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Assessment of the predictive capability of IT models at the Community Coordinated Modeling Center

Abstract:

The Community Coordinated Modeling Center (CCMC) is an interagency partnership with the goal of bridging the gap between science and space weather operations while enhancing research, supporting development of next-generation space weather models, and disseminating knowledge to the broader community. The CCMC hosts the largest assembly of state-of-the-art physics-based space weather models and has developed a variety of tools for space weather visualization and analysis. In addition to providing the community easy access to these modern space research models and the tools to support science research, one of the primary goals of the CCMC is to test and validate models for transition from research to operations. In this paper, we focus on the community-wide Ionosphere/Thermosphere (IT) model validation efforts led by the CCMC and present results of the assessment of the models for reproducing storm impacts on IT parameters such as TEC, neutral density, and Joule Heating. In order to quantify storm impacts on the parameters, we consider several quantities: changes compared to quiet time (the day before storm), difference between 24-hour intervals, and maximum increase/decrease during the storm. We compare the calculated quantities from the models with the observed values, including ground-based GPS TEC measurements in several longitude sectors where data coverage is relatively better, orbital averages of neutral densities along the CHAMP satellite track and the DMSP Poynting Flux during storm events (e.g., 2006 AGU storm). Model output and observational data used for the challenge will be permanently posted at the CCMC website (<http://ccmc.gsfc.nasa.gov>) as a resource for the space science communities to use.