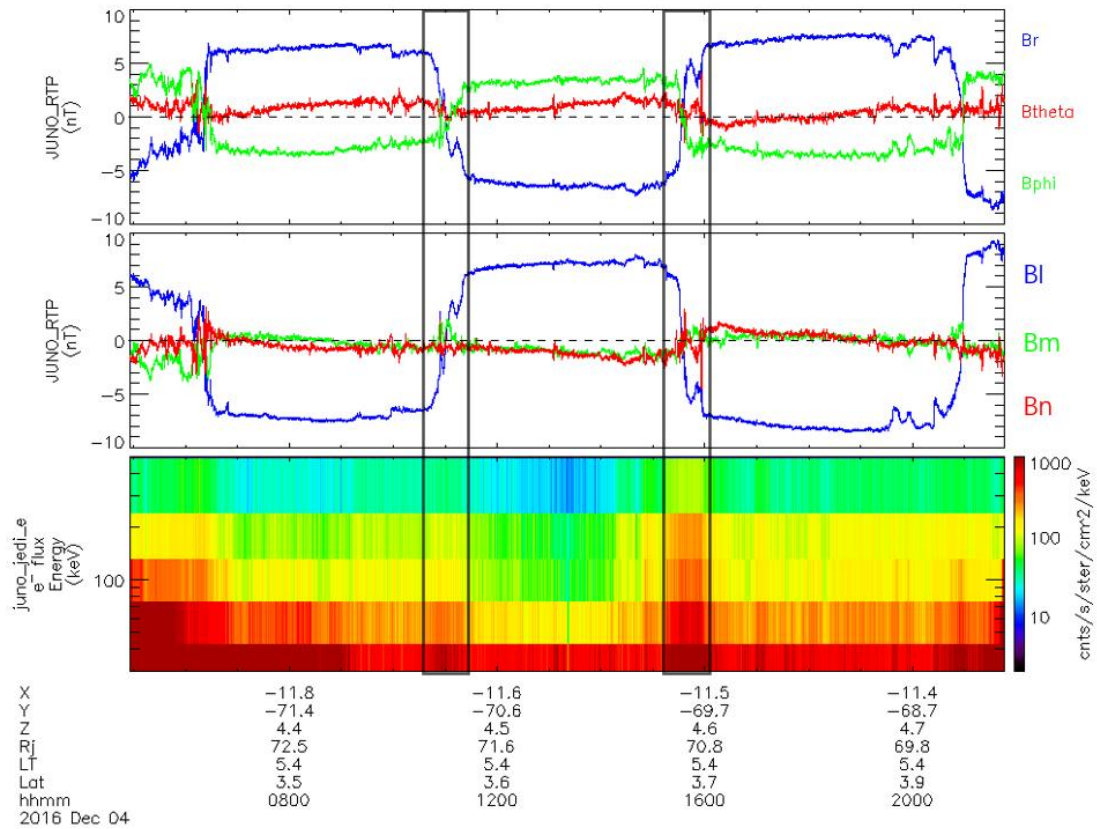


Figure S3. Current sheet crossing example 1 before and after a quiet auroral observation. (a) Three magnetic field components in JRTP coordinates and (b) field-aligned coordinates. Panel (c) displays the energy spectrums of electrons. The location information at the bottom of the figure is in the JSS (Jupiter-De-Spun-Sun) coordinate system. The red shadings represent the current sheet crossing regions.

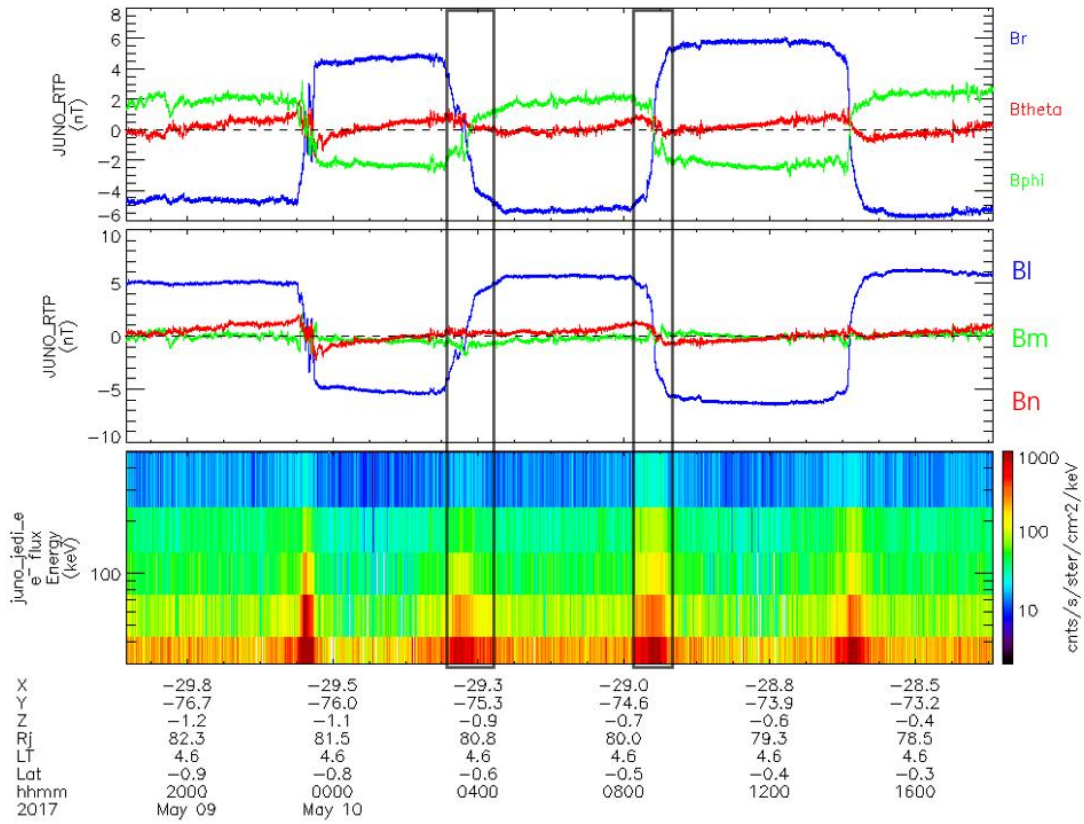


Figure S4. Current sheet crossing case 2 in quiet condition. The same organization as in Figure S2.

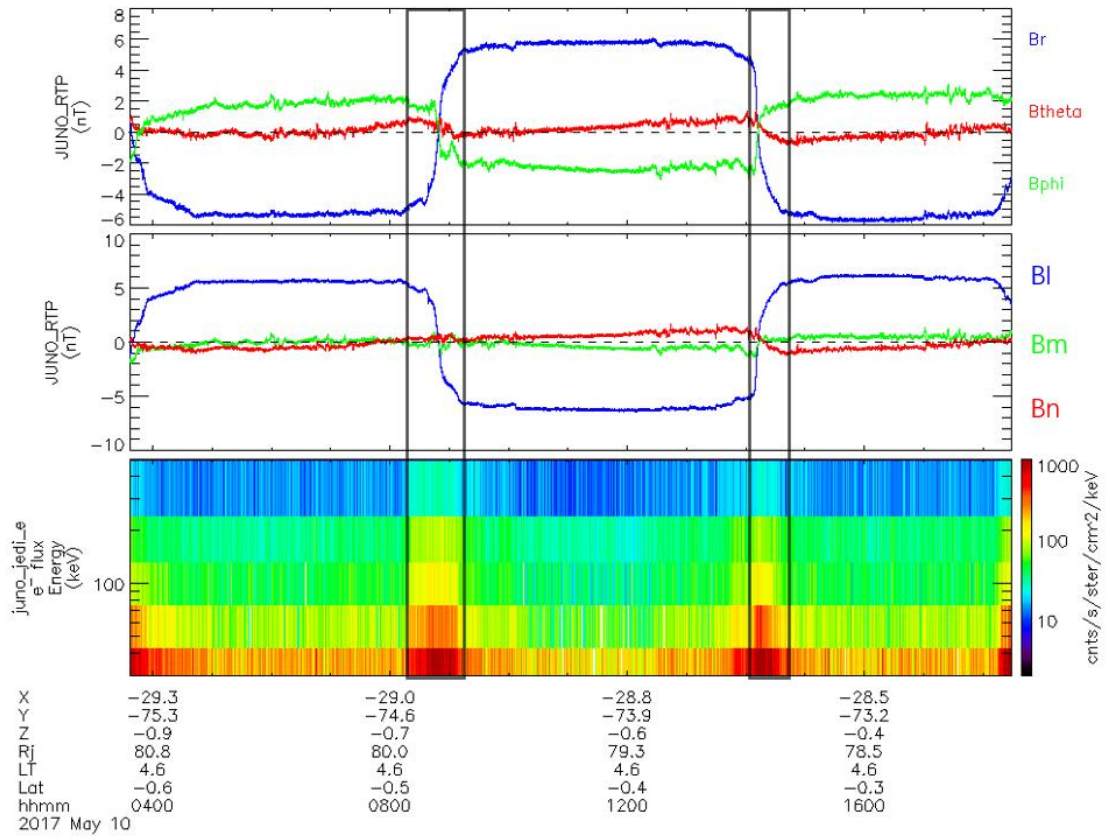


Figure S5. Current sheet crossing case 3 in quiet condition.

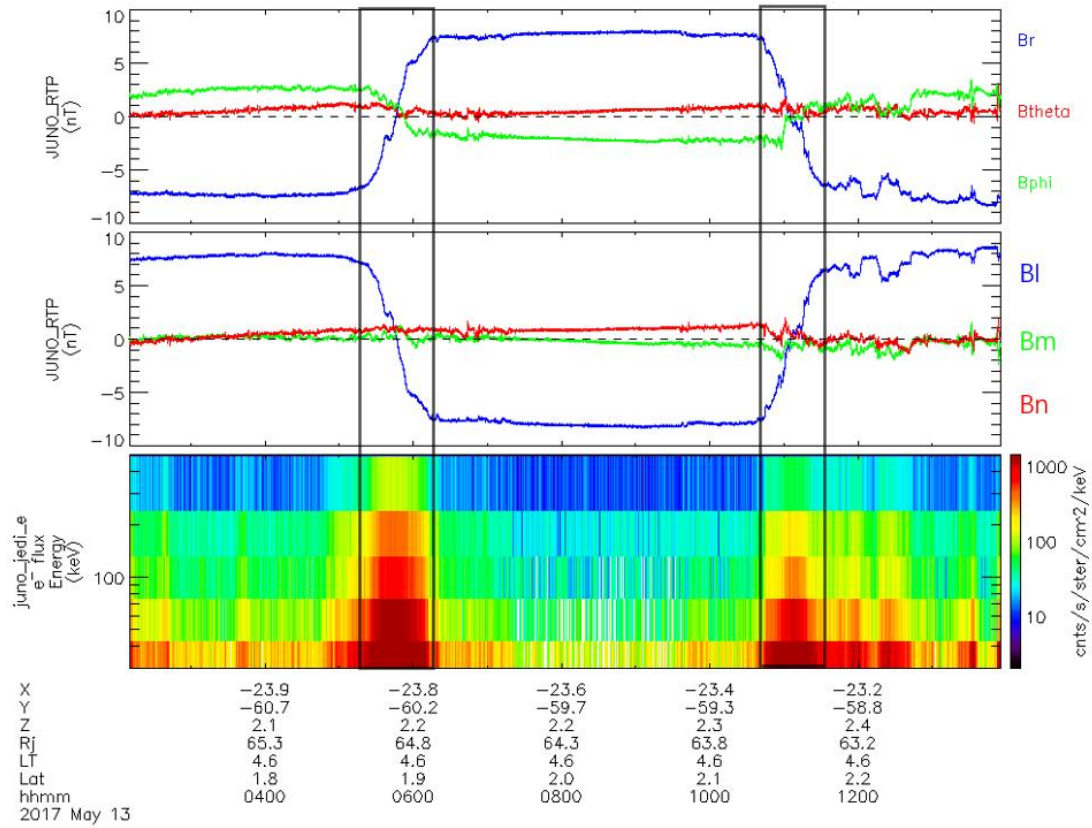


Figure S6. Current sheet crossing case 4 in quiet condition.

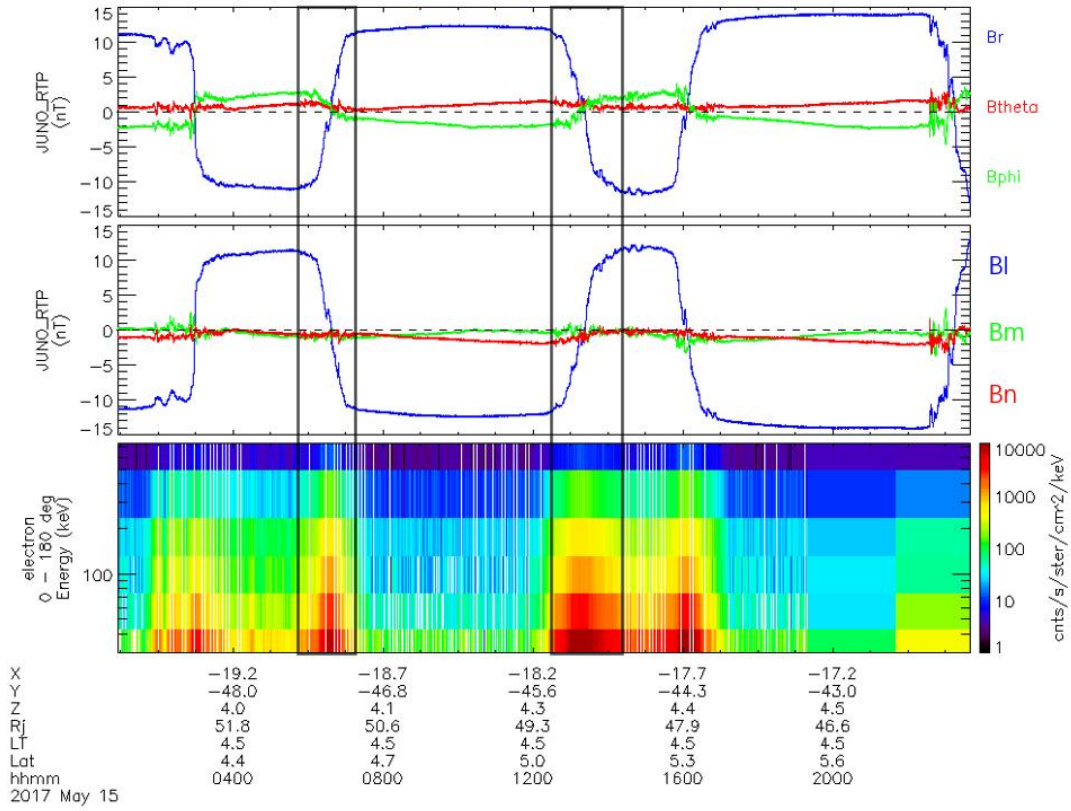


Figure S7. Current sheet crossing case 5 in quiet condition.

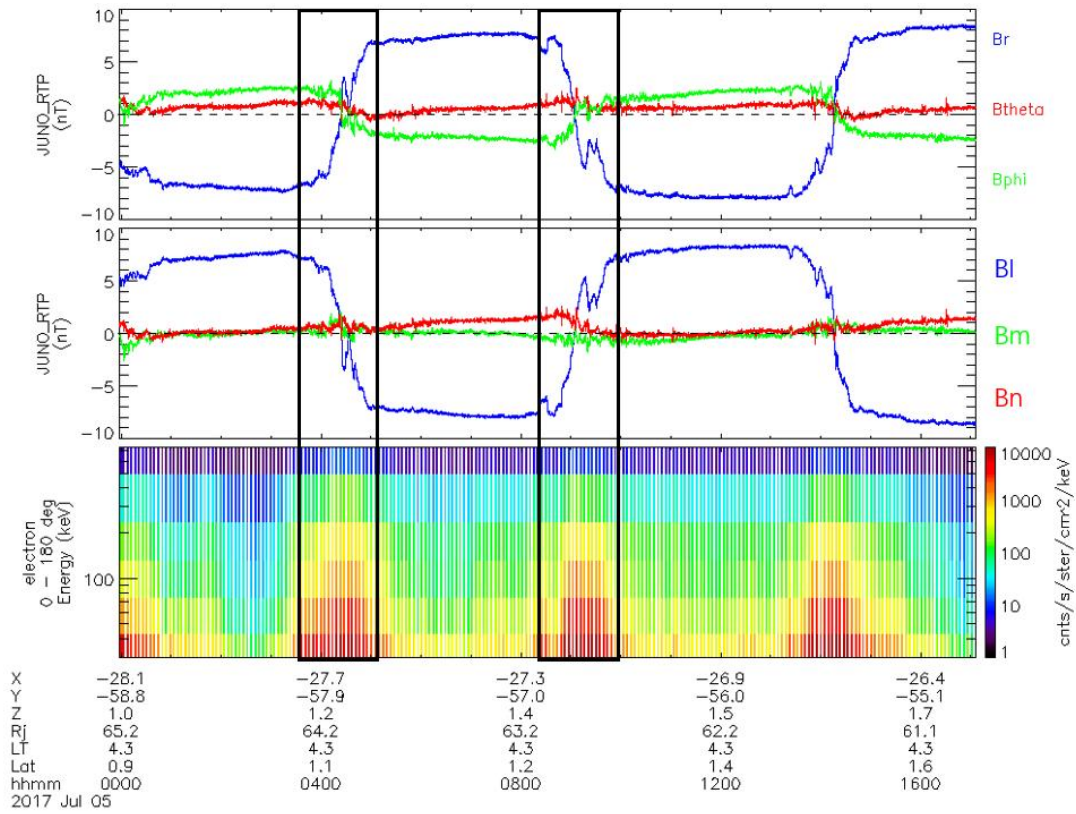


Figure S8. Current sheet crossing case 6 in quiet condition.

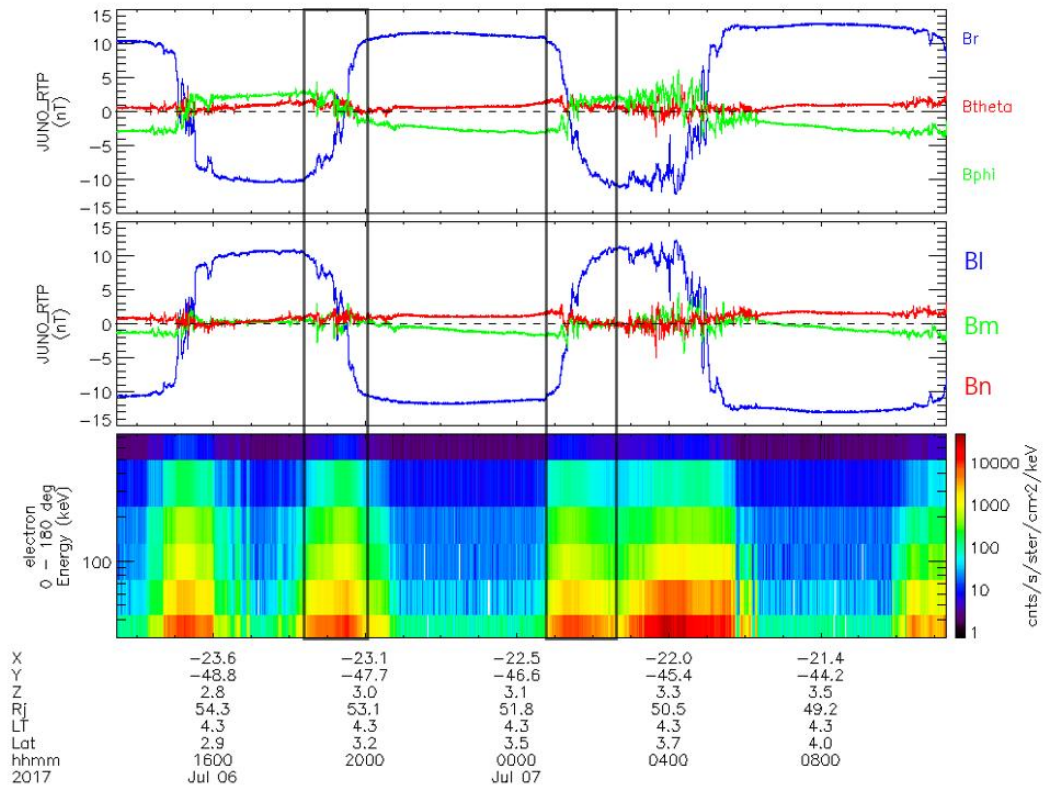


Figure S9. Current sheet crossing case 7 in quiet condition.

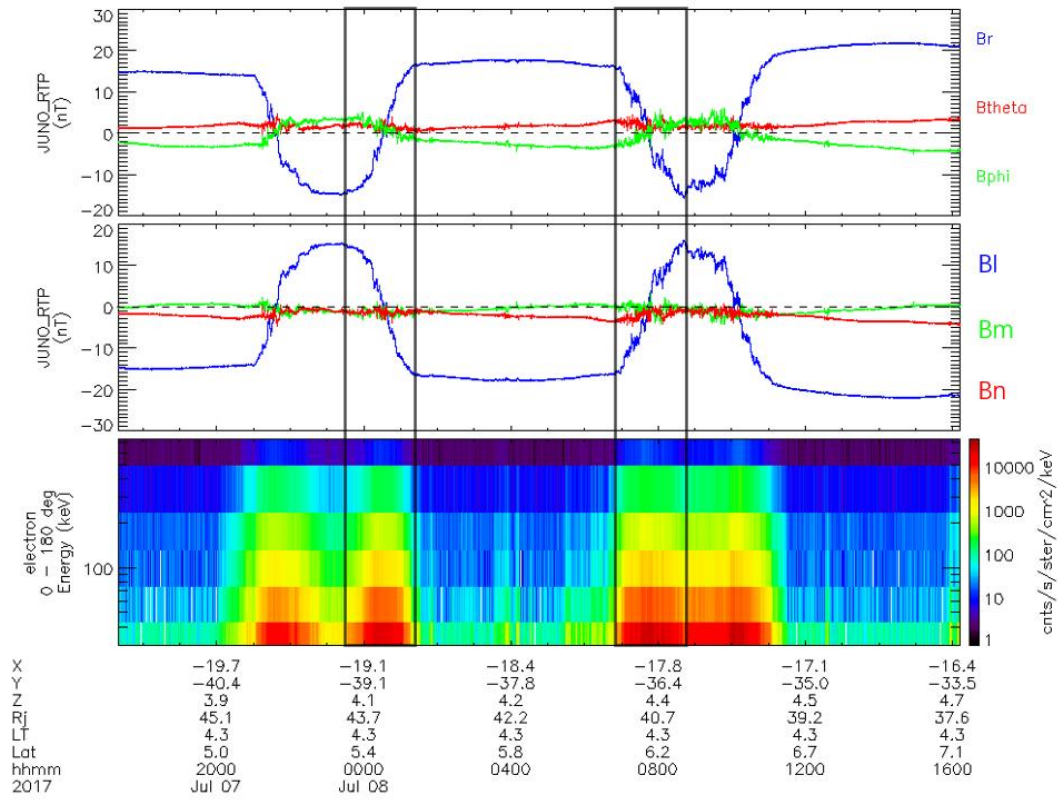


Figure S10. Current sheet crossing case 8 in quiet condition.

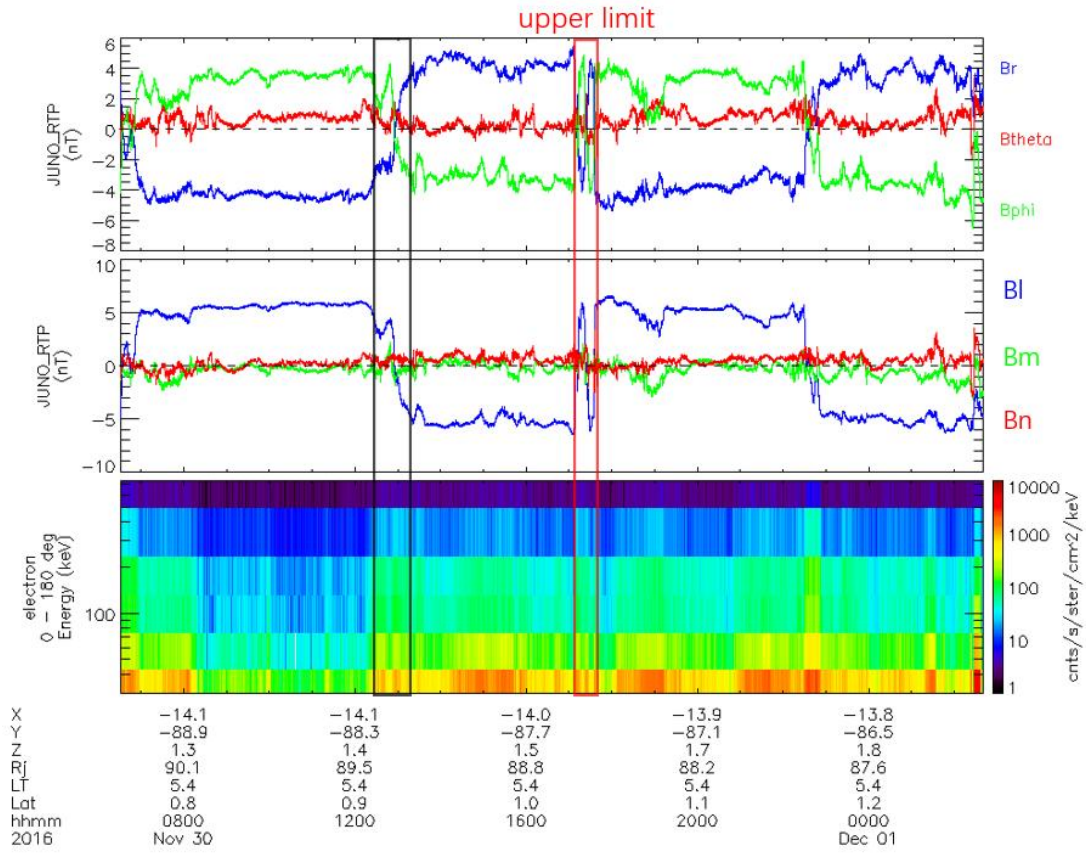


Figure S11. Current sheet crossing case 1 in external perturbation condition.

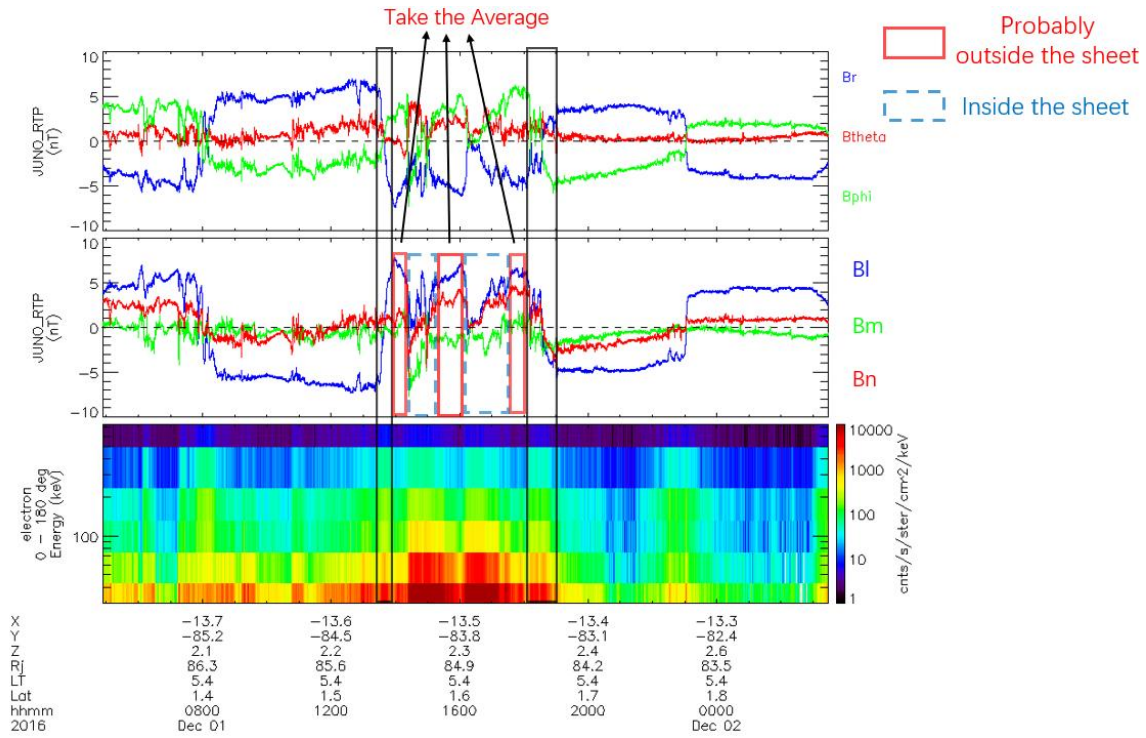


Figure S12. Current sheet crossing case 2 in external perturbation condition with strong disturbance. Sampling the B_{lobe} before the second current sheet crossing is challenging because the spacecraft is not always outside of the dynamic current sheet. To achieve a more reliable B_{lobe} sampling, we average the B_l component over the region probably outside the current sheet.

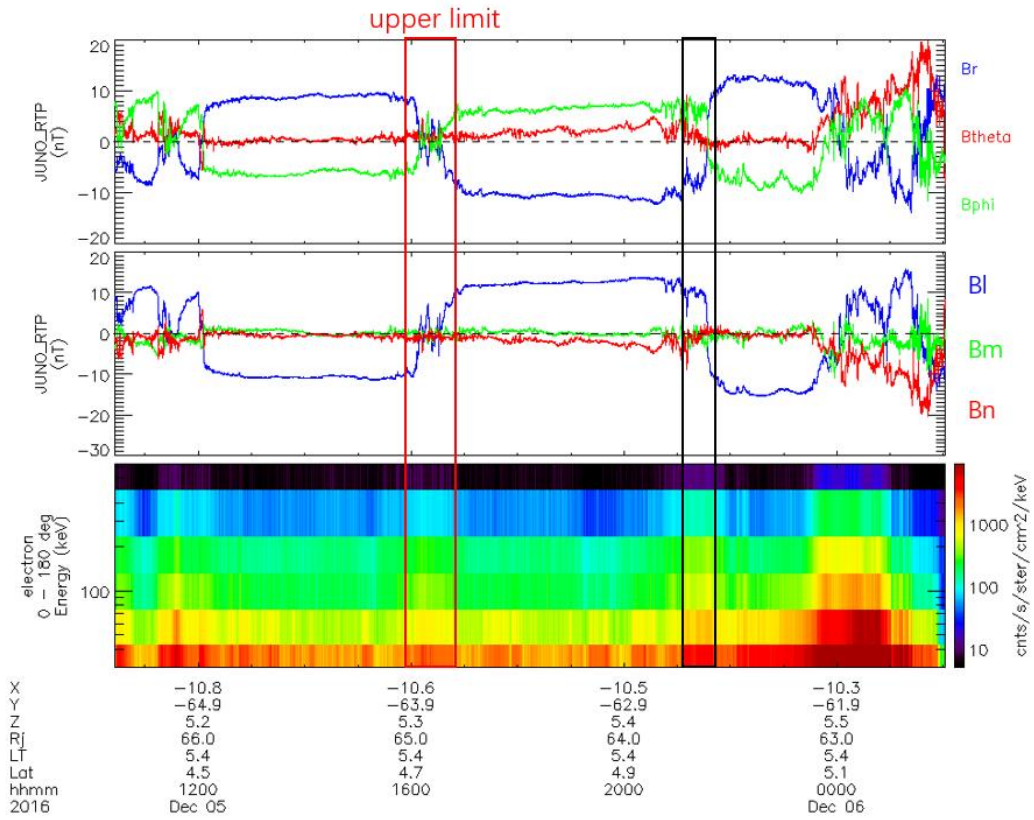


Figure S13. Current sheet crossing case 3 in external perturbation condition.

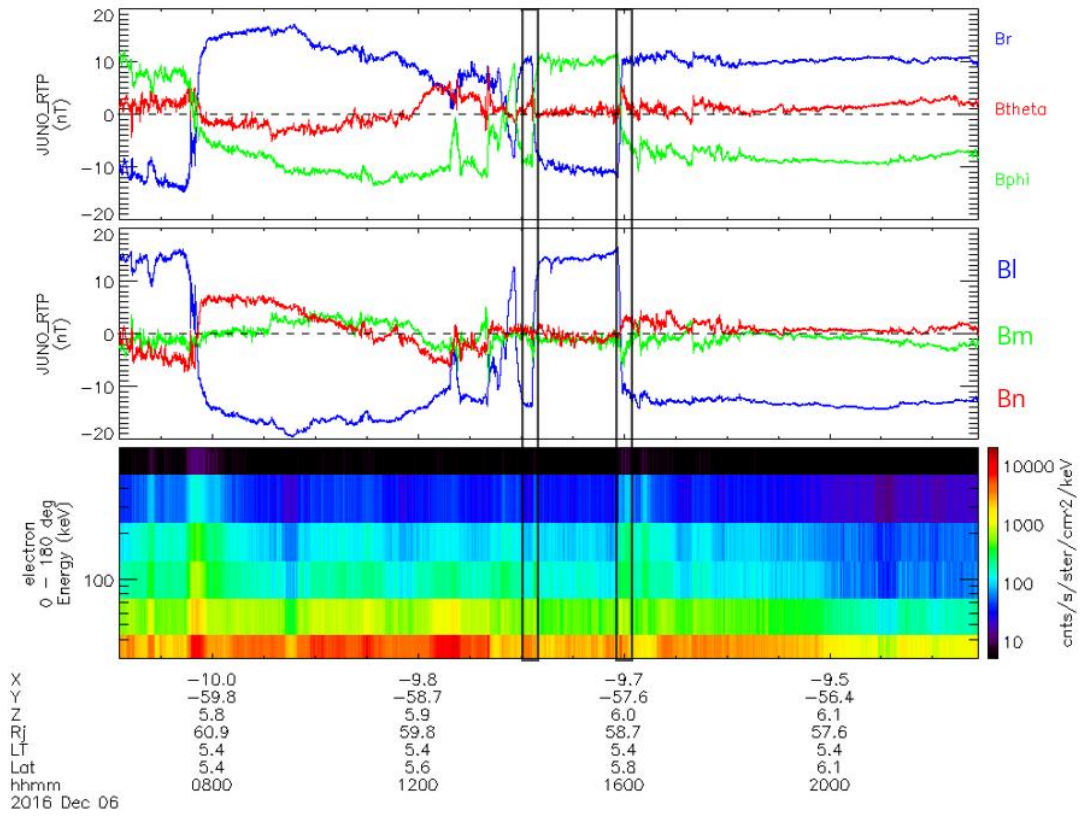


Figure S14. Current sheet crossing case 4 in external perturbation condition.

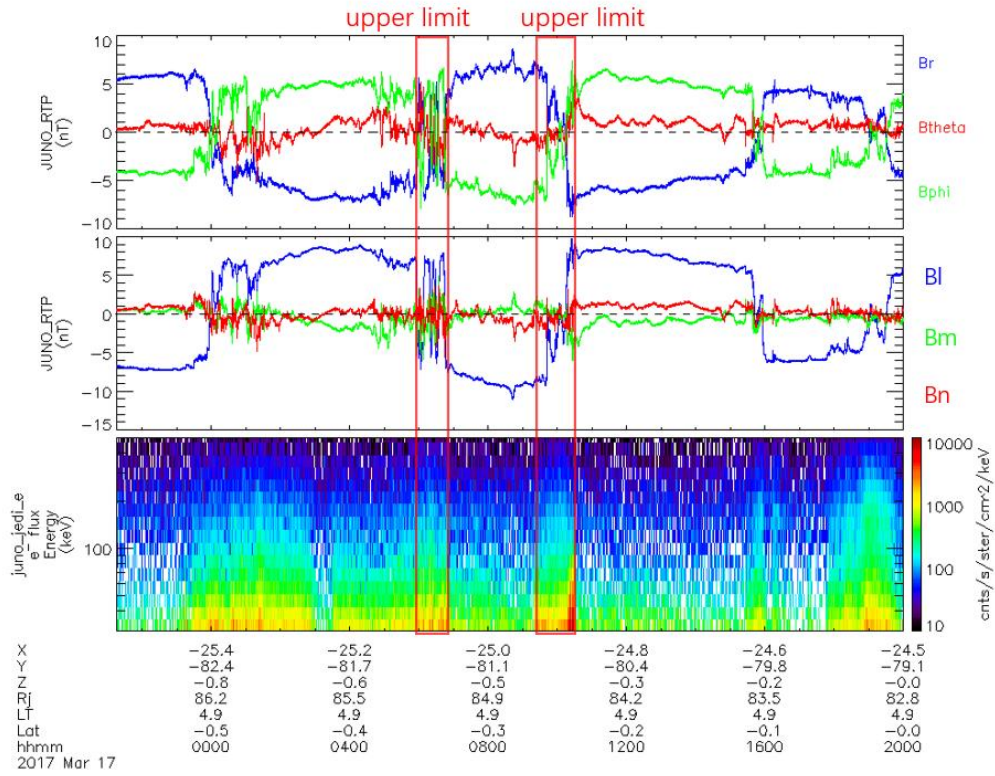


Figure S15. Current sheet crossing case 5 in external perturbation condition.

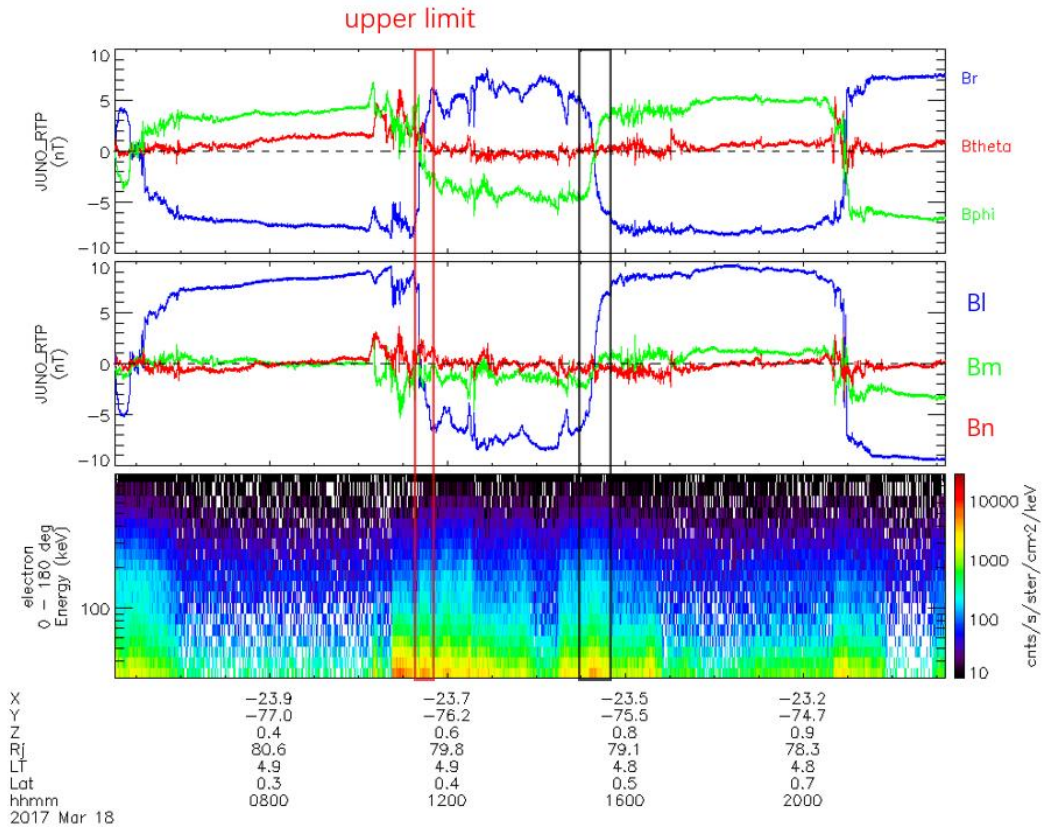


Figure S16. Current sheet crossing case 6 in external perturbation condition.

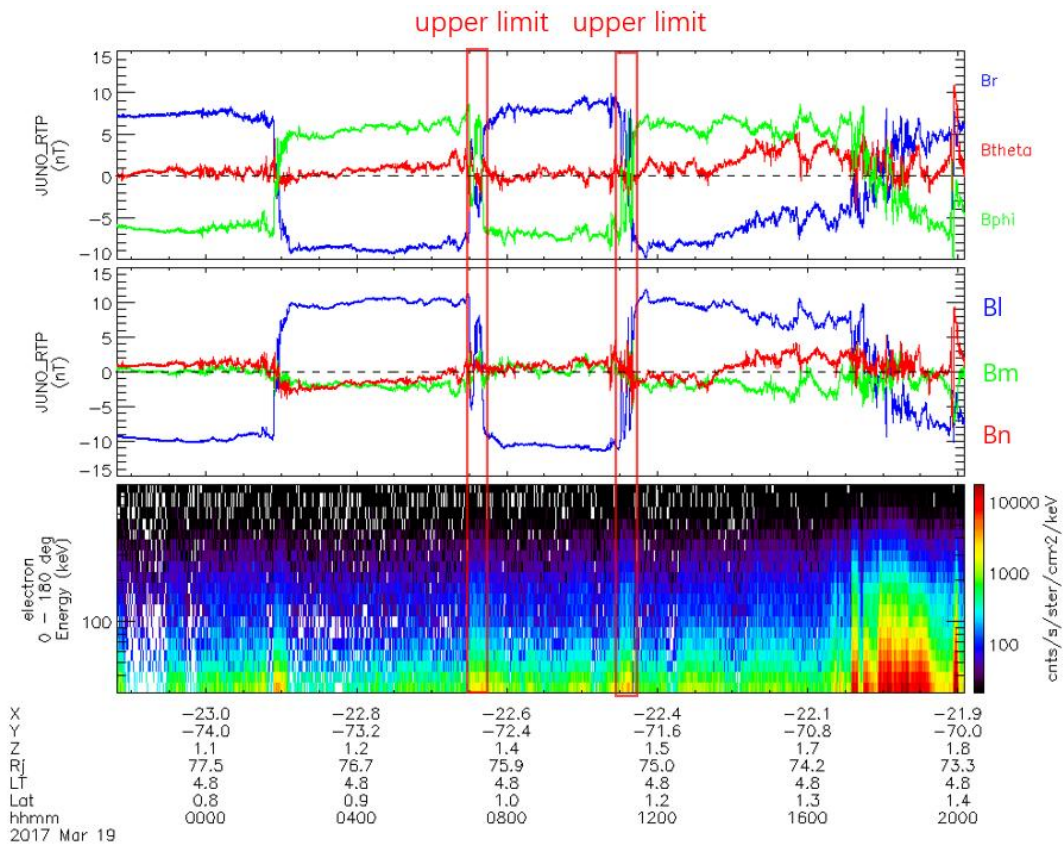


Figure S17. Current sheet crossing case 7 in external perturbation condition.