

## Network of satellite beacon experiment for the study of equatorial spread -F from Africa, Asia to Pacific regions

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Equatorial spread F (ESF) is intense ionospheric irregularities that occur around the geomagnetic equator. It can cause intense scintillation to satellite-ground communications, and serious error in the GPS measurements. ESF itself is known as a Rayleigh-Taylor instability that occurs at the bottom side of the equatorial F-region normally after the local sunset period. In the ESF event, plasma depleted region rapidly enhance, and shows fast upwelling upto at most 1000km height. The ESF has been a hot research topic of the equatorial/low-latitude ionosphere for long time. However, day-to-day variability and large longitudinal variation is not well understood. The C/NOFS (Communications/Navigation Outage Forecasting System) satellite was launched in 2008 into the low-inclination orbit to study these aspects of the ESF. We, Japanese researchers, have developed a large network of ground-based observations of the ionosphere in the Southeast Asian region. It includes the Equatorial Atmosphere Radar (EAR) of RISH, Kyoto University, the ionosonde network SEALION of NICT, and optical instrument network OMTI of STEL, Nagoya University. We also have developed the digital satellite beacon receiver named "GNU Radio Beacon Receiver (GRBR)", and started observations in Southeast Asian countries. From TEC results in these regions with C/NOFS, we have successfully showed that longitudinal large-scale wave structure of the ionosphere is in good relationship to the ESF occurrence. In other countries there are many research activities for the ESF. Among them, SRI International (USA) started radar and beacon receiver network on Pacific islands, and Indian scientists study the ESF for long time. In this research program we then try to collaborate with scientists from these groups, and widen our observation network from India to Pacific mainly by enhancing GRBR observations. Also we hope to locate a GRBR in the African region to tackle yet-unknown longitudinal variation of the ESF.

Keywords: Equatorial spread-F, network observations, satellite beacon experiment, Large-scale Wave Structure, radar