CEDAR-GEM Modeling Challenge Session at 2013 GEM Mini-Workshop

CEDAR-GEM Modeling Challenge Session was held on Dec. 8 2013 during 2013 GEM Mini-Workshop.

Since the initiation of the CEDAR-GEM Challenge during Joint CEDAR-GEM Workshop in June 2011, the project focuses on various scientific and operational aspects of the performance of magnetosphere and ionosphere models and addresses challenges of model-data comparisons and metrics studies. During CEDAR-GEM Challenge Meetings at the 2013 Space Weather Workshop (April 15, 2013) and 2013 CEDAR Workshop (June 22-28,2013), there was a discussion on "How to quantify storm impact on the ionosphere and thermosphere", and 8 physical processes (http://ccmc.gsfc.nasa.gov/RoR_WWW/presentations/GEM-CEDAR-2013-SWx-meeting/Tim_Fuller-Rowell_Challenge_2013.pdf) for the study were suggested by Tim Fuller-Rowell. In the session, as a continuation of the discussion, "Quantifying storm impact on the ionosphere/thermosphere" was dealt along with "Model-data comparison for high inclination and polar orbiting satellite (e.g., ISS, DMSP, and etc.)".

The topics below were presented and discussed:

Introduction: Masha Kuznetsova
Quantifying the storm energy input

- High latitude IT response during magnetic storms: Cheryl Y Huang (USAF AFMC AFRL/RVBXP)
- Relationship between nitric oxide and auroral heating/Poynting flux: Dan Weimer (Virginia Tech)
- Ionization due to particle precipitation during the August 2011 storm: Yanshi Huang (Univ. of New Mexico)
- Thermospheric mass density enhancement via soft electron precipitation: Binzheng Zhang (Dartmouth)
- Quantifying the storm effects on the modeled neutral density variations on the CHAMP satellite track: Emine Ceren Kalafatoglu Eyigüler (Istanbul Technical University/CCMC)
- High latitude energy dissipation compared with DMSP observations: Lutz Rastaetter (CCMC)

Role of drivers on IT model results:

- Conductivities consistent with FACs in the AMPERE-driven TIEGCM: Art D. Richmond
- High-latitude ionospheric drivers and their effects on wind patterns in the thermosphere: Lucas Liuzzo (Univ. of Michigan)

Build-up of plasma and structure at mid-latitudes

- TEC and Ne changes during 2006 Dec. Storm: Ja Soon Shim (CCMC)

Onset/timing/evolution of neutral composition change

- O/N2, NO column density and auroral boundary changes during storms based on GUVI data: Yongliang Zhang (APL)

Model-data comparison for high inclination and polar orbiting satellite:

- ISS FPMU and DMSP SSIES Ne, Te data: Joseph I. Minow (NASA, Marshall Space Flight
- Preparation for a new model/data comparison project

Below are the action items agreed during the meeting for 2013 GEM mini-Workshop:

- Agree on a set of time intervals for the comprehensive study of storm effects
- Provide ISS FPMU Ne and Te data for the selected time intervals: Joseph Minow
- Provide DMSP Poynting flux data: Cheryl Huang, Delores Knipp
- Get tools for swapping drivers ready: CCMC (Ja Soon Shim)
- Study quantifying the storm effects on neutral density using orbital averaged density: Emine Ceren Kalafatoglu Eyigüler, Ja Soon Shim, and Lutz Rastaetter
- Provide possible ways to quantify storm effects on TEC: Tim Fuller-Rowell, Roy Calfas

  ★ Others are also encouraged to contribute. Informal discussion is planned during 2014 Space Weather Workshop (either Monday or Friday of the week).