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

[P-EM12]Space Weather, Space Climate, and VarSITI

convener:Ryuho Kataoka(National Institute of Polar Research), Antti A Pulkkinen (NASA Goddard Space Flight Center), Kanya Kusano(名古屋大学宇宙地球環境研究所, 共同), Kazuo Shiokawa(Institute for Space-Earth Environmental Research, Nagoya University)

Thu. May 24, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

Past, Present, and Future of Solar-Terrestrial Environment is the keynote of this session. We share the latest scientific papers to understand how the solar-terrestrial environment changes in various time scales, and discuss the necessary international collaboration projects associated with VarSITI. More specifically, welcomed papers include space climate studies using tree rings and ice cores; cutting-edge observational and modeling studies of geospace, heliosphere and the sun; simulation and statistical studies to predict the future space weather and space climate.

[PEM12-P22]Prediction of occurrence of sporadic E layers using GAIA

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Keywords:Sporadic E layer, Occurrence, Prediction, Atmosphere-ionosphere coupled model

Sporadic E layer (Es) occasionally appears in a narrow-altitude region between about 90 km and 120 km. Es has significant influences on radio communications and broadcast, and therefore, the prediction of occurrence of Es is one of the most important phenomena in space weather forecast. Although it is generally accepted that Es is formed by combination of neutral wind shear and metallic ions originated from meteor ionization in the lower thermosphere and in the upper mesosphere, the mechanisms of formation and variation of Es have not been quantitatively understood. Previous observations have indicated that Es has clear seasonal and local time variations and geographic location dependences. Our group has been developing GAIA (Ground-to-topside model of Atmosphere and Ionosphere for Aeronomy), which self-consistently includes the whole atmosphere and the ionosphere with meteorological reanalysis data introduced in the lower atmosphere. Present version of GAIA has a horizontal resolution of one degree. Although the resolution of GAIA is still not enough to directly reproduce Es, it is expected that the model can give at least a clue to estimating occurrence conditions of Es. Previous studies using GAIA show that seasonal and geographical dependence of vertical wind shear in the lower thermosphere region agrees with seasonal and geographical dependence of the Es occurrence rate [Shinagawa et al., 2017]. We will report the result of prediction study of daily variations in the Es occurrence, and discuss the possibility of predicting the Es occurrence.

Reference

Shinagawa, H., Y. Miyoshi, H. Jin, and H. Fujiwara (2017), Global distribution of neutral wind shear associated with sporadic E layers derived from GAIA, J. Geophys. Res. Space Physics, 122, doi:10.1002/2016JA023778.