2020 Workshop: Poynting Flux

Long title
Grand Challenge: Understanding the Electromagnetic Energy Input to Earth’s Atmosphere
Grand Challenge
Conveners
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Description

We plan to bring together observationalists, modelers and data assimilation experts to address a major challenge of the CEDAR community: understanding the electromagnetic energy input to Earth's atmosphere. The idea is to bring these experts together to exchange information, specifically to identify, highlight and ultimately address the current challenges faced by the modeling community in coupling whole-atmosphere models with magnetospheric models. A strong presence from the observational community is required to address the challenges faced by modelers, and to highlight the major deficiencies (in terms of spatio-temporal resolution and overall accuracy). Following the first-year meeting we will mount a coordinated observational campaign focused on determining the Poynting flux as accurately as possible over a specific region (to be chosen in the first-year meeting). In parallel to this, we will work on developing existing approaches to the problem (e.g. AmGEO, MIX) and coupling those specification efforts to models that include the ITM. By the third year, we expect to have validated these specifications and quantified their effects on other model parameters, as well as quantifying the uncertainties and the important covariances between errors at different points and in different variables. This information will be critical in feeding the development of whole-atmosphere-magnetosphere modeling efforts, both through validation of those models and possibly through direct data assimilation.

Agenda

11:30: B. Anderson "Electromagnetic Energy Input to the High Latitude Ionosphere and Thermosphere: Fundamental Concepts, Challenges and Prospects"

11:48: D. Knipp & L. Kilcommons "DMSP-derived Poynting flux in dynamic auroral boundary coordinates"

12:06: L. LaMarche "Observations of Ion Heating with the Resolute Bay Incoherent Scatter Radar"

12:24: T. Matsuo "Assimilative Mapping of Geospace Observations (AmGEO): Data Science Tools for Collaborative Geospace Systems Science" (pdf)

12:42: W. Bristow "High resolution potential estimates from SuperDARN"

13:00: S. Buchert "Entangled Dynamos and Joule Heating In the Earth's Ionosphere " (pdf)

13:18: D. Weimer "Empirical models of the Poynting flux and Applications"

13:30: C. Sheng "GITM simulations with high-resolution SuperDARN convection pattern"

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