Equatorial MU radar, plan and progress

Mamoru YAMAMOTO[(1)], Hiroyuki HASHIGUCHI[(1)], and Toshitaka TSUDA[(1)(2)]

(1) Research Institute for Sustainable Humanosphere (RISH), Kyoto University
Uji, Kyoto, JAPAN

(2) Research Organization of Information and Systems (ROIS), Tokyo, Japan

Research Institute for Sustainable Humanosphere (RISH), Kyoto University has been studying the atmosphere and ionosphere 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. The EAR, however, had a limited sensitivity to the MU radar as the total output power is just 1/10 to the MU radar. As new facility, we now plan to establish “Equatorial MU (EMU) Radar” just next to the EAR site in Indonesia. The EMU will have an active phased array antenna with the 163 m diameter and 1055 cross-element Yagis. Total output power of the EMU will be more than 500 kW. The EMU is the “MU radar class” facility, and can detect turbulent echoes from the mesosphere (60-80 km). 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” that is one of the important project in the Master Plan 2014 of the Science Council of Japan (SCJ). Last year we applied the project again to SCJ Masterplan 2017, and was awarded as an important project (total 28 projects were selected this time). In the presentation, we show the EMU system and our efforts toward the new facility.