

Study of equatorial atmosphere/ionosphere under RISH/LAPAN collaboration

YAMAMOTO, Mamoru^{1*} ; YATINI, Clara² ; BUDIYONO, Afif² ; HERMAWAN, Eddy² ; HASHIGUCHI, Hiroyuki¹

¹RISH, Kyoto University, ²National Institute of Aeronautics and Space (LAPAN)

The Earth's atmosphere is vertically coupled with atmospheric waves. Momentum/energy transfer from lower to upper atmosphere through wave propagation plays an big role of determining the dynamics of the atmosphere. The energy input from the sun is the maximum at the equator that leads to the intense convection, and then variety of atmospheric waves are generated in the region. The equatorial atmosphere could be regarded as an engine for dynamics of the whole atmosphere. RISH-LAPAN started collaboration for the study of equatorial atmosphere/ionosphere since mid 1980s, and conducted radiosonde observation campaigns, meteor and MF radars, etc. The Equatorial Atmosphere Radar (EAR) was installed over the geographic equator on Sumatra Island in 2001. We continued long-term experiment for more than 10 years, and have found that troposphere-stratosphere airmass exchange is controlled by the modulation of the tropopause by Kelvin waves. Turbulent structures of the tropopause region is also revealed by the EAR. In the ionosphere, spatial and temporal variability of the equatorial Spread-F are clearly observed by the multibeam experiment. With research collaboration with other Japanese university/institutes, the EAR site now became a complete observatory that consists of many instruments, i.e., a meteor radar, a boundary-layer radar, a meteorological radar, lidars, an ionosonde, GPS receivers, etc. The next big project of our own is to improve the EAR ability by building the Equatorial MU radar (EMU) aside of the EAR, which is now included in the Japanese Master Plan. RISH-LAPAN recently obtained a fund of "JSPS Bilateral Joint Research Projects" for FY2014-2016. We will have more chances to discuss collaborative research program for the equatorial atmosphere/ionosphere. In the presentation we summarize our collaboration, and discuss future direction of research including the new EMU.

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