

International Session (Oral) | Symbol P (Space and Planetary Sciences) | P-EM Solar-Terrestrial Sciences, Space Electromagnetism & Space Environment

[P-EM06_30PM2] Study of coupling processes in Sun-Earth system with large radars and large-area observations

Convener: *Mamoru Yamamoto (Research Institute for Sustainable Humanosphere, Kyoto University), Yasunobu Ogawa (National Institute of Polar Research), Satonori Nozawa (Solar-Terrestrial Environment Laboratory), Hiroyuki Hashiguchi (Research Institute for Sustainable Humanosphere, Kyoto University), Chair: Hiroyuki Hashiguchi (Research Institute for Sustainable Humanosphere, Kyoto University)

Wed. Apr 30, 2014 4:15 PM - 6:00 PM 312 (3F)

The Earth accepts huge input of energy and material from the Sun. The Earth's environment is maintained by the balance between their inputs and outputs. It is important to study energy and material transport of the Earth. This is an international session that discusses studies of the coupling processes in the Sun-Earth system based on the projects of large radars and large-area observation network. The facilities and networks included are the Equatorial MU Radar (EMU) in Indonesia to study the whole equatorial atmosphere, the EISCAT_3D radar system to study detailed structures and elementary processes of the magnetosphere-ionosphere in the polar region, and global observation networks of magnetometers and radio and optical instruments to study the coupling processes with the global scale. We will show outline of the project and discuss sciences by soliciting variety papers. This session is open to the world, and we strongly encourage submission of papers related to other facilities and projects, i.e., atmospheric or incoherent-scatter radars, observation networks, satellites, and simulation or theoretical studies, etc.

5:15 PM - 5:30 PM

[PEM06-P13_PG] Geolocation of lightning discharge in the Maritime Continent based on radio observation in 0.1-40 kHz band

3-min talk in an oral session

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Recent researches based on observation and data assimilation of lightning discharge indicate a possibility of now-cast and forecast of severe weather such as torrential rain. In these works, lightning data is focused on as a proxy for the presence or absence of deep convection which generates thunderstorm. In previous works, occurrence of cloud-to-ground (CG) lightning discharges has been mainly used due to the ease of data availability. However, lightning observation based on electromagnetic measurement shows that there is extremely huge scale lightning whose scale is more than hundreds times bigger than that of averaged event. Lightning data including "occurrence" and "scale" enable us to evaluate not only existence but also intensity of atmospheric convection. Quantitative evaluation of atmospheric convection would make it possible to make a now-cast and forecast for intensity distribution of precipitation. The Maritime Continent (MC) is one of the most important regions for lightning observation in the world. Thunderstorm activity causes enormous human and economic damage to countries in MC. However, until now, only few statistical studies on the lightning activity with scale information of lightning discharge have been done. In this work, lightning observation network in the MC based on electromagnetic measurement in 0.1-40 kHz band is summarized. This network is developed to

estimate not only spatial distribution but also scale one of lightning discharges. We have already constructed observation stations at Tainan in Taiwan (23.1N, 121.1E), Saraburi in Thailand (14.5N, 101.0E), Pontianak in Indonesia (0.0N, 109.4E), Los Banos in Philippines (14.2N, 121.25E) and Son Tay in Viet Nam (21.1N, 105.5E). Data obtained by multipoint observation is synchronized by GPS receiver installed at each station. At the presentation, we show evaluation of accuracy for geolocation and detection efficiency of signal radiated from lightning discharge based on comparisons with World Wide Lightning Location Network (WWLLN) data.