2025 Workshop: Predictability of the geospace environment

Long title
Predictability of the geospace environment
CEDAR Regular Workshop
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Description

Research into the predictability of the geospace environment (mesosphere, ionosphere, thermosphere, and magnetosphere) is critical for advancing space weather forecasting capabilities. Advances in modeling, data assimilation, and observations are also critical to improve space weather predictions. Despite its importance, research into the predictability of the geospace environment remains limited, leaving a number of outstanding questions. For example, the limit of deterministic predictability in the troposphere has long been understood to be ~2 weeks, though we currently have little understanding of the predictability limits in the geospace environment. How the predictability limits vary across spatial scales and in different components of the geospace environment are also largely unknown. Knowledge of the sources of predictability during quiet and disturbed time periods is also limited. This session solicits presentations focused on fundamental research into predictability of the geospace environment, as well as advances in modeling and observations that will lead to advances in predictions of the geospace environment from short (days to weeks) to long (months to years) time scales.

Justification

Advancing space weather forecasts is critical due to the increasing dependence of society on space based technologies. A key component of developing improved

forecasting capabilities is fundamental research into the predictability of the geospace environment. Knowledge of the predictability of the geospace environment is currently limited as it has not historically attracted significant attention within the scientific community. However, the CEDAR/GEM communities are well poised to conduct the fundamental research into the predictability of the geospace environment, which will ultimately help to improve space weather predictions. The CEDAR/GEM communities also have a key role to play in the development of models, observations, and data assimilation techniques that can lead to enhanced space weather predictions. This session aims to promote predictability research within the CEDAR/GEM communities through presentations that (1) highlight recent research on the predictability of the geospace environment, (2) discuss advances in modeling and observations that will enhance predictability research, and (3) exposing students and early career scientists to predictability research.

Related to CEDAR Science Thrusts:
Encourage and undertake a systems perspective of geospace
Explore processes related to geospace evolution
Workshop format
Short Presentations
Include a virtual component?
Yes
Keywords
geospace predictability, upper atmosphere, modeling
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