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

[P-EM13]Study of coupling processes in solar-terrestrial system

convener:Mamoru Yamamoto(Research Institute for Sustainable Humanosphere, Kyoto University), Yasunobu Ogawa(National Institute of Polar Research), Satonori Nozawa(名古屋大学宇宙地球環境研究所, 共同), Akimasa Yoshikawa(Department of Earth and Planetary Sciences, Kyushu University)
Sun. May 20, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
The Earth accepts vast 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 project "Study of coupling processes in solar-terrestrial system" that was approved by the Master Plan 2017 of Science Council of Japan. The facilities and networks included are the Equatorial MU Radar (EMU) in Indonesia to study the whole equatorial atmosphere, the EISCAT_3D radar in northern Scandinavia to study detailed structures and elementary processes of the magnetosphere-ionosphere coupling in the polar region, and global networks of various ground-based instruments and observation data. We will show current status 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.

[PEM13-P05]Regional and Diurnal Variations of Lightning, Precipitation and Hydrometeor Characteristics along Equatorial Indonesia

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Keywords:lightning, precipitation, hydrometeor, Indonesia

Regional and diurnal variations in lightning, precipitation and hydrometeor characteristics along equatorial Indonesia had been investigated using several remote sensing systems. The vertical structure of precipitation over four locations along equatorial Indonesia, namely, Kototabang (KT; 100.32^{o} E, 0.20^{o} S), Pontianak (PT; 109.37^{o} E, 0.00^{o} S), Manado (MN; 124.92^{o} E, 1.55^{o} N) and Biak (BK; 136.10^{o} E, 1.18^{o} S) were determined using the gradients of the radar reflectivity (dBZ) below the freezing level which were gathered from the latest 2A25 TRMM–Precipitation Radar product over a 17-year time span (1998–2014). Furthermore, the TRMM 2A12 data were used to study the vertical profile of hydrometeor and a network of Parsivel disdrometers were used to observe characteristics of surface raindrop size distributions (DSDs). The World Wide Lightning Location Network (WWLLN) data were used to study the lightning characteristics at each location. Finally, MODIS data were used to investigate the cloud properties at each location such as aerosol optical depth (AOD) and cloud effective radius. The convective storms are more intense at PT than at KT, MN and BK which were indicated by a higher storm height, cloud water content and lightning intensity. The average of storm height for PT, KT, MN and BK are 6.1, 5.9, 5.4 and 5.7 km, respectively. PT has the smallest ratio of the downward increasing (DI) to the downward decreasing (DD) of dBZ toward the surface, followed by BK, KT and MN. The ratio values are 0.92, 1.18, 1.30, and 1.33, respectively. Thus, precipitation systems at PT more continental in nature than those at other three locations because the DI is frequently observed over the ocean and the higher prevailing rain top heights over land as observed at PT are associated with DD, in most cases [1]. Number

of stratiform rain profile at PT and BK is greater than other locations in which the ratio of the profile of stratiform to convective rains at PT, BK, KT and MN are 2.07, 2.01, 1.61 and 1.65, respectively. Moreover, the ratio of deep to shallow convective rains at PT (2.51) and KT (2.26) are greater than those at MN (1.26) and BK (1.60). While the DD pattern which indicates a decrease in the raindrop concentration is more dominant at PT, the DSD at PT has more large drops than at other three sites [2]. Because shallow convective rain, which is normally associated with large drops, is not dominant at PT, dominant large drops at this location may not associate with this rain type. Detailed information about the microphysical processes affecting the DSD at each location will be presented during the meeting.

[1] Marzuki, H. Hashiguchi, M. Vonnisa and Harmadi, 2018: Seasonal and Diurnal Variations of Vertical Profile of Precipitation over Indonesian Maritime Continent. *Engineering and Mathematical Topics in Rainfall*, H. Theodore and P. Rao, Eds. InTechOpen, Croatia, in press.

[2] Marzuki, M., Hashiguchi, H., Yamamoto, M. K., Mori, S., and Yamanaka, M. D., 2013: Regional variability of raindrop size distribution over Indonesia, Ann. Geophys., 31, 1941-1948, https://doi.org/10.5194/angeo-31-1941-2013.