

Atmospheric boundary layer structure during southwest monsoon period using L-band UHF radar

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The lower portion of the Atmosphere called Atmospheric Boundary Layer (ABL) is characterised by a Low Level Jetstream (LLJ) around 850 hPa associated with southwest monsoon season. This LLJ has an active role in the propagation and maintaining the rainfall activity during this period. Diurnal structure of LLJ can be directly linked to the variations in the boundary layer depth. An L-band wind profiler-commonly referred as lower atmospheric wind profiler (LAWP) was installed at Gadanki (13.50N, 79.20E), Andhra Pradesh, India and \sim 370 m above msl. The ABL characteristics have been closely examined from the three components of the wind and associated reflectivity during the non rainy days and during active and weak phases of southwest monsoon period. From the zonal wind it is noticed that the LLJ is not established during May, even then the westerlies with 5 ms⁻¹ are seen in early morning hours (\sim 6 am) in height of 1 km and during daytime the entire boundary layer is easterlies. From June onwards the LLJ is getting strengthened and the maximum speed is found in the early morning hours over a wide area around 1.3 km and core of maximum wind is elevated to about 2.8 km in the after noon hours, it is due to the development of the convective boundary layer. During this situation the height of the mixed layer (CBL) is increased due to the thermal activity from the ground. This mode of variations is noticed in all the days considered. The maximum wind speed is \sim 25 ms⁻¹ in the 8 am at about 1.4 km in the month of July. The diurnal evolution is same as that of the earlier month and this type of diurnal feature is clear in all monsoon months. The ABL structure due to wind during active and weak phases of southwest monsoon have considerable variation in wind directions and also in magnitude.