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GLOBAL MODELLING OF MAGNETOSPHERE-IONOSPHERE COUPLING: EPOP-SWARM OBSERVATIONS (I)

Monday 11 June 2018 11:45 (30 minutes)

We present first results from a comprehensive three-dimensional model of magnetosphereionosphere coupling. The model describes plasma flow produced by global scale (Volland-Stern) convection electric fields that are coupled with a physical model of the ionosphere. The initial
magnetospheric plasma density is specified using the Global Core Plasma Model (GCPM), while initial density and temperature profiles of electrons and various species of ions and neutrals are taken from the IRI and MSIS models, respectively. The interaction of magnetospheric plasma with the ionosphere is self-consistent and includes effects of sunlight,ionization and recombination,heating and cooling processes,Hall and Pedersen conductivity altitude dependence,and chemistry.The model has already been used to study the development and erosion of plasmaspheric plumes that exert influence over energetic particle dynamics in the inner magnetosphere. It also describes plasma flow over the entire polar cap, which, when combined with data-assimilation of,for example, SuperDARN data, will eventually lead to improved accuracy of space weather forecasting. The main application of the new model is focused on interpreting measurements from the ePOP/CASSIOPE and SWARM satellite missions, which have combined their operations. First modelling results utilizing observations from this new ESA-Canada joint mission will be presented. The novel Yin-Yang overset grid and flexibility of the model to describe non-dipolar magnetic fields will be briefly described, as well as methodology needed to combine the model with more global models such as the LFM MHD model.

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