“Monsoon Par Charcha”
मानसून पर चर्चा
Monsoon Discussion Forum of 2024

short and medium-range products
(inputs from IITM and NCMRWF)

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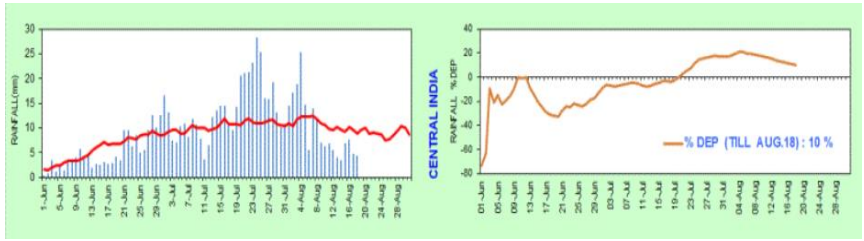
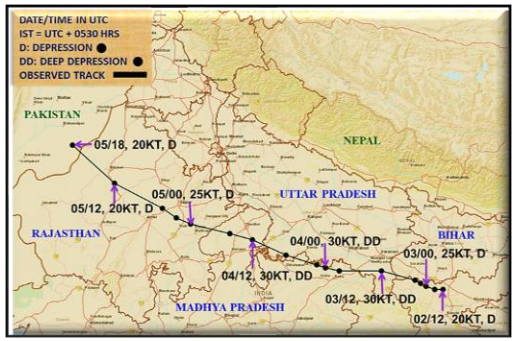
Outline

- Monsoon 2024
  - *Active phase (19-27 July 2024)*
  - *Deep Depression over Land (02-05 August 2024)*
- Forecast
- Special products
- Km scale modelling

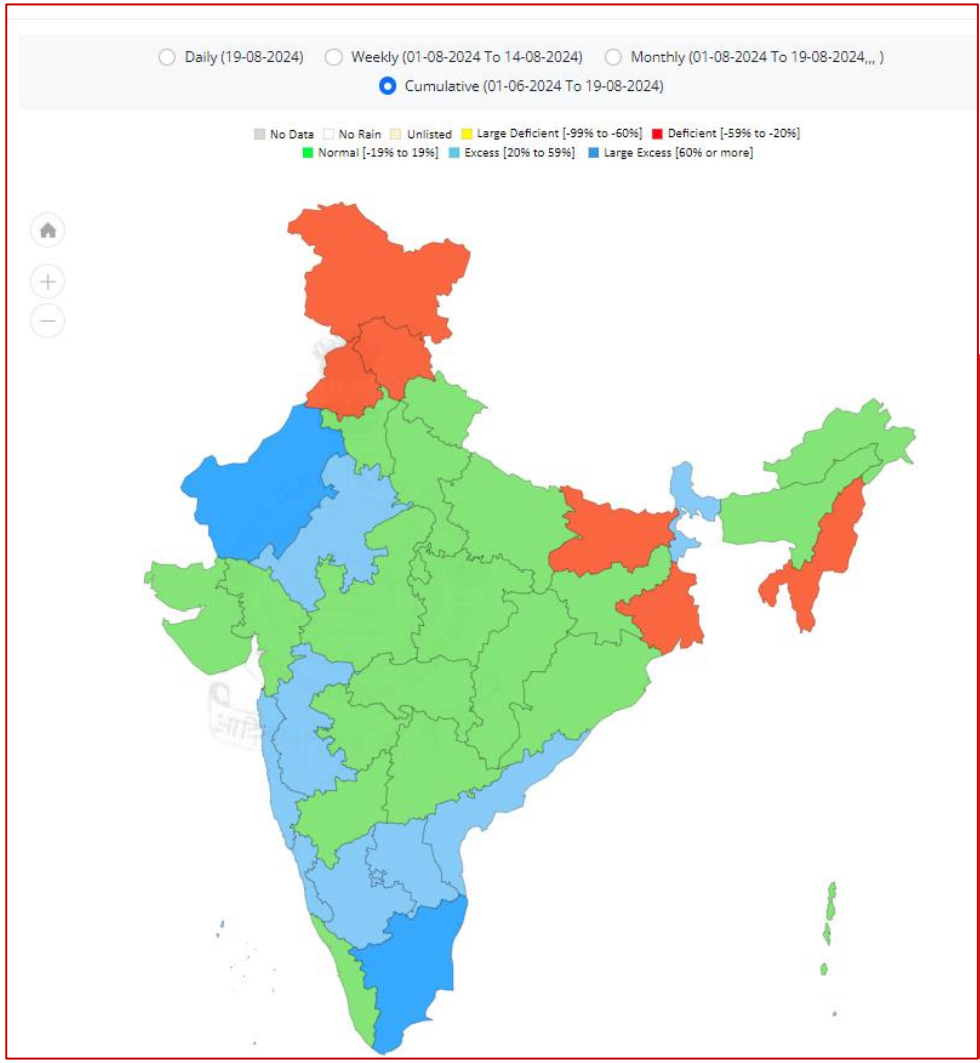


Source : IMD



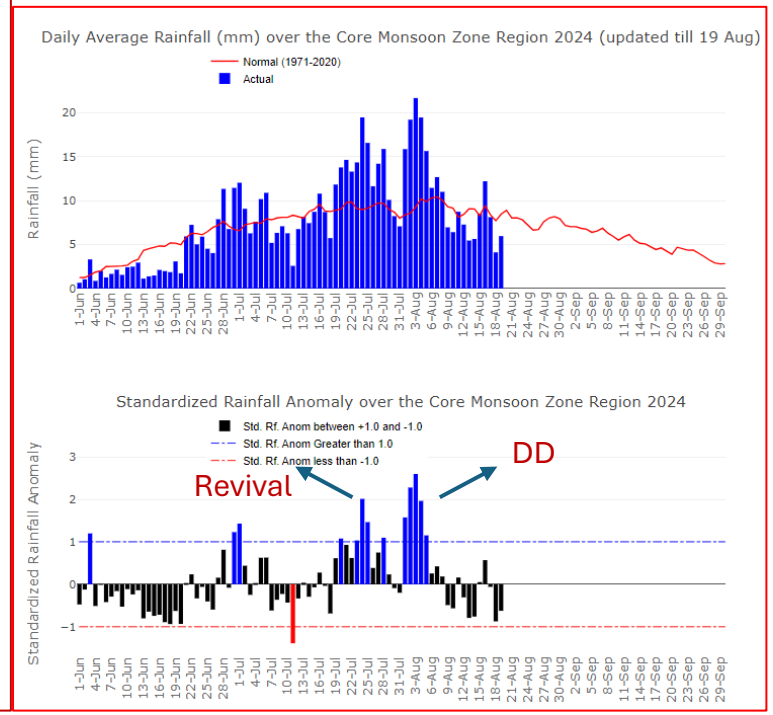
Source: IMD

Monsoon 2024



- Meteorological subdivisions in central and East India - normal rainfall
- Southeast Peninsular India – excess rainfall
- Northwest India – Excess rainfall

(climatologically dry region, synoptic system during first week of August)

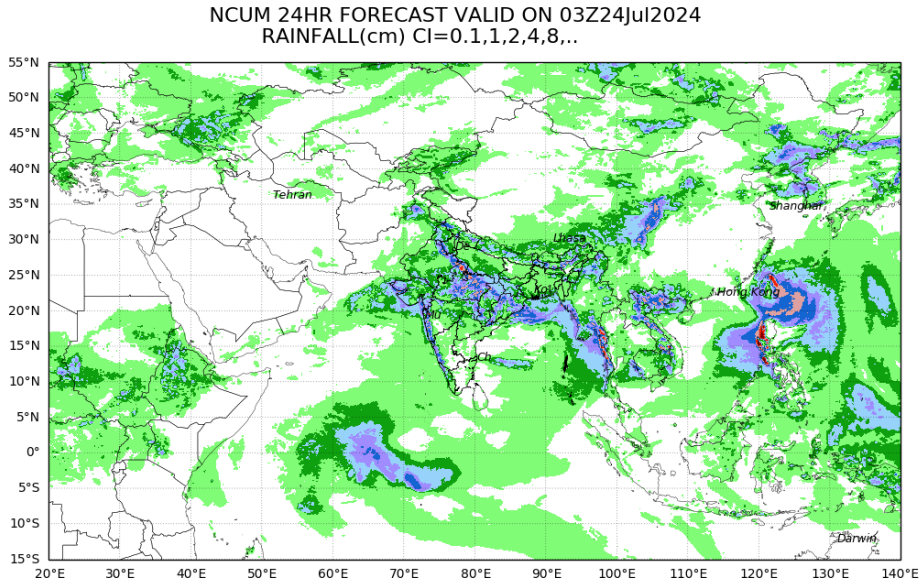


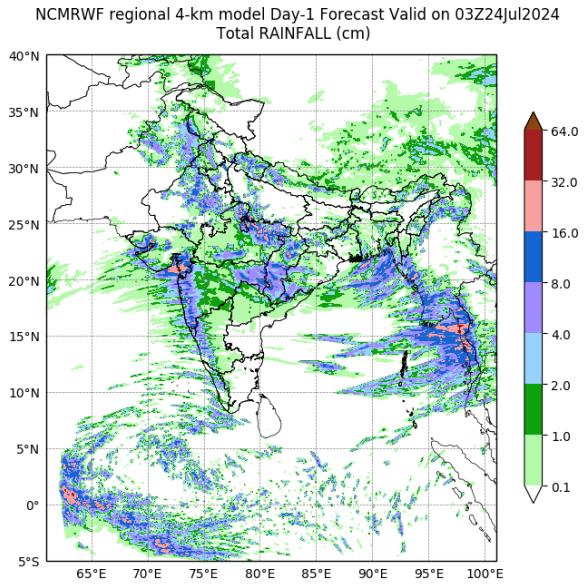
- Monsoon onset in 2024 was “early” (*due to established cyclonic storm “REMAL” - IMD*)
- By 2nd July 2024 it covered the entire country.
- Monsoon Revival from break – 3rd week of July

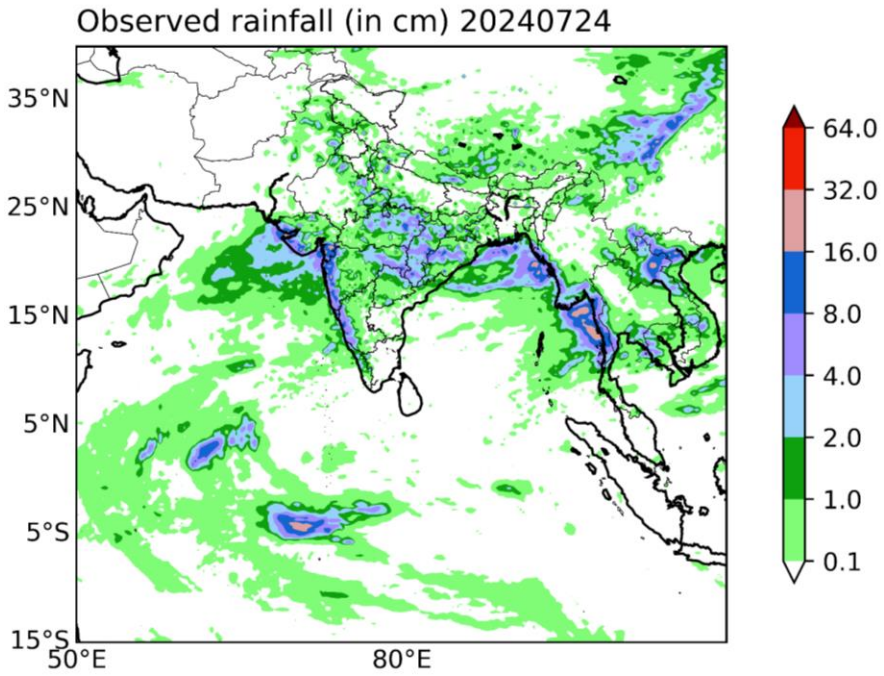
Source: IMD

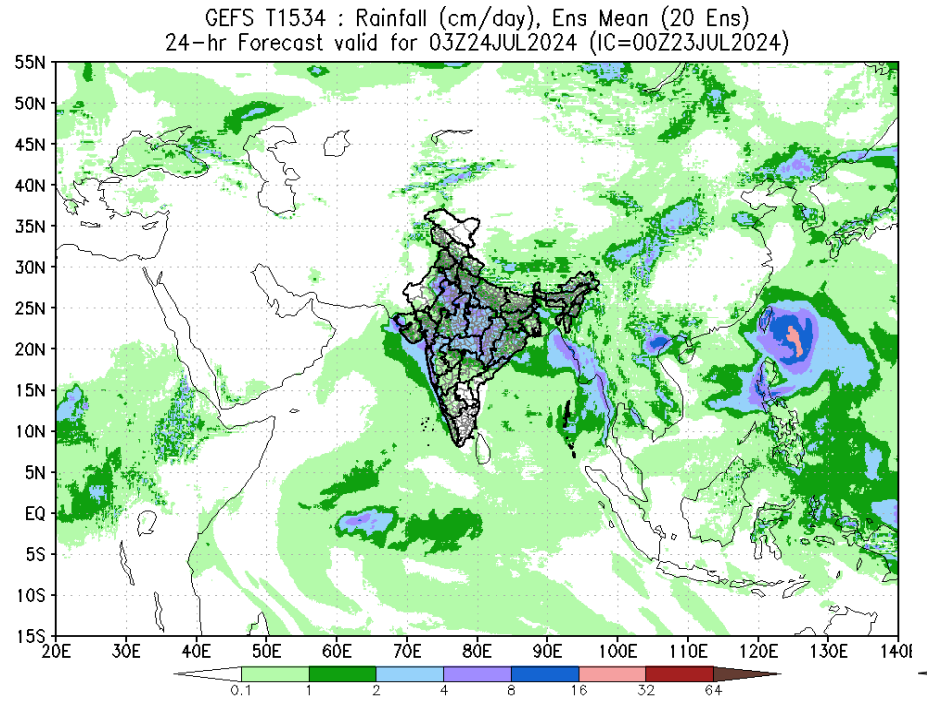
Peak active day (24th July 2024) (Day – 1 forecast)

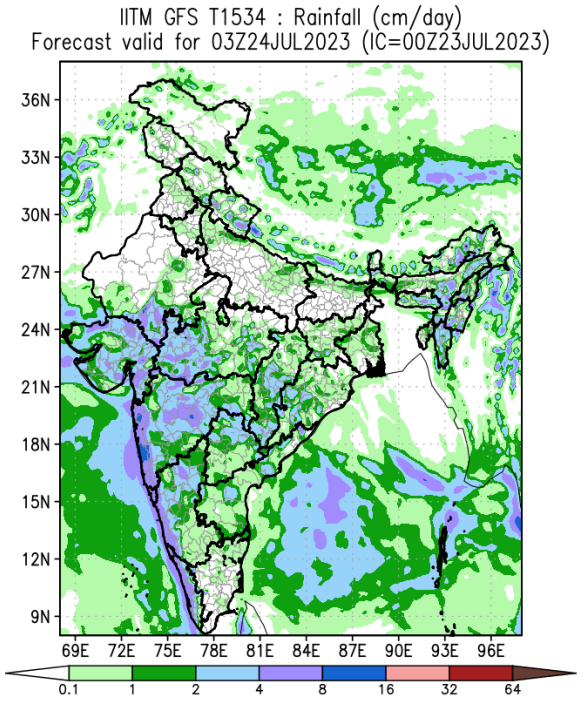
- Rainfall maxima – tilting rain band
- Convection over the Bay of Bengal.
  (*different in GFS)*
- GEFS ensemble mean performance is better
- Overestimation of rainfall amounts
  NCUM *(Global and regional)*



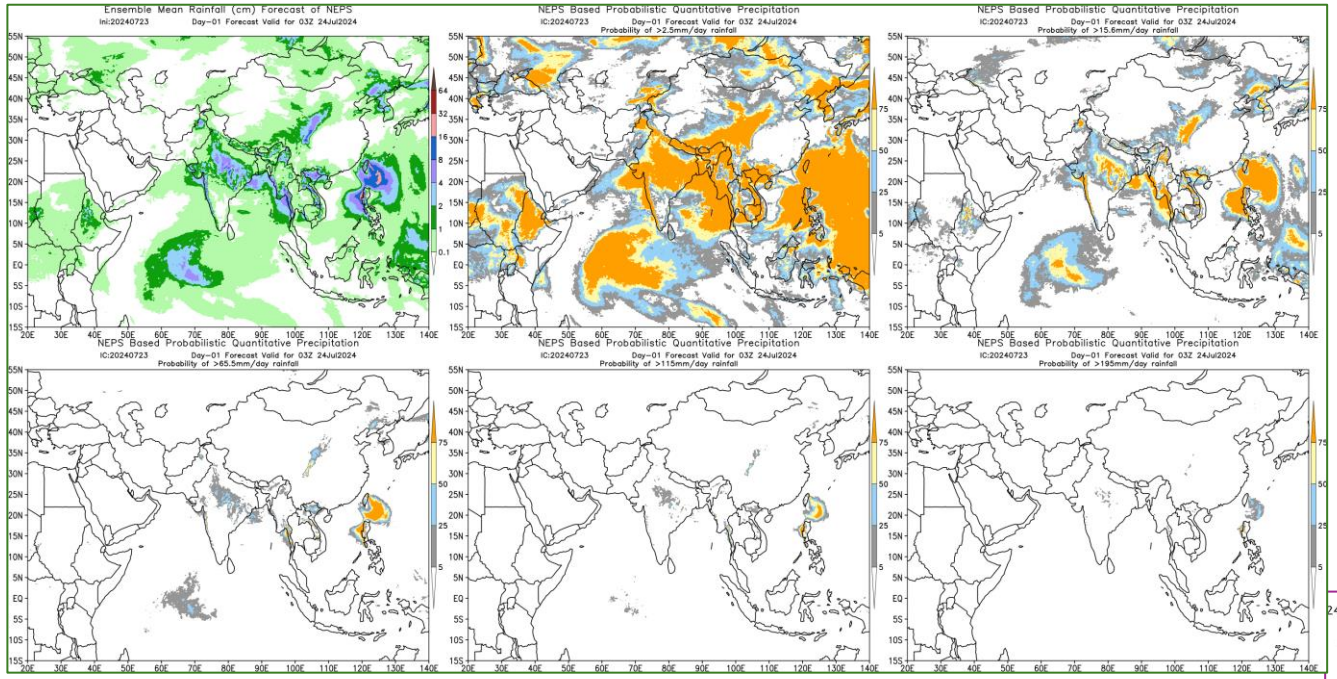


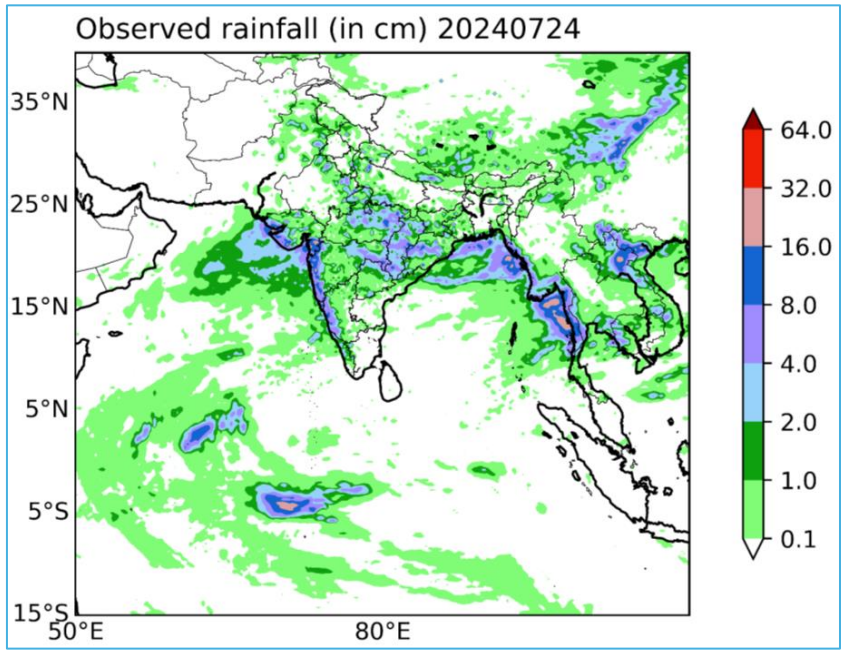






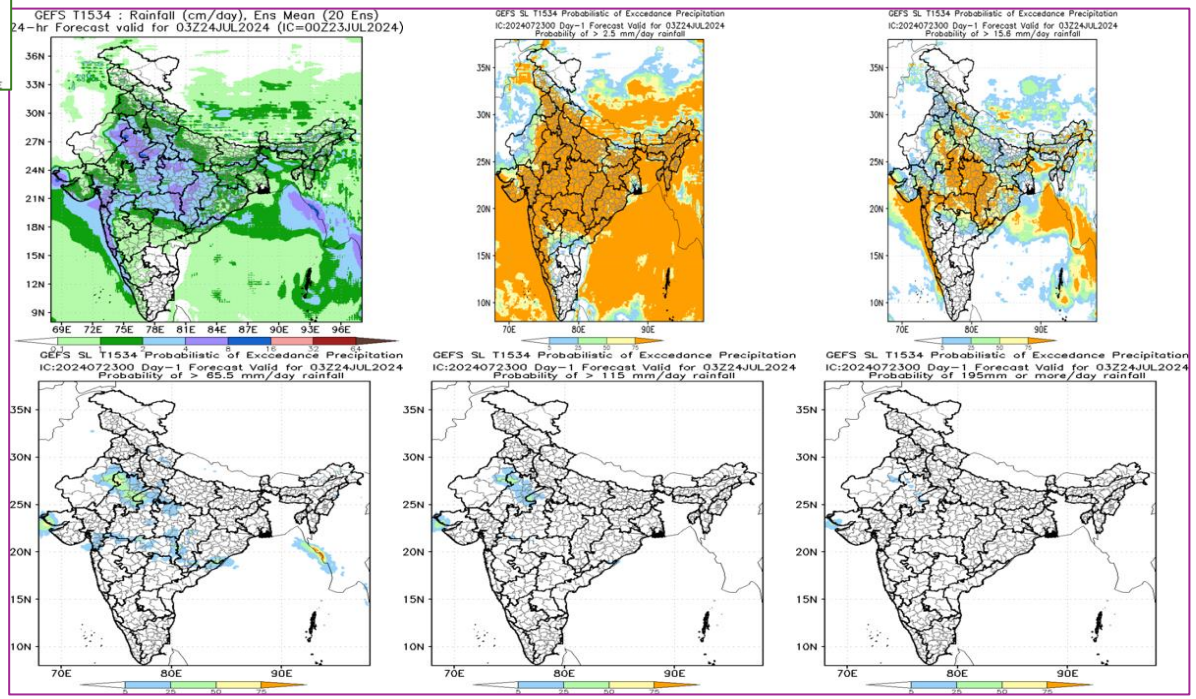
Probabilistic forecasts (Day-1 forecast 20240724)





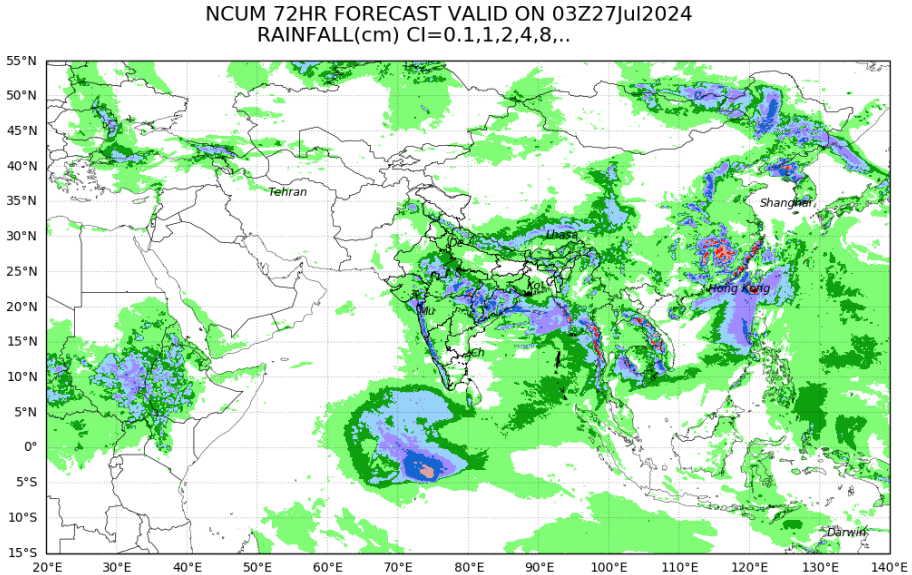
Both NEPS and GEFS exhibit – spatial rainfall patterns with observations.

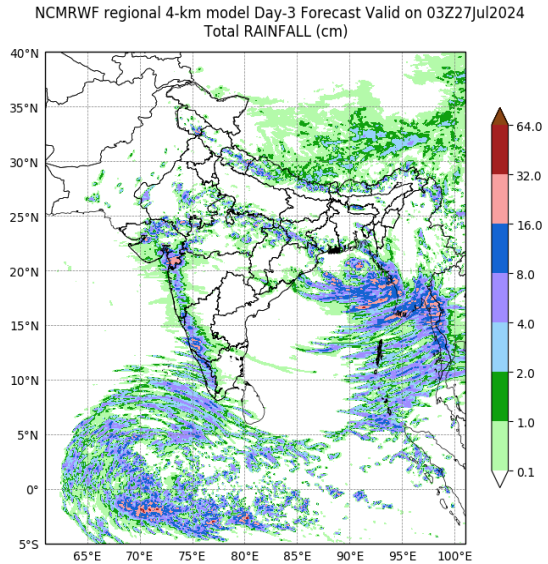
Rainfall >115mm/day is both EPS systems

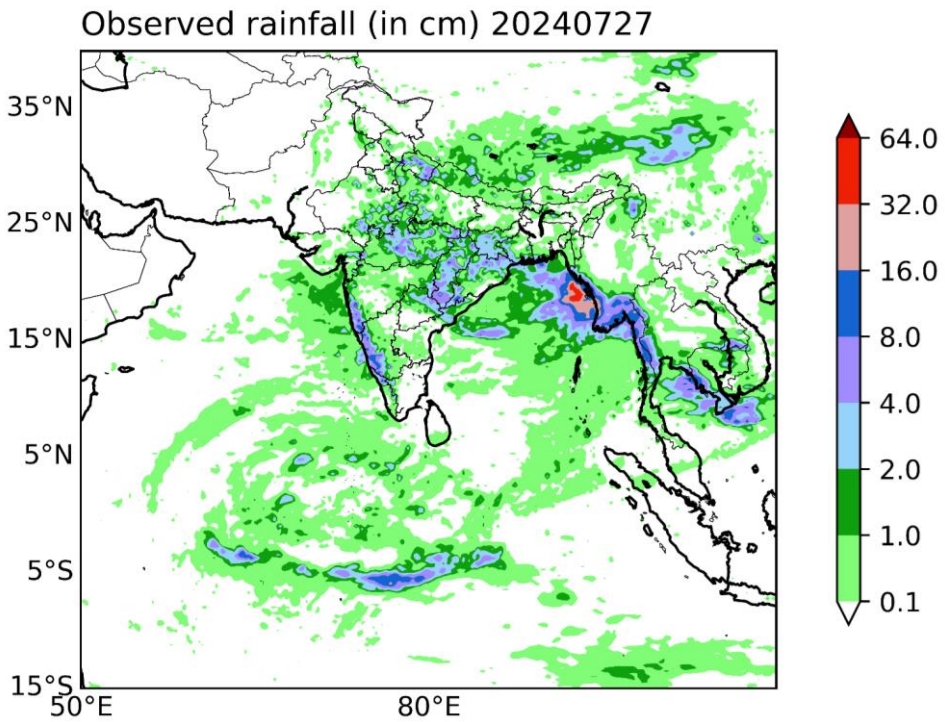


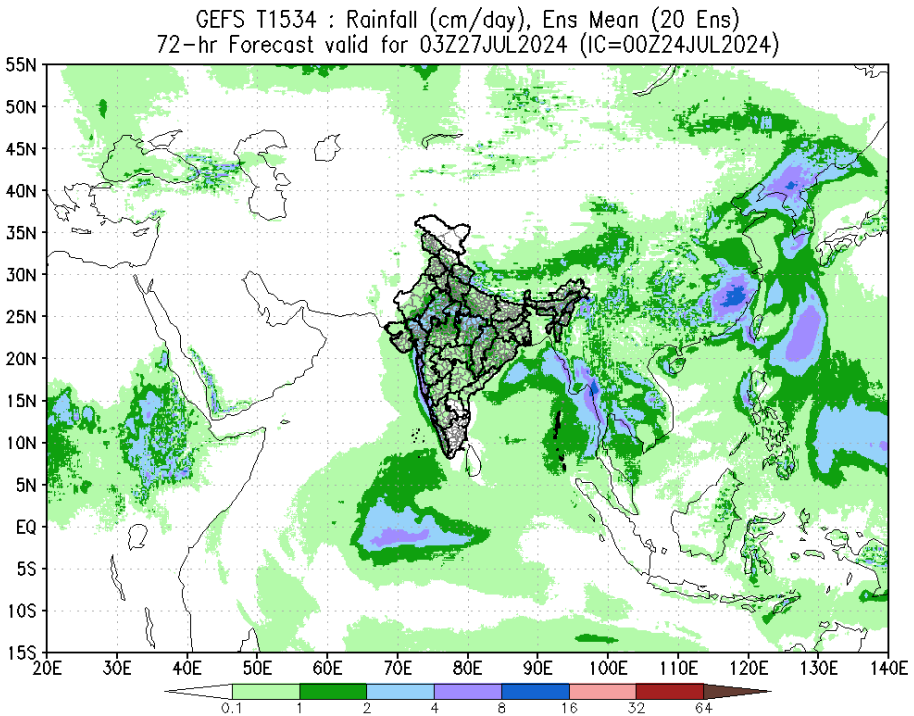
27th July 2024
(Day – 3 forecast)

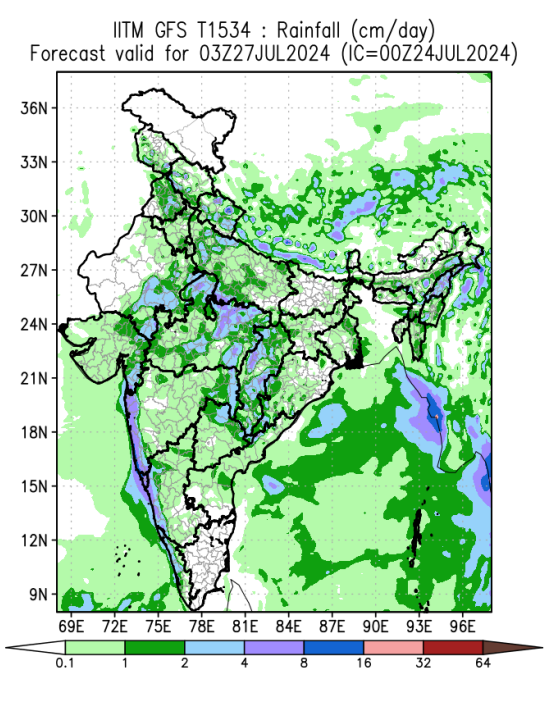
- Overestimation of Western Eq. Indian Ocean convection in NCUM Global model
- Convection over the Bay of Bengal.
  (*different in GFS)*
- GEFS ensemble mean performance is better



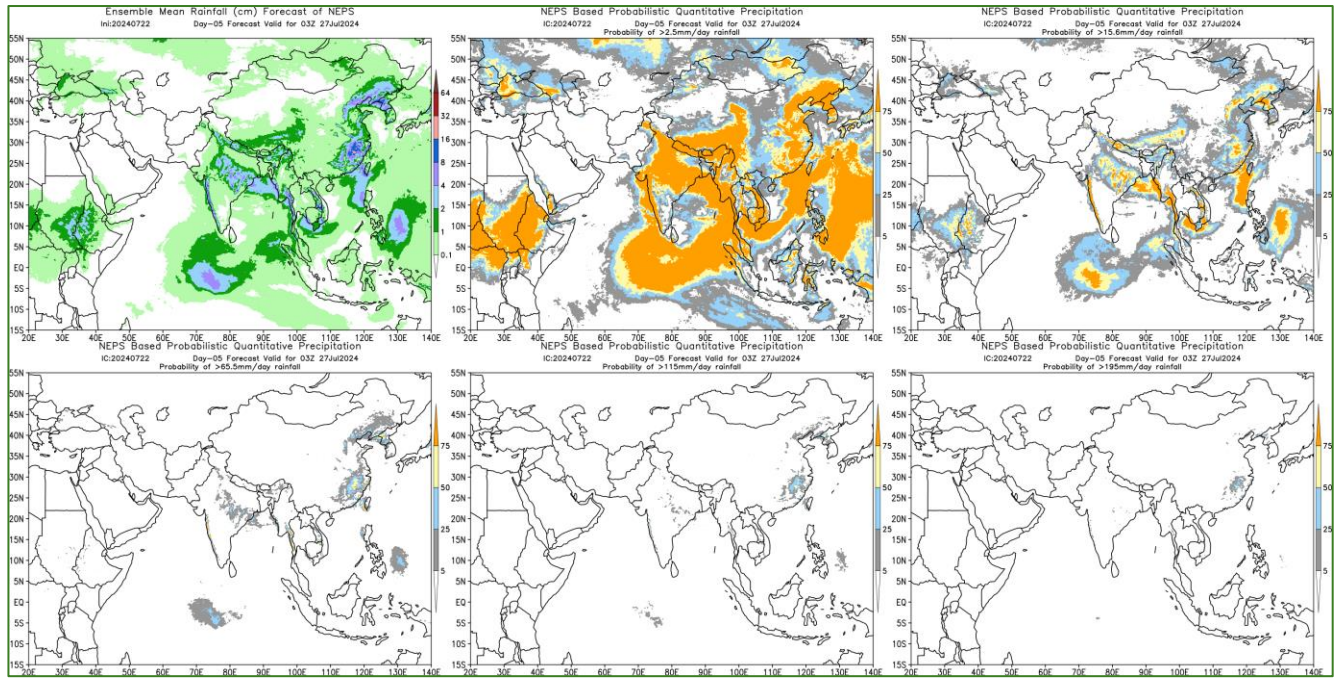


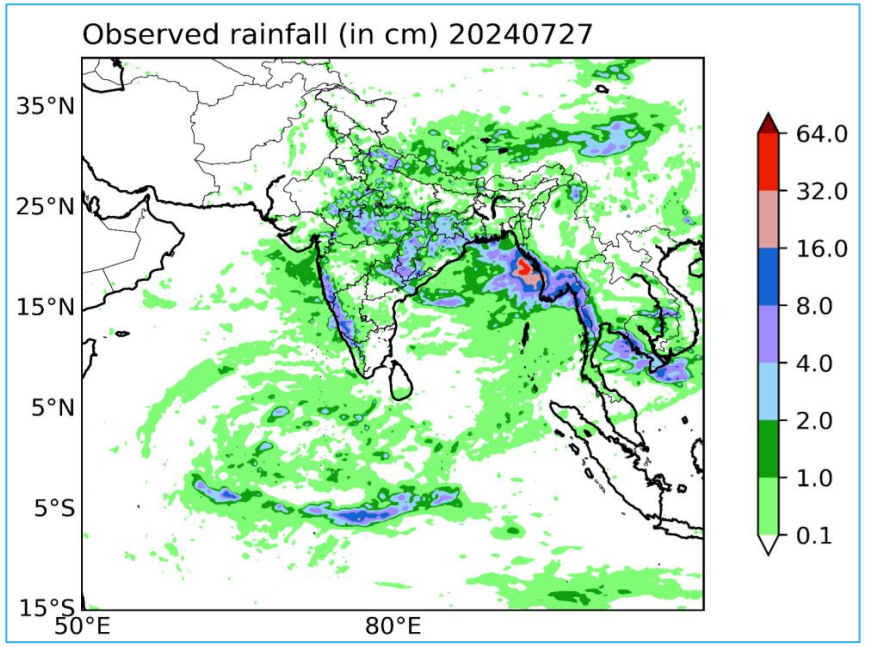






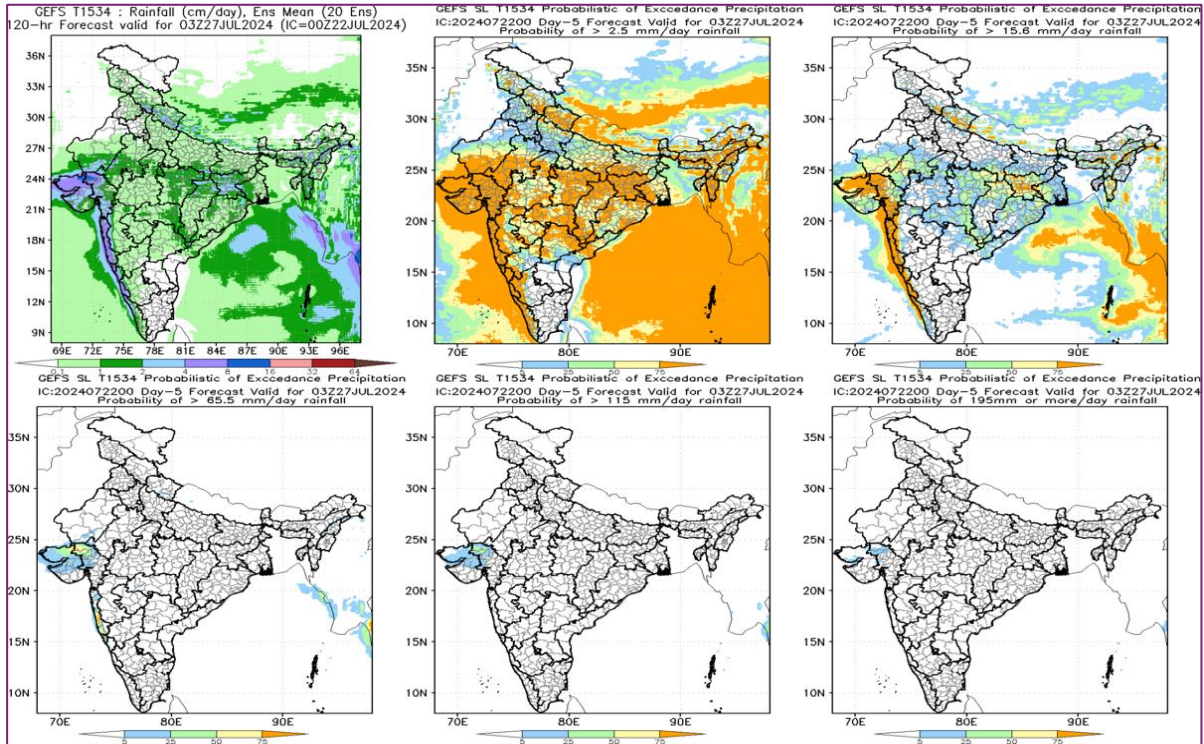
Probabilistic forecasts
(Day-5 forecast 20240727)



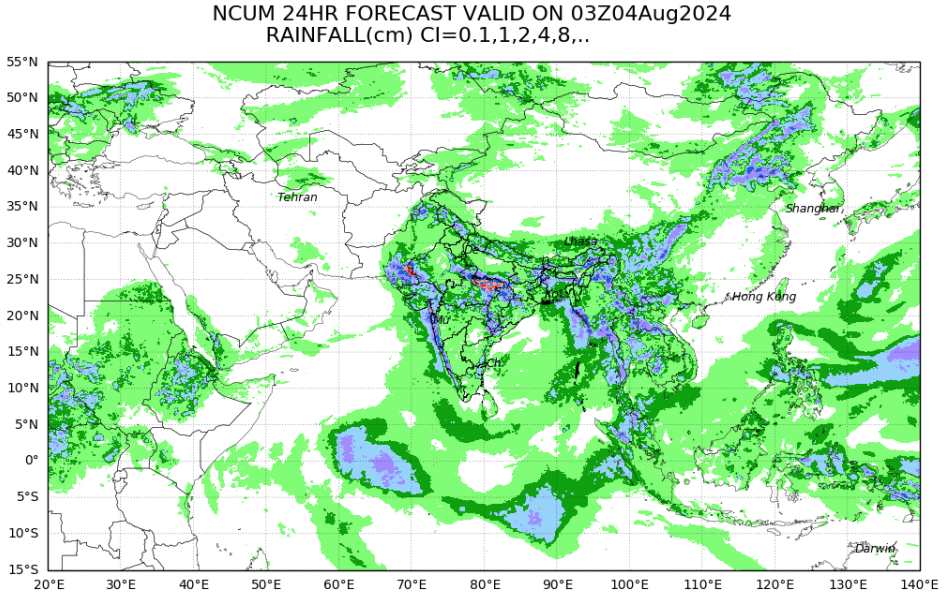


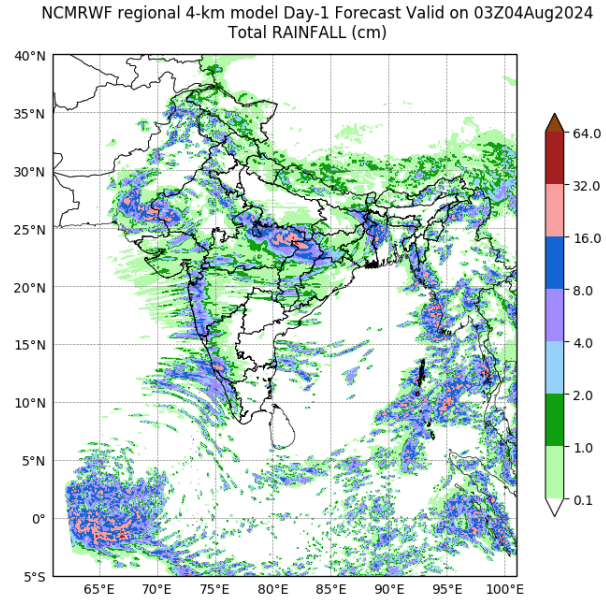
Overestimation - land convection (Gujarat)

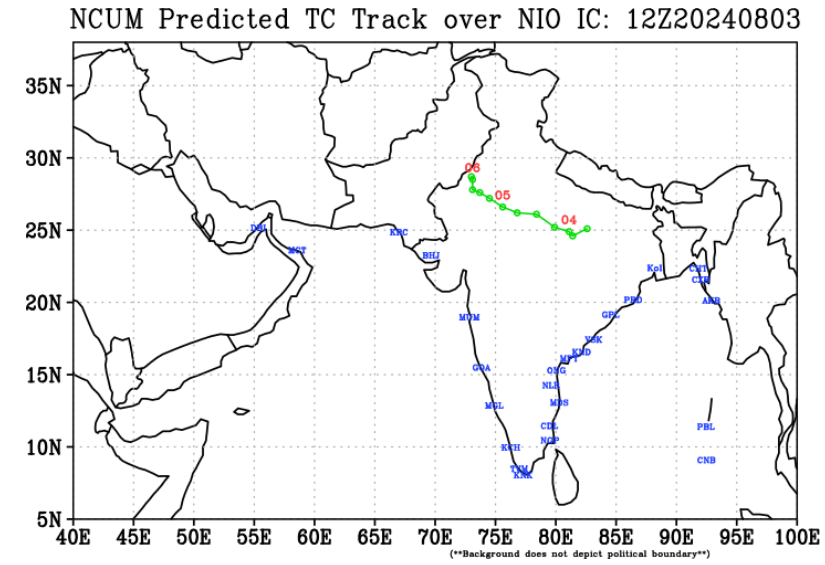
Rainfall >115mm/day is both EPS systems

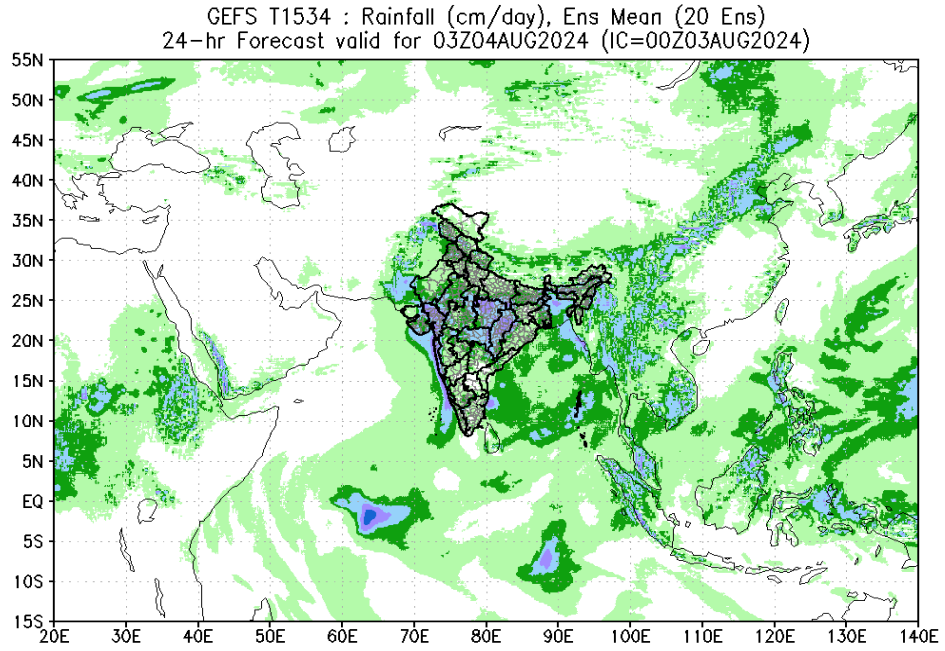


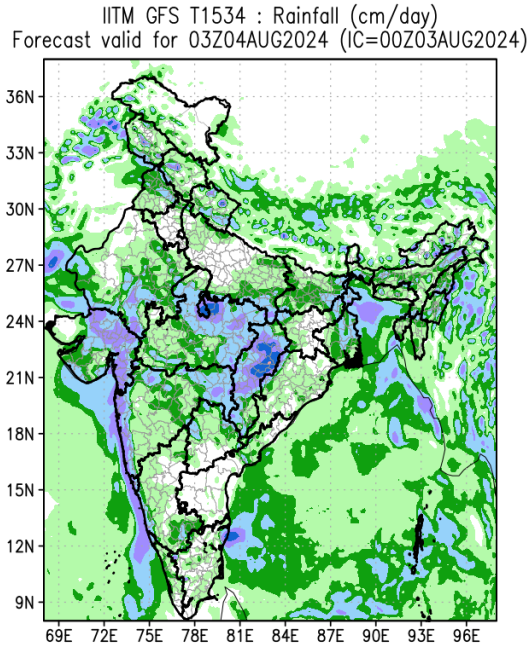
Deep depression 02-05 August 2024

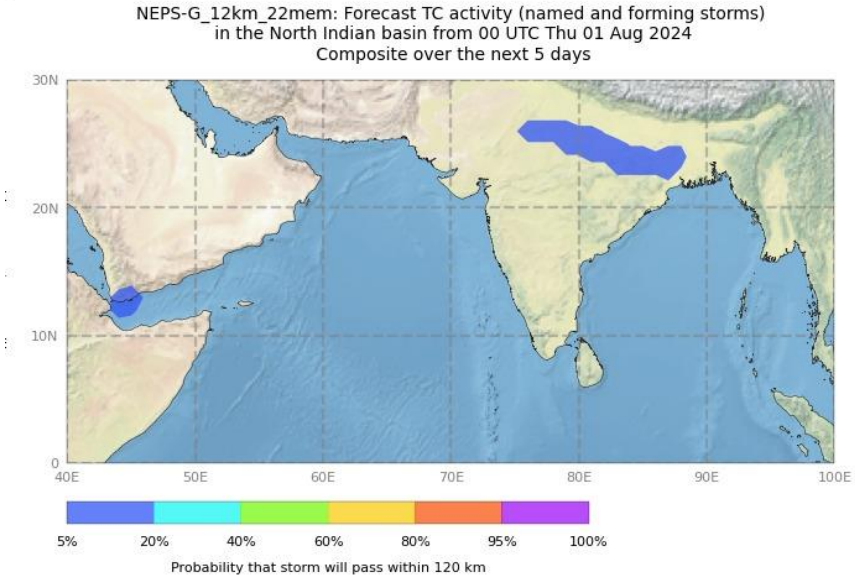




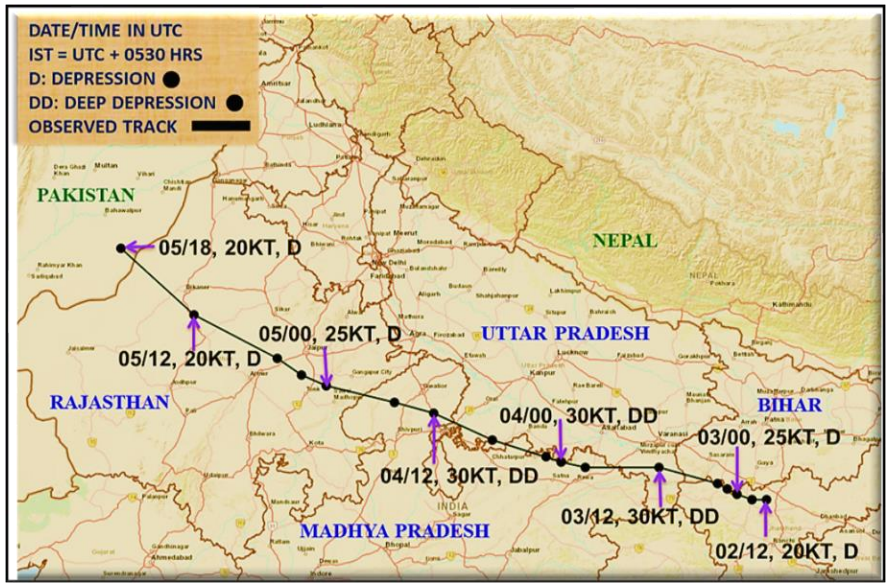








Deep depression 02-05 August 2024



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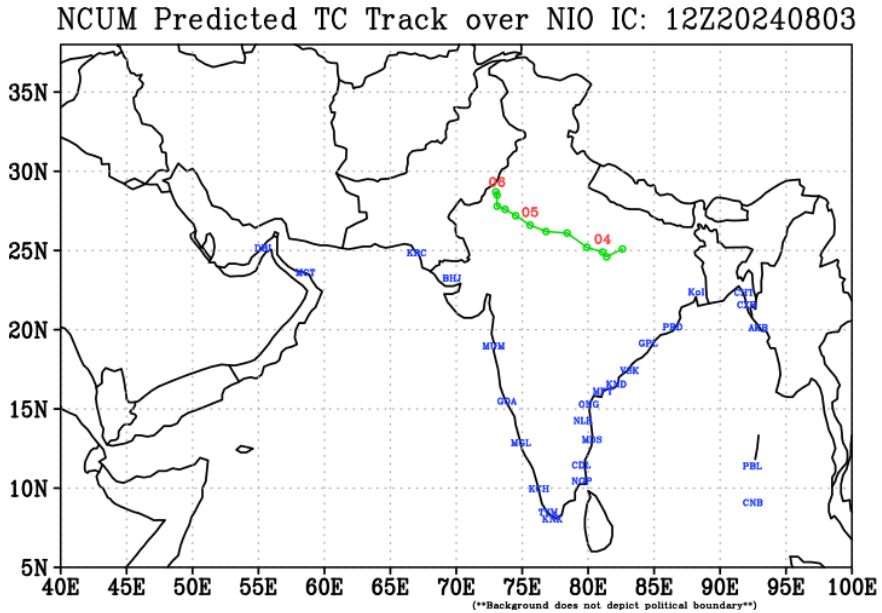
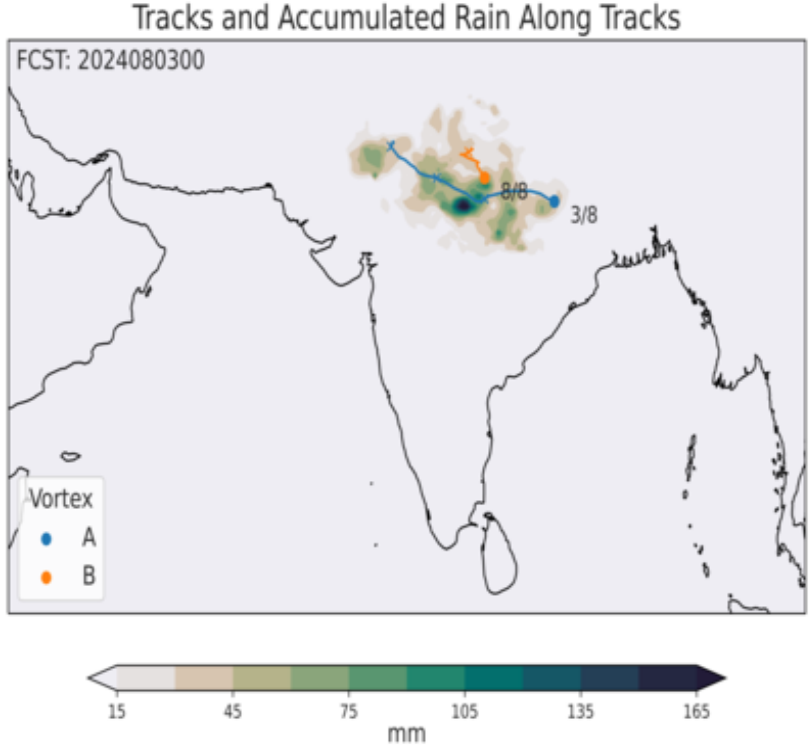
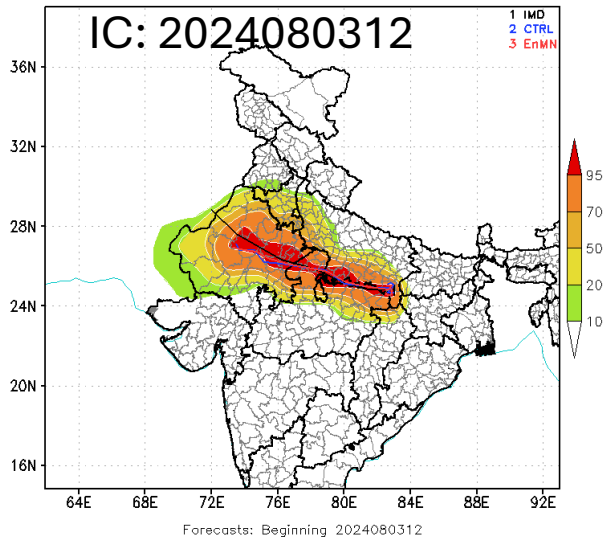


GFS



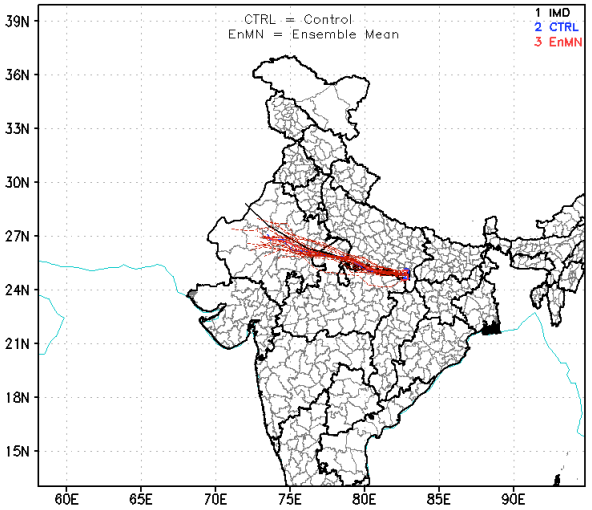
GEFS T1534 Verification – Deep Depression 03 August 2024

Probability (%) of storm passing within 65nm during next 60h



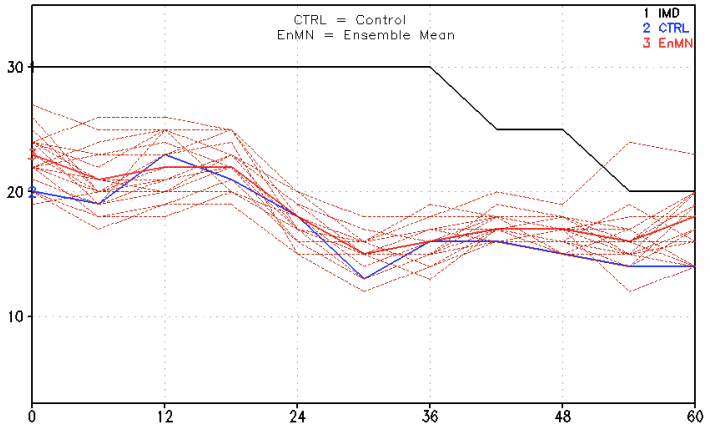
Forecasts: Beginning 2024080312

2024 Deep Depression Tracks Aug 2024



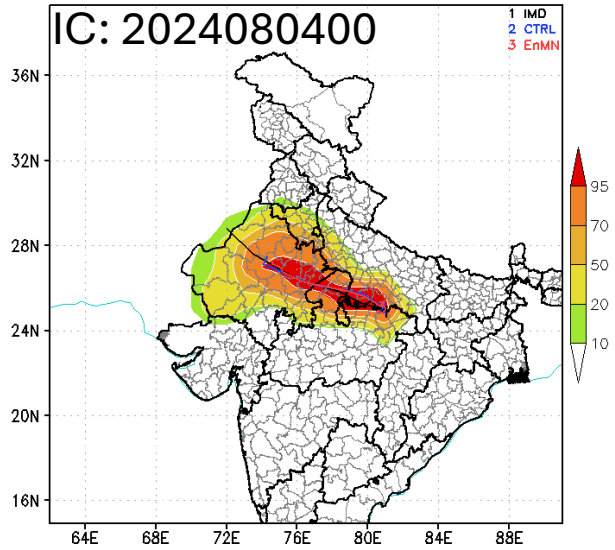
Forecasts: Beginning 2024080312

2024 Deep Depression Intensity Aug 2024



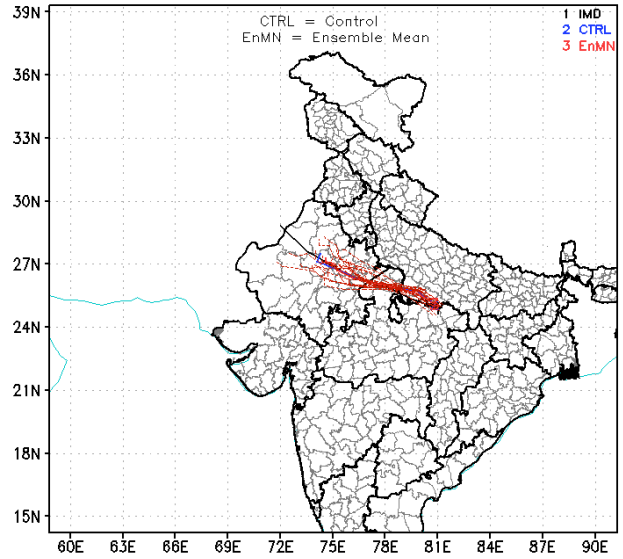
Forecasts: Beginning 2024080312

Probability (%) of storm passing within 65nm during next 48h



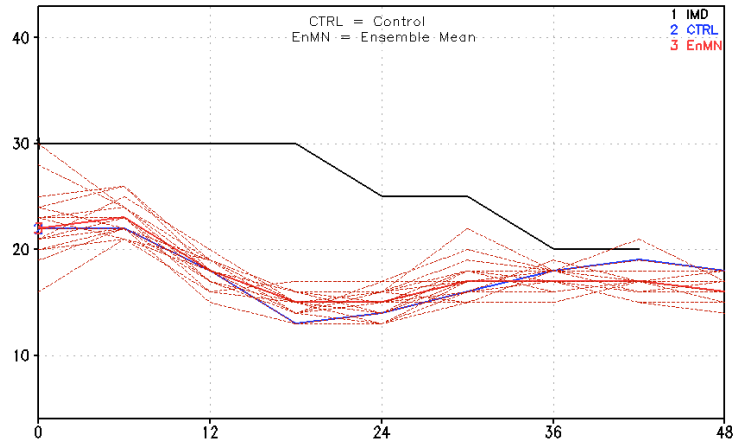
Forecasts: Beginning 2024080400

2024 Deep Depression Tracks Aug 2024



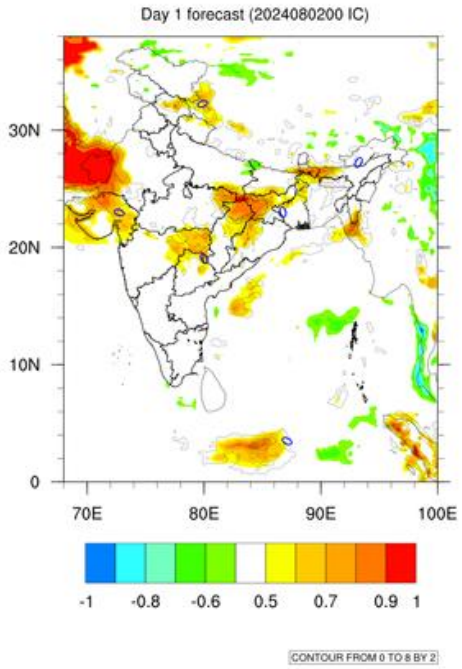
Forecasts: Beginning 2024080400

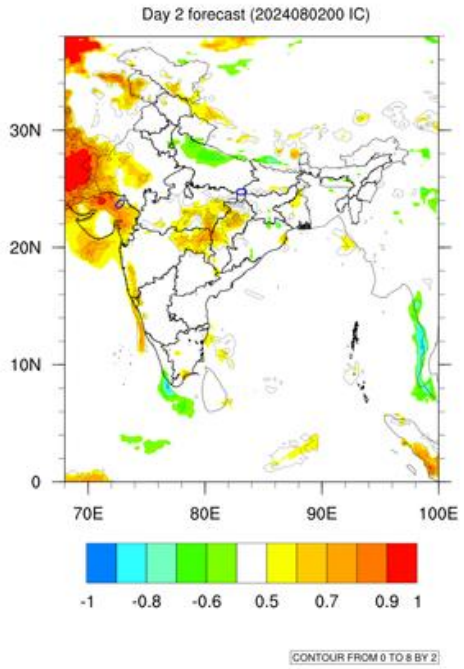
2024 Deep Depression Intensity Aug 2024

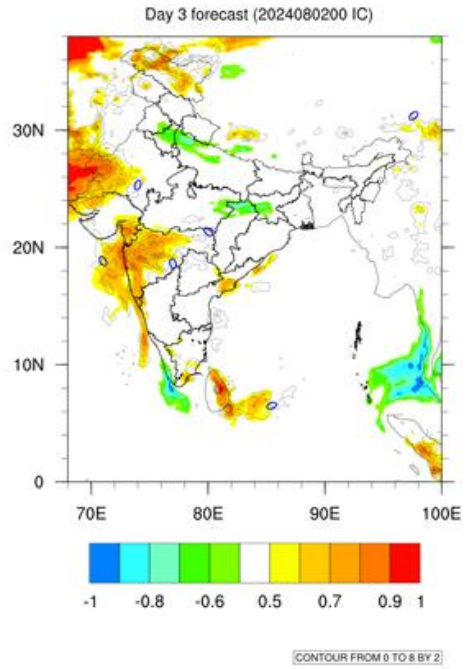


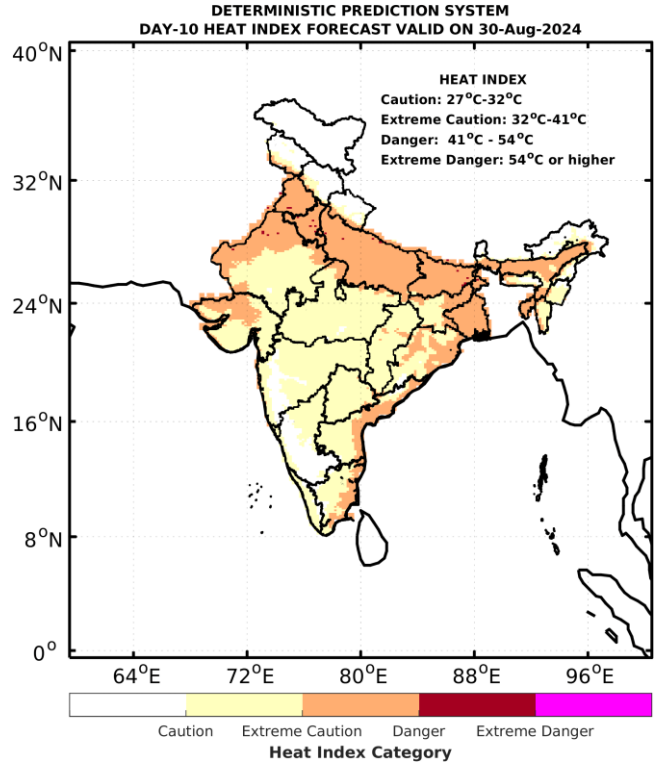
Forecasts: Beginning 2024080400

Extreme Forecast Index - DD over NW India





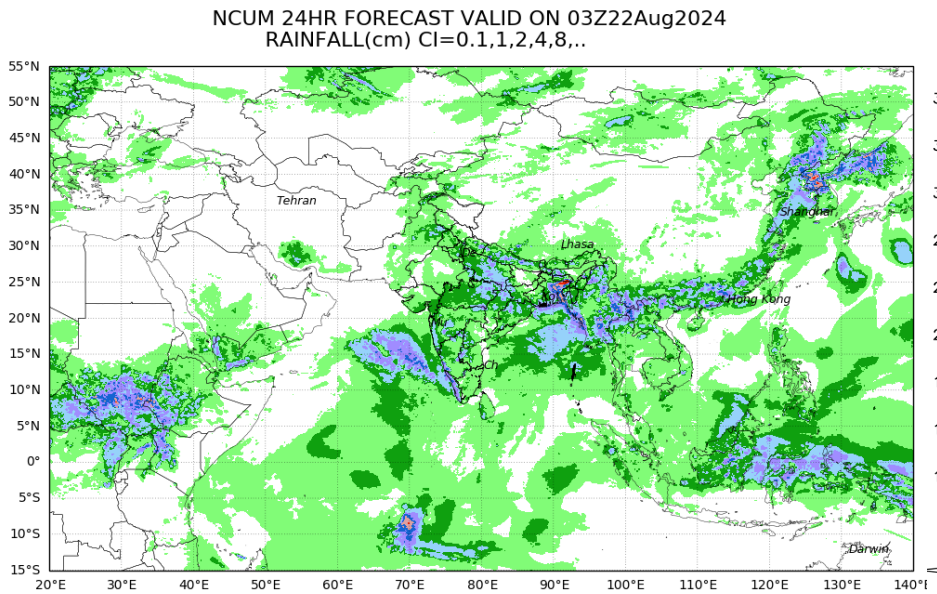


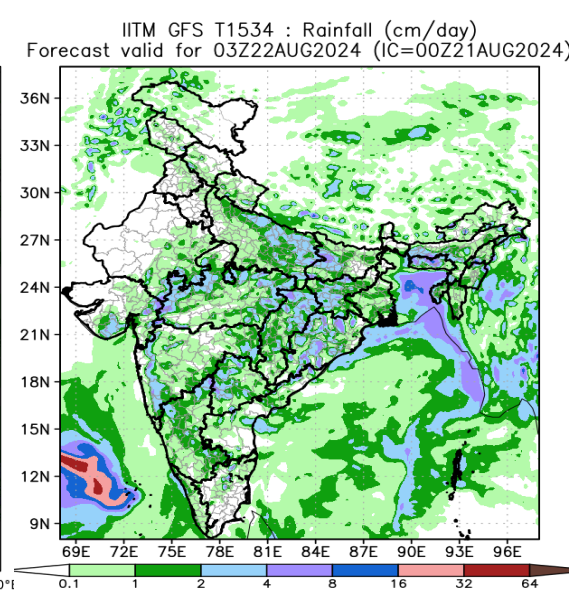


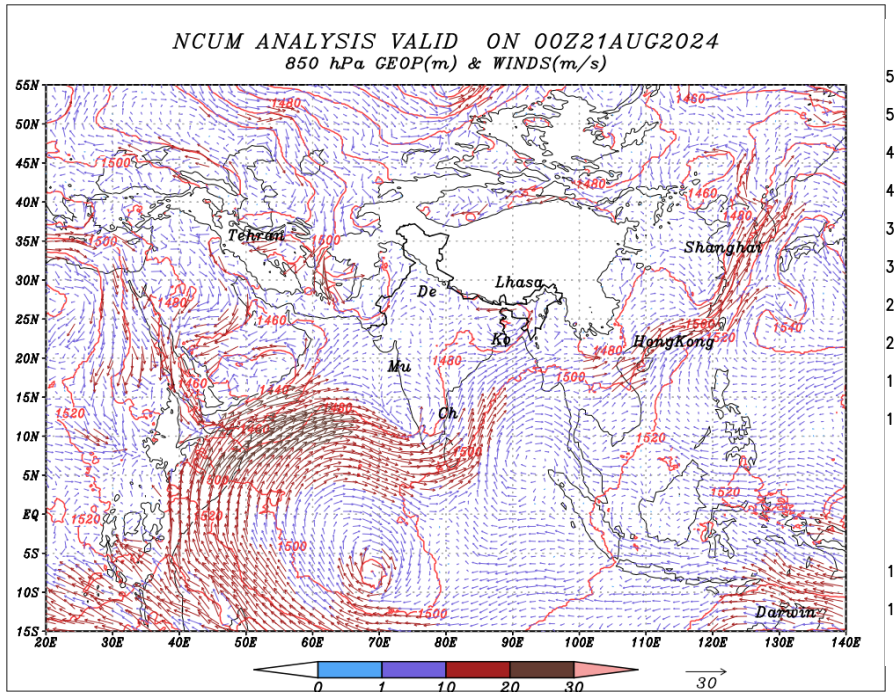
Likelihood of extreme weather.

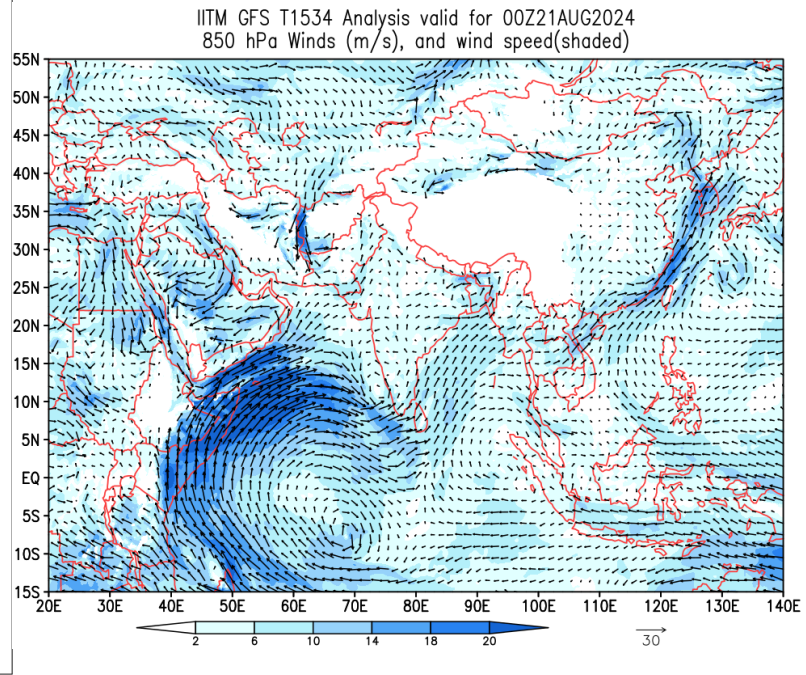
NCMRWF is also generating EFI (2m temperature)
EFI for Rainfall is ongoing

Forecasts Day -1

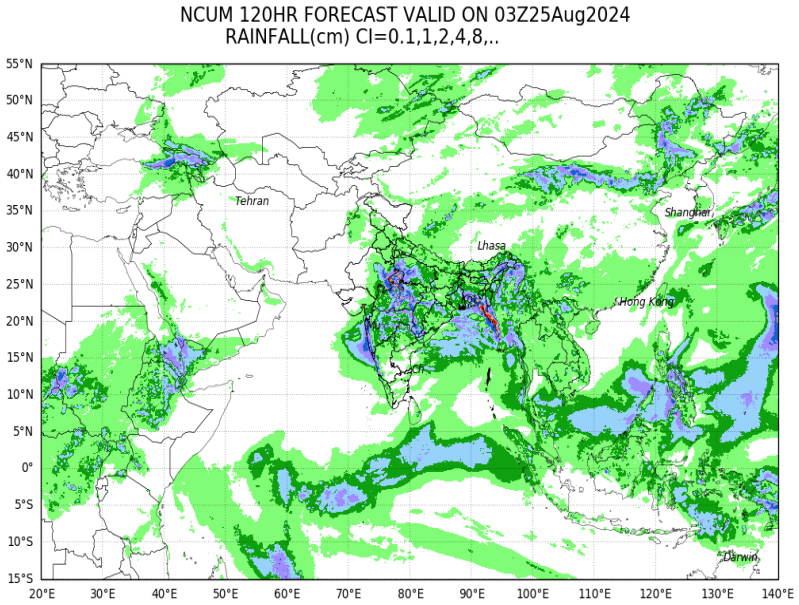


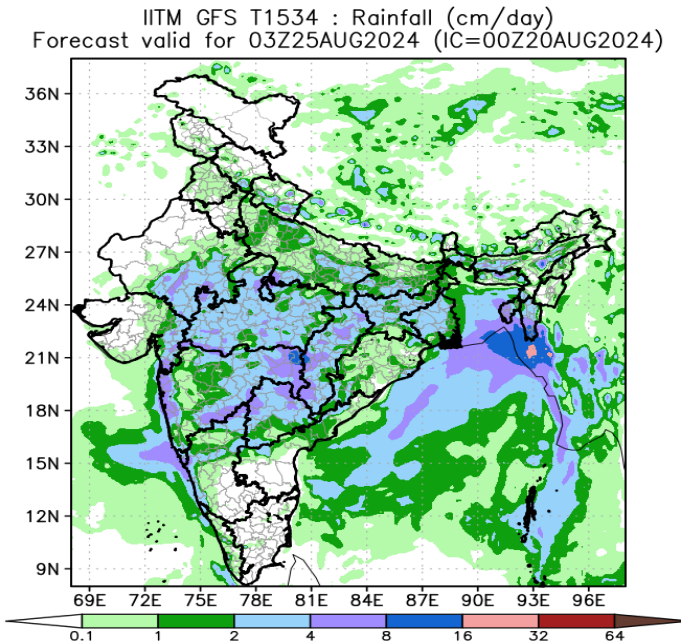


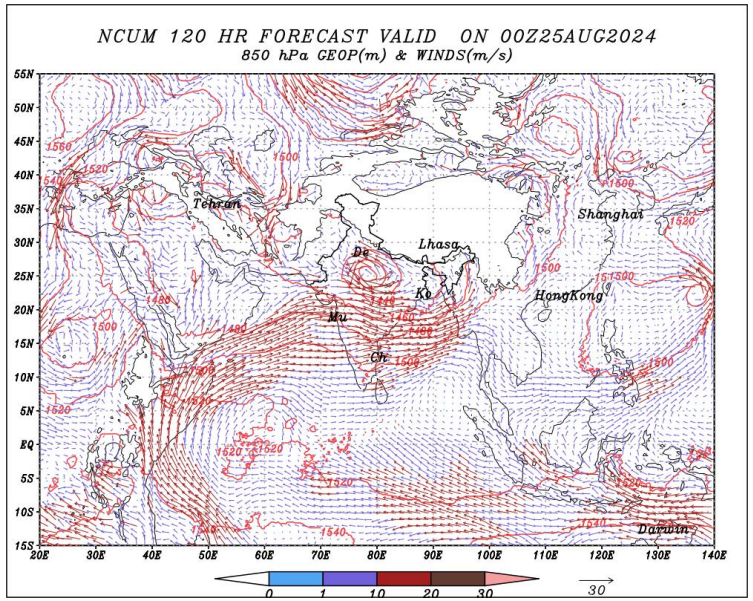


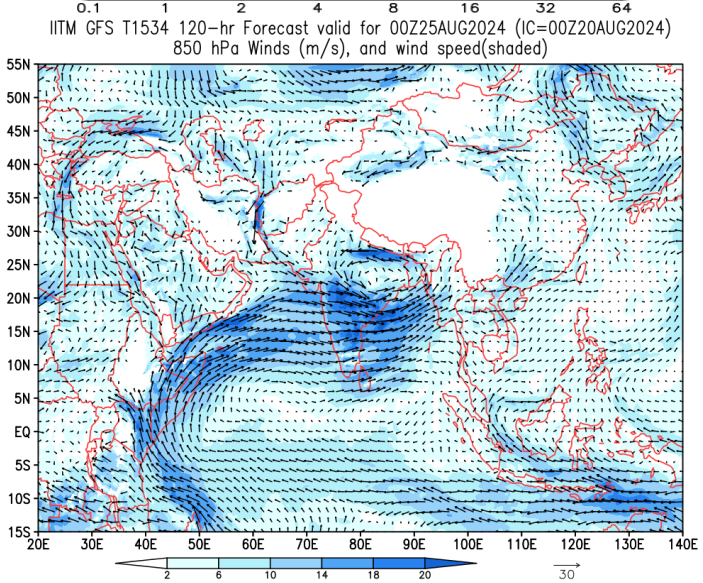


Forecasts Day -5



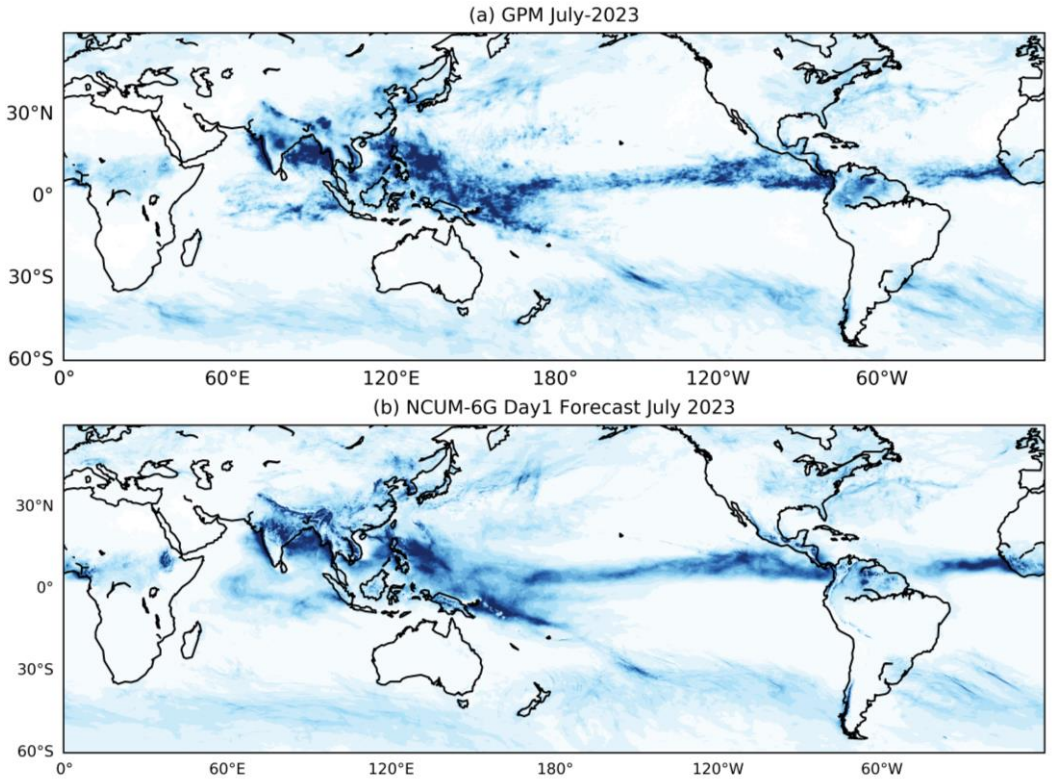


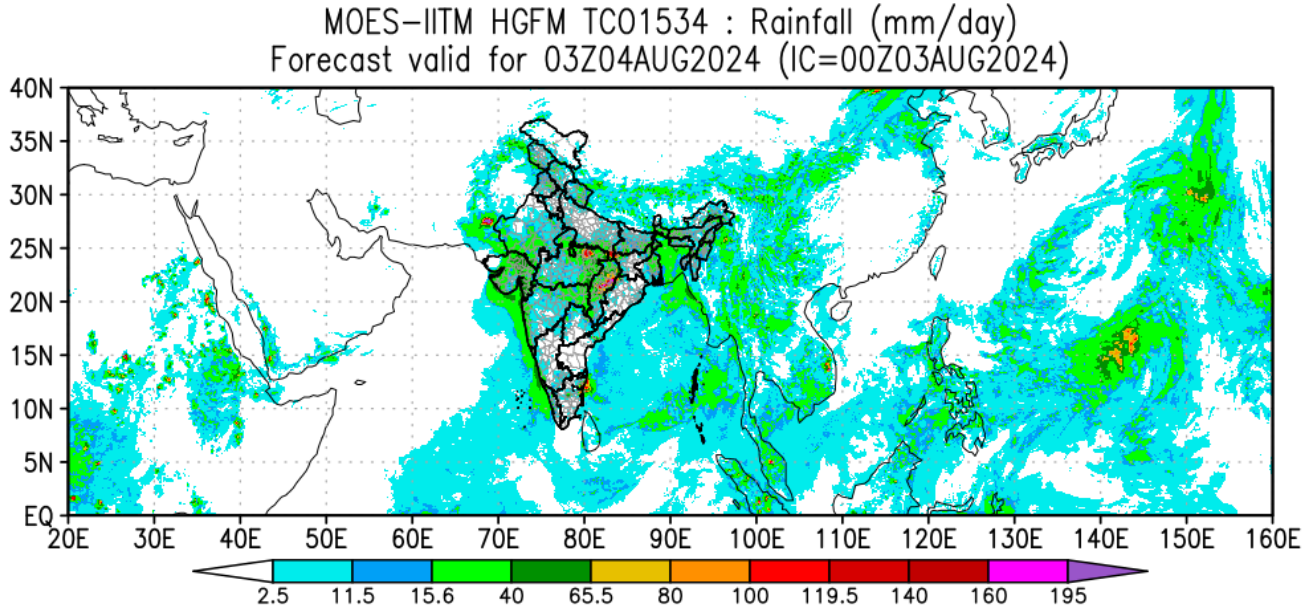




- Position of the cyclonic circulation.
- The intensity of the rainfall and its spatial distribution.

Towards km scale modelling - a new paradigm





- Km-scale - substantial progress in understanding climate extremes, and circulation changes.
- Do not solve every problem.
- Resolving the mesoscale organization critical for precipitation extremes

It still needs to be operational! NCMRWF

(Acknowledgements to Dr. M.N. Sreevathsa, Sc-F)

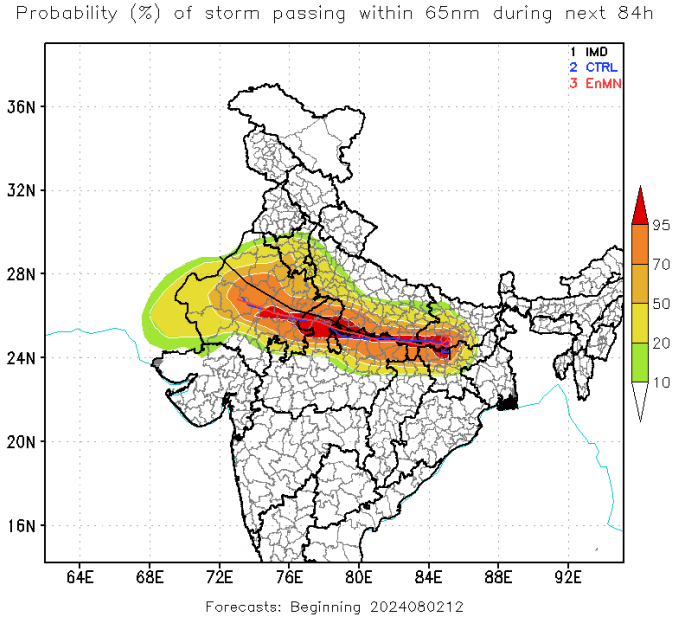
Summary

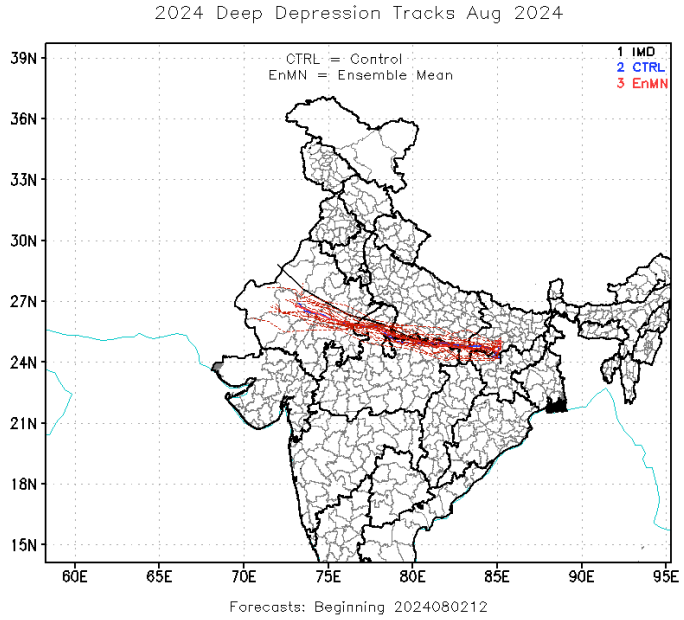
- Rainfall forecast verification at the medium range during monsoon 2024 in IITM and NCMRWF modelling systems are performing well.
- Overestimation (underestimation) in NCUM (GFS) over the Indian subcontinent.
- Ensemble tracks/strike probability need to be checked for various thresholds.

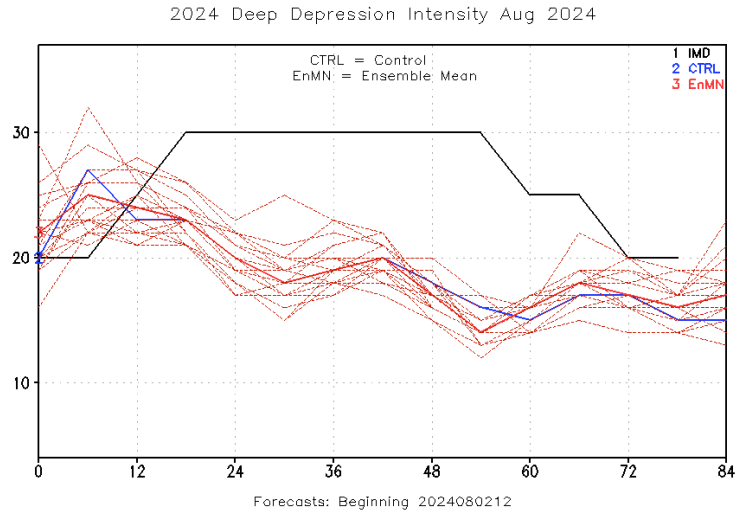
Thanks

GEFS T1534 Verification

IC: 2024080212







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