

Equatorial Spread F Irregularities Observed with the Equatorial Atmospheric Radar in the West Pacific

Shoichiro Fukao[1], Yuichiro Ozawa[2], Mamoru Yamamoto[1], Hiroyuki Hashiguchi[1], Masayuki Yamamoto[1]

[1] RASC, Kyoto Univ., [2] Infomatics, Kyoto Univ.

A 50-MHz Doppler radar with an active phased-array antenna system, the Equatorial Atmosphere Radar (EAR), has been operated at the equator in West Sumatra, Indonesia (0.2S, 100.32E; geomagnetic latitude 10.63S) since July 2001. The EAR operates with a peak output power of 100kW and a circular antenna array approximately 110 m in diameter. The EAR can view perpendicular to the geomagnetic field to observe 3-m equatorial spread F (ESF) irregularities. The purpose of this paper is to present unique results obtained with EAR. First, the EAR observed that ESF irregularities with east-west scale sizes of 200-500 km traversed with a speed of 100-200 m/s from west to east in a fan shaped altitude-longitude sector. They considerably changed their structures, but well-matured ones are, in general, quite similar to those of the altitude-time sections simultaneously obtained. Second, a tiny structure born within the sector was followed to grow, and growth rate was estimated. It has been found to be in the same order of the magnitude as the one of the gravitational Rayleigh-Taylor instability. Finally, intense ESF irregularities occurred at both east and west edges of the sector after local sunrise. The west one moved toward the east while the east one toward the west, contrary to the nighttime ESF irregularities. The east one gradually disappeared with the sunrise at the 100 km altitude, and left the sector from the west edge with the decay rate of one order of magnitude smaller than the growth rate.