2011 Workshop: MI Coupling in the PBL

Long title
M-I Coupling and Ionospheric Dynamic Response Within the Plasmasphere Boundary Layer
CEDAR-GEM
Conveners
P. Erickson
J. Goldstein
Description

This joint workshop will bring the CEDAR and GEM PMI (Plasmasphere-Magnetosphere-Ionosphere) communities together to discuss joint scientific questions of common interest within the mid-latitude plasmasphere boundary layer, where the cold dense inner plasmasphere overlaps the hot, tenuous outer plasmasphere. A rich variety of historical and current data is available now from ground radar, digisonde, GPS total electron content, and magnetometer diagnostics along with satellite based views from CRRES, IMAGE, Akebono, DMSP, DEMETER, and THEMIS. This information, when combined with modern plasmasphere and magnetospheric models, presents a compelling opportunity to advance knowledge through a systems level approach on such topics as wave/particle coupling, plasmasphere sub/co/super-rotation, plasmasphere crenellations and other morphologies, and ionospheric redistribution through storm enhanced density and sub-auroral polarization streams. The processes in these topic areas also couple closely to ion upwelling and outflow mechanisms which are known to have large implications for the dynamics of ring current, plasma sheet, and overall system response to solar wind disturbances.

- Session I: GEM Plasmasphere-Magnetosphere-Ionosphere (Mon 27 Jun, 4 - 6 pm)
- Session II: GEM Plasmasphere-Magnetosphere-Ionosphere (Tue 28 Jun, 10 - 12 am)
- Session III: JOINT WITH CEDAR (Tue 28 Jun, 1:30-3:30p) "M-I Coupling within Plasmasphere Boundary Layer"

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GENERAL CALL: The GEM PMI focus group would like to invite presentation and participation in three sessions at this year's GEM/CEDAR joint workshop. The three sessions take place on Monday and Tuesday, as listed above. Session III is devoted especially to joint GEM/CEDAR topics. We also invite active participation and presentations of new results by members of the LSW FST on the Plasmasphere. Please e-mail us for a speaking slot as soon as possible.

SCIENCE TOPICS:

1) Modeling plasmaspheric density: formation, evolution, morphology. Observations in support of models, and model-data comparisons. What are the radial, MLT, and field-aligned structures? What evidence is there for interhemispheric asymmetries?

2) The inner magnetospheric electric field: global modeling, observations, and impact.

3) Plasmaspheric plume density distribution. How well do plasmaspheric drainage plumes map to ionospheric SED plumes moving westward? What is the altitude and temporal signature as we move from low to mid to high latitudes? What creates the "lumpy" structure within plumes, and how does this structure evolve? Is the plasma inside late-storm plumes from the magnetosphere, or outflow from a hot-ionosphere high-latitude source? Where are the gaps in understanding?

4) PBL electric field variability. What is the altitude dependence of the variability and what implications does this have for field-aligned currents and the scaling of the magnetic field mapping function / electric field structuring? Do we have enough empirical evidence to make a statement and can data-guided models help?

5) Plasmapause location and structure. How do ionospheric and magnetospheric people locate the plasmapause / PBL? Are these compatible? What forms the structure seen on the PBL inner edge?

6) Wave/particle interactions and macroscale instabilities in the PBL. Where are these located (in plasmasphere, in ducts, on plasmapause, within plume, ..)? Where do they have an impact on particle trajectories through scattering or anomalous heating?

7) Conductivity control of PBL electrodynamics. How is the coupled electric field on PBL field lines affected by ionospheric conductivity in either or both hemispheres?

Justification

Joint focused collaboration is needed on these topics between CEDAR and GEM. Goldstein is the chair of the GEM focus group Plasmasphere-Magnetosphere Interactions (PMI), so directly relevant to GEM goals.

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