

[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-P03]Ionospheric responses to the 21 August 2017 Solar Eclipse by using data assimilation approach

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Using the physical based thermosphere-ionosphere model with ensemble Kalman filter, this study reports the first data assimilation results of the ionosphere responses to the solar eclipse on 21 August 2017. The system with 2-minute assimilation cycle of ground-based GNSS observations show the dynamic variations of the equatorial ionization anomaly (EIA) due to modifications of the electrodynamics by the solar eclipse. Two major ionosphere responses are captured. First, there was an early appearance of EIA at the westward boundary of moon shadow, followed by the feature of the enhanced EIA at lower latitudes and the suppressed EIA at the higher latitudes. These eclipse-induced conjugate EIA variations are produced by the eastward electric field perturbation around magnetic equator and the westward electric field perturbation at the higher latitudes.