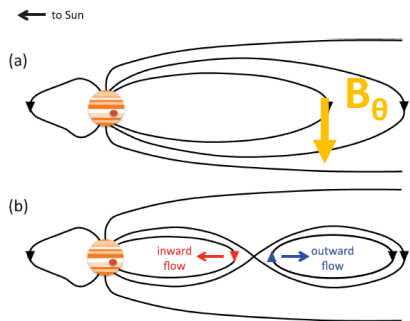
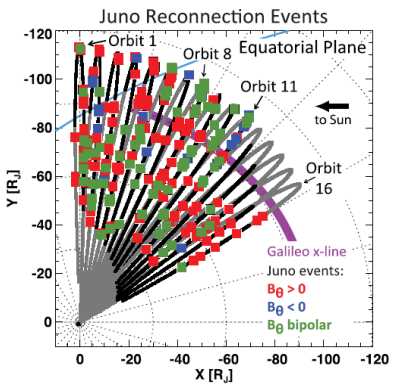
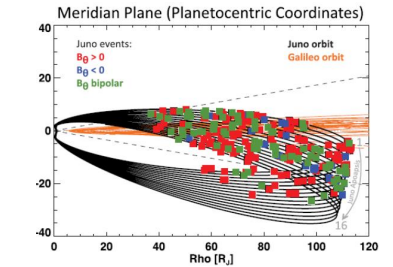
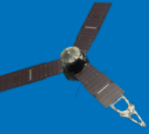


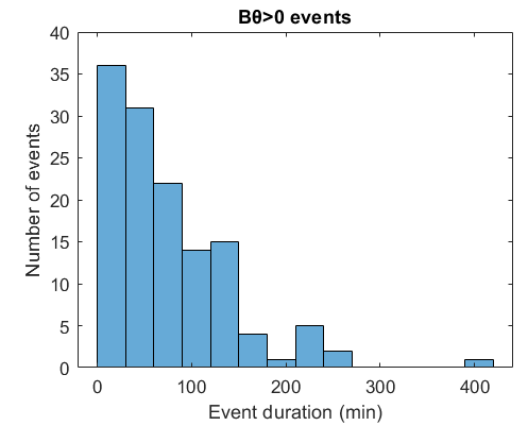
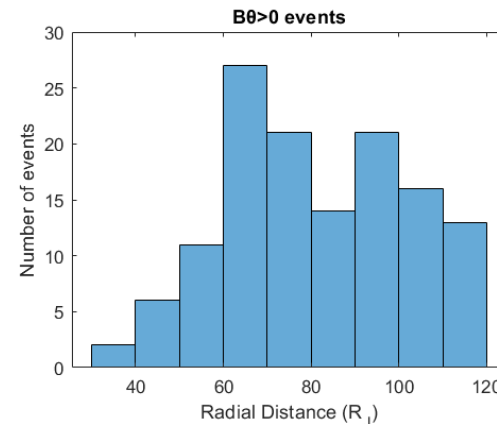
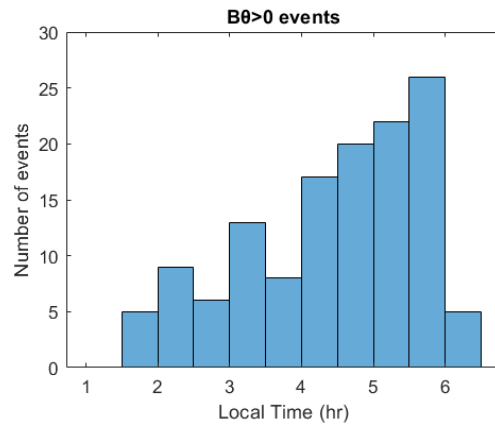
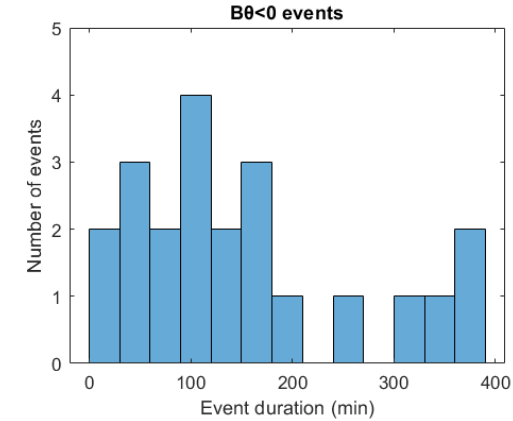
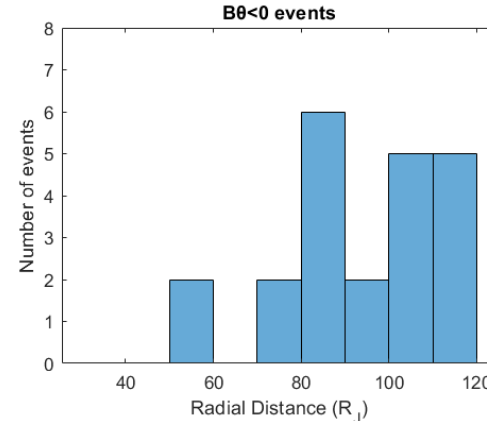
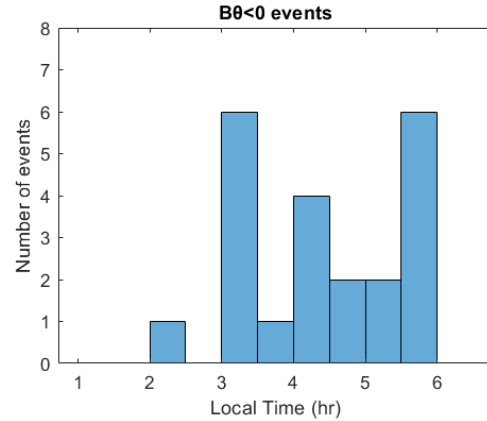
# A statistical study of the features of ion acceleration events in the Jovian magnetotail using Juno/JEDI data

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Vogt et al. (2020)



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# Motivation

- Planetary magnetospheres are very efficient accelerators of charged particles
- The energization processes of magnetotail plasma populations are thought to share similarities among the various magnetospheres
- In this study we focus on the investigation of the characteristics of ion acceleration processes in the Jovian magnetosphere

# Data Sources



- JEDI – Jupiter Energetic particle Detector Instrument (JEDI-090)
- “Puck” EPDs: Flux, angular distribution and composition of incident ions with energies of a few keV to several MeV
- $H^+$ :  $\sim 50 \text{ keV} - \sim 3 \text{ MeV}$   
 $O + S$ :  $\sim 140 \text{ keV} - \sim 400 \text{ keV}$   
 $O$ :  $\sim 400 \text{ keV} - > 5 \text{ MeV}$   
 $S$ :  $\sim 400 \text{ keV} - > 5 \text{ MeV}$   
 $e^-$ :  $\sim 30 \text{ keV} - \sim 1 \text{ MeV}$



- Instrument: MAG – Magnetometer
- Provides measurements of magnetic field components with a time resolution of 1 s per vector

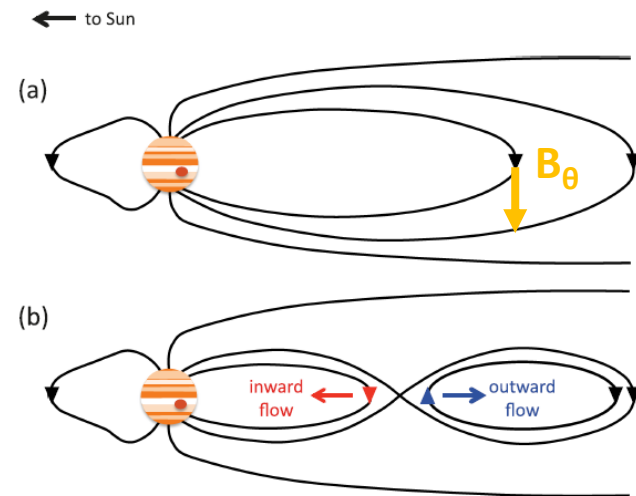
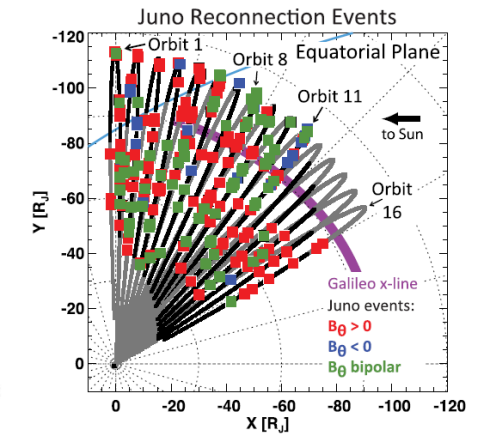
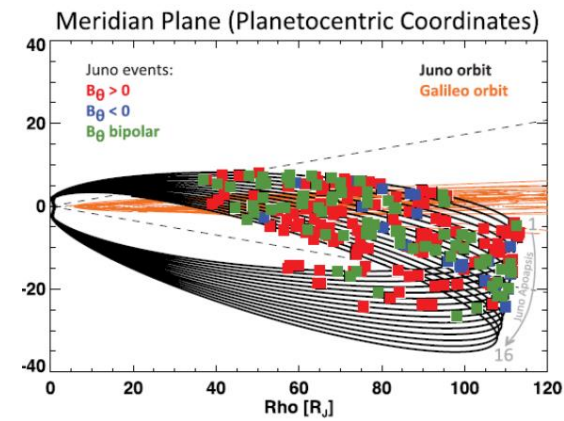
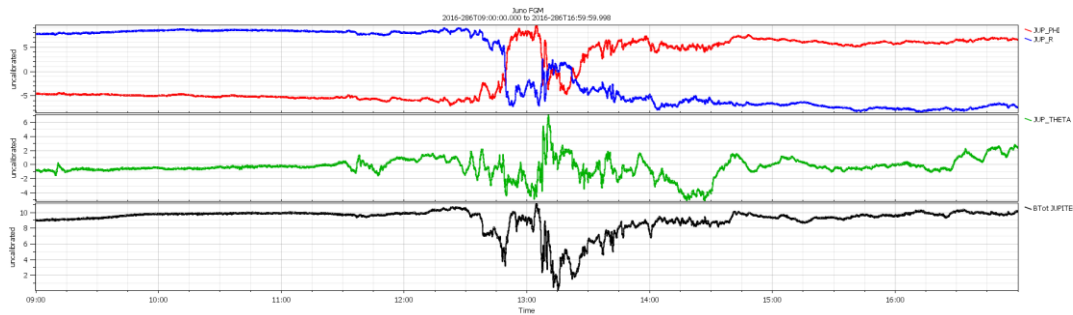
# Previous Studies

**Vogt, M. F., Connerney, J. E. P., DiBraccio, G. A., Wilson, R. J., Thomsen, M. F., Ebert, R. W., et al. (2020): Magnetotail reconnection at Jupiter: A survey of Juno magnetic field observations, observations. *Journal of Geophysical Research: Space Physics*, 125, e2019JA027486.**

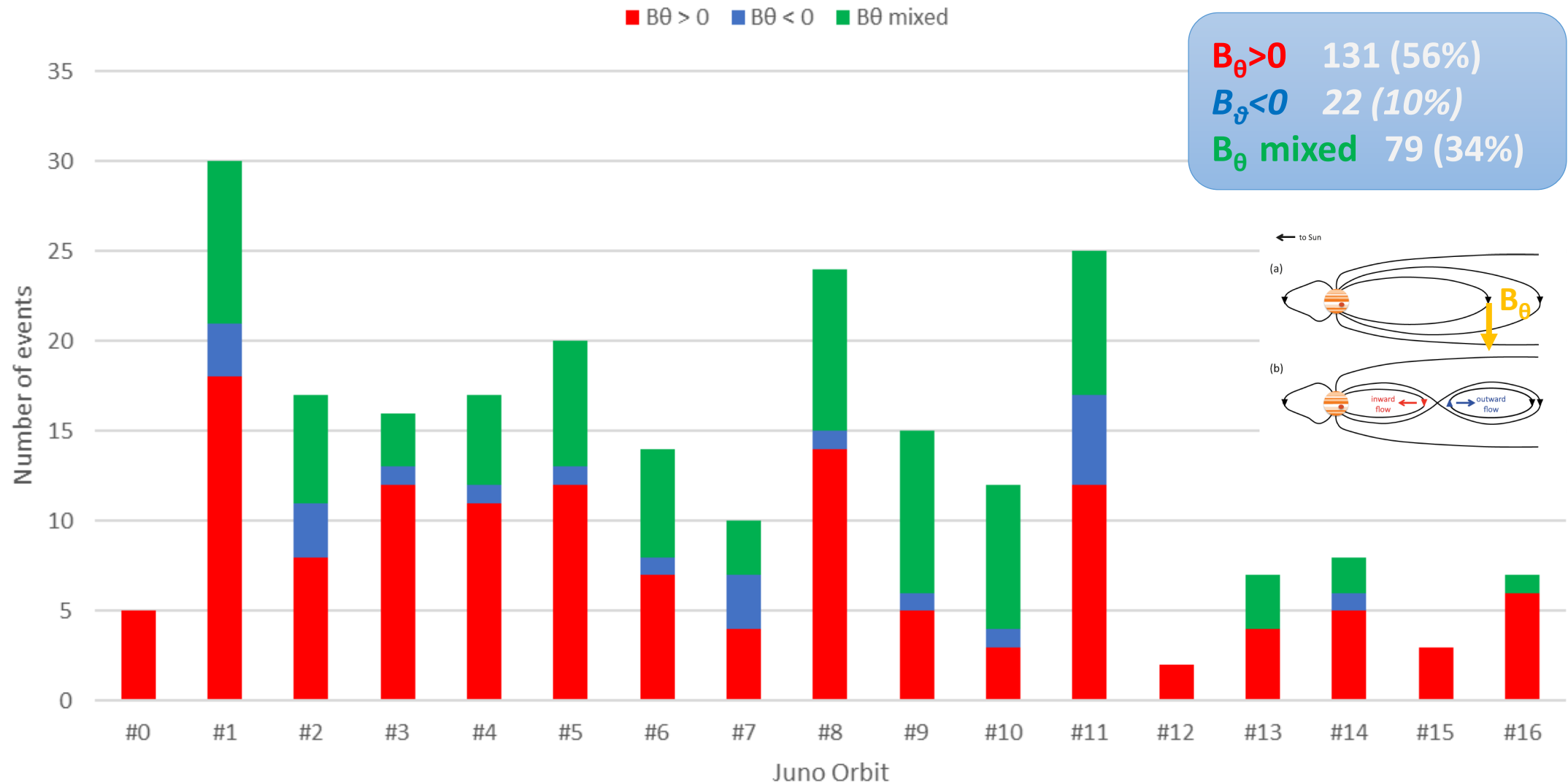
<https://doi.org/10.1029/2019JA027486>



- July 2016 – October 2018 (first 16 Juno Orbits): 232 dipolarization events detected based on  $B_{\theta}$  variations

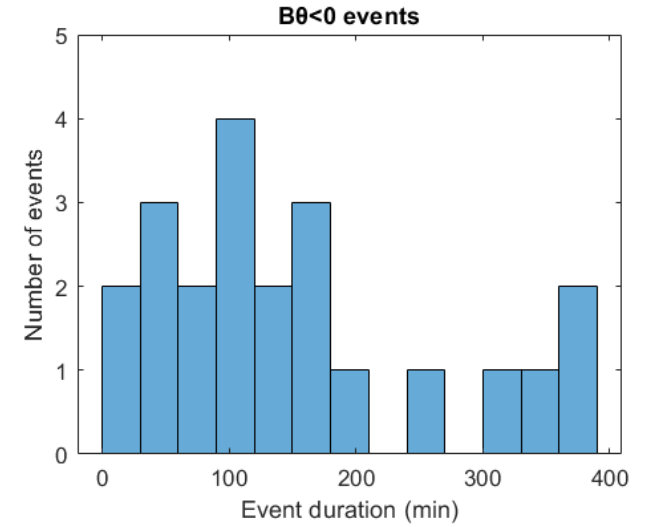
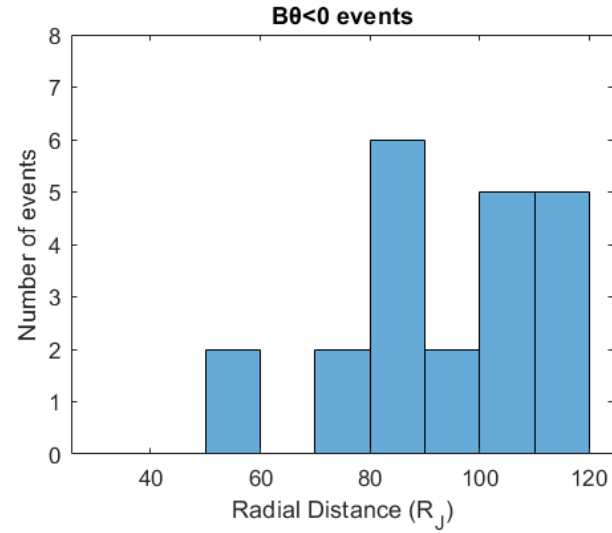
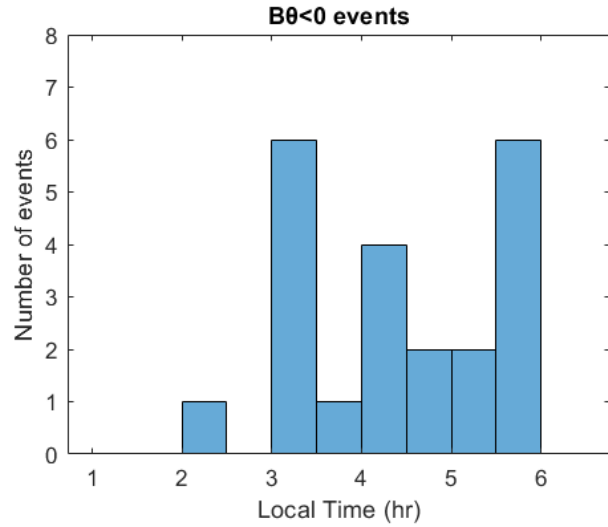


# Event Categories

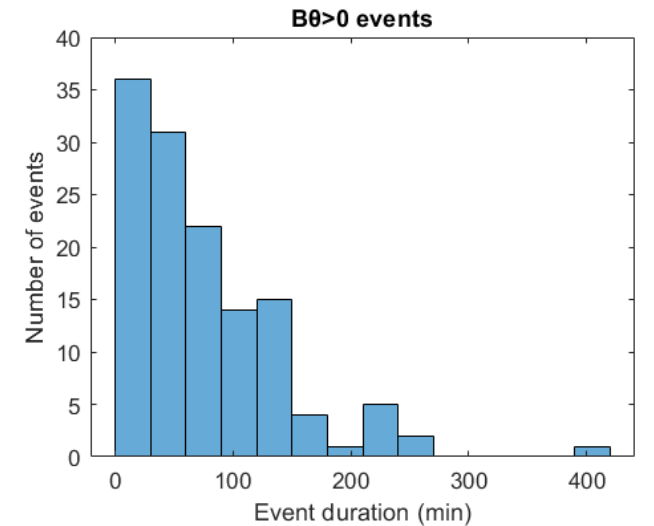
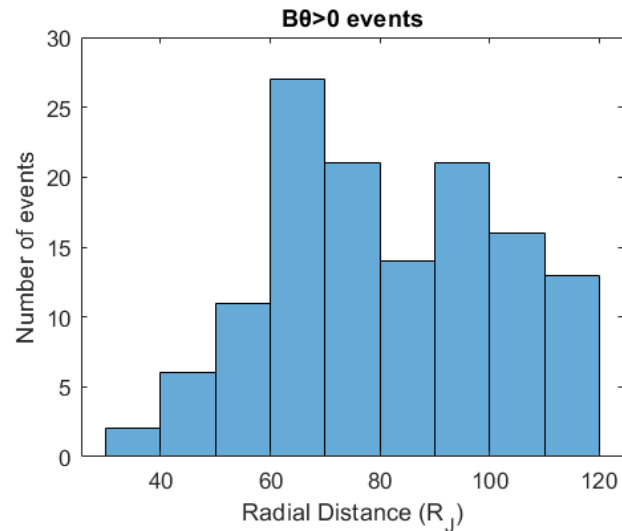
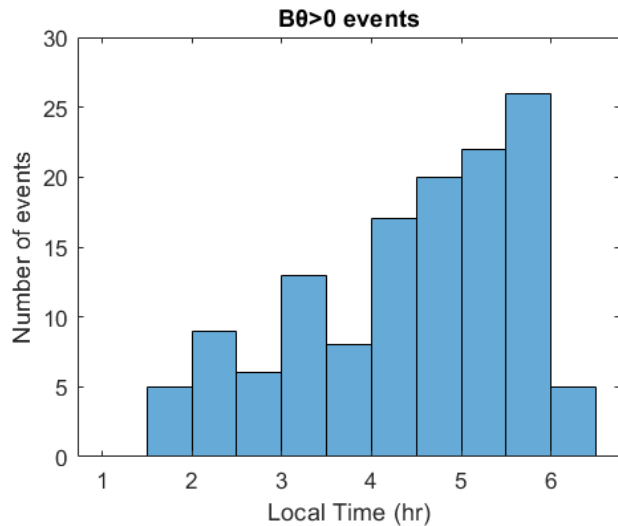


# Event Properties

$B_{\theta} < 0$   
 $N = 22$



$B_{\theta} > 0$   
 $N = 131$



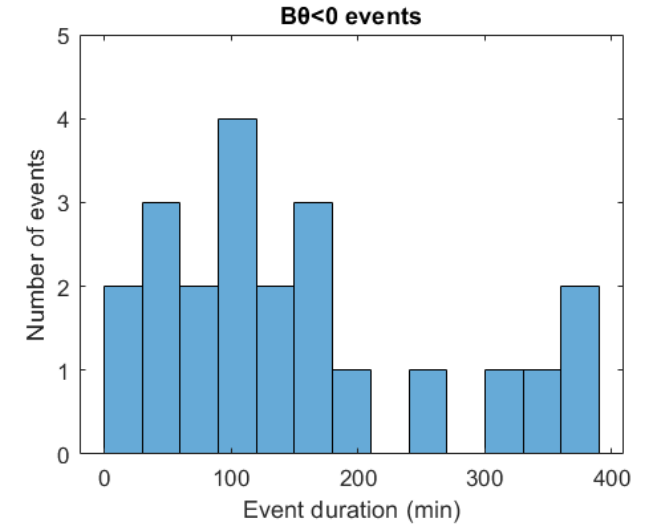
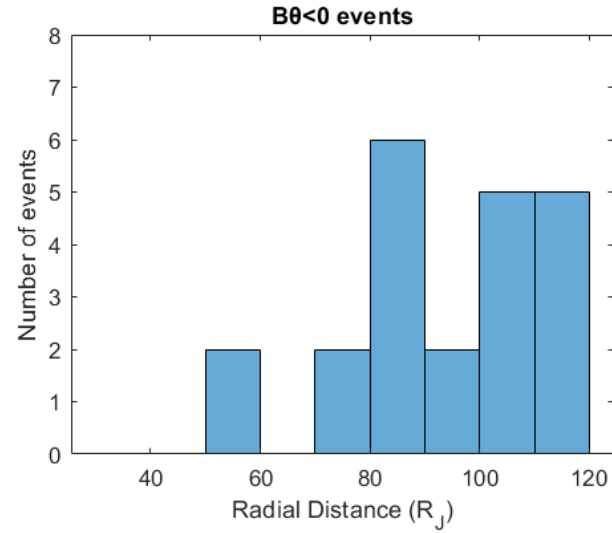
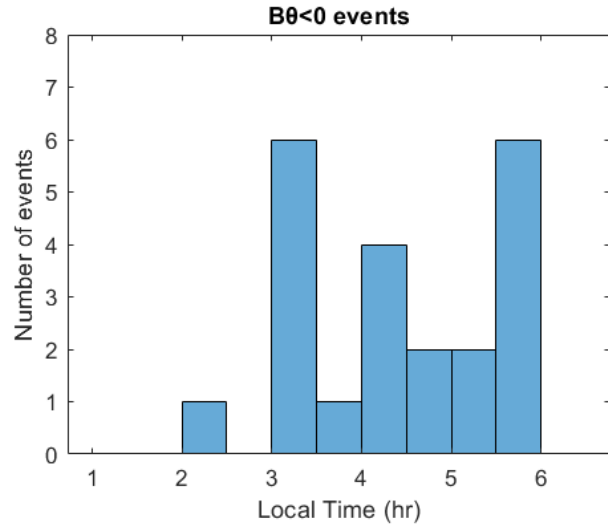
*Local Time*

*Radial Distance*

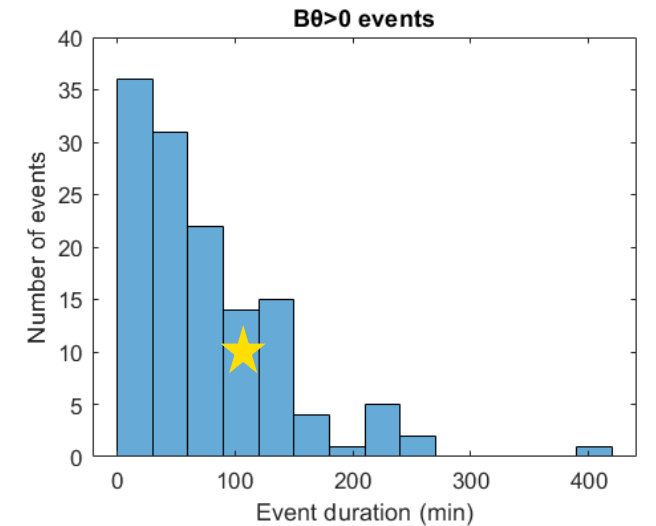
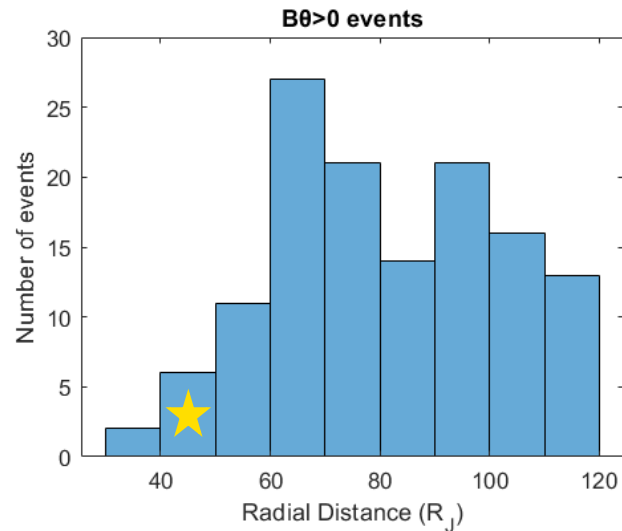
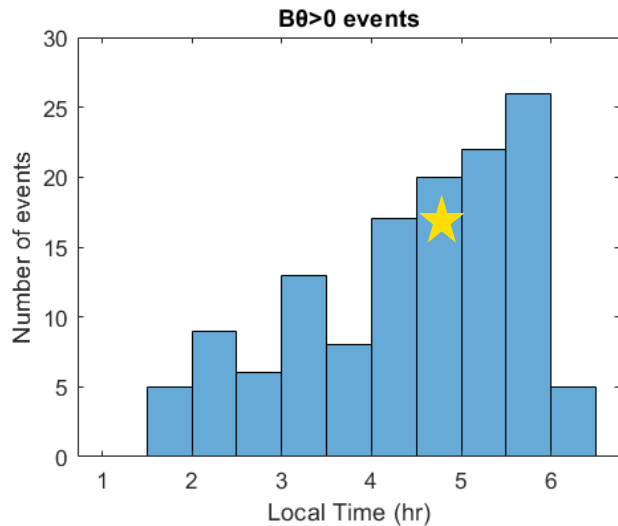
*Duration*

# Interesting Examples

$B_{\theta} < 0$   
 $N = 22$



$B_{\theta} > 0$   
 $N = 131$



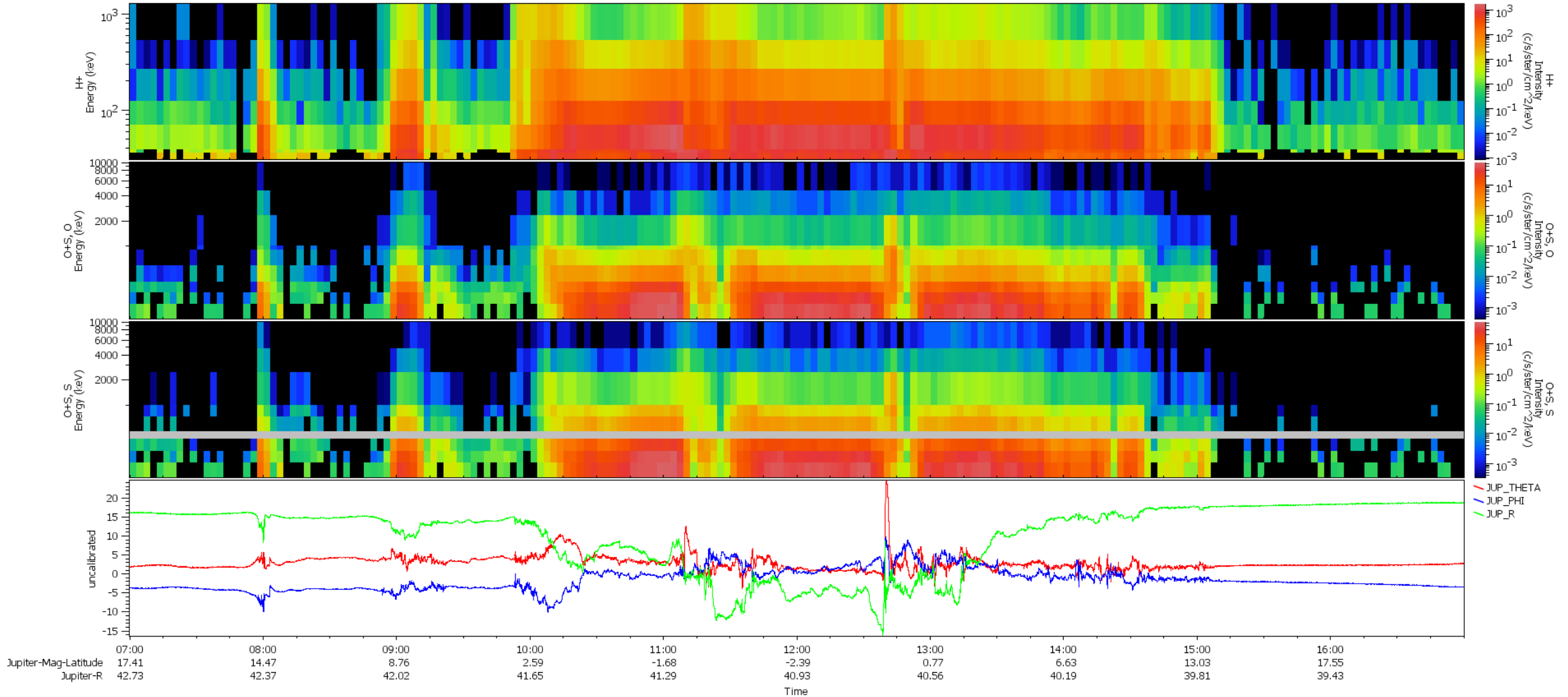
*Local Time*

*Radial Distance*

*Duration*

# Interesting examples

JED900TPCL00 H+ (37,9280,43,5534) keV ...  
Energy Spectrogram configuration  
Calendar Time (2017-083T07:00:00.000 to 2017-083T16:59:998)



# Future goals

- Extract the ion plasma moments to acquire an overview of the actual plasma flows
- Investigate further the characteristics of ion acceleration and search for possible mechanism(s)
- The physical processes that result in the acceleration of energetic particles in the terrestrial magnetosphere remain object of active scientific research
- Exploit the multi-species, multi-charge state plasma of Jupiter to test acceleration theories and conduct a comparative study of charged particle acceleration processes in the magnetospheres of Earth and Jupiter.