

Behavior of predicted convective clouds and precipitation in the high resolution Unified Model over the Indian summer monsoon region

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Abstract: National Centre for Medium Range Weather Forecasting high-resolution regional convective-scale Unified Model with latest tropical science settings is used to evaluate vertical structure of cloud and precipitation over two prominent monsoon regions: Western Ghats (WG) and Monsoon Core Zone (MCZ). Model radar reflectivity generated using Cloud Feedback Model Inter-comparison Project Observation Simulator Package along with CloudSat profiling radar reflectivity is sampled for an active synoptic situation based on a new method using Budyko's index of turbulence (BT). Regime classification based on BT-precipitation relationship is more predominant during the active monsoon period when convective-scale model's resolution increases from 4 km to 1.5 km. Model predicted precipitation and vertical distribution of hydrometeors are found to be generally in agreement with Global Precipitation Measurement products and BT-based CloudSat observation, respectively. Frequency of occurrence of radar reflectivity from model implies that the low-level clouds below freezing level are underestimated compared to the observations over both regions. In addition, high-level clouds in the model predictions are much lesser over WG than MCZ.

Keywords: High-resolution models ,BT, COSP, CloudSat,