

VARIABILITIES OF E REGION FAI OVER GADANKI AND THEIR RELATIONSHIP TO LONG PERIOD WAVE OSCILLATIONS

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Abstract:

In this paper, we present diurnal, seasonal and day-to-day variabilities of the low latitude E region Field-Aligned Irregularities (FAI) observed using the MST radar located at Gadanki (13.50 N, 79.20 E, Dip 6.30 N). An attempt has also been made to study the signature of long period wave oscillations in the FAI which are known to exist in the middle atmosphere. Several attempts have been made at mid-latitudes on the control of long period waves in the FAI generation and they have shown that there is a significant co-relation between E region FAI and the long period wave activities. It may be noted that since radar observations on low latitude E region is very limited, the generation of E region FAI and their variabilities over low latitudes are not fully understood. Keeping this in mind, we have operated radar continuously for 15 minutes for every 6 hours daily since October 2002. The observations show that while the E region FAI are weak during daytime and found to occur in the form of thin layers below 100 km, they are found to extend to altitudes as high as 140 km and are found to be highly structured than that of daytime. Seasonal characteristics show that the FAI are found to be stronger during summer and equinox than during winter. The investigations made on the day-to-day variabilities on the backscatter echoes of the E region FAI show signature of the planetary scale wave activities. The results addressing the short and long term behaviors constitute the first such investigation on the relationship of FAI and long period waves from low latitude station. These are compared in detail with that of mid-latitudes and discussed critically in view of latitudinal difference involved and the proximity of Gadanki to the electrojet.