

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-P01\_PG] Equatorial MU Radar project

3-min talk in an oral session

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Keywords: Atmospheric radar, ionosphere observation, Indonesia, MST radar

Research Institute for Sustainable Humanosphere, Kyoto University (RISH) has been studying the atmosphere by using radars. The first big facility was the MU (Middle and Upper atmosphere) radar installed in Shiga, Japan in 1984. This is one of the most powerful and multi-functional radar, and is successful of revealing importance of atmospheric waves for the dynamical vertical coupling processes. The next big radar was the Equatorial Atmosphere Radar (EAR) installed at Kototabang, West Sumatra, Indonesia in 2001. The EAR was operated under close collaboration with LAPAN (Indonesia National Institute for Aeronautics and Space), and conducted the long-term continuous observations of the equatorial atmosphere/ionosphere for more than 10 years. The MU radar and the EAR are both utilized for inter-university and international collaborative research program for long time. National Institute for Polar Research (NIPR) joined EISCAT Scientific Association together with Nagoya University, and developed the PANSY radar at Syowa base in Antarctica as a joint project with University of Tokyo. These are the efforts of radar study of the atmosphere/ionosphere in the polar region. Now we can find that Japan holds a global network of big atmospheric/ionospheric radars. The EAR has the limitation of lower sensitivity compared with the other big radars shown above. RISH now proposes a plan of Equatorial MU Radar (EMU) that is to establish the MU-radar class radar next to the EAR. The EMU will have an active phased array antenna with the 163m diameter and 1055 cross-element Yagis. Total output power of the EMU will be more than 500kW. The EMU can detect turbulent echoes from the mesosphere (60-80km). In the ionosphere incoherent-scatter observations of plasma density, drift, and temperature would be possible. Multi-channel receivers will realize radar-imaging observations. The

EMU is one of the key element in the project "Study of coupling processes in the solar-terrestrial system" for Master Plan 2014 of the Science Council of Japan (SCJ). We show the EMU project and its science in the presentation.