[EE] Evening Poster | P (Space and Planetary Sciences) | P-EM Solar-Terrestrial Sciences, Space Electromagnetism & Space Environment

[P-EM14]Recent Advances in Ionosphere Observation and Modeling for Monitoring and Forecast

convener:Charles Lin(Department of Earth Sciences, National Cheng Kung University), Yang-Yi Sun(China University of Geosciences, Institute of Geophysics and Geomatics)
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Increasing number of observation opportunities in the Earth's ionosphere and upper atmosphere advances the research of the ionosphere weather in the recent two decades. In the ground segment, global deployment of ground-based GNSS receivers, newly planned radars and airglow instruments greatly extend the observation coverages. In the space segment, a number of upcoming new satellite missions with capabilities of airglow, neutral winds and electron density observations will provide a variety of observation worldwide. With the large amount and diversity of datasets, sophisticated theoretical and empirical models can be validated, and implemented for inclusion of new thermosphere and ionosphere phenomena. Additionally, advances in applications of data assimilation technique on the ionosphere monitoring and forecast system are developing in progress. These recent advances in observations and models are important to move forward the status of the ionospheric space weather monitoring and forecast. It is the purpose of this session to solicit studies providing observations, theoretical and empirical modeling and data assimilation on the multiple scales of ionosphere structures, from global morphology to small scale irregularities and traveling ionospheric disturbances. Studies on magnetically quiescent and disturbed conditions will both be addressed.

[PEM14-P01]The driven parameters of the NCAR/TIE-GCM at high latitudes assimilated with the occultation TEC during the storm time

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The Thermosphere-Ionosphere Electrodynamics General Circulation Model (TIE-GCM) are assimilated with the FORMOSAT-3 occultation total electron contents (OTEC) to optimize the model driven parameters that the simulation results could monitor the ionosphere during the magnetic storm time. The TIE-GCM was developed by NCAR/HAO is a self-consistently electrodynamics coupled thermosphere and ionosphere model. The model could be driven by a few parameters such as the y-component of Interplanetary Magnetic Field (IMF-By) and the Cross Polar Cap Potential (CPCP) that control the ion convection at high latitudes. We assimilated the OTEC data along the line of sight from GPS to LEO satellites measured by the FORMOSAT-3 with the TIE-GCM such that both the optimal IMF-By and CPCP could be obtained in the storm time. The 3-hours assimilation cycle are constructed to study the geo-magnetic storm in the day Sep. 09, 2011. The pre-3-hours OTEC data before the beginning of a time cycle are assimilated with TIE-GCM to optimize the parameters of IMF-By and CPCP that optimized the initial state of the cycle. The post-1-hour OTEC data after the initial state are assimilated with TIE-GCM to optimize the IMF-By and CPCP to monitor the ionosphere in forward 3-hours. The simulation results and the optimal IMF-By, CPCP could be compared with the observation data in the ionosphere and the values in the geophysical indices database (GPI).