New Aspects of F Region Plasma Irregularities Revealed by the Gadanki Radar

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F region irregularities studied so far from Gadanki have been based on observations made during the equinoxial periods. During 2008 and 2009, we have made observations during summer in addition to the equinoxes. Several new features have been registered in the summer observations that cannot be accounted for by the processes that often do for the equinoxial observations. Their occurrence in the postmidnight hours of summer, when the F region plasma density is below the detectability limit, extending to 600 km and beyond calls for an interpretation in terms of governing physical process. Considering that the nighttime Es activity is the strongest in the mid-night hours of summer, we have searched for the possible linkage between the two processes. Having known that the midlatitude F region irregularities are closely related to the Es activity, finding similar clue for low latitude would provide a significant path forward to understand the E-F region coupling processes in detail. In this paper we will present the new results acquired at Gadanki, compare them with those made during the equinox including those of other longitudes, and a detailed investigation on these keeping the possible role of Es activity.