2019 Workshop: ITM models

Long title
ITM models: Past, Present and Future
Conveners
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Description

The workshop will focus on modern computational models used to describe the ionosphere/thermosphere/mesosphere (ITM) system. A short description of the models will be presented to provide the audience with a basic knowledge of the physics in the model and its capability. In particular, the presentations will discuss the (1) basic equations solved, (2) numerical techniques used, (3) strong and weak points (both physics and numerics), (4) examples of model results, and (5) future developments.

Agenda

Tuesday (6/18: 10:00 - 12:00)

1. Huba: intro

2. Jonathan Snively: MAGIC

3. Matt Zettergren: GEMINI: a local-scale, multi-purpose ionospheric model

4. Roger Varney: Polar outflow modeling

5. Astrid Maute: TIEGCM & electrodynamics

6. Aaron Ridley: GITM

7. Joe Huba: SAMI3

8. Erich Becker: A gravity-wave resolving mechanistic GCM up to 450 km:Importance of the treatment of diffusion

Wednesday (6/19: 13:30 - 15:30)

1. Valery Yudin: WAM

2. Naomi Maruyama: IPE

3. Hanli Liu: WACCM-X

4. Tomoko Matsuo: Data Assimilation Modeling

5. Nick Pedatella: WACCM-X/DART

6. Gary Bust: IDA4D: the whats, whys, and hows

7. Ridley/Huba: final comments/discussion

Justification

The importance of computational modeling to understand the ionosphere/thermosphere /mesosphere (ITM) system cannot be understated given the complex, nonlinear nature of the system, as well as its role in the development of operational space weather models. Moreover it fully encompasses the definition of CEDAR (Coupling, Energetics, and Dynamics of Atmospheric Regions), as well as embracing one of the Decadal Survey's aims: to understand `the consequences of solar variability on the atmospheres and surfaces of other bodies in solar system, and the physics associated with the magnetospheres, ionospheres, thermospheres, mesospheres, and upper atmospheres of the Earth and other solar system bodies,' and the NSF Geospace Science Plan challenge `How mass, energy, and momentum are transported through the heliosphere, magnetosphere, ionosphere, and atmosphere.' Additionally, such a session was held at the 2009 CEDAR Workshop and it was extremely successful (i.e., it led to a Chapman Conference in 2011 and an AGU Monograph on ionosphere/thermosphere modeling). Given that this was 10 years ago, it is appropriate to revisit model development over the past decade.

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