2025 Workshop: Using MAGE for science

Long title
Making discoveries with the Multiscale Atmosphere Geospace Environment (MAGE) Model
CEDAR-GEM
Conveners
Michael Wiltberger
Slava Merkin
CGS Team
wiltbemj@ucar.edu
Description

This session will introduce participants to the capabilities of the open-source version of the MAGE model, a state-of-the-art global geospace simulation tool. MAGE is a next-generation model designed to simulate the entire geospace system, with dedicated components for the magnetosphere, inner magnetosphere, and ionosphere-thermosphere, enabling a fully coupled representation of geospace dynamics. The open source release of MAGE will occur before the joint CEDAR/GEM meeting making this session very timely. The session will include an overview of the model's features and applications, followed by a hands-on tutorial guiding attendees through the installation, execution, and analysis of MAGE simulation results. This interactive session is designed for researchers and students interested in leveraging MAGE for space weather and geospace investigations.

Justification

The Multiscale Atmosphere Geospace Environment (MAGE) model is a cutting-edge, open-source geospace simulation tool designed to capture the complex interactions between the magnetosphere, inner magnetosphere, and ionosphere-thermosphere system. With capabilities that span all regions of geospace critical to both the CEDAR and GEM communities, MAGE provides an advanced framework for investigating space weather dynamics and fundamental geospace processes. This session is particularly timely as it highlights the upcoming open-source release of MAGE, expanding access to the model for researchers and students across the community.

Previous tutorials on MAGE at CEDAR and GEM meetings have been well attended and highly successful, demonstrating strong interest in learning how to utilize the model for scientific investigations. By providing hands-on experience with installation, execution, and analysis of MAGE simulations, this session will empower attendees to apply the model to their own research. Additionally, the session will cover key capabilities of MAGE, ensuring that participants understand its strengths and applications for advancing geospace science. Increased adoption and utilization of MAGE within the community will enhance scientific discovery and foster collaboration across CEDAR and GEM research areas.

Related to CEDAR Science Thrusts:
Encourage and undertake a systems perspective of geospace
Manage, mine, and manipulate geoscience/geospace data and models
Workshop format
Short Presentations
Hands On Training
Keywords
modeling, magnetosphere, ionosphere, thermosphere
Focus Group and Group Leader

MESO - Bea Gallardo-Lacourt, Gareth Perry, Emma Spanswick, Yari Collado-Vega, and Bashi Ferdousi
MMV - Lutz Rastätter, Alexa Halford, Joh Rigler, and Mike Liemohn
SCIMM - Cristian Ferradas, Chao Yue, Jacob Bortnik, and Qianli Ma

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