Plasmaspheric Plumes and Erosion During the 7-8 September 2017 Storm

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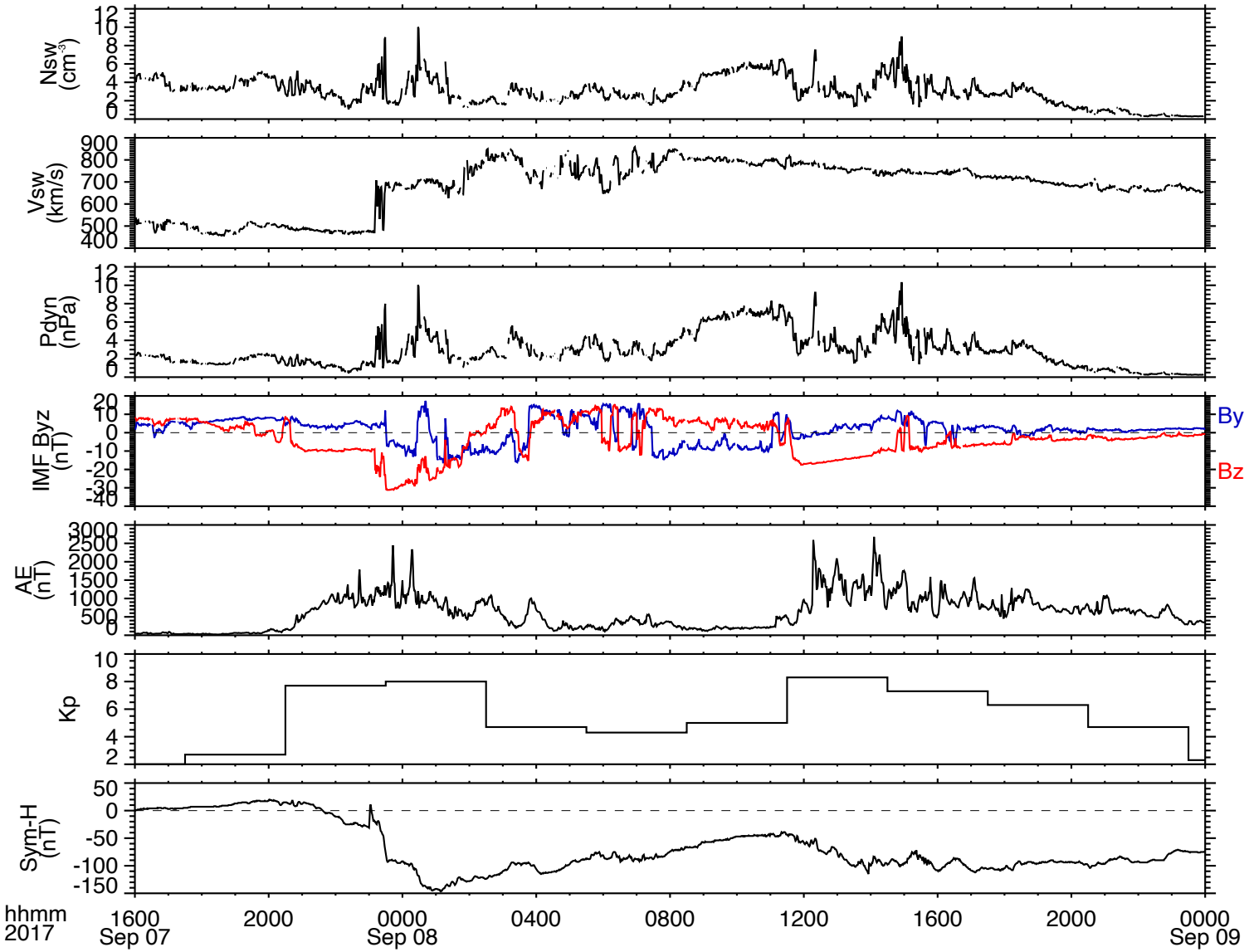
LWS Cold Plasma Team Meeting
23-24 March 2023

Solar wind and Geomagnetic conditions



Severe Plasmaspheric Erosion

Space Weather

RESEARCH ARTICLE
10.1029/2019SW002168

Special Section:
Space Weather Events of 4-10 September 2017

Response of the Ionosphere-Plasmasphere Coupling to the September 2017 Storm: What Erodes the Plasmasphere so Severely?

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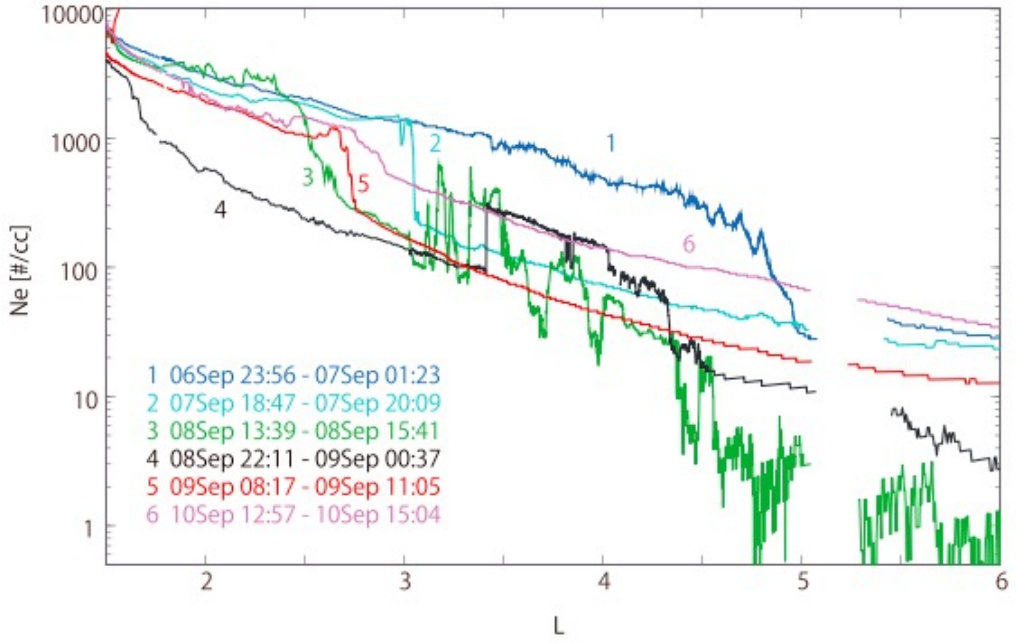
Key Points:
- An extreme erosion of the plasmasphere was observed by the ERG/Arase spacecraft (L_p1.6–1.7)
- The trough minimum location identified in GNSS-TEC moved equatorward as low as ~48 degree magnetic latitude (L = ~2.2)
- The observed erosion was qualitatively reproduced by the IPE simulation by including the effect of the penetration electric field

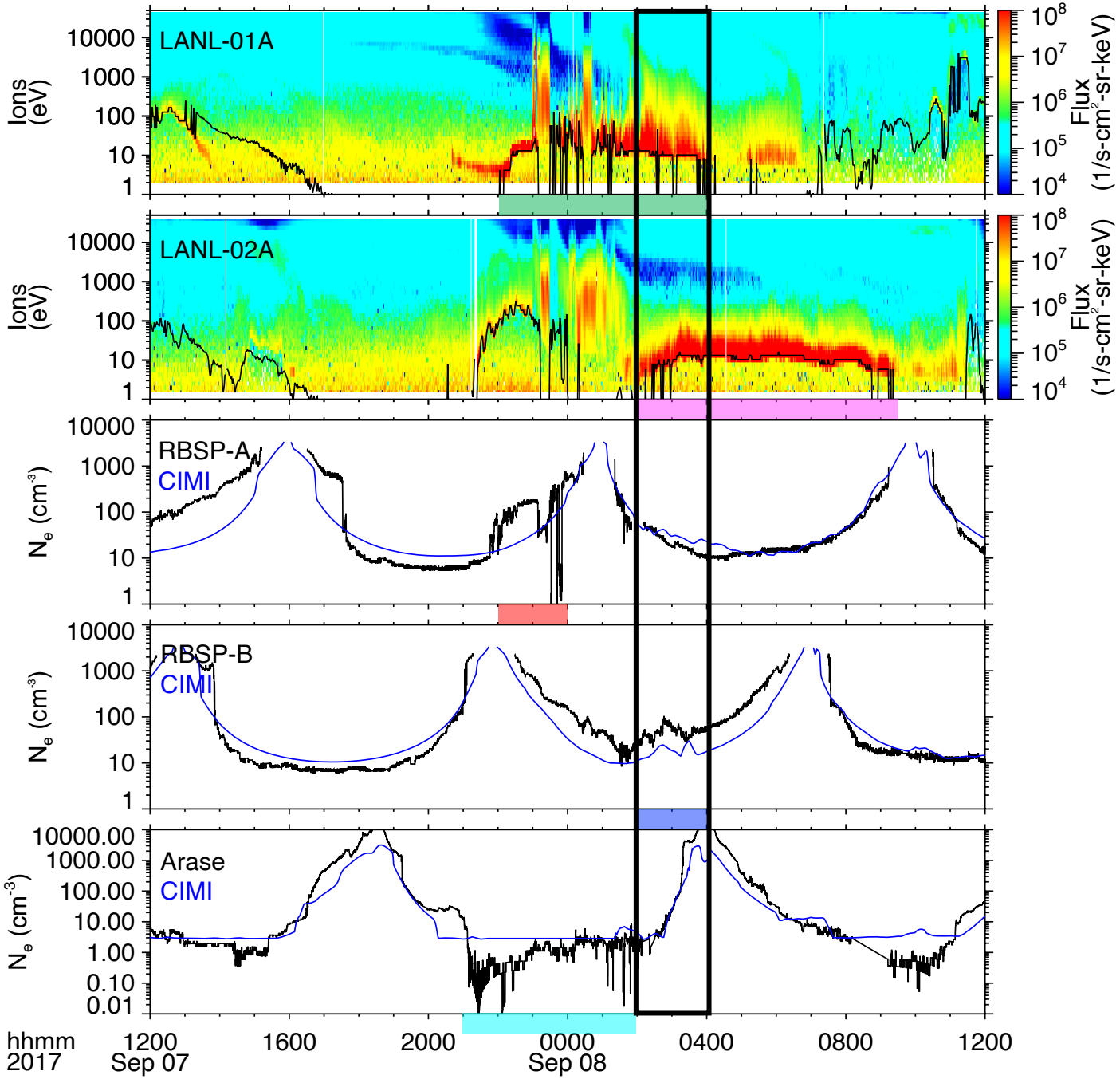
Arase

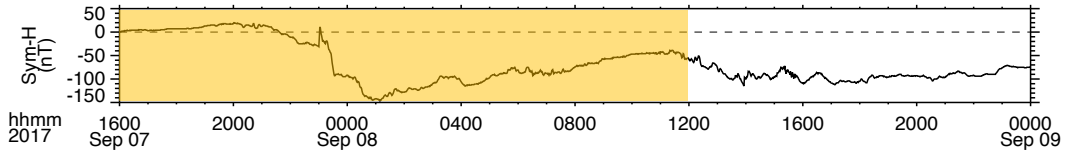


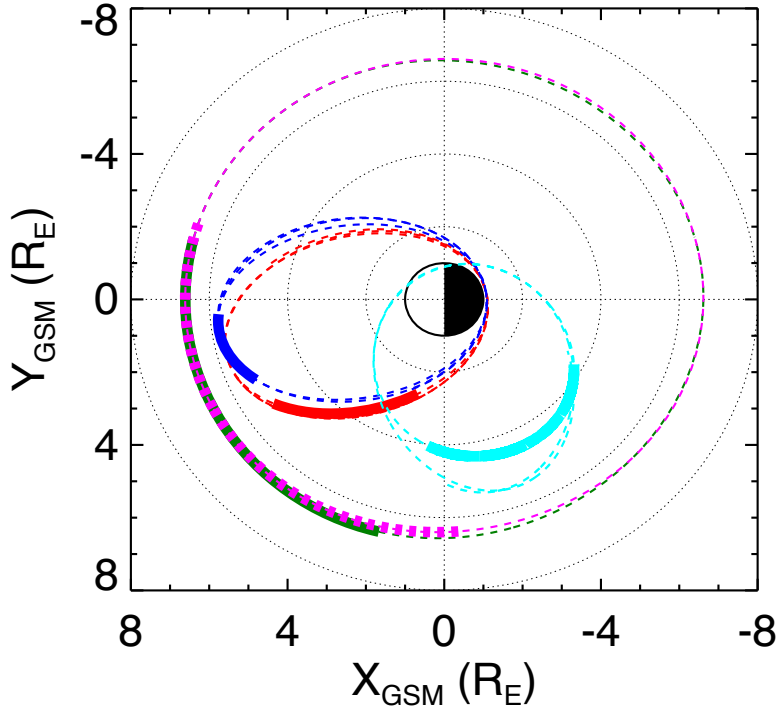
The study suggested that the storm time convection electric field can explain the degree of severity in plasmaspheric erosion.

Plume Observations

1st Dip of the storm







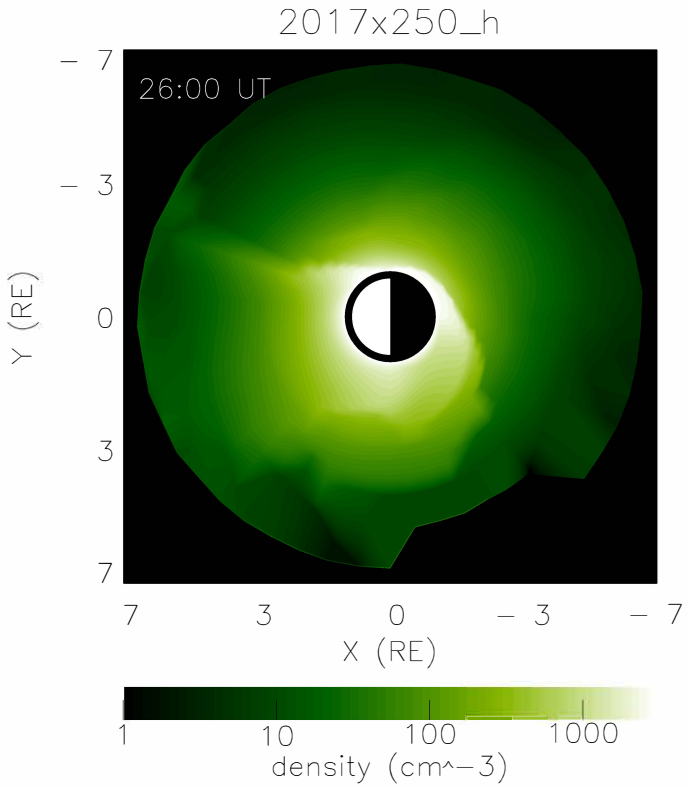
CIMI Simulation

1st Dip of the storm

Plume Observations

1st Dip of the storm

Sep8
02UT



Sep8
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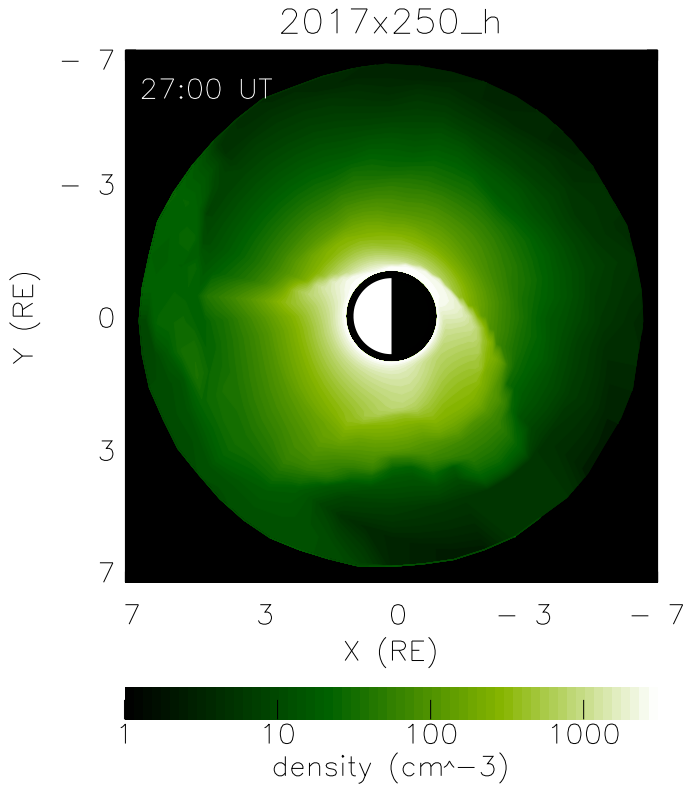
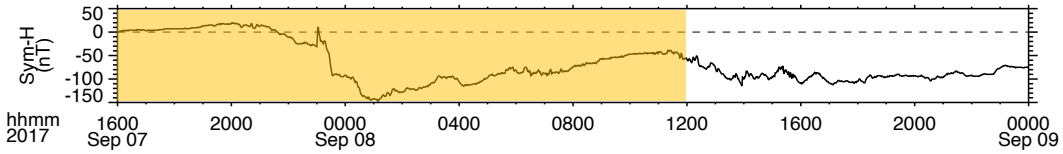
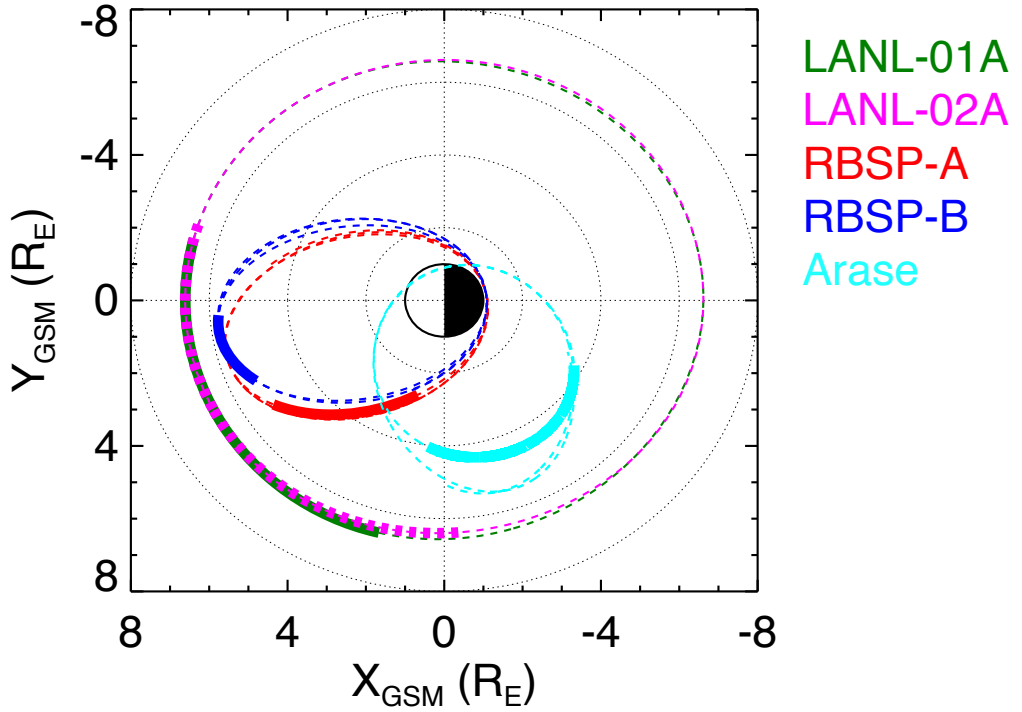
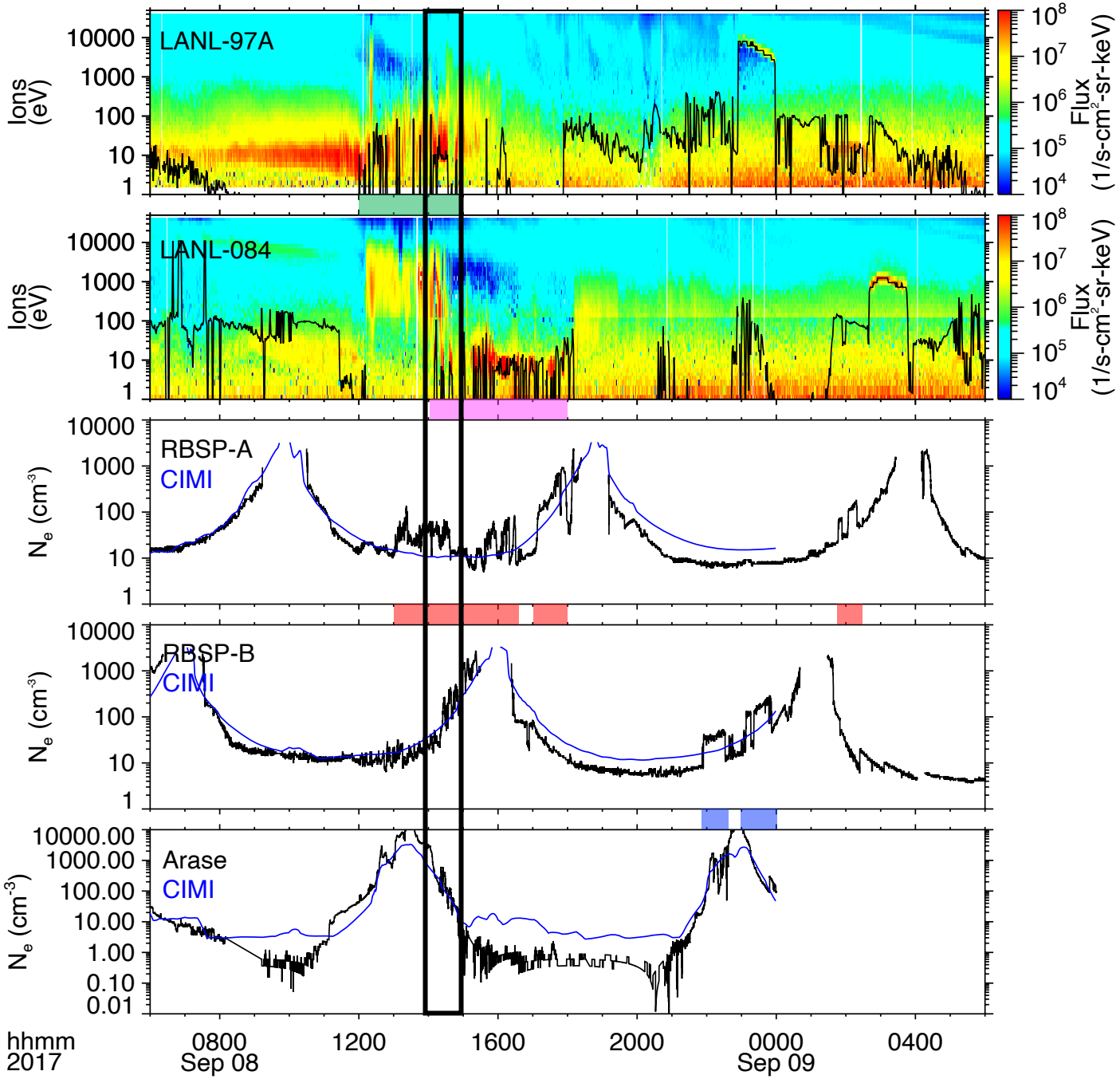


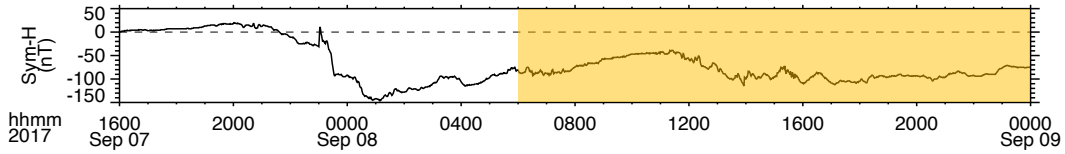


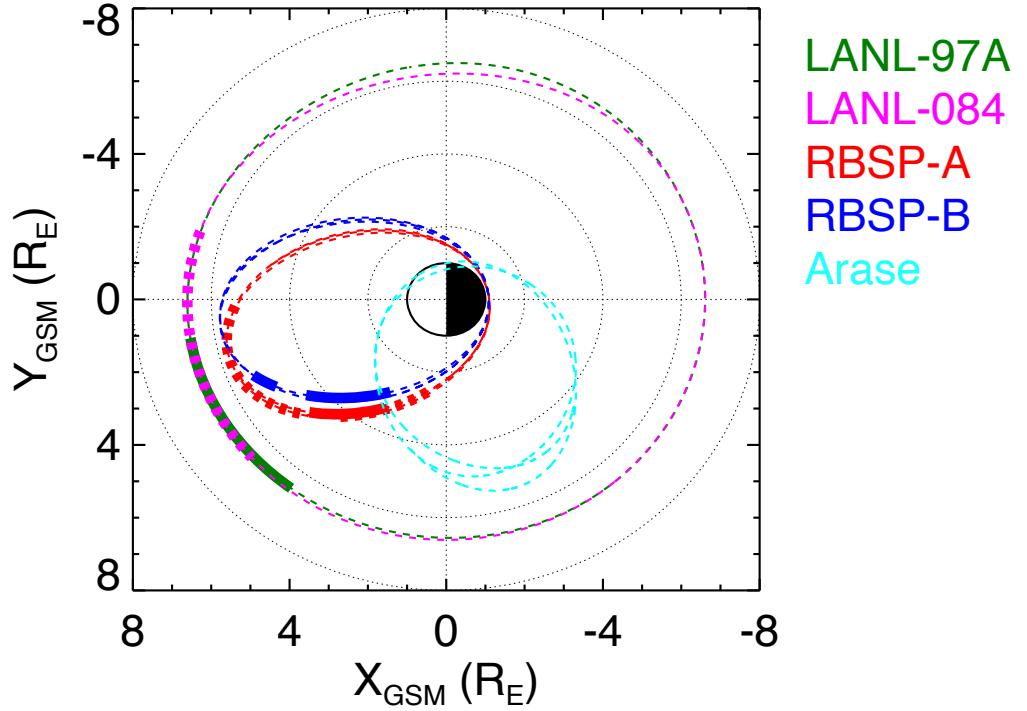


Plume Observations

2nd Dip of the storm



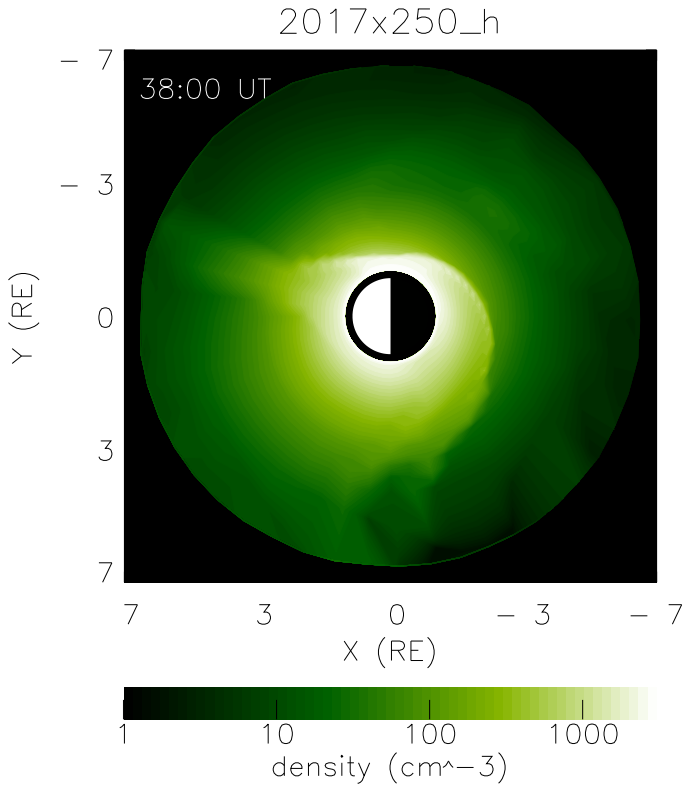




CIMI Simulation

1st Dip of the storm

Sep8
14UT



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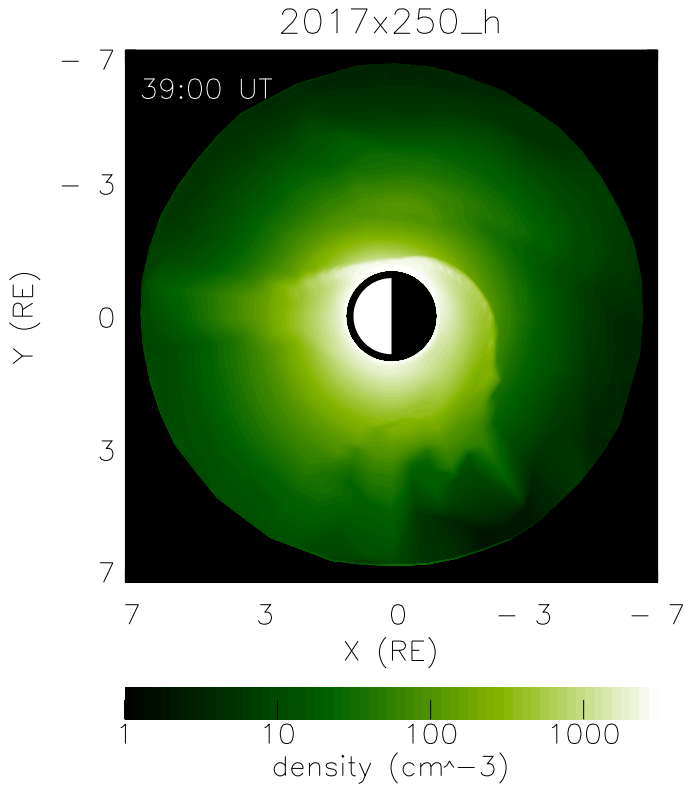
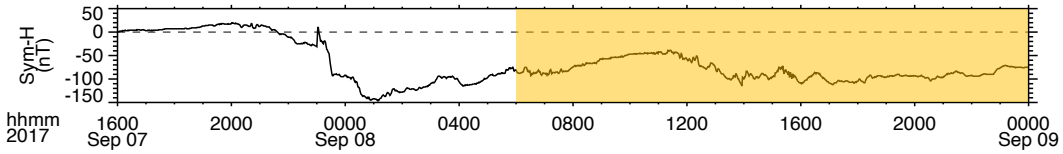
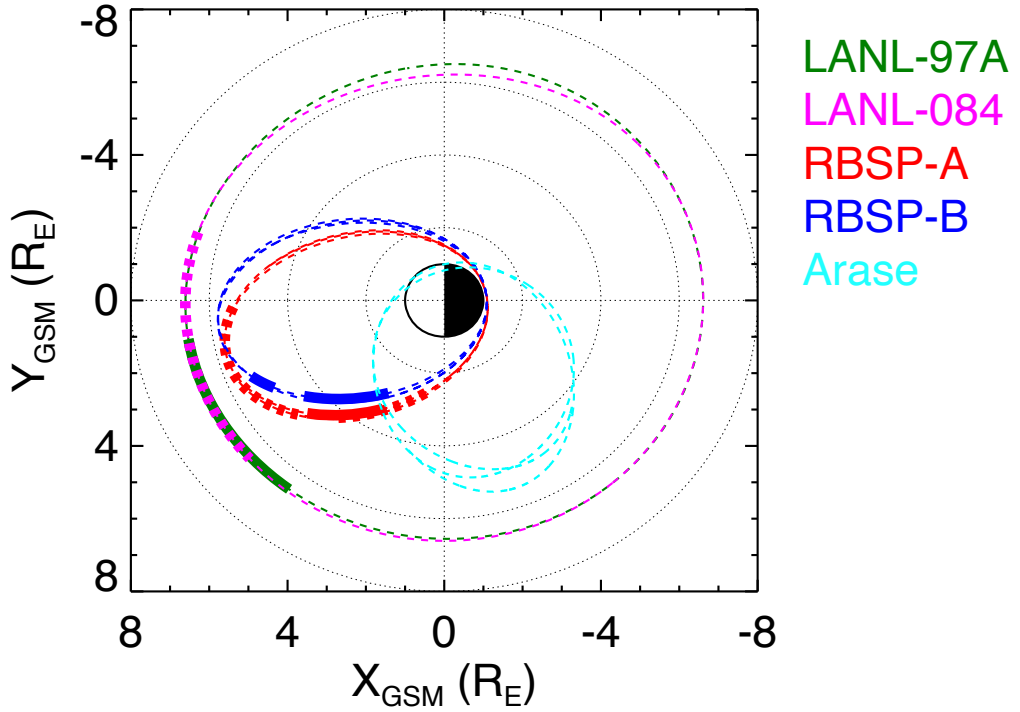


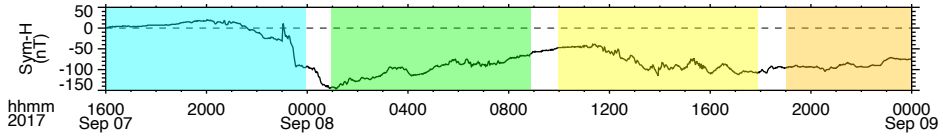
Plume Observations

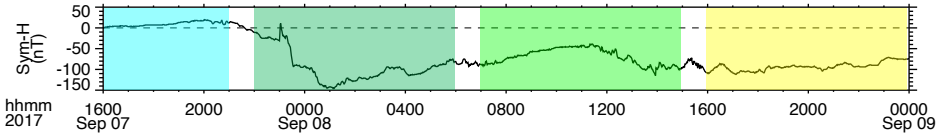
2nd Dip of the storm





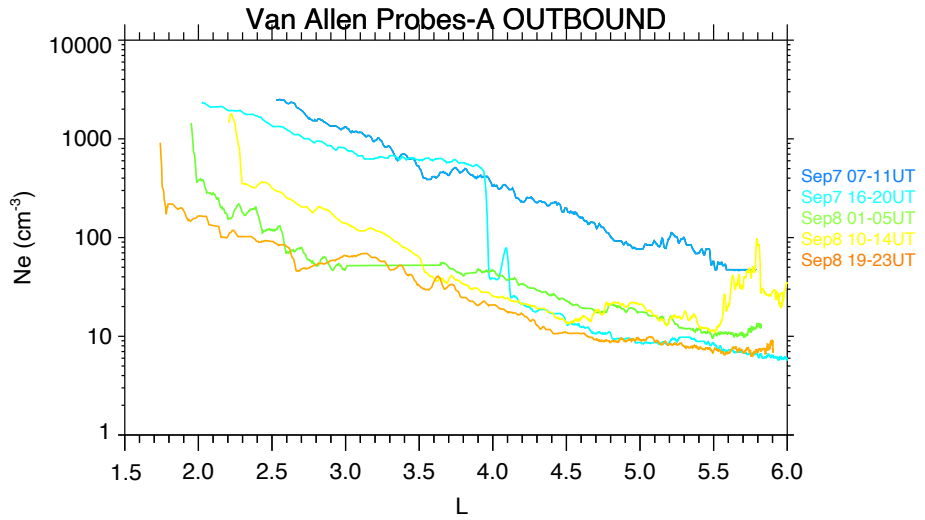
RBSP Observations of Plasmaspheric Erosion

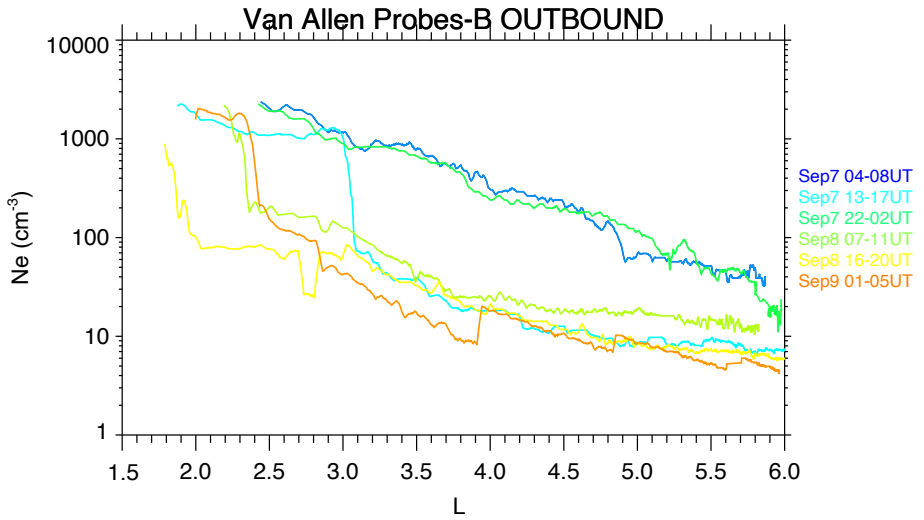




RBSP-A **RBSP-B**

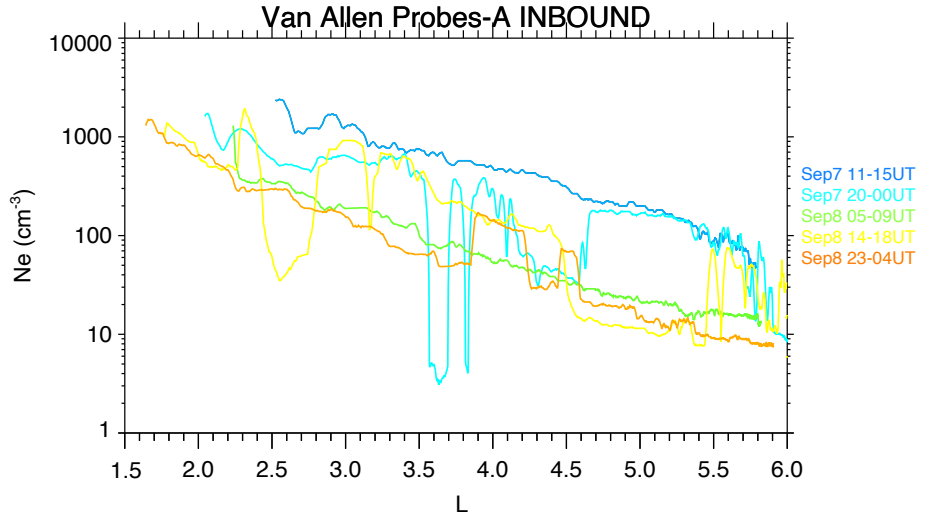
Outbound Pass

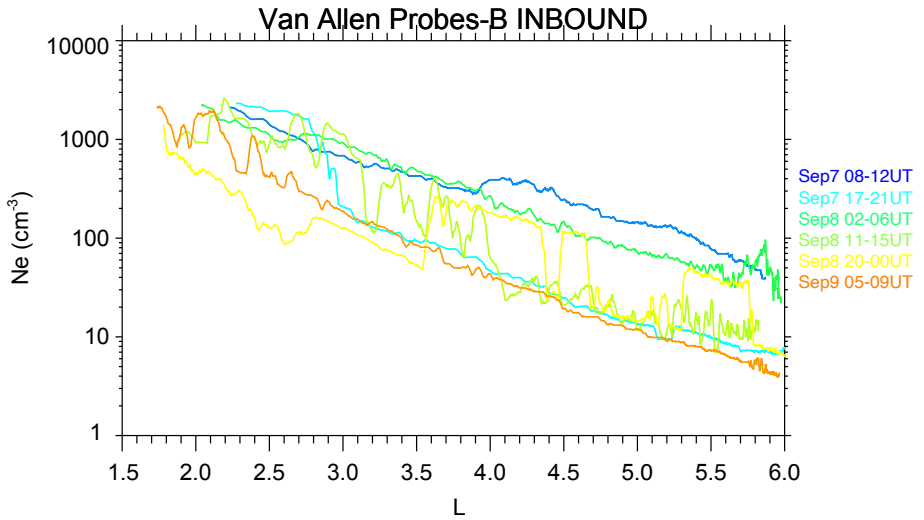




Dawnside erosion

Inbound Pass





Duskside plumes

Backup Slides

Van Allen Probes-B & Arase

Sep 7-8