

Statistical study of daytime 150-km field-aligned irregularities observed with Equatorial Atmosphere Radar in Indonesia

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Between 130 and 170 km altitude in the daytime equatorial ionosphere, the so-called 150-km FAIs (Field-Aligned Irregularities) have been observed since 1960's with several VHF radars [Basley, 1964], but generation mechanisms of the 150-km FAIs are still unknown. We report statistical results of the 150-km FAIs observed with the Equatorial Atmosphere Radar (EAR) at Kototabang, Indonesia. Since August 2007, 150-km FAIs measurements have been carried out with the EAR for 5-10 days every month. By analyzing the 150-km FAIs observed with the EAR during a period from August 2007 to October 2009, we have revealed statistical characteristics of the 150-km FAIs over Kototabang. The results of echo intensity about 150-km FAIs can be summarized as follows. 1) We found that occurrence rate of the daytime 150-km FAIs over Kototabang exceeded 60% during a periods from May to August, but that the occurrence rates in March and April were less than 30%. 2) We investigate seasonal variation of sporadic E layer with ionogram at Kototabang. That variation is coincident seasonal variation of 150-km FAIs except December. 3) Altitude of 150-km FAIs is highest in November (155km) among a year, and amplitude of the altitude variation during a day is small in April and November. 4) Zonal asymmetry of the echo intensity of the 150-km FAIs was seen in all seasons higher on the eastward beam than on the westward beam. Such a zonal asymmetry of the echo intensity was also seen in upper E-region FAI (105-120km). We investigated drift velocities of 150-km FAIs. The results can be summarized as follows. 1) The averaged southward perpendicular drift velocity is consistent with that taken from the empirical model of vertical plasma drifts in the F-region [Scherliess and Fejer, 1999]. 2) The averaged zonal velocity of the 150-km FAIs is westward, but amplitude is smaller than the F-region zonal drift velocity [Fejer et al., 1991] and zonal drift velocity of the 150-km FAIs observed at Jicamarca.

Keywords: ionosphere, radar, FAI, equatorial region, ionospheric irregularity