

Low level wind characteristics over Cochin, India during the 2018 Monsoon Flood as observed with a 205 MHz wind Profiling Radar

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The present study analyses the characteristics of remotely sensed wind data from a VHF wind profiler to understand the features of the monsoon low level jet during the historical deluge that occurred in Kerala, India in the monsoon months of 2018. A major flood-induced disaster occurred during the period 09-16 August 2018. The sophisticated radar installed at the Advanced Centre for Atmospheric Radar Research (ACARR), Cochin University of Science and Technology, Kerala, and operating at 205 MHz, provides high spatial (45 m) and temporal (~10 minutes) data of all the three wind components. Deep convective clouds which were advected from the eastern Arabian Sea led to the unprecedented flood situation, which was obvious from the wind profiler data. The radar data was screened for data quality and examined for its daily variation during the flood event. It is observed that the monsoon low level jet showed an increasing tendency during the major event, and crossed a threshold value of around 18 ms^{-1} on many days. The Radar is capable of acquiring vertical profiles of all the three components of wind from 315 meter to beyond 20 km, and the vertical shear also could be studied. On many occasions, the depth of the westerlies was large enough ($> 7 \text{ km}$ depth) to bring in ample moisture on to the land area from the adjoining Arabian Sea. It is observed that the high content of moisture due to enhanced speed and depth of westerlies could create havoc in the State. Detailed results with a numerical weather prediction model (WRF) is also presented. The Model could simulate the large-scale features reasonably well over the State. A comparison is made between winds obtained from the WRF and from the Radar.

Keywords: Stratosphere-Troposphere Radar, 205 MHz, Kerala Flood