

Mesoscale Simulation of Off-Shore Trough and Mid-Tropospheric Cyclone associated with Heavy Rainfall along the West Coast of India using ARMEX Reanalysis

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Abstract In this paper, the evolution of the off-shore trough is examined along with the corresponding mid-tropospheric cyclone (MTC) over the west coast of India during 07-09 August 2002, using the mesoscale model MM5. A detailed examination of the MTC, which formed over the northwest Arabian Sea off Gujarat coast (21.5o N, 72.0o E) on August 07, 2002 is done besides discussing the corresponding heavy rainfall (recorded amount 24 cm per day in the west coast of India) event. The combination of offshore trough corresponding to MTC is very rare feature along the west coast of India. Due to its interesting meteorological features, the event has been chosen for simulation with MM5. The mesoscale simulation experiments are performed from 0000UTC on August 07 to 0300UTC on August 09, 2002 with ARMEX (Arabian Sea Monsoon Experiment) data. An additional experiment is conducted using NCMRWF (National Centre for Medium Range Weather Forecasting, India) operational data for comparison purpose. The results indicate that the experiment using ARMEX data captured the well-organized MTC over the Arabian Sea off Gujarat coast at 500hPa level better as compared to the one which used NCMRWF data. Further, these results closely agree with Era Interim reanalysis as well. Though the distribution of rainfall associated with the convective systems is well simulated by the experiment which uses ARMEX data, it doesn't show abundant enhancement with respect to rainfall quantity. The 75hrs simulation using ARMEX data, shows positive impact due to the assimilation of ARMEX-I observations in the GDAS (Global Data Assimilation System) at NCMRWF.