WCRP-JNU Training School on Monsoon Variability in Changing Climate

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Area of work

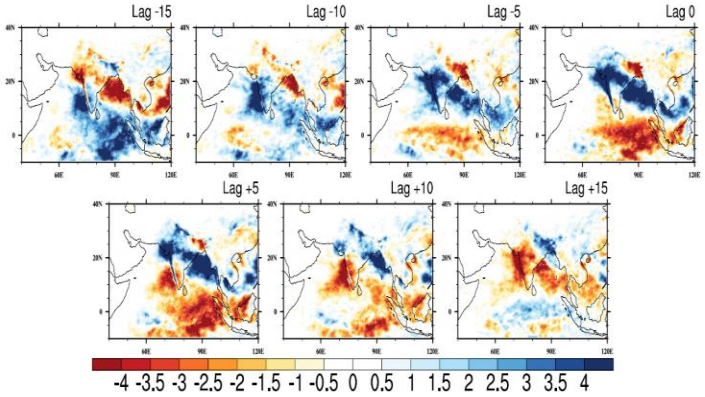
- I am concerned with research on the study of monsoon intraseasonal oscillations (MISOs) and its forecast evaluation.

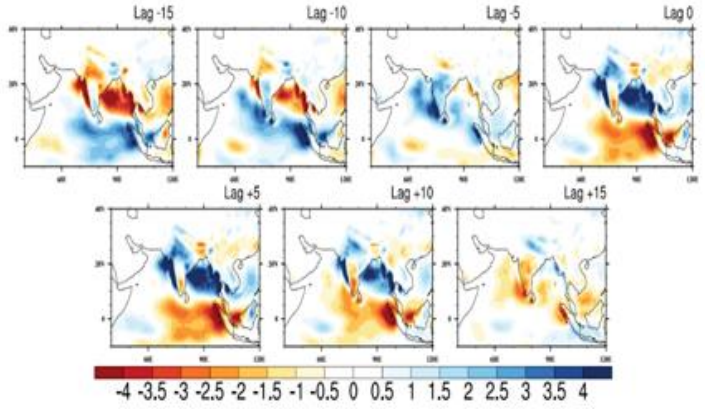
- I have evaluated the forecast dataset of NCEP Ensemble Prediction System (EPS) and Climate Forecast System version 2 (CFSv2) for the prediction of MISO.

- I am also working for the forecast verification of Global Ensemble Forecast System (GEFS). The verification is done with respect to various statistical scores such as Bias score, Equitable Threat Score and so forth.

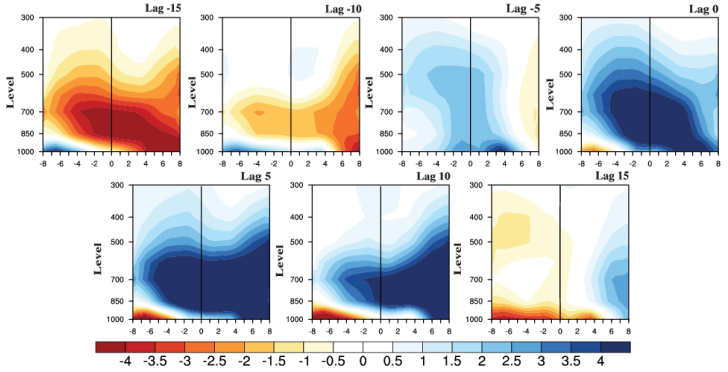
Evaluation of NCEP TIGGE short range forecast for Indian summer monsoon intraseasonal oscillation

This study focuses on the short-range prediction of Monsoon Intraseasonal Oscillations (MISOs) using the National Centers for Environmental Prediction(NCEP) Ensemble Prediction System (EPS) data from The Observing System Research and Predictability Experiment (THORPEX) Interactive Grand Global Ensemble (TIGGE) archive. The present analysis is done by using daily forecast data for up to 7-day lead time and compared with observations.

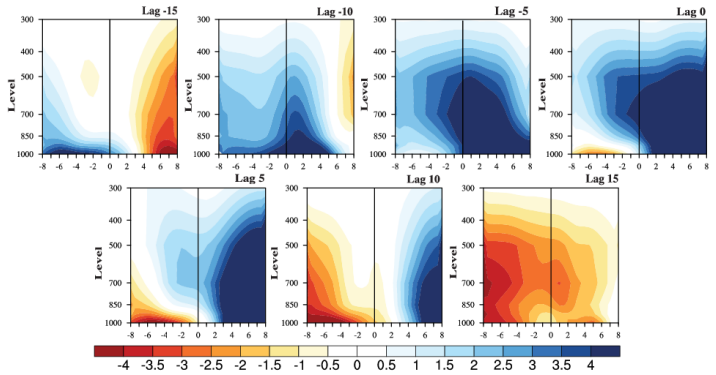




Observation
←TRMM
NCEP R1 →
(sp.humidity)

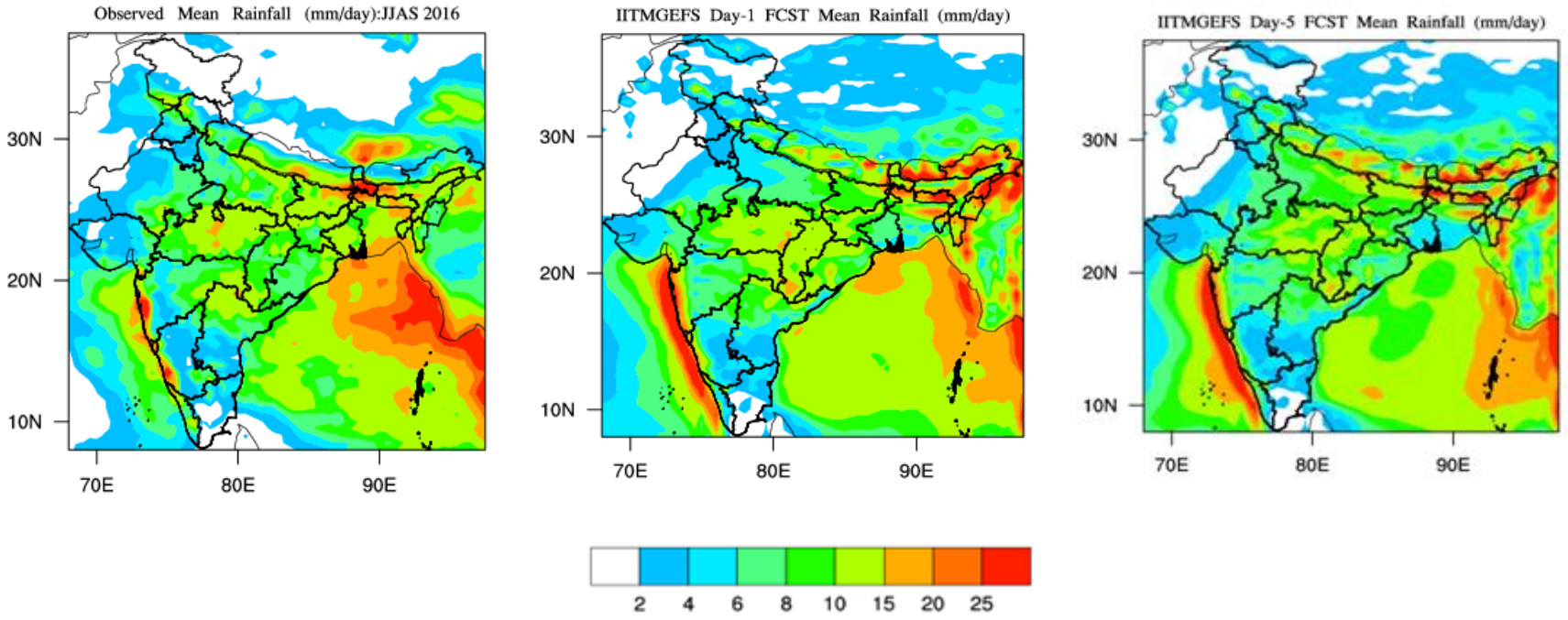


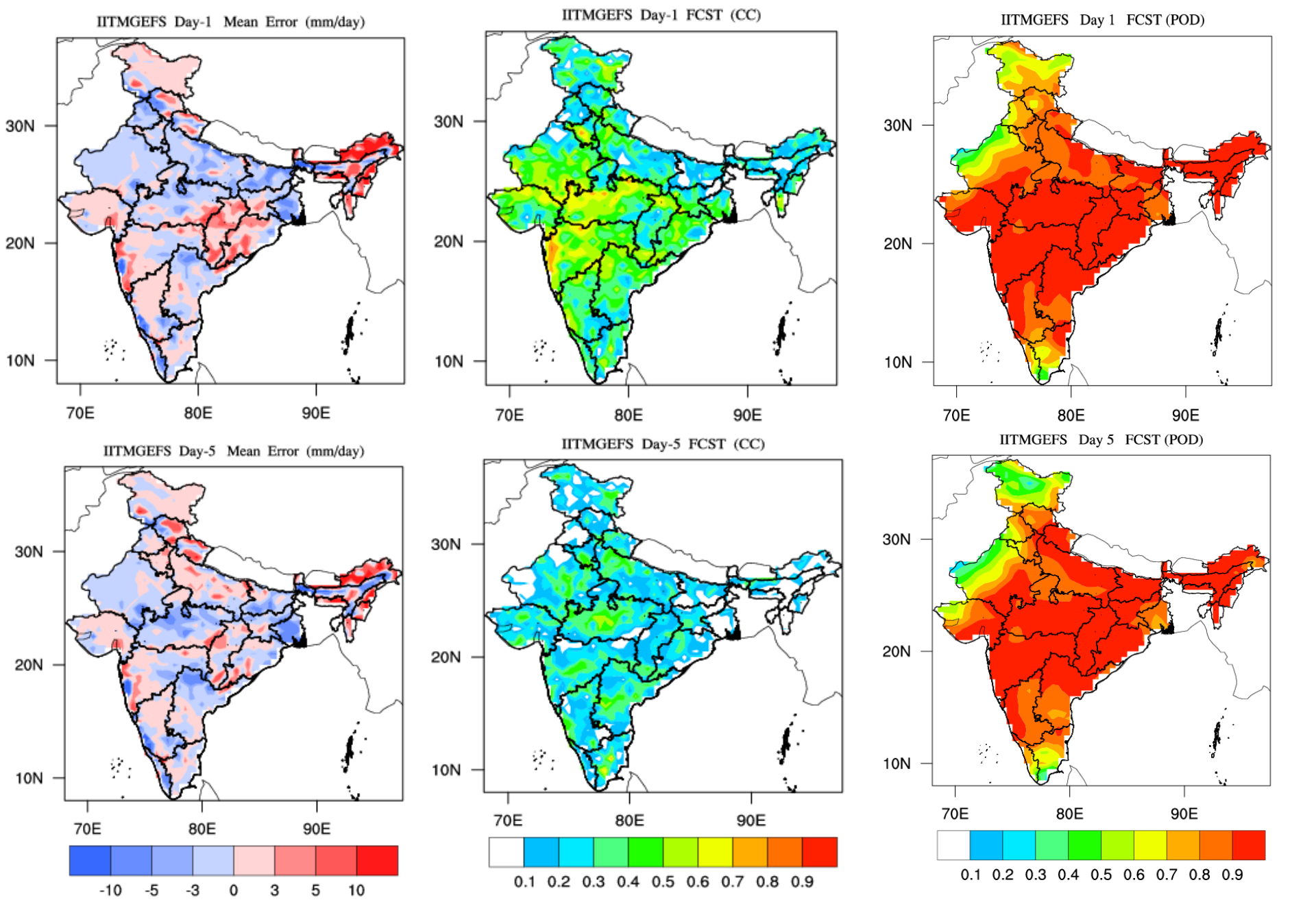
Forecast
←168 h
96 h →



Verification of Global Ensemble Forecast System (GEFS) T574

The Global Ensemble Forecast System (GEFS) T574 L64 (about 34 km on equator) with 21 ensemble members is running operationally once in a day (00 UTC) since June 2016 to give 8 days probabilistic forecast.





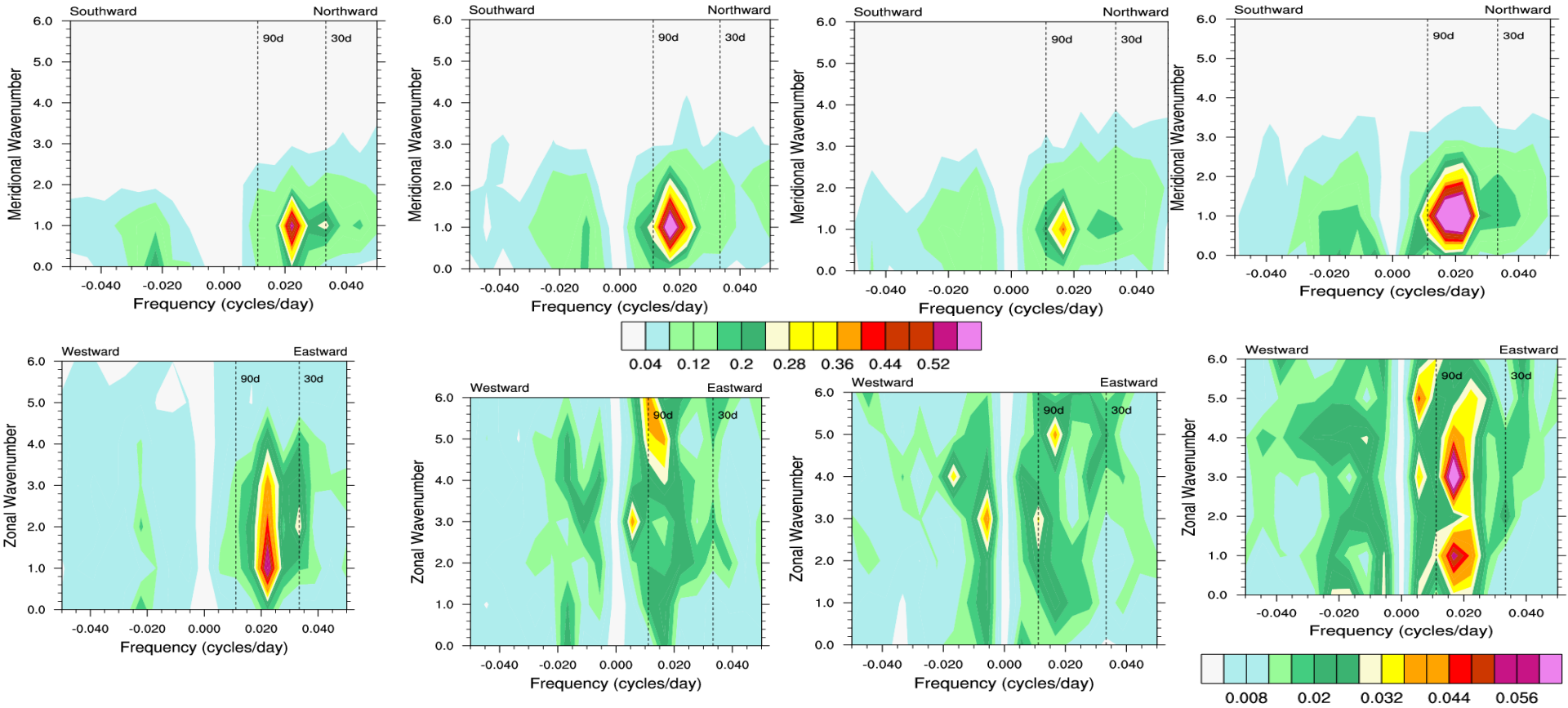
The GEFS T574 shows promising results and fares better than the deterministic forecast.

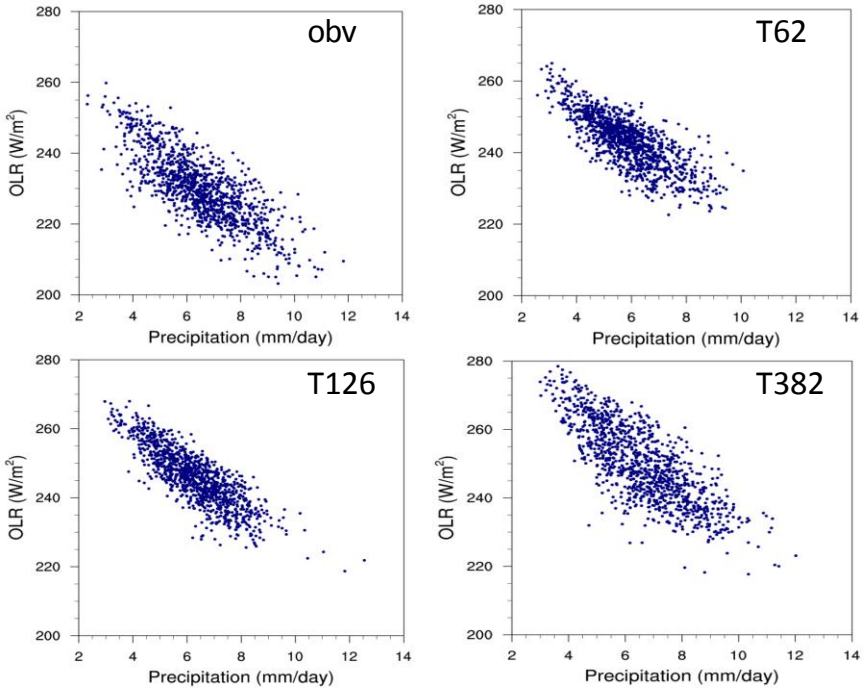
Thank you

Impact of model resolution in the simulation of Monsoon Intraseasonal Oscillation in Climate Forecast System Version 2

Another work being carried out is the analysis of Climate Forecast System version 2 (CFSv2) forecasts generated at IITM at three horizontal resolutions (T62, T126 and T382) in simulating the Monsoon Intraseasonal Oscillation (MISO) of the Indian summer monsoon (ISM). Objective of this work is to analyze the impact of change in model resolution alone on the forecast skill and accuracy.

TRMM T62 T126 T382





The distribution of rainfall shows the rain to be concentrated towards low rain and high OLR indicating the presence of shallow clouds or convection. There are negligible events corresponding to high rain and low OLR which shows the absence of deep convection. Hence the models fail to generate deep convection even if we are increasing the model resolution. The domain used here is (15˚S-30˚N, 60˚E-100˚E).

The bias in moist static energy is high over Indian landmass which shows that the instability is low over the region in the models. Due to this low instability deep convection cannot take place and thus we get much more rainfall from shallow convection.

Hence this work shows that with higher resolution up to certain extent model shows improvement but for achieving higher model fidelity, physical parameterization suitable for higher resolution needs to be implemented.