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Statistical study of F-region field-aligned irregularities based on Equatorial Atmosphere Radar in Indonesia

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I examined the statistical characteristics of Field-Aligned Irregularities (FAIs) echoes from the F-region of Ionosphere using Equatorial Atmosphere Radar (EAR) in Indonesia during three years from 2010 to 2012. We investigated the differences between post-sunset and post-midnight FAIs. Some results are analyzed in the daily and monthly average of echo power, spectral width, and Doppler velocity. We found that post-midnight FAIs occurred mostly in summer solstices from May to August in 2010 and 2011, and only in June and July in 2012. We realized some different characteristics between post-sunset and post-midnight FAIs observed from EAR as follow. (1) Echo intensity of the post-midnight FAIs is weaker than that of post-sunset FAIs. (2) The post-sunset FAIs often exceed an altitude of 450 km, whereas the post-midnight FAIs mostly occur in a range from 200 to 450 km in F-region. (3) Spectral width of the post-midnight FAIs is smaller than that of the post-sunset FAIs. These results suggest that plasma instability operates more actively at post-sunset than at post-midnight.

Keywords: F-region Ionosphere, Field-Aligned Irregularities (FAIs), VHF radar