[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

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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-P05]Recent improvement of SuperDARN interferometry and neutral wind observation

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SuperDARN (Super Dual Auroral Radar Network) is an international HF radar network originally intended to cover a wide range of polar ionosphere in both hemispheres by its fields-of-view and to monitor global ionospheric plasma convection in high temporal resolution of about 1 minitue in quasi real time mainly for space weather research. It can observe not only ionospheric plasma Doppler velocity and electric field, a variety of geomagnetic waves, ionospheric disturbances and irregularities, but also polar mesoephere echoes like PMSEs and neutral wind around mesopause region using meteor echoes. As it is originally designed to measure global ionospheric plasma parameters, the spatial resolution has been rather coarse and it was originally difficult to obtain vertical profile of neutral wind (Hall et al., 1997). By applying raw IQ time series analysis method (Yukimatu, GRL, 2002), decucing the height profile of neutral wind was achieved and using more sophisticated observational manners like frequency domain interferometry and oversampling technique, the resolution of neutral wind vertical profile was improved down to a few km or so (Tsutsumi et al., 2009), but such observation has been routinely made at a limited number of SD radars due to, e.g., lack of enough interferemter calibration. Recently how to overcome an issue on interferometer calibration of each SuperDARN radar has been well discussed in the SuperDARN community, the accuracy or reliability of height information of near range echoes and neutral wind measurement could also possibly be drastically improved at many SD radars in near future. As SuperDARN radars are distributed in mid to high latitude in a wide longitudinal range globally, it could contribute

much to understand mesosphere-lower-thermosphere (MLT) region dynamics and vertical coupling between ionosphere and neutral upper atmosphere. The details of future observational and scientific development and perspective will be shown and discussed.