

Coupling between Monsoon Low Level Jet and Tropical Easterly Jet and its Impact on Monsoon Rainfall: A case study using 205 MHz ST Radar

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The Advanced centre for Atmospheric Radar Research (ACARR) is operating a state-of-the-art and unique stratosphere-troposphere wind profiler radar at 205 MHz frequency. This radar setup primarily for the study of dynamics of the Indian summer monsoon has been providing accurate, three dimensional wind profiles for an altitude range of 315 m to 20 km. In this paper we study the characteristics of the monsoon low level jet (MLLJ) and the tropical easterly jet (TEJ), which are two important components of monsoon circulation. The variability of MLLJ and TEJ and their association with monsoon rainfall observed over Cochin (10° N) is studied for the monsoon season of 2016. The MLLJ core speed varies between 9–50 ms⁻¹ showing a decreasing trend towards the end of September, when the monsoon is in its withdrawal phase. The MLLJ core height also shows variations with maximum and minimum values of 0.76 km and 4.95 km, respectively. The range observed for TEJ core speed lies between -56 and -15 ms⁻¹ whereas the core height lies within a range of 14–19 km. The coupling between MLLJ and TEJ and their relation to vertical velocity at 850 hPa is investigated. It is observed that increase in the core wind speed difference between MLLJ and TEJ favors the development of the ascending motion in the lower troposphere. We also investigate the variations in TEJ and MLLJ and the link with the monsoon rainfall observed over India.