

FLASH FLOOD CASE STUDY INDIA

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India Meteorological Department
Follow-up Operations Workshop
South Asia Flash Flood Guidance System
5 – 7th June 2018
New Delhi, India

CONTENT

1. Introduction

2. Synoptic Conditions

3. Case Study

4. Conclusion

ACTIVE MONSOON SEASONS

- SOUTHWEST MONSOON
(JUNE TO SEPTEMBER)
- NORTHEAST MONSOON
(OCTOBER TO DECEMBER)

29th AUGUST 2017

Associated Synoptic situation

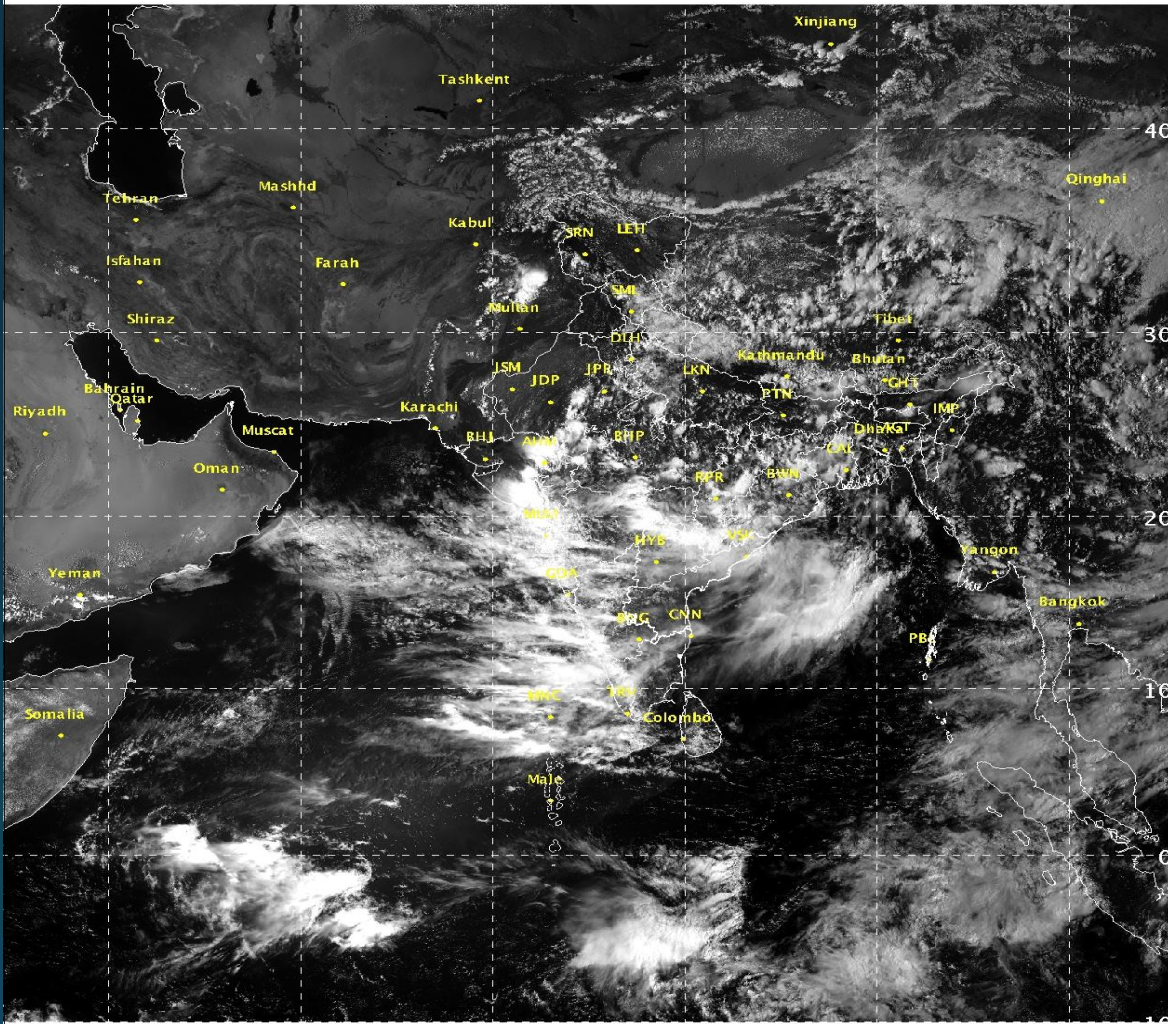
Low pressure Area and associated cyclonic circulation:

- On 29th August, a well-marked low pressure area lay over southwest Madhya Pradesh & neighbourhood and on 30th it lay over northern parts of Saurashtra and adjoining Gujarat region .The associated upper air cyclonic circulation extended up to 7.6 km above sea level tilting southwestwards with height.
- **Offshore Trough:**
Another aiding factor for this extreme rainfall was an offshore trough at mean sea level running from south Maharashtra coast to north Kerala coast on 29th August, which was seen off Karnataka - Kerala coast on 30th August.

Satellite Images – 28th and 29th Aug

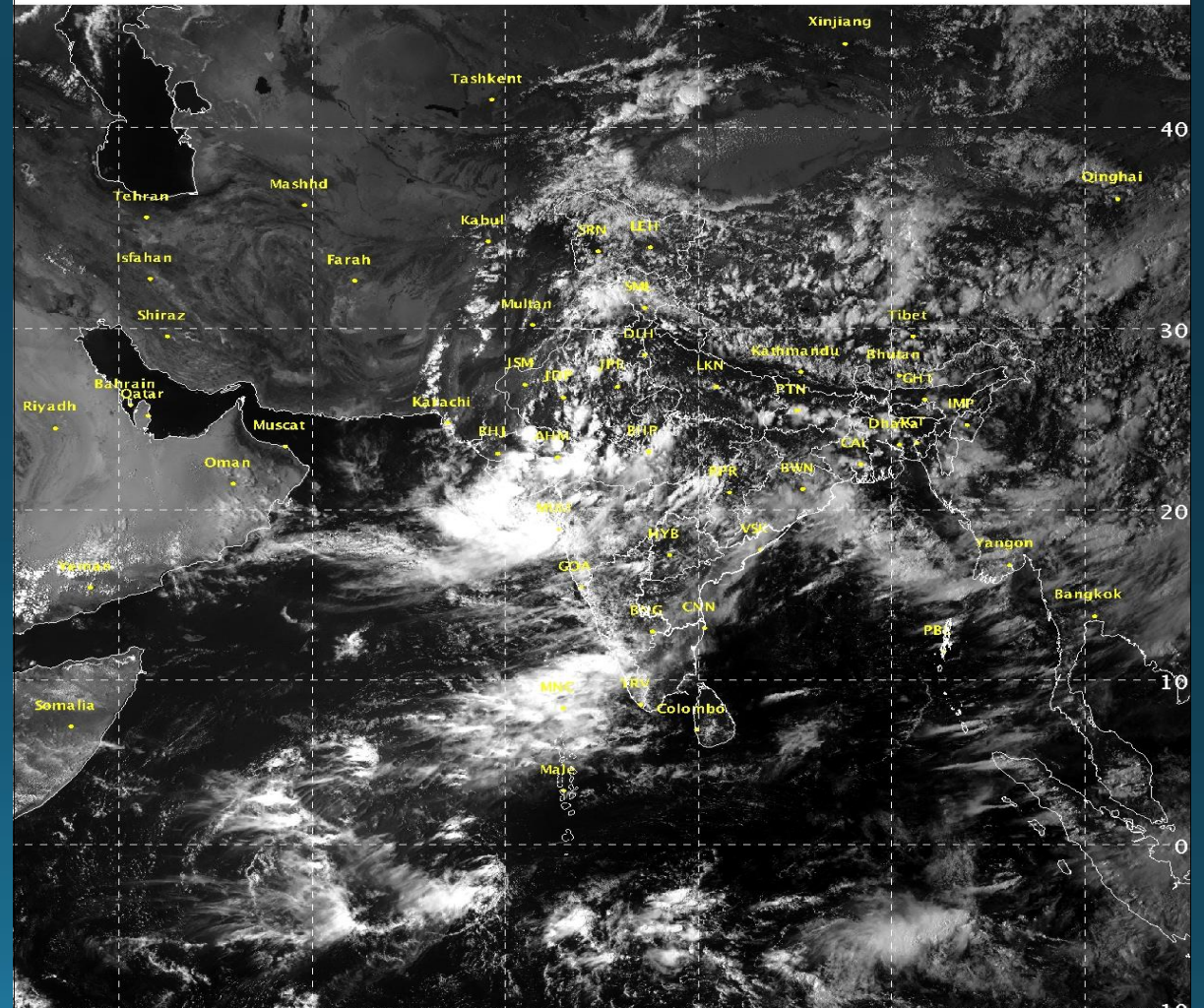
SAT :INSAT-3D IMG
IMG_VIS 0.65 um
LIC Mercator (LINEAR STRETCH: 1.0%)

28-08-2017/09:00 GMT
28-08-2017/14:30 IST



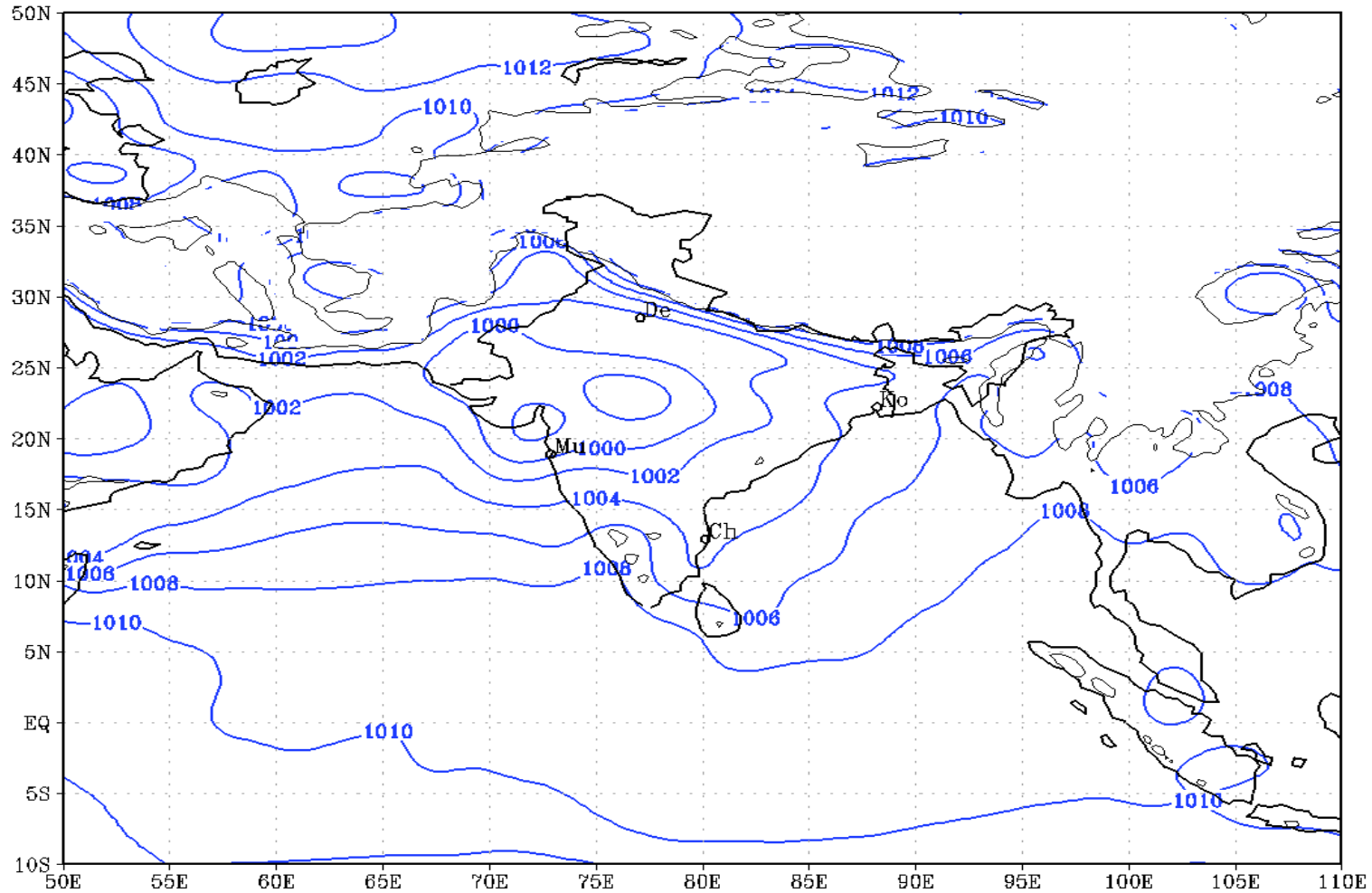
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IMG_VIS 0.65 um
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29-08-2017/09:30 GMT
29-08-2017/15:00 IST



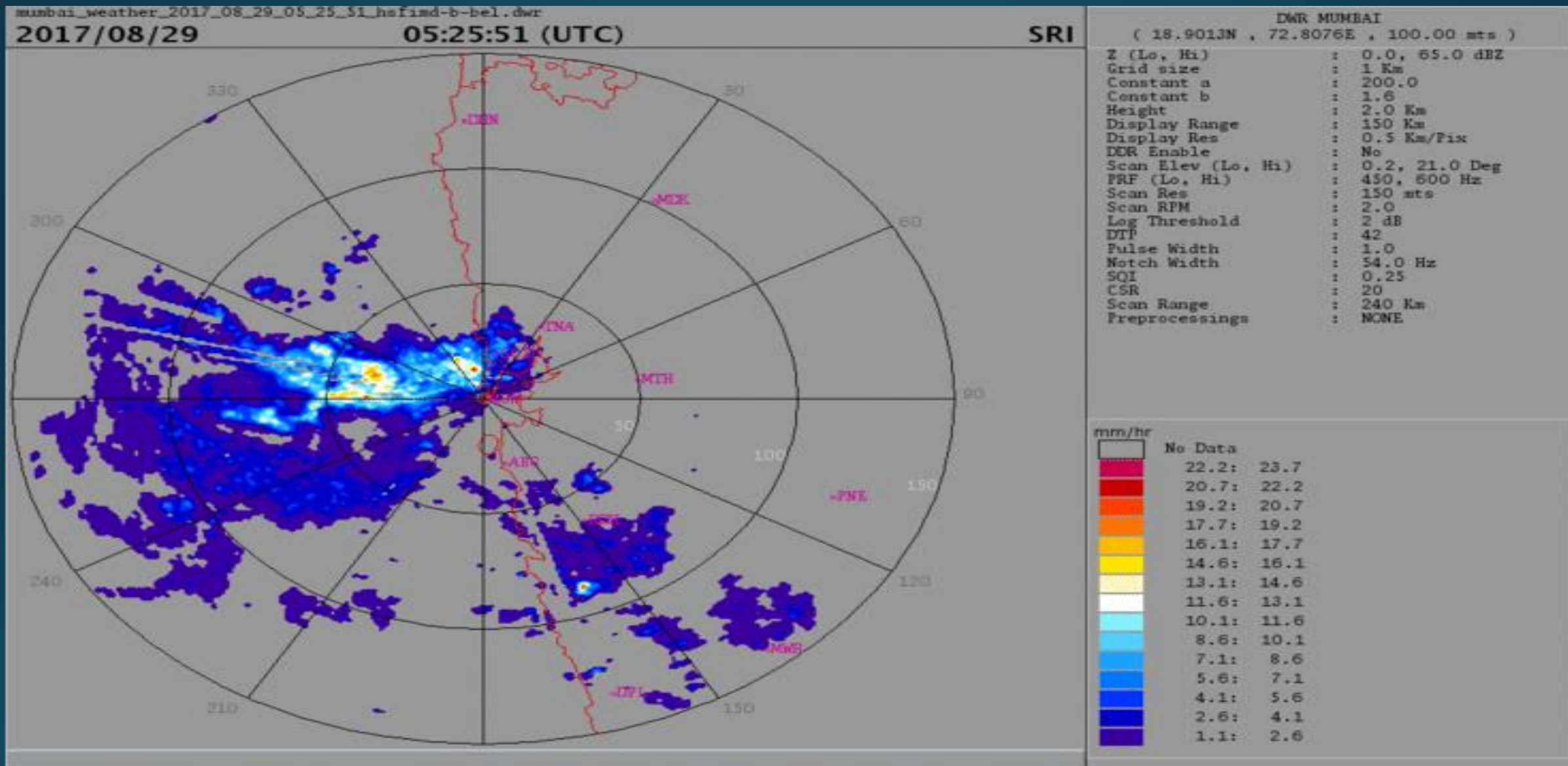
Synoptic Conditions– 29th Aug

IMD :GFS MODEL(12 Km) MSL Pressure (hPa) FORECAST (06 HR)
based on 00 UTC of 29-08-2017 valid for 06 UTC of 29-08-2017



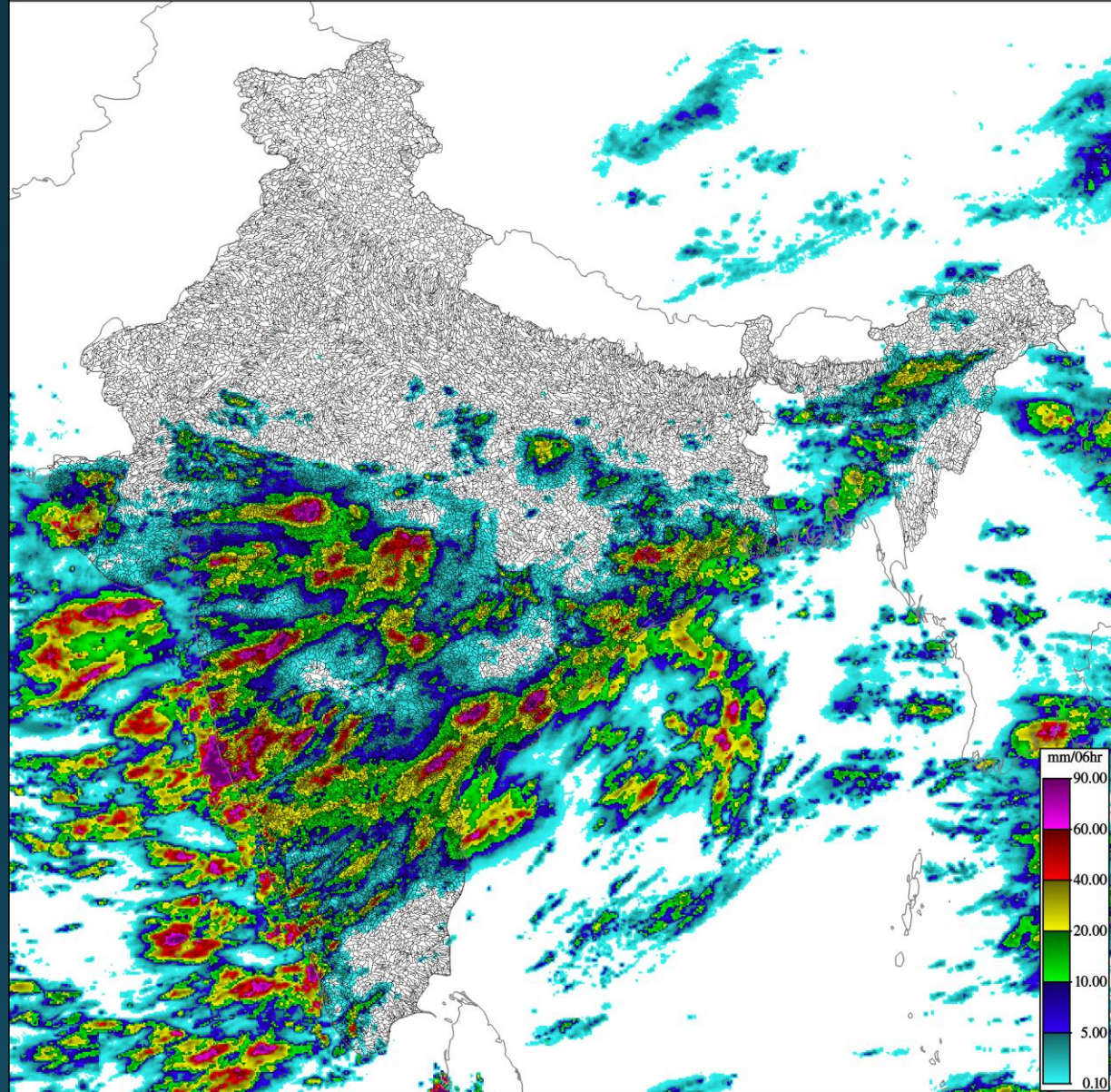
(Background does not depict political boundary)

RADAR ANIMATION 29th Aug – 0530 UTC

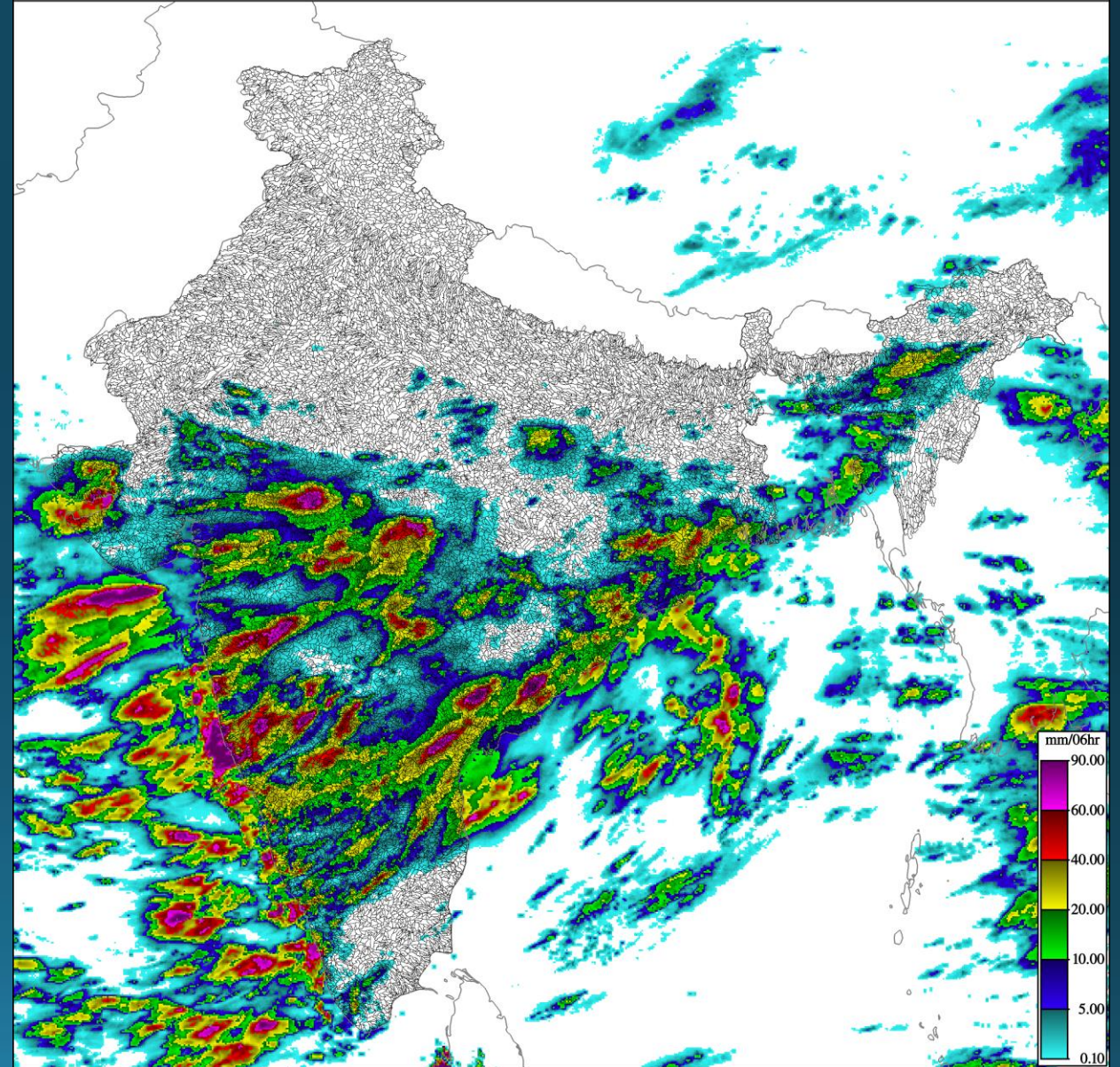


MWGHE and GHE 29th Aug -00 UTC

MWGHE - 06 hr 2017-08-29 00:00 UTC INDIA

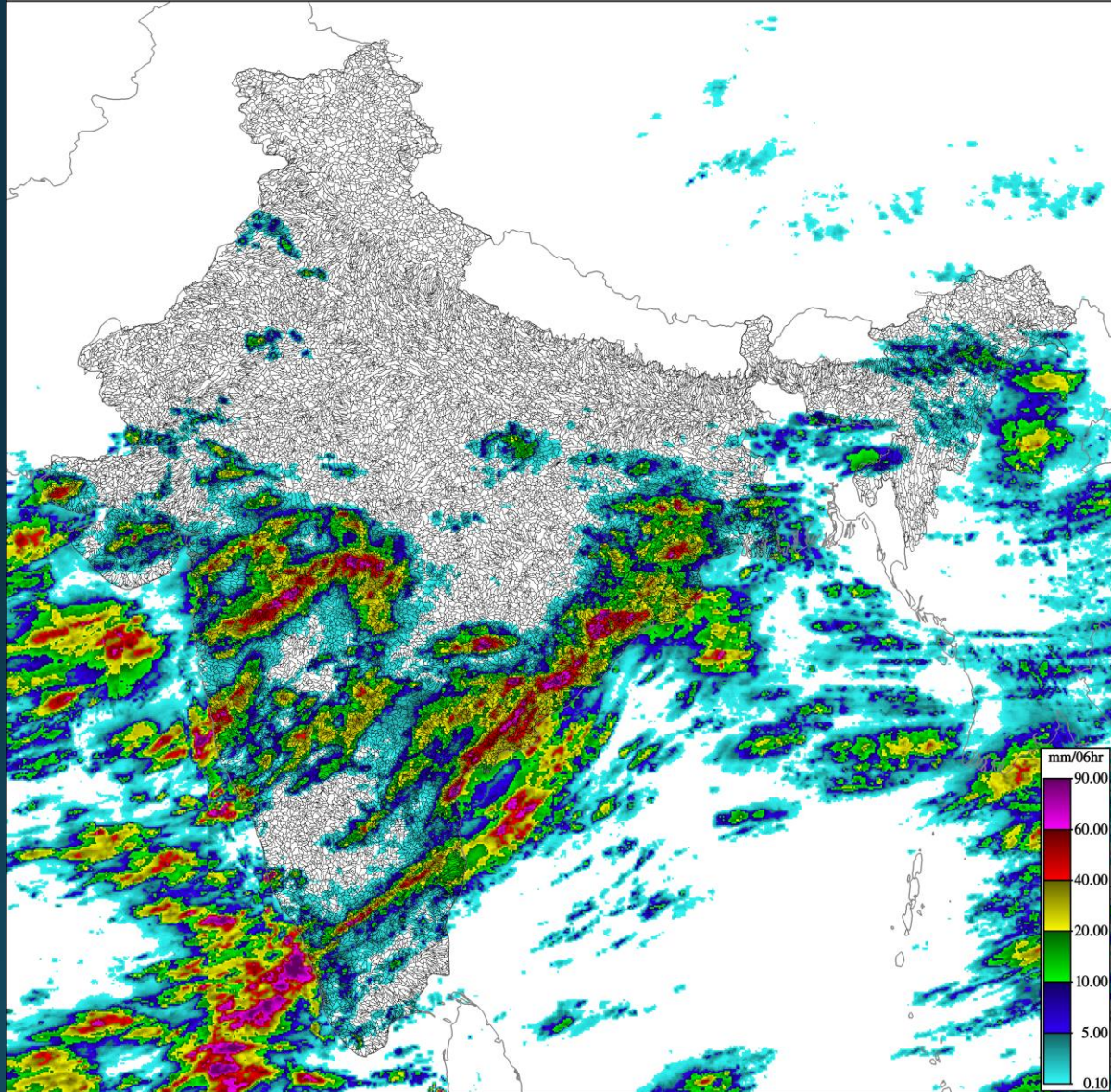


GHE - 06 hr 2017-08-29 00:00 UTC INDIA

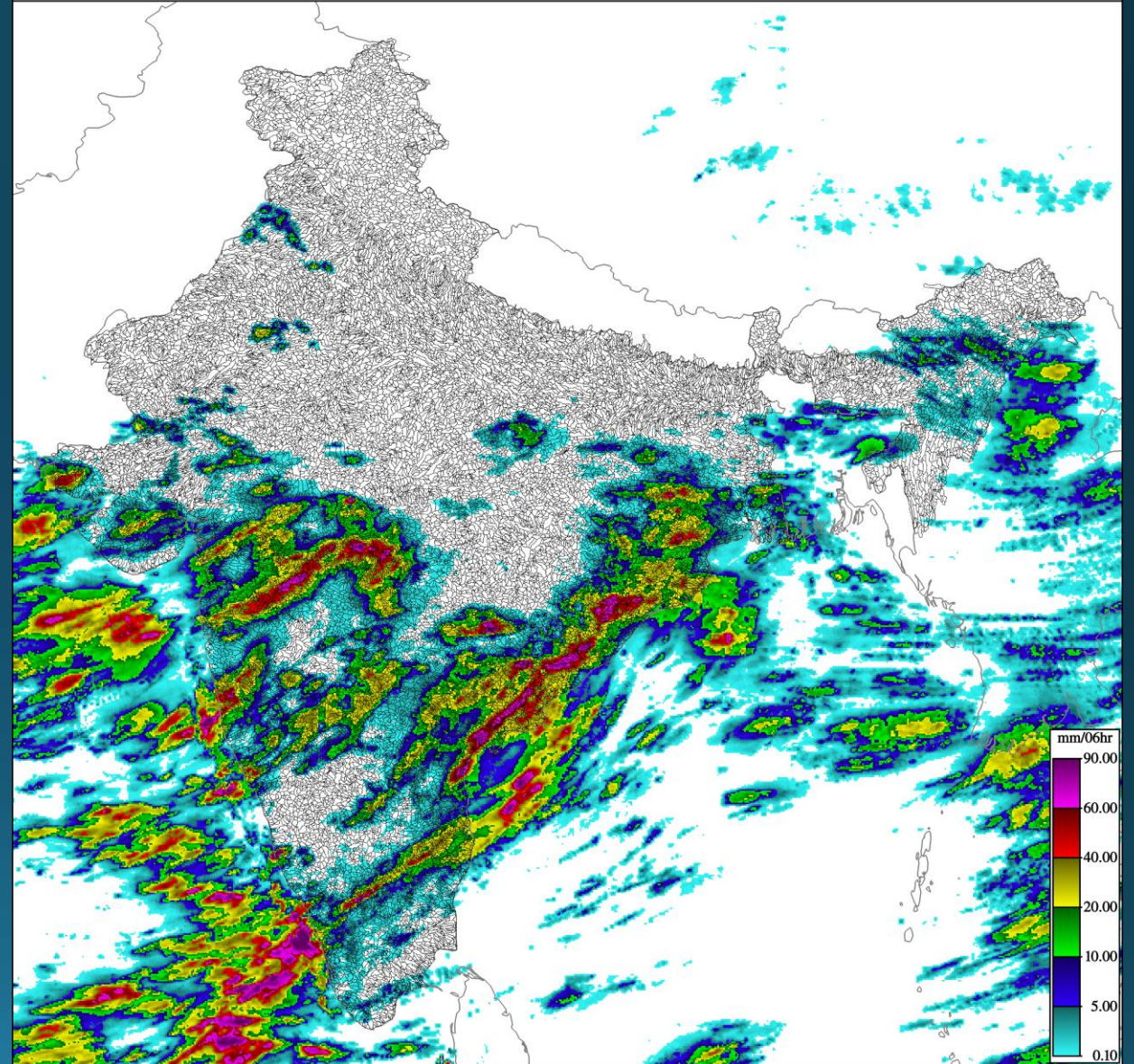


MWGHE and GHE 29th Aug -06UTC

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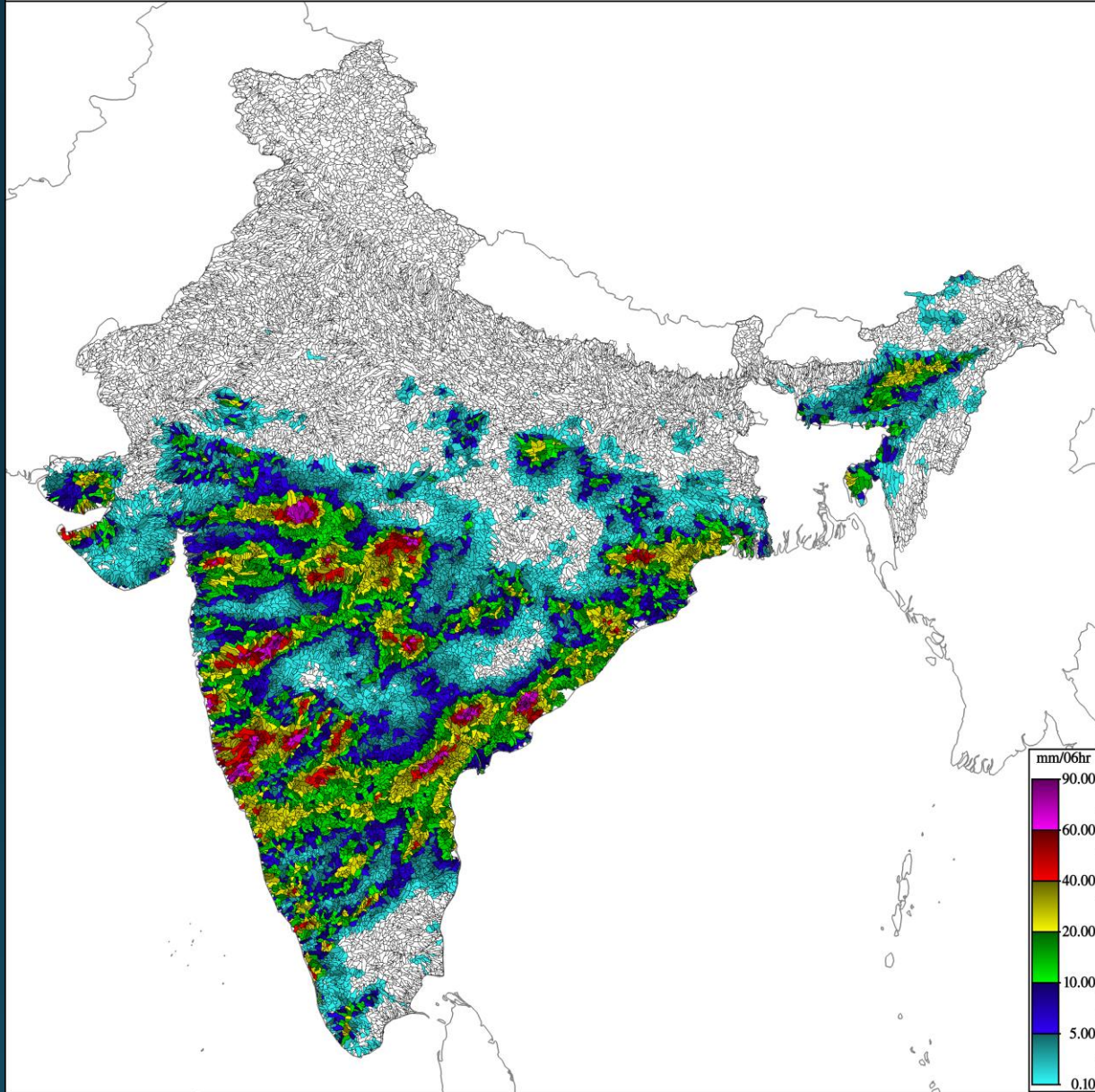


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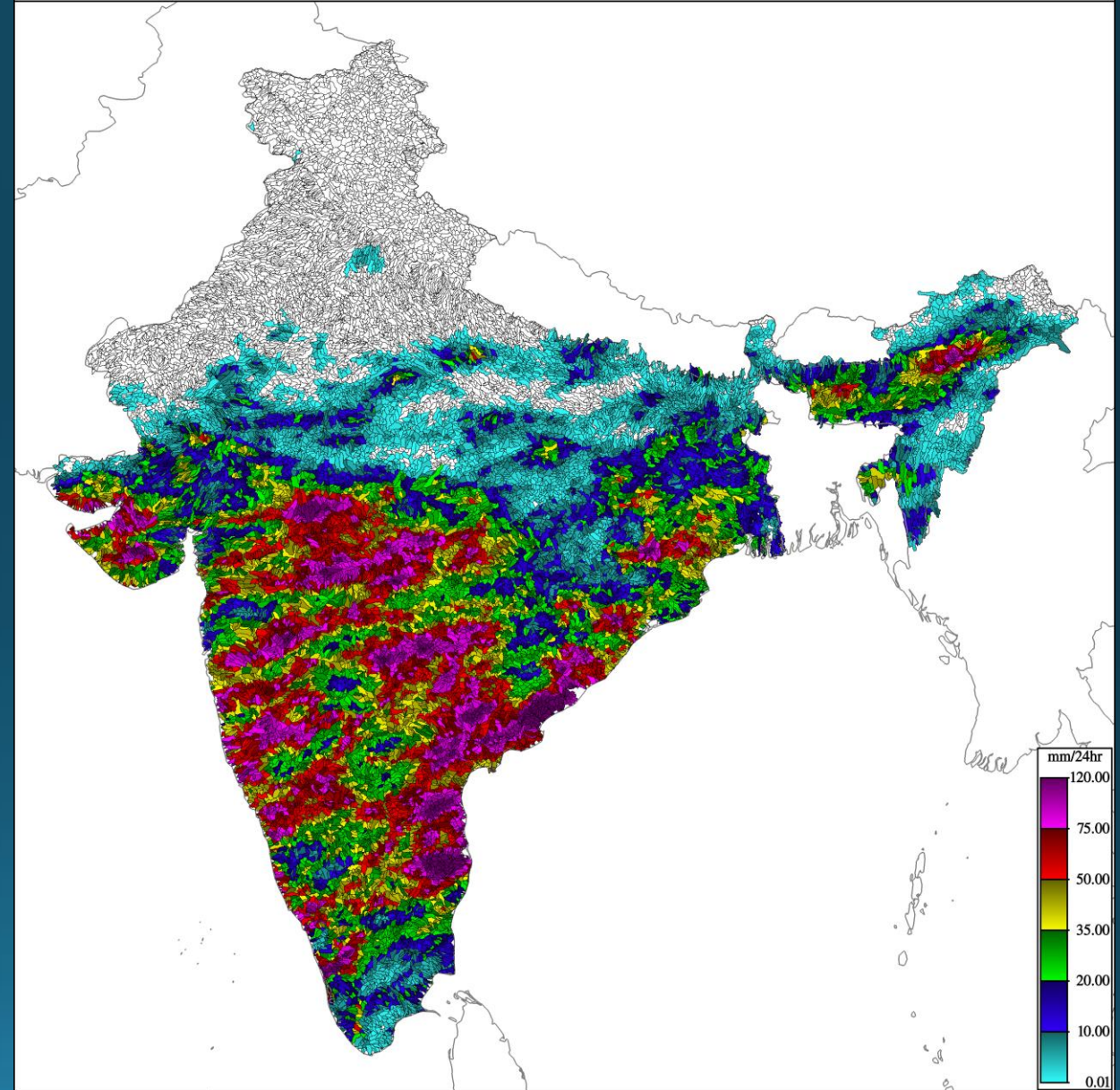


Merged Mean Areal Precipitation 29th Aug - 00UTC

MAP - 06 hr 2017-08-29 00:00 UTC INDIA

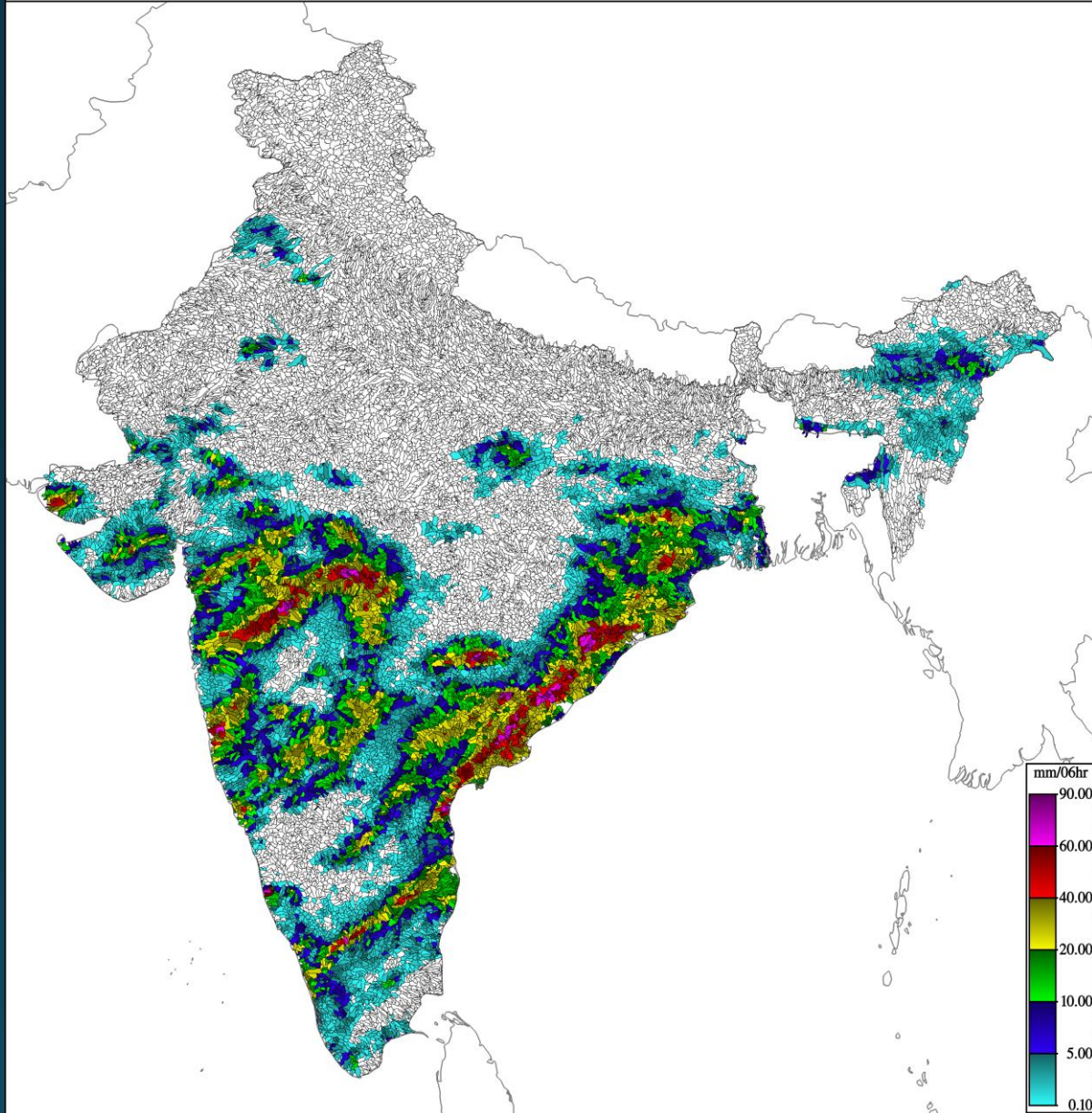


MAP - 24 hr 2017-08-29 00:00 UTC INDIA

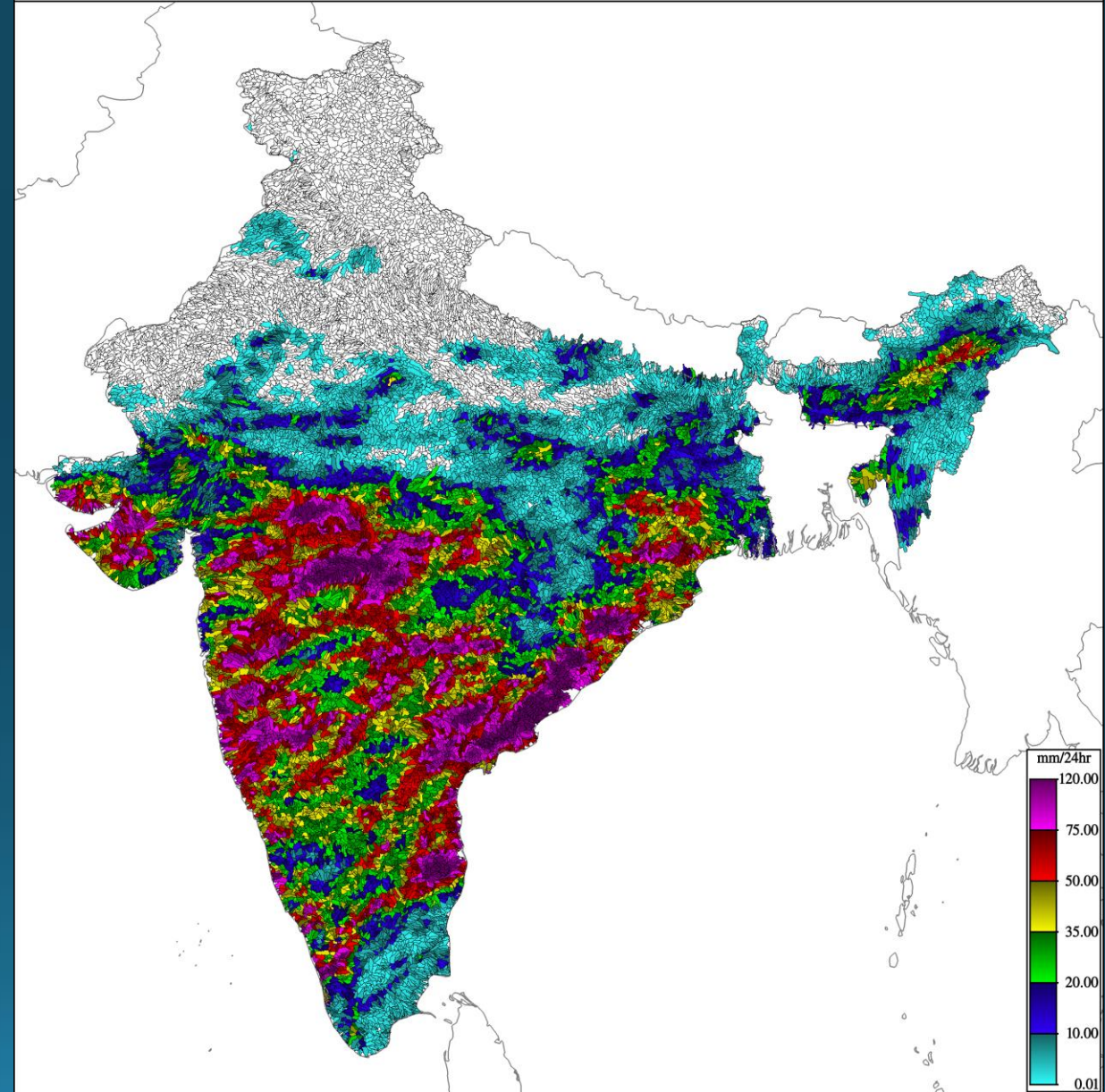


Merged Mean Areal Precipitation 29th Aug - 06UTC

MAP - 06 hr 2017-08-29 06:00 UTC INDIA

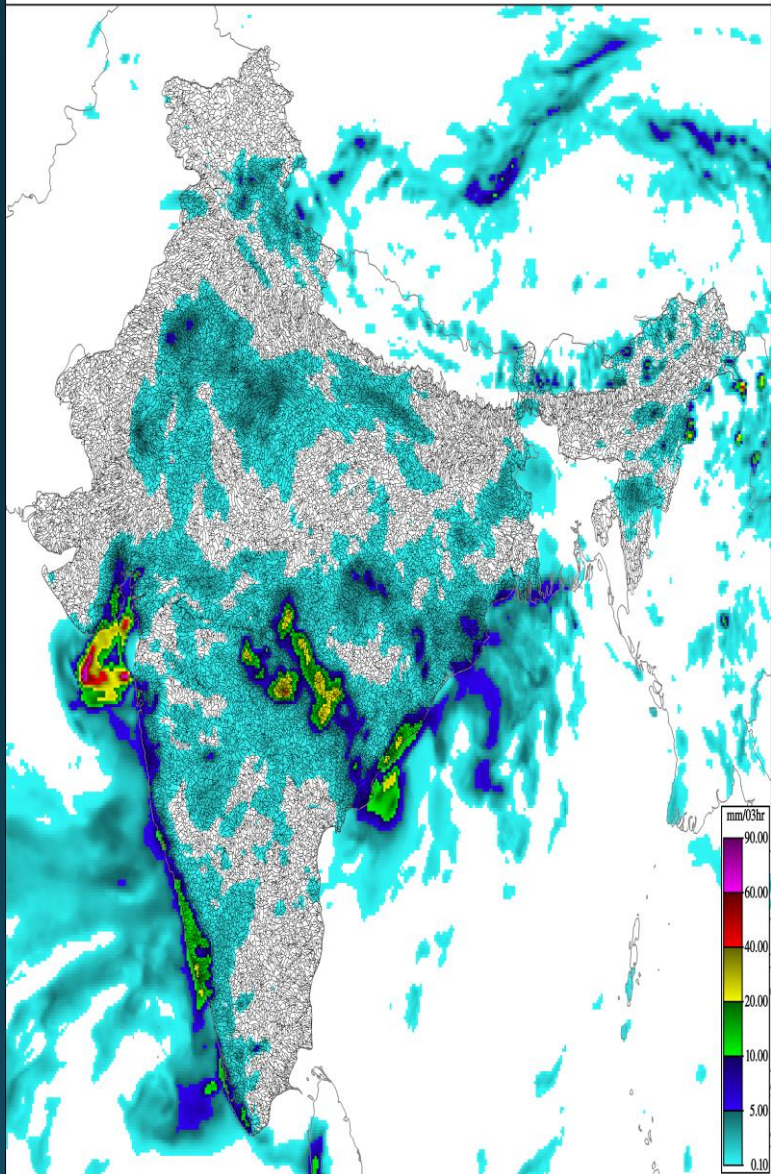


MAP - 24 hr 2017-08-29 06:00 UTC INDIA

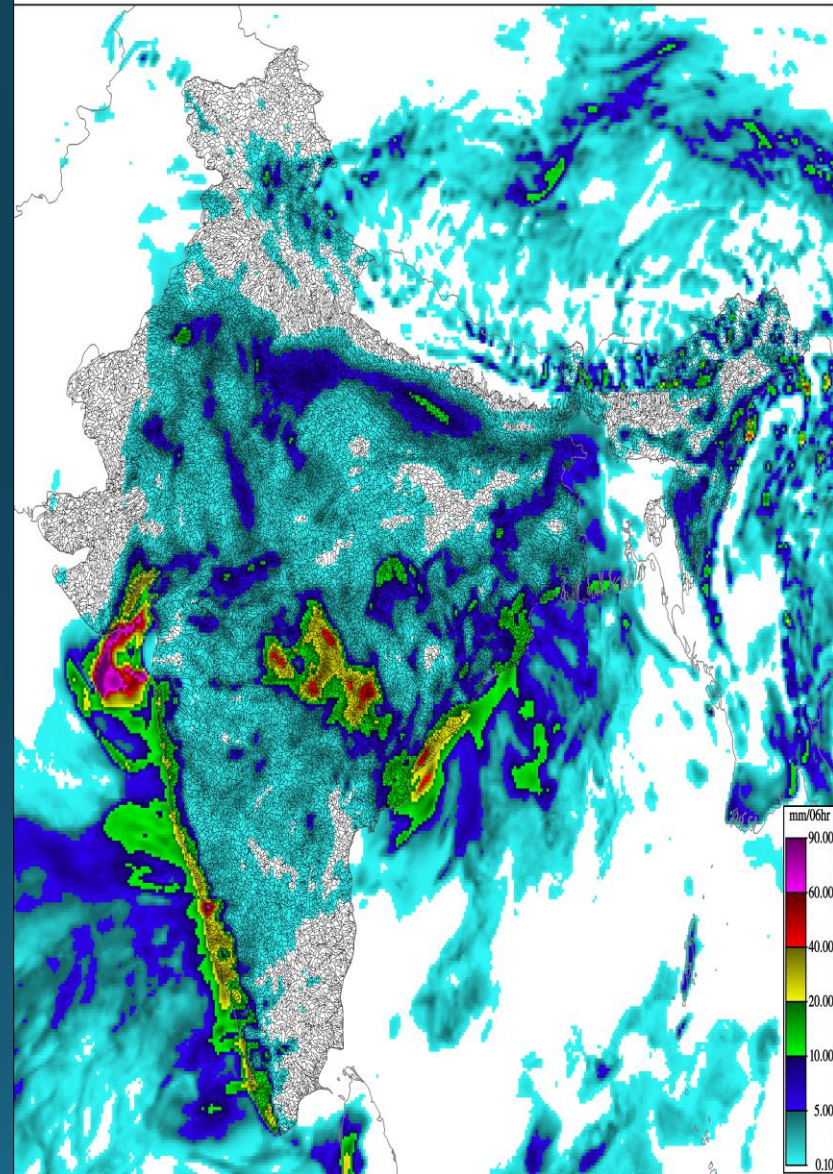


FORECAST 29th Aug - 00UTC

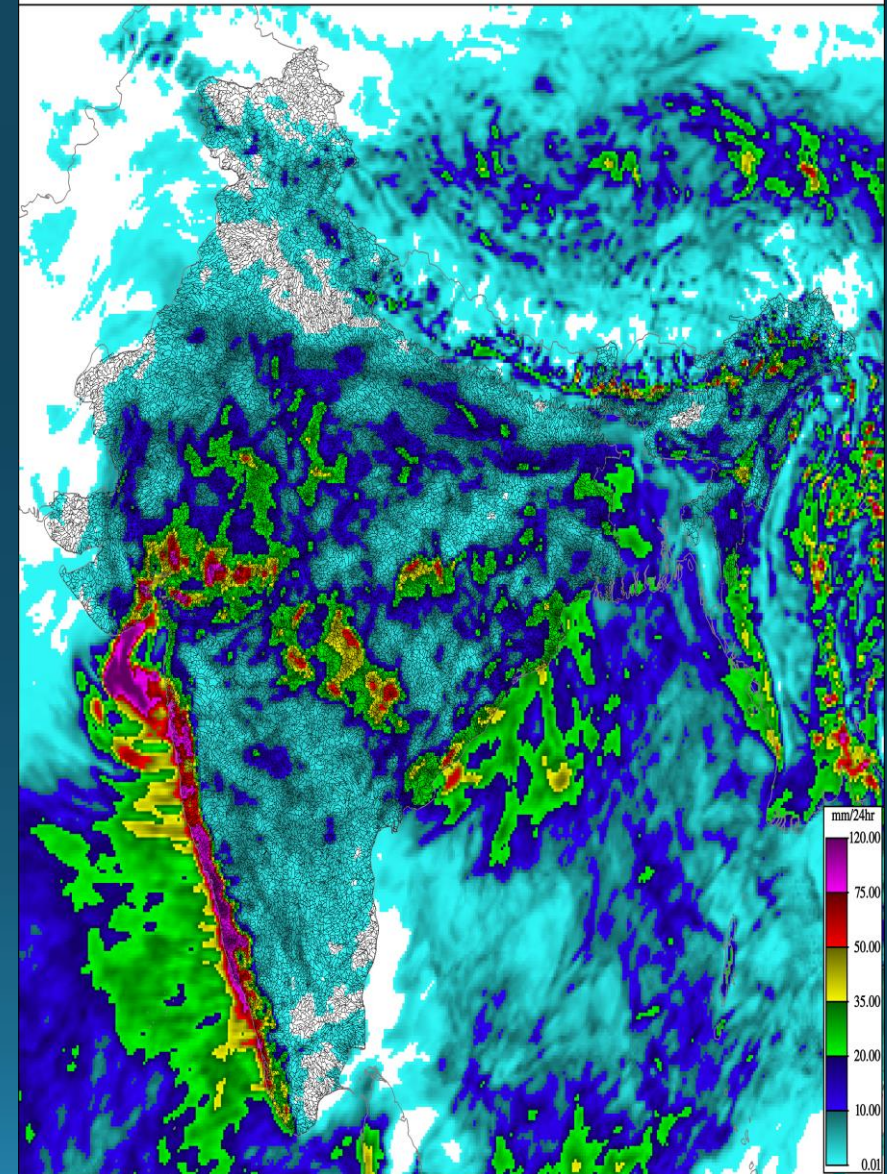
FCST1 - 03 hr 2017-08-29 00:00 UTC INDIA



FCST1 - 06 hr 2017-08-29 00:00 UTC INDIA

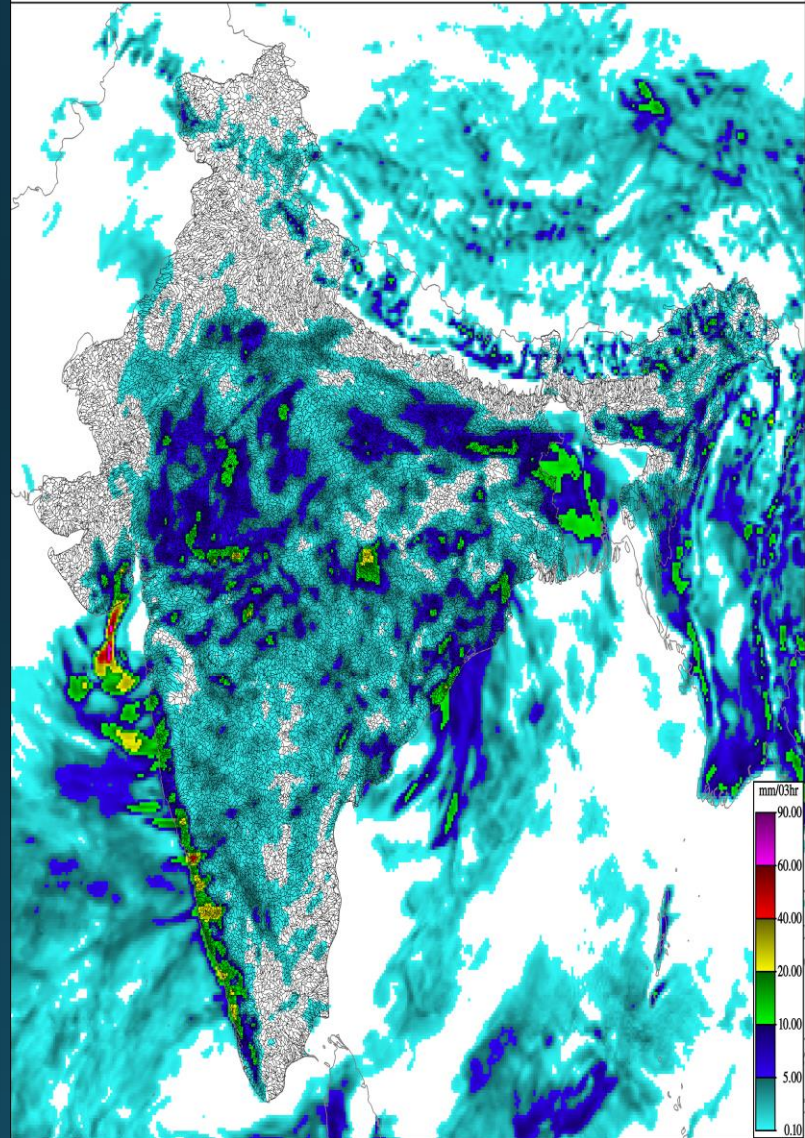


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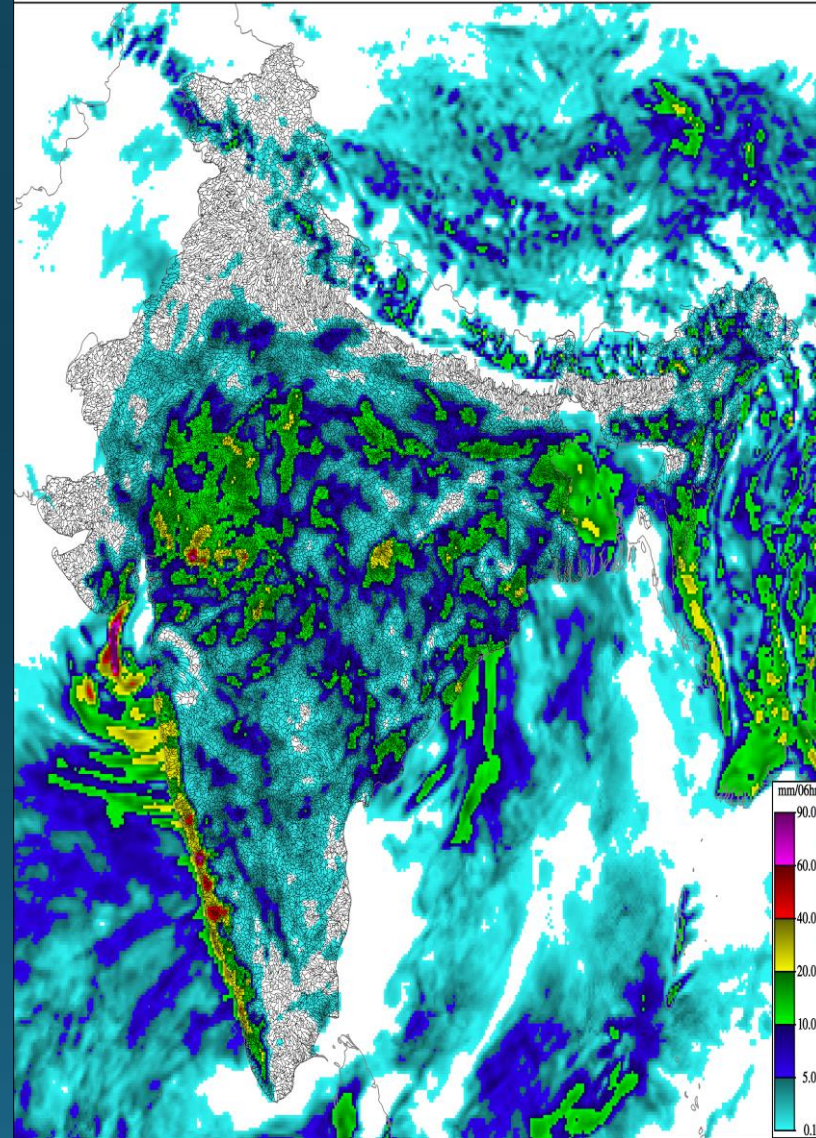


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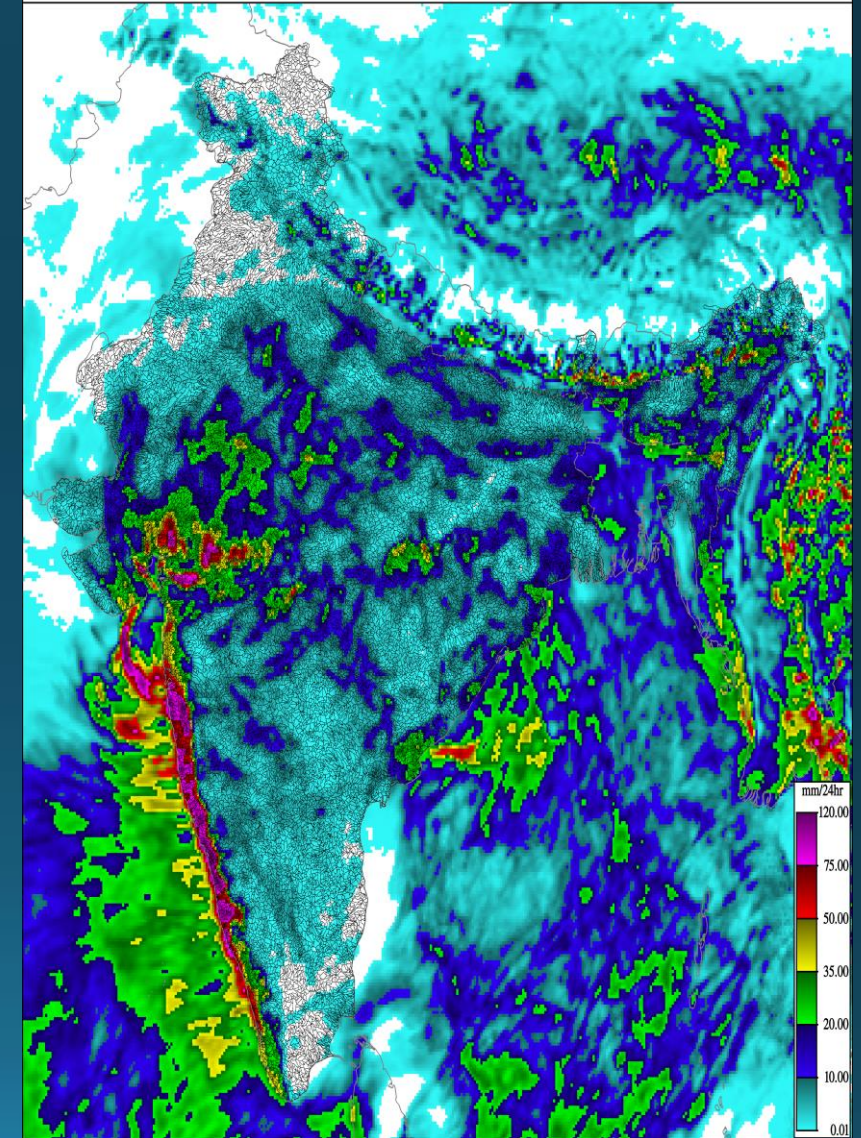
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FCST1 - 06 hr 2017-08-29 06:00 UTC INDIA

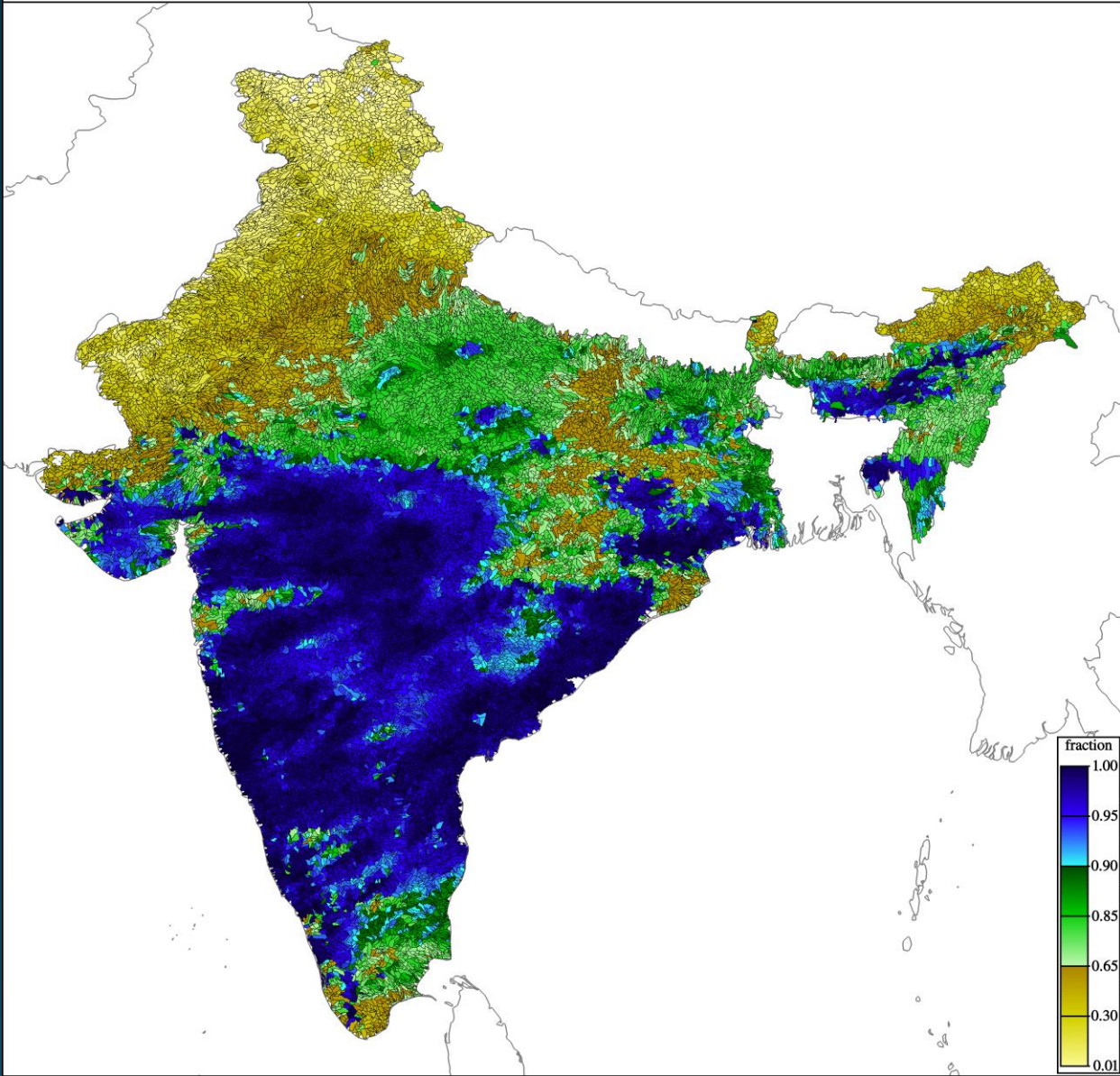


FCST1 - 24 hr 2017-08-29 06:00 UTC INDIA

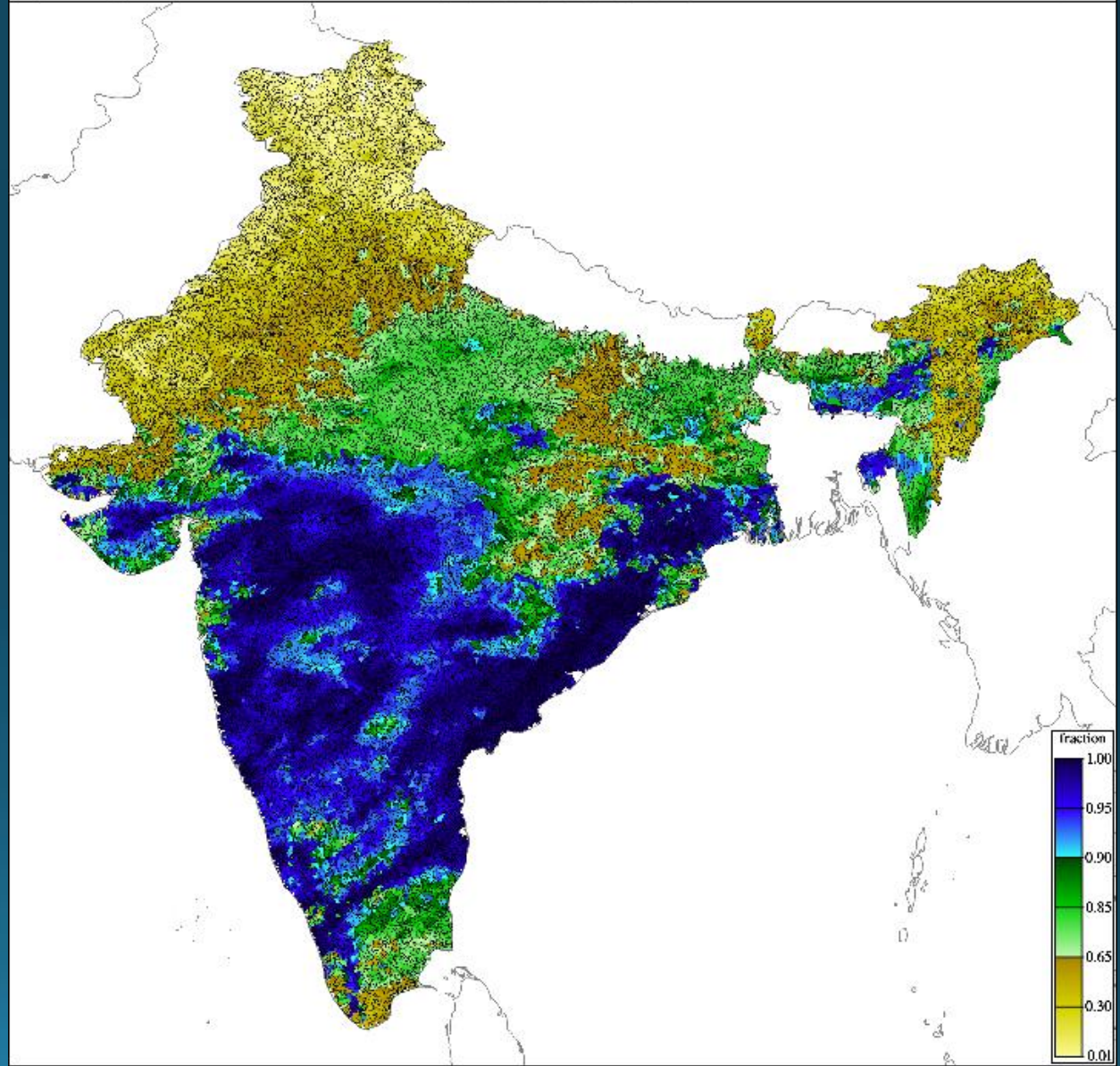


Average Soil Moisture 29th Aug – 00 & 06UTC

ASM - 06 hr 2017-08-29 00:00 UTC INDIA

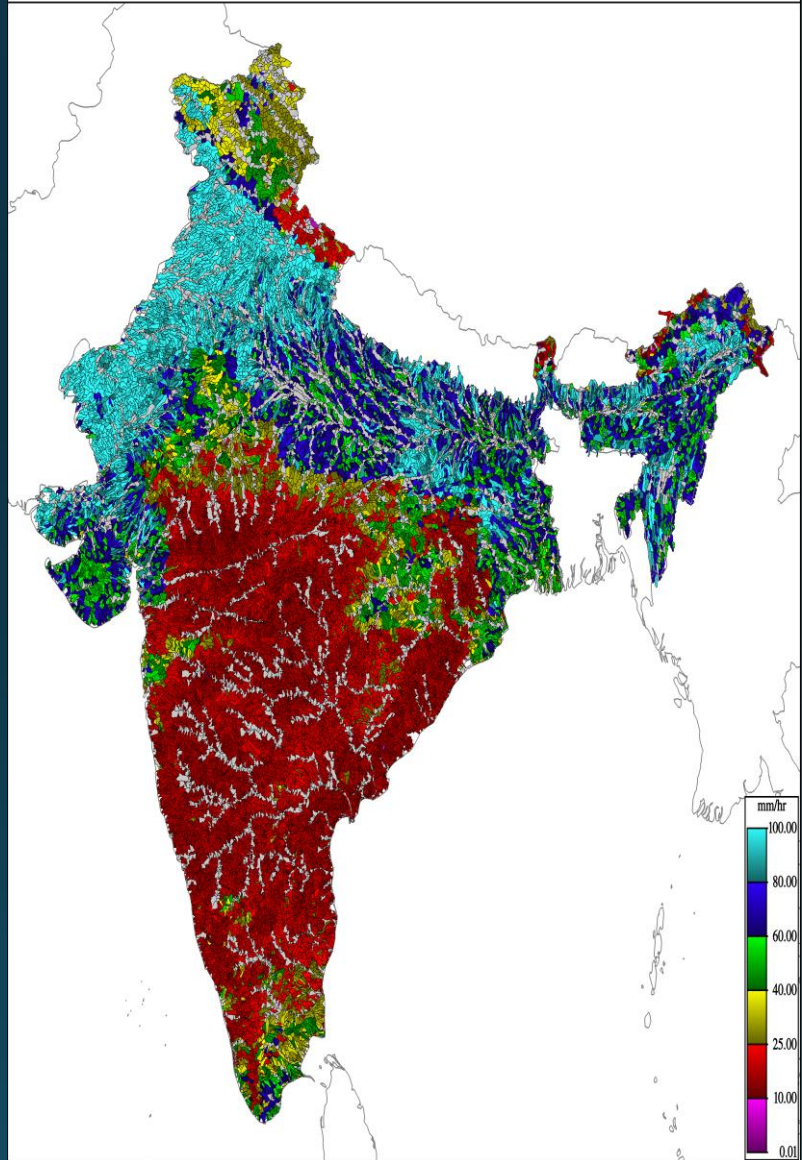


ASM - 06 hr 2017-08-29 06:00 UTC INDIA

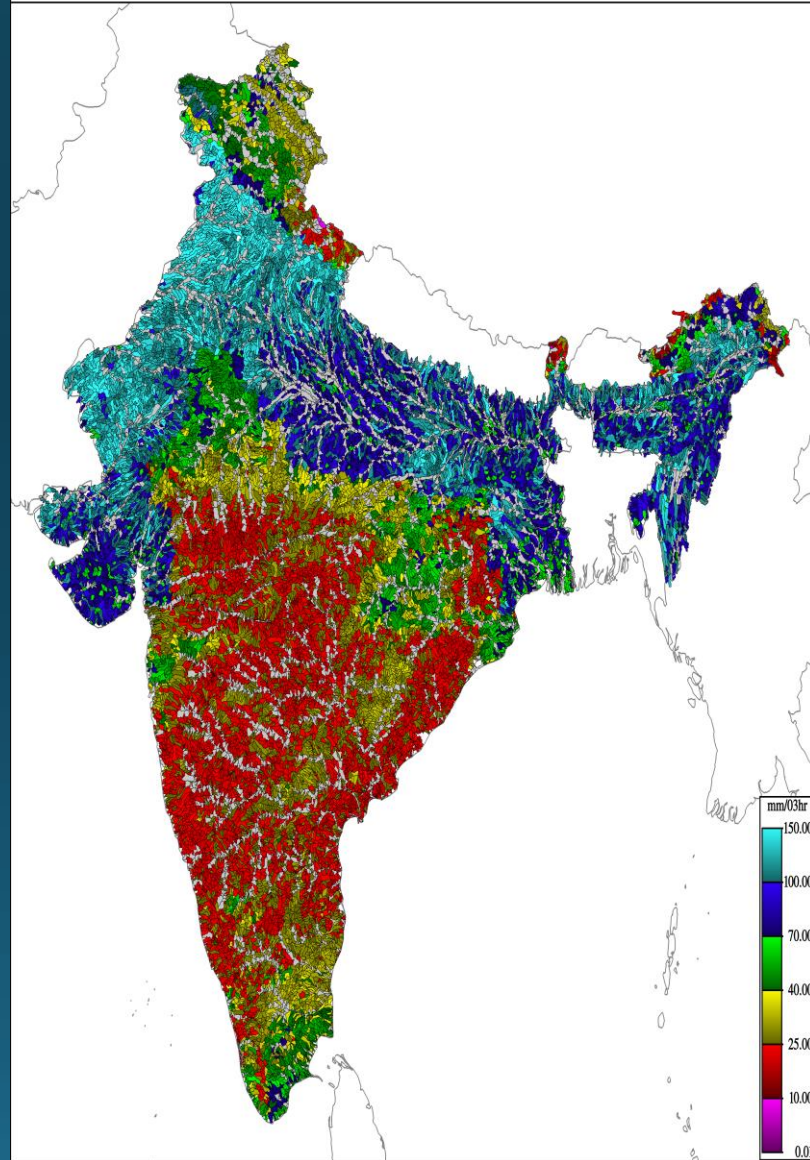


Flash Flood Guidance 29th Aug - 00UTC

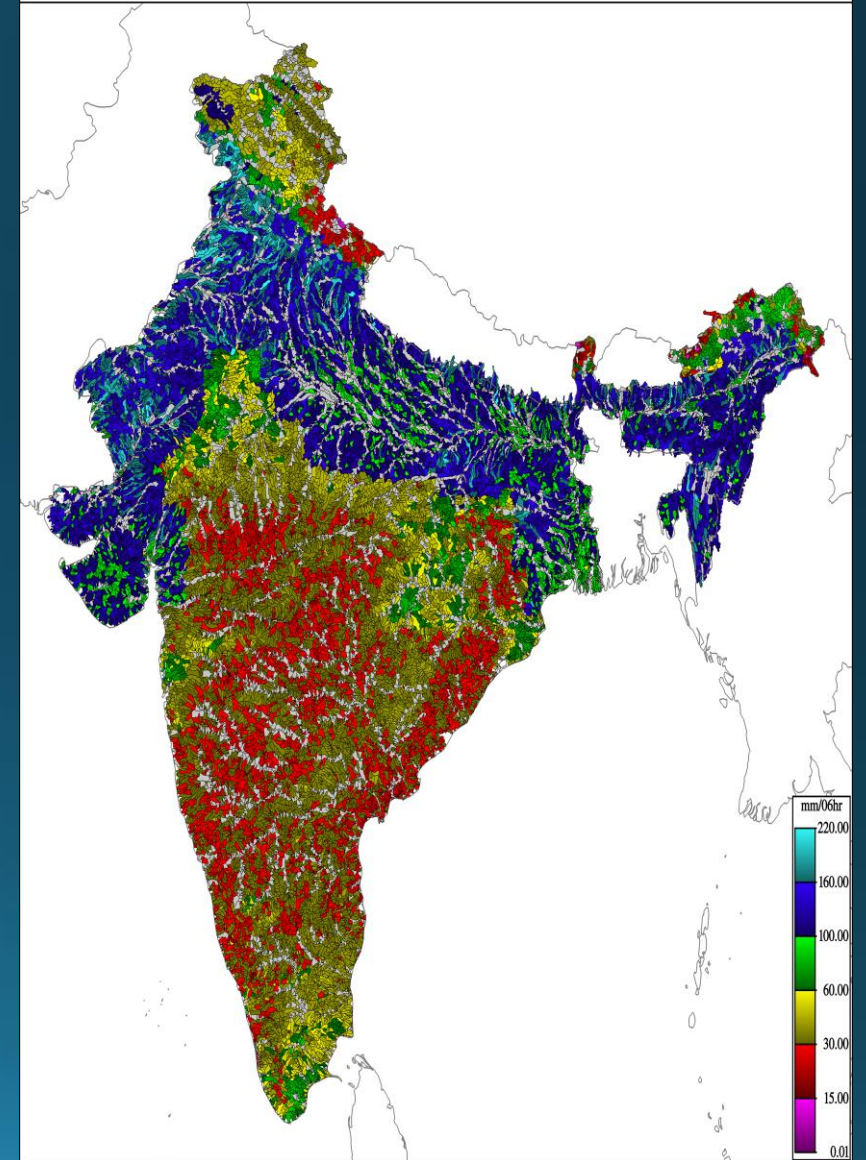
FFG - 01 hr 2017-08-29 00:00 UTC INDIA



FFG - 03 hr 2017-08-29 00:00 UTC INDIA

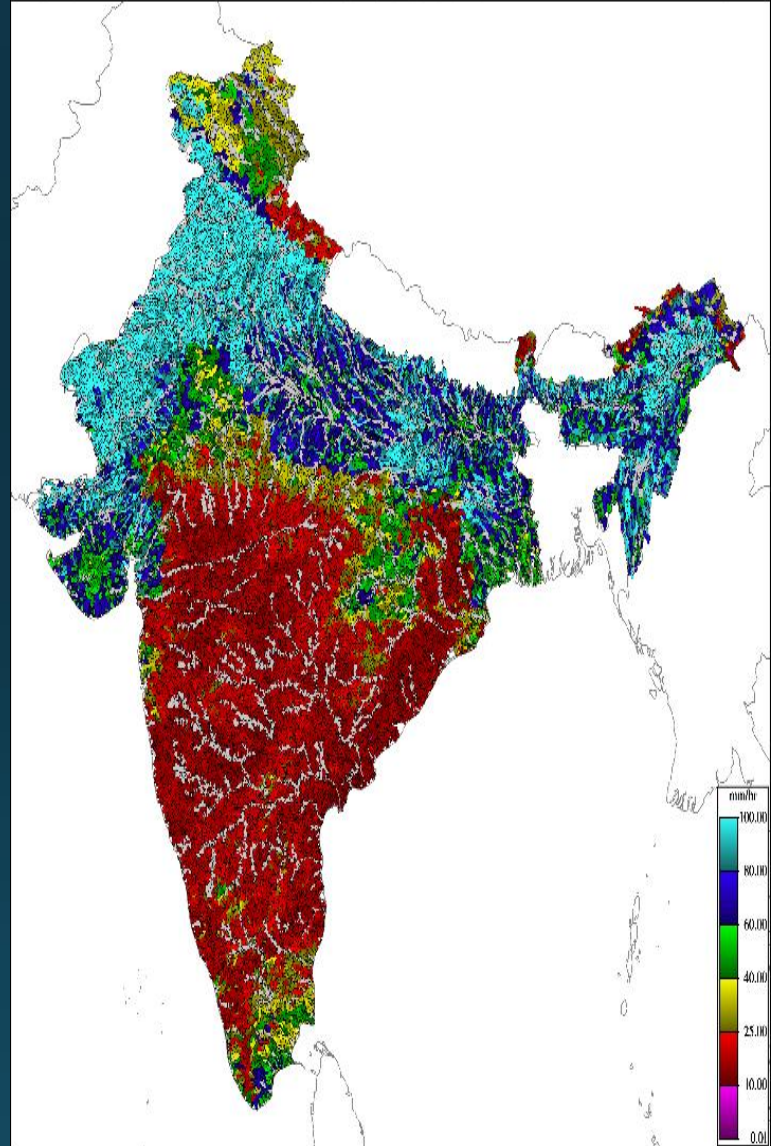


FFG - 06 hr 2017-08-29 00:00 UTC INDIA

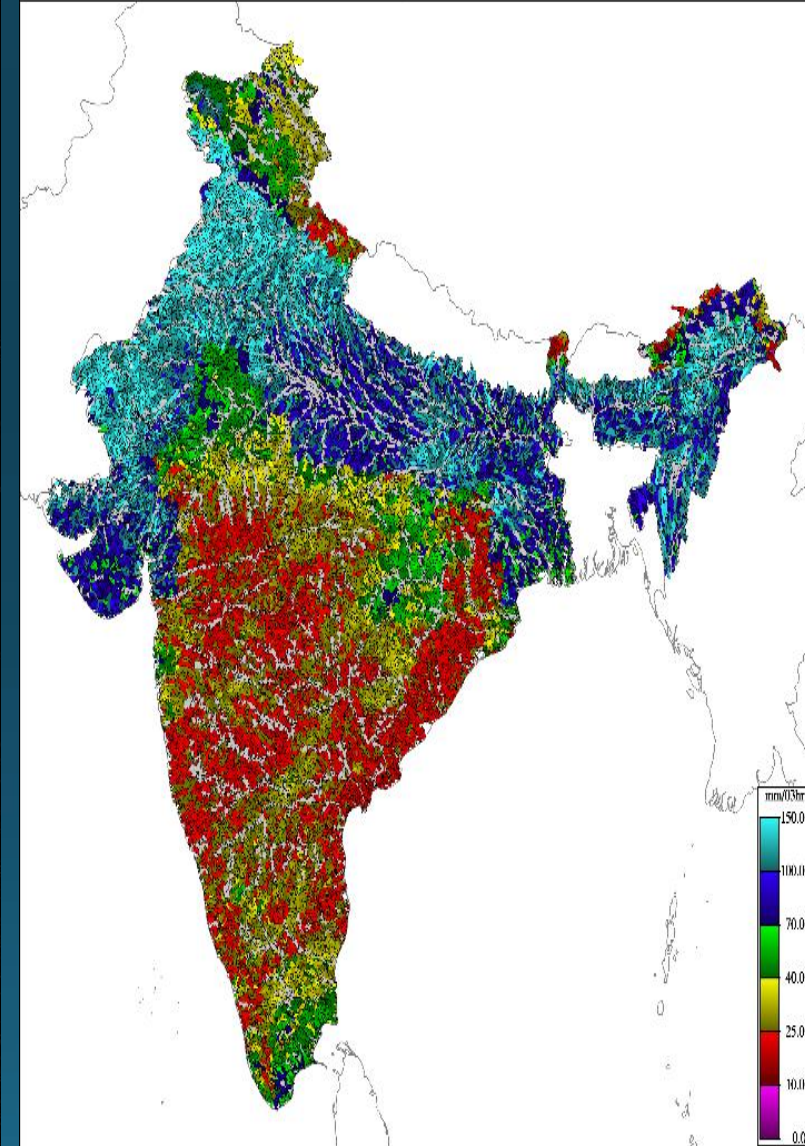


Flash Flood Guidance 29th Aug - 06UTC

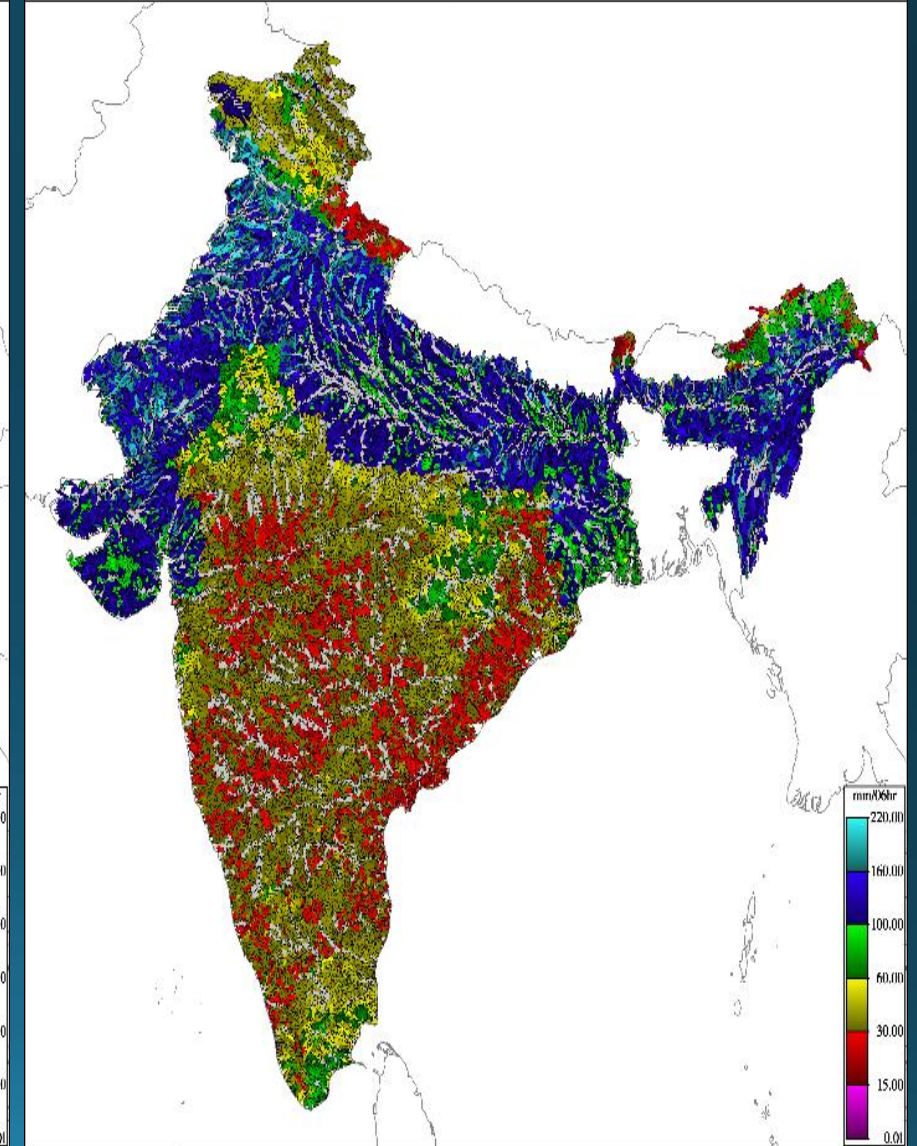
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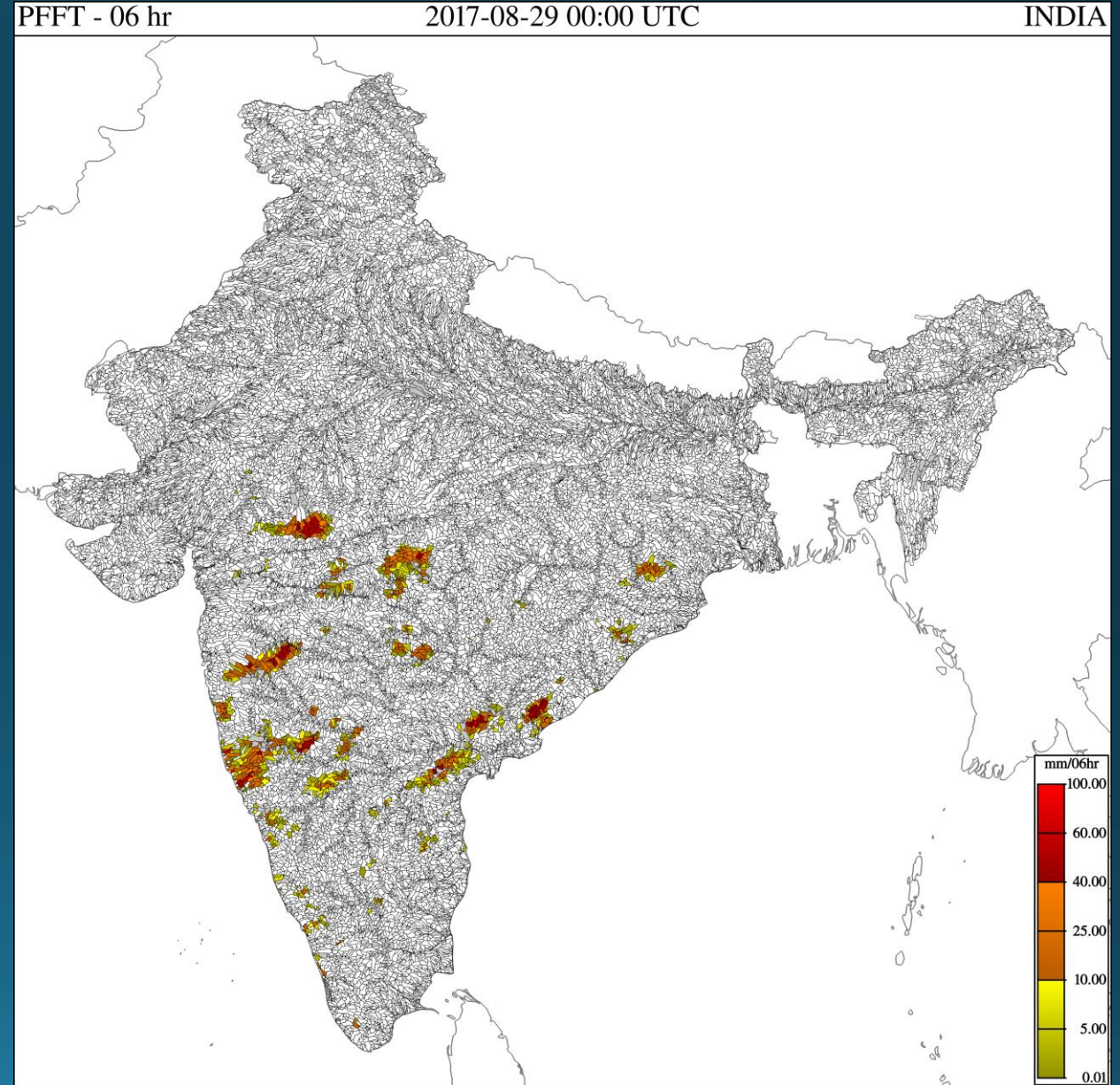
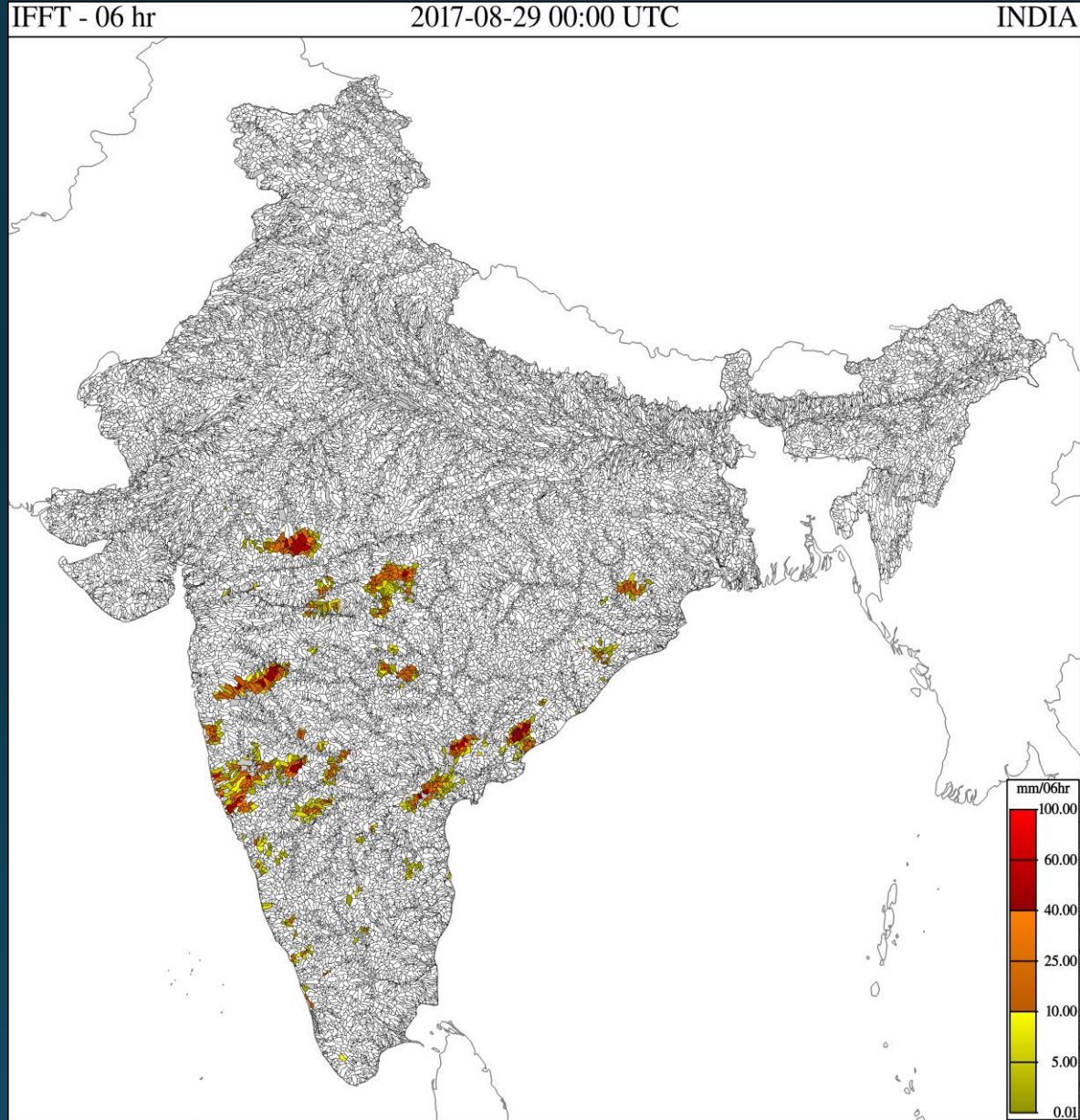
FFG - 03 hr 2017-08-29 06:00 UTC INDIA



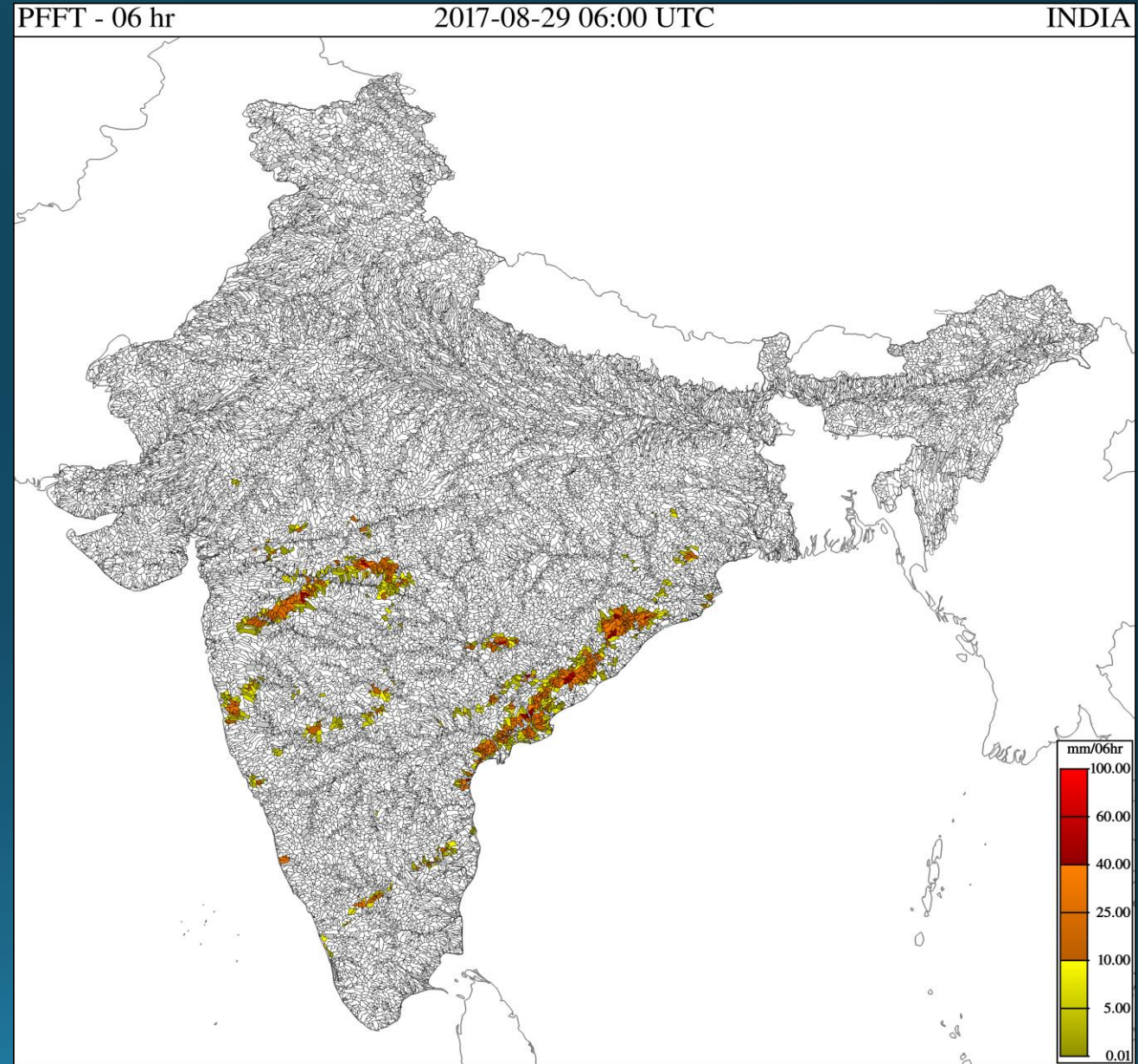
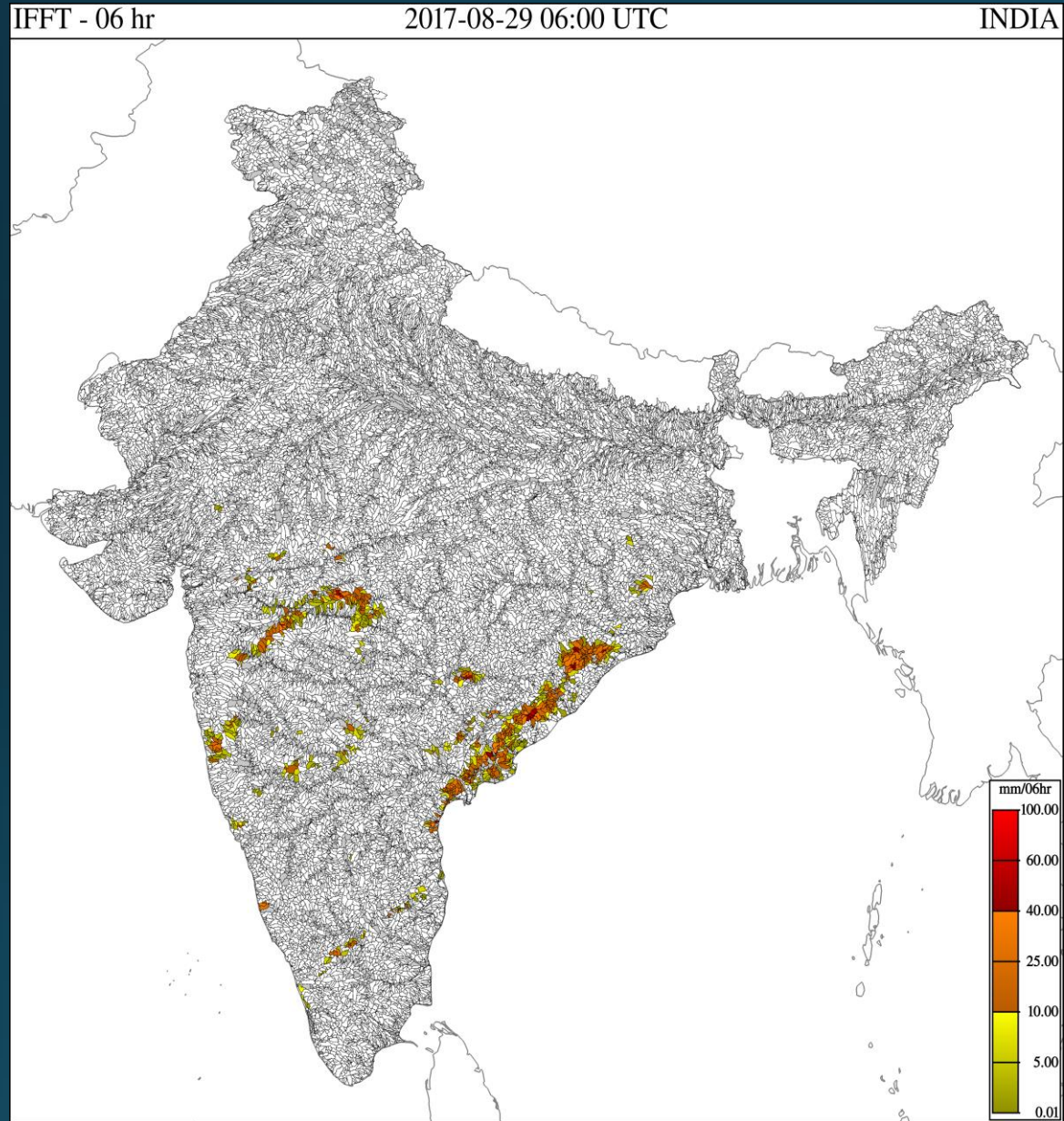
FFG - 06 hr 2017-08-29 06:00 UTC INDIA



Flash Flood Threat 29th Aug - 00UTC

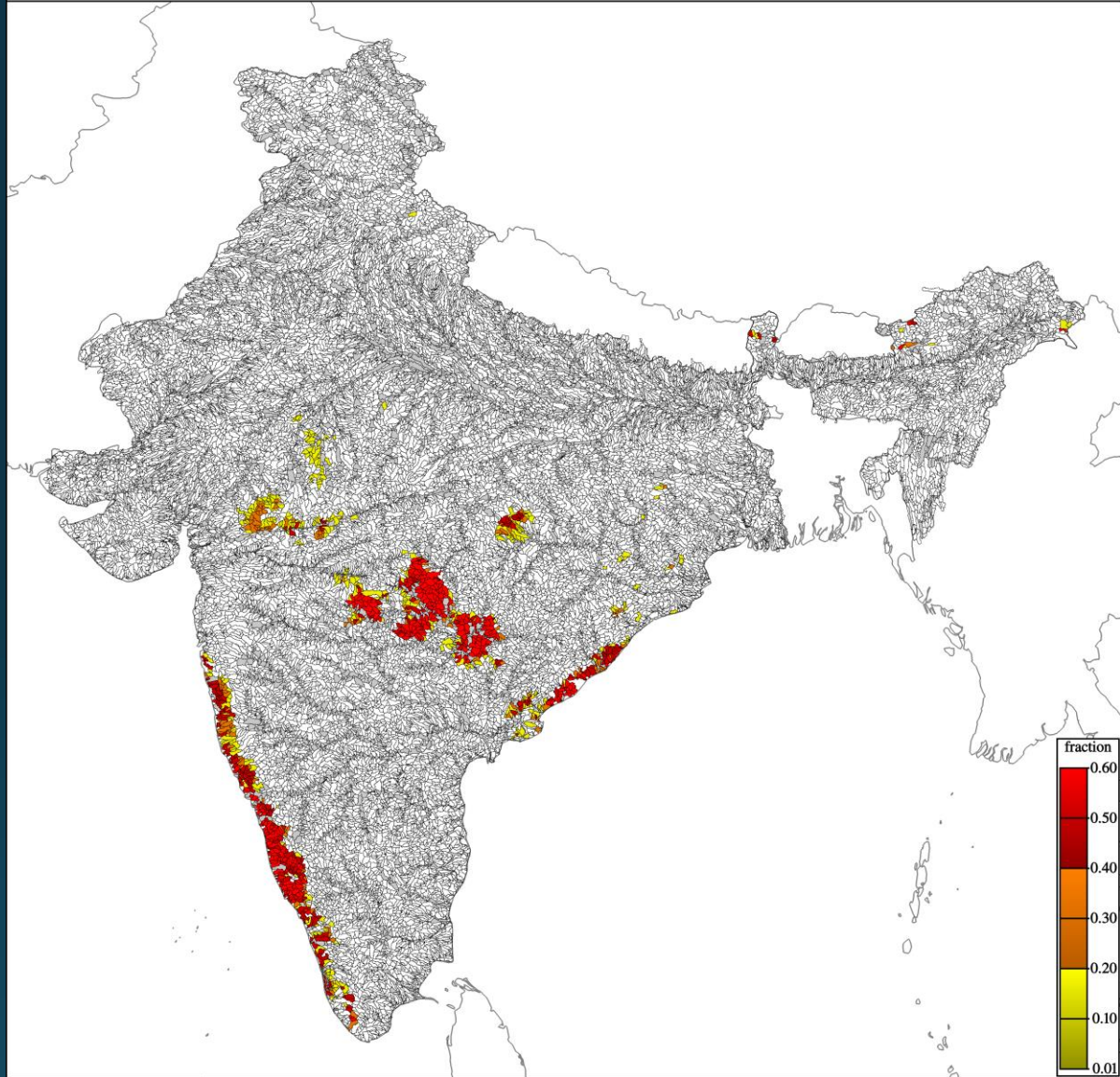


Flash Flood Threat 29th Aug - 06UTC

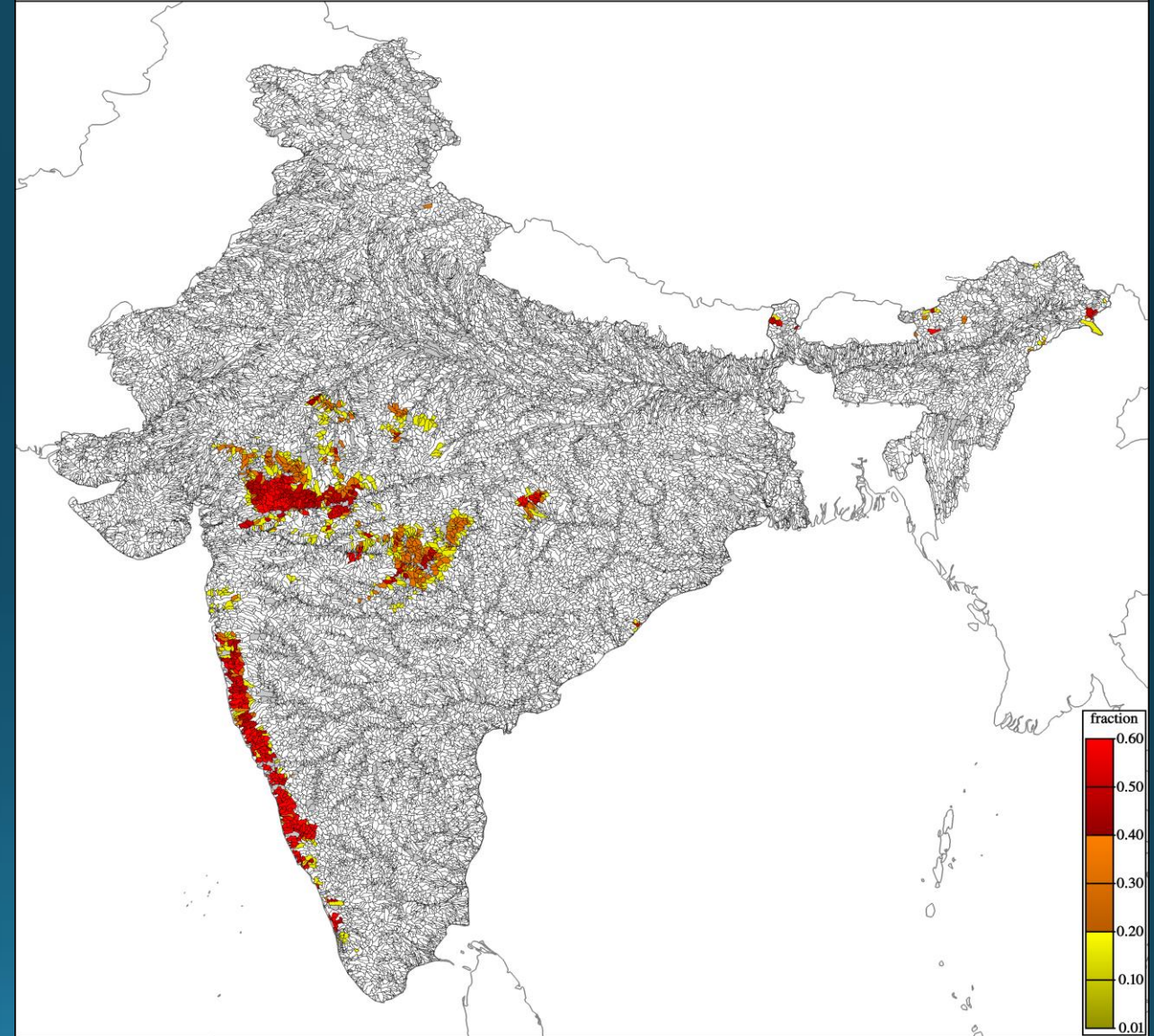


Flash Flood Risk 29th Aug - 06UTC

FFR1 - 12 hr 2017-08-29 00:00 UTC INDIA



FFR1 - 12 hr 2017-08-29 06:00 UTC INDIA



MAPSERVER INTERFACE

2018-03-08 04:20:41 IST

SASIAFFG - South Asia Flash Flood Guidance System

2018-03-07 22:50:41 UTC

The interface displays four map panels arranged in a 2x2 grid, each showing a different basin configuration. The top-left panel shows the 'MAP' basin with a colorful flood risk overlay. The top-right panel shows the 'ASM' basin with a similar overlay. The bottom-left panel shows the 'FFG' basin with a different color scheme. The bottom-right panel shows the 'PFFT' basin with a grayscale background and colored flood risk areas. Each map panel includes a zoom slider and a '4' or '6' button. Green checkmarks are visible between the panels.

Base Layers

- SASIAFFG Operational Product
- SASIAFFG Basin Outlines
- Open Street Maps - Water Only
- Open Street Maps - Roads Only

Zoom to Country

Select Country

Product Selection Table

Basin: MAP ASM FFG PFFT

Raster: 06HR 12HR 24HR

Product Date Selection

Product Date: 2017-08-29 00:00 UTC

00	01	02	03	04	05
06	07	08	09	10	11
12	13	14	15	16	17
18	19	20	21	22	23

Prev Hour Next Hour
Prev 6hr Interval Next 6hr Interval
Prev Day Next Day

Reset to Current

Sync Date Controls

Base Layers

- SASIAFFG Operational Product
- SASIAFFG Basin Outlines
- Open Street Maps - Water Only
- Open Street Maps - Roads Only

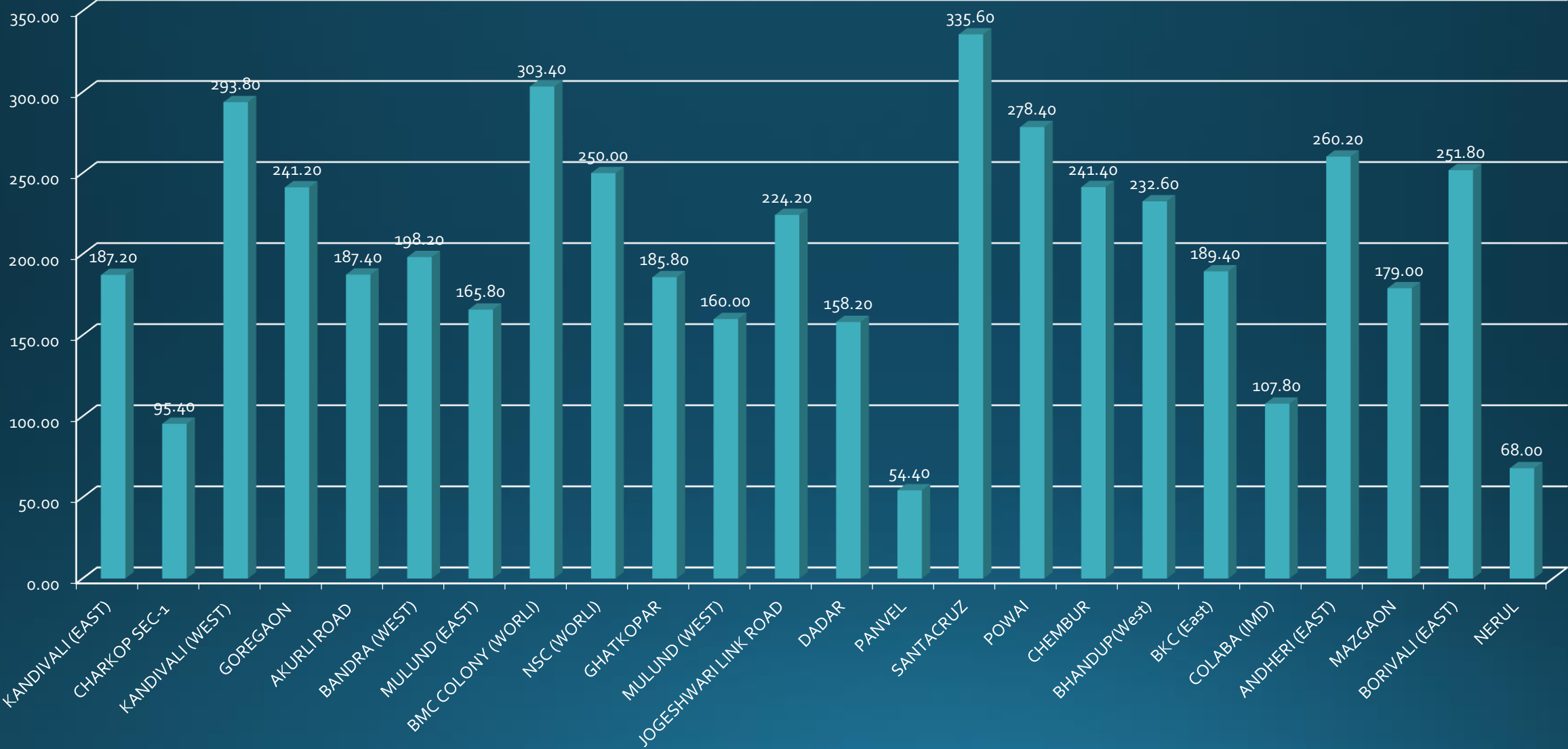
ADVISORY

- 1) 29th August 2017 – 00 UTC valid till 06 UTC
- 2) 29th August 2017 – 06 UTC valid till 12 UTC

Generally, in time steps of 6 hours for next 12 hours with **Watch (Be Updated)** to **Alert (Be Prepared)** to **Warning (Take Action)**.

Main area of concentration are Central India, West Coastal part of India

Rainfall (in mm) received over different stations in Mumbai on 30/08/2017 (SAFAR AWS Network)



As rain subsides, Mumbai floods death toll is five, 12 missing



The Hindu Net Desk

AUGUST 30, 2017 09:14 IST
UPDATED: AUGUST 31, 2017 00:18 IST

SHARE ARTICLE 37 6 PRINT A | A | A

Smart Owner

Ad

• Sit back & let your money work for you

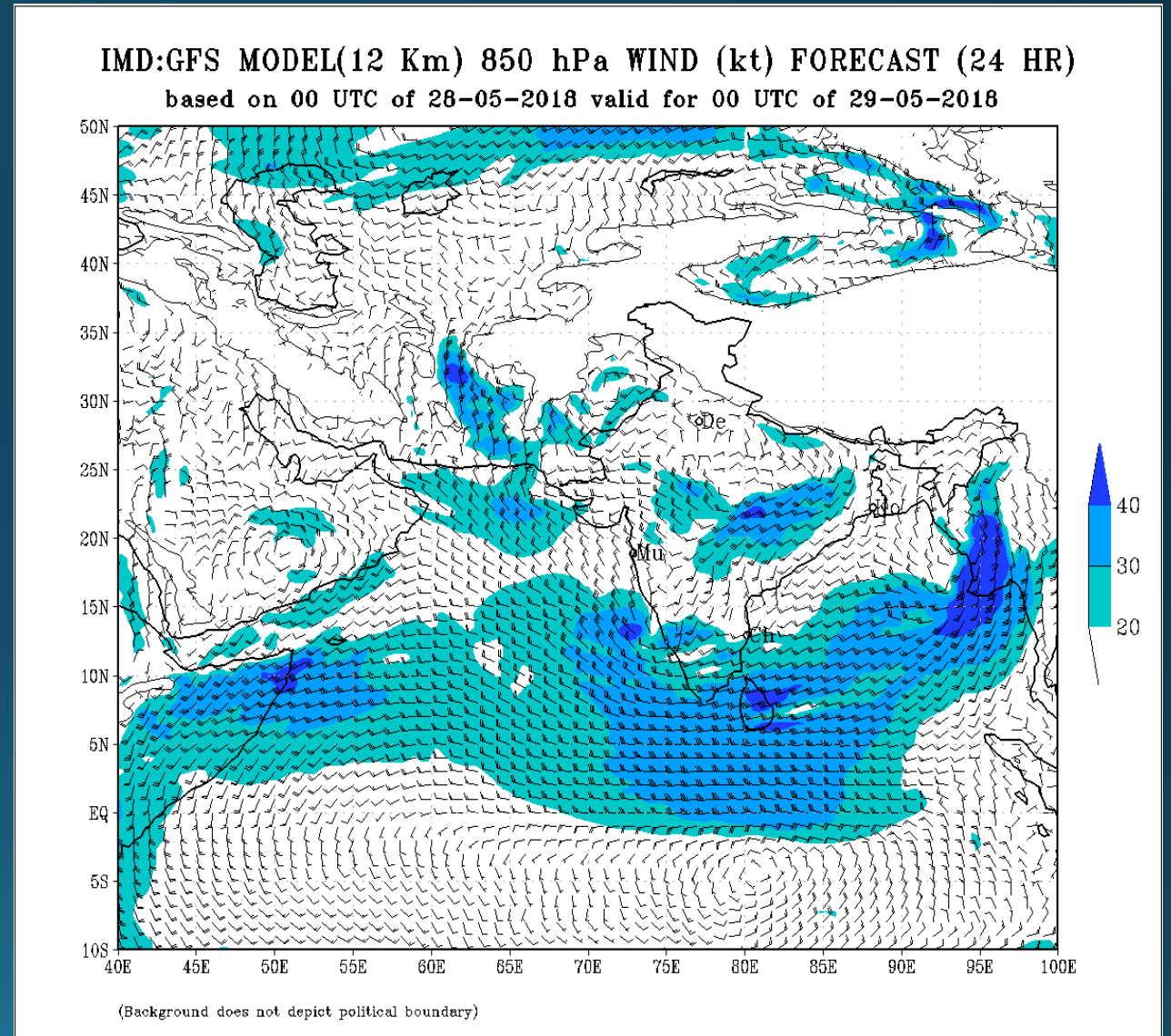


RECENT CASE STUDY

29th MAY 2018

SYNOPTIC CONDITIONS

The well marked low pressure area lay over southeast Arabian sea and adjoining east central Arabian Sea off north Kerala Karnataka coasts. Associated cyclonic circulation extends upto 7.6 km above mean sea level.

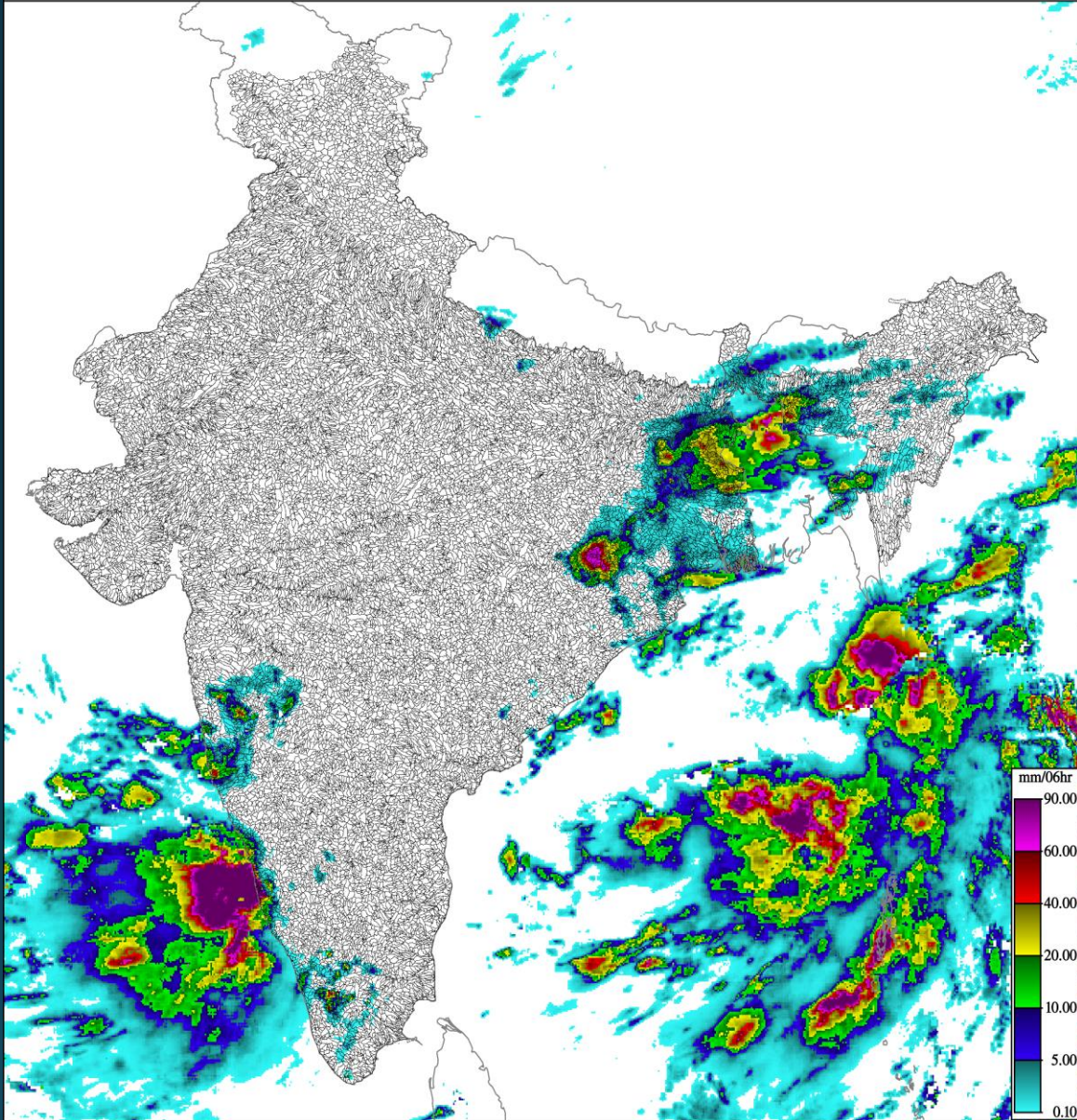


MWGHE and GHE 29th May -00 UTC

MWGHE - 06 hr

2018-05-29 00:00 UTC

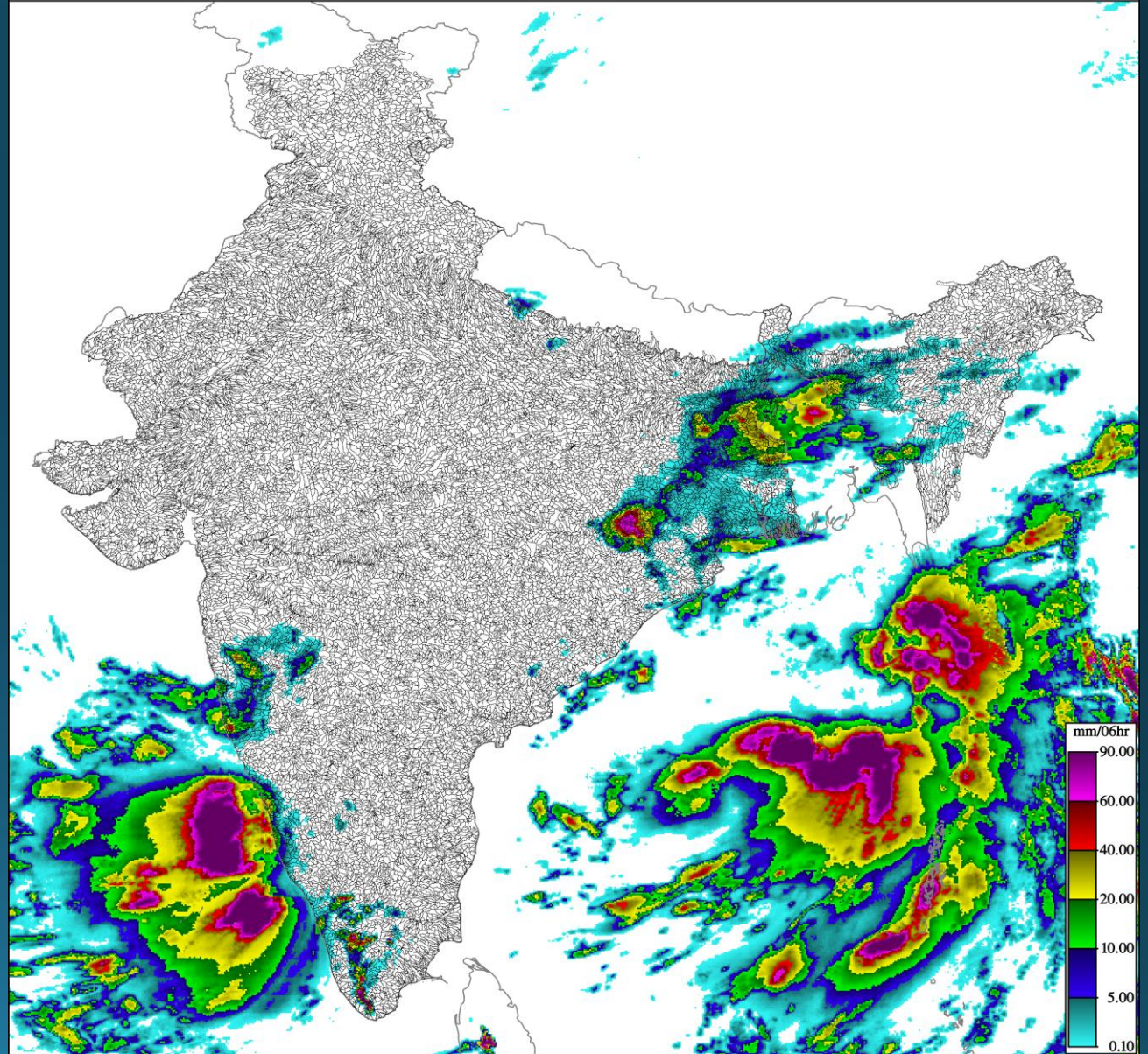
INDIA



GHE - 06 hr

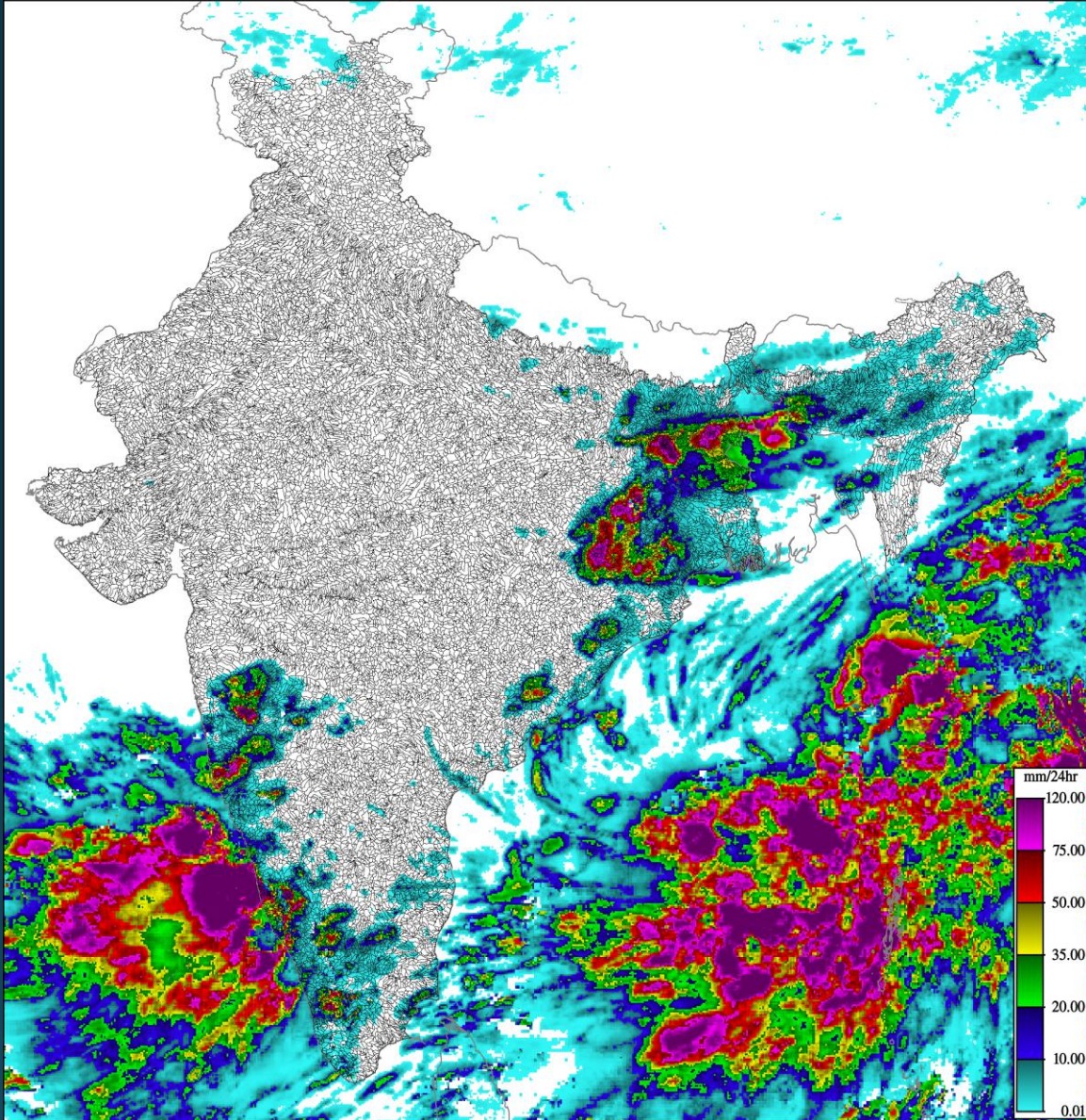
2018-05-29 00:00 UTC

INDIA

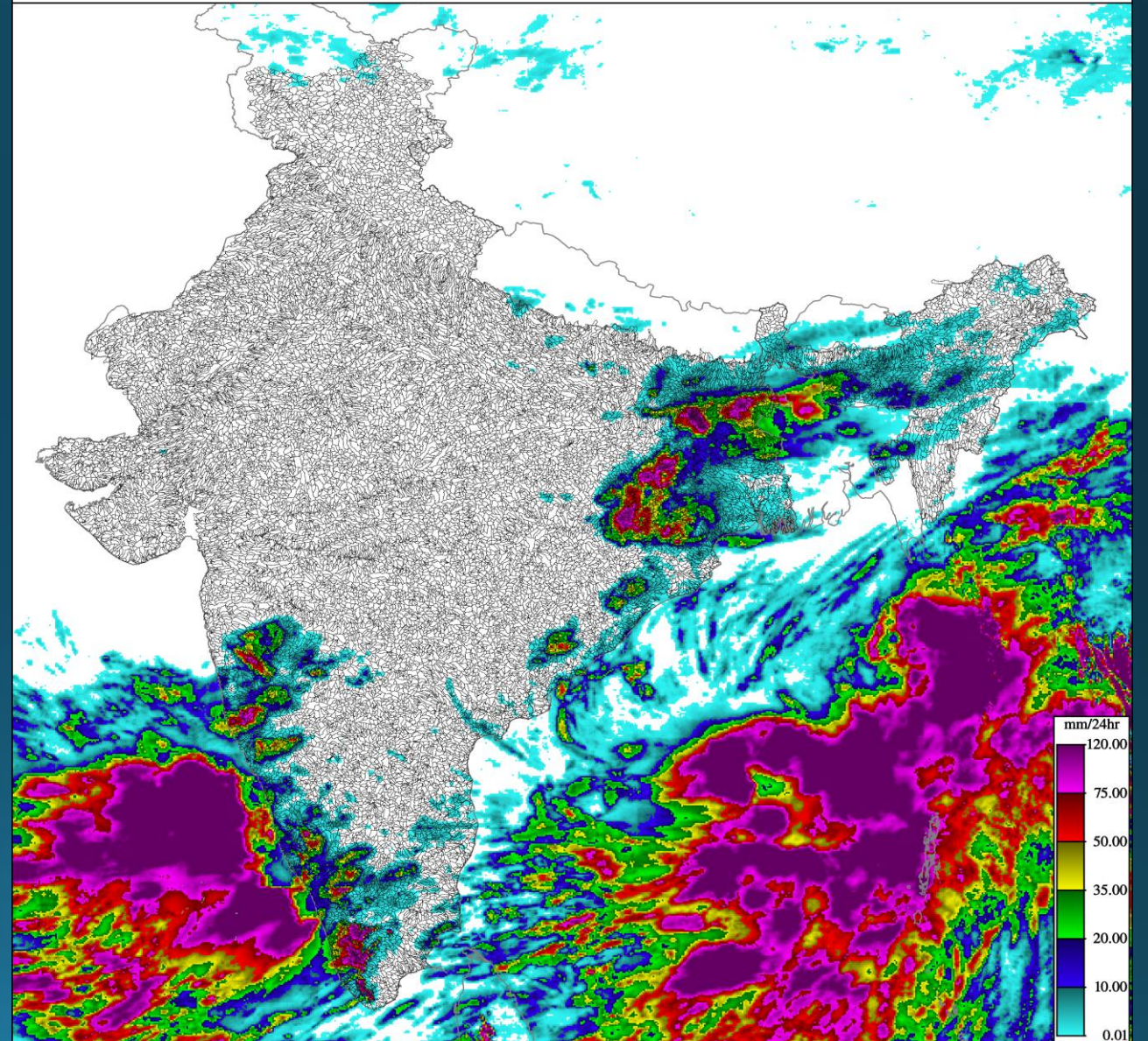


MWGHE and GHE 29th May -00 UTC

MWGHE - 24 hr 2018-05-29 00:00 UTC INDIA

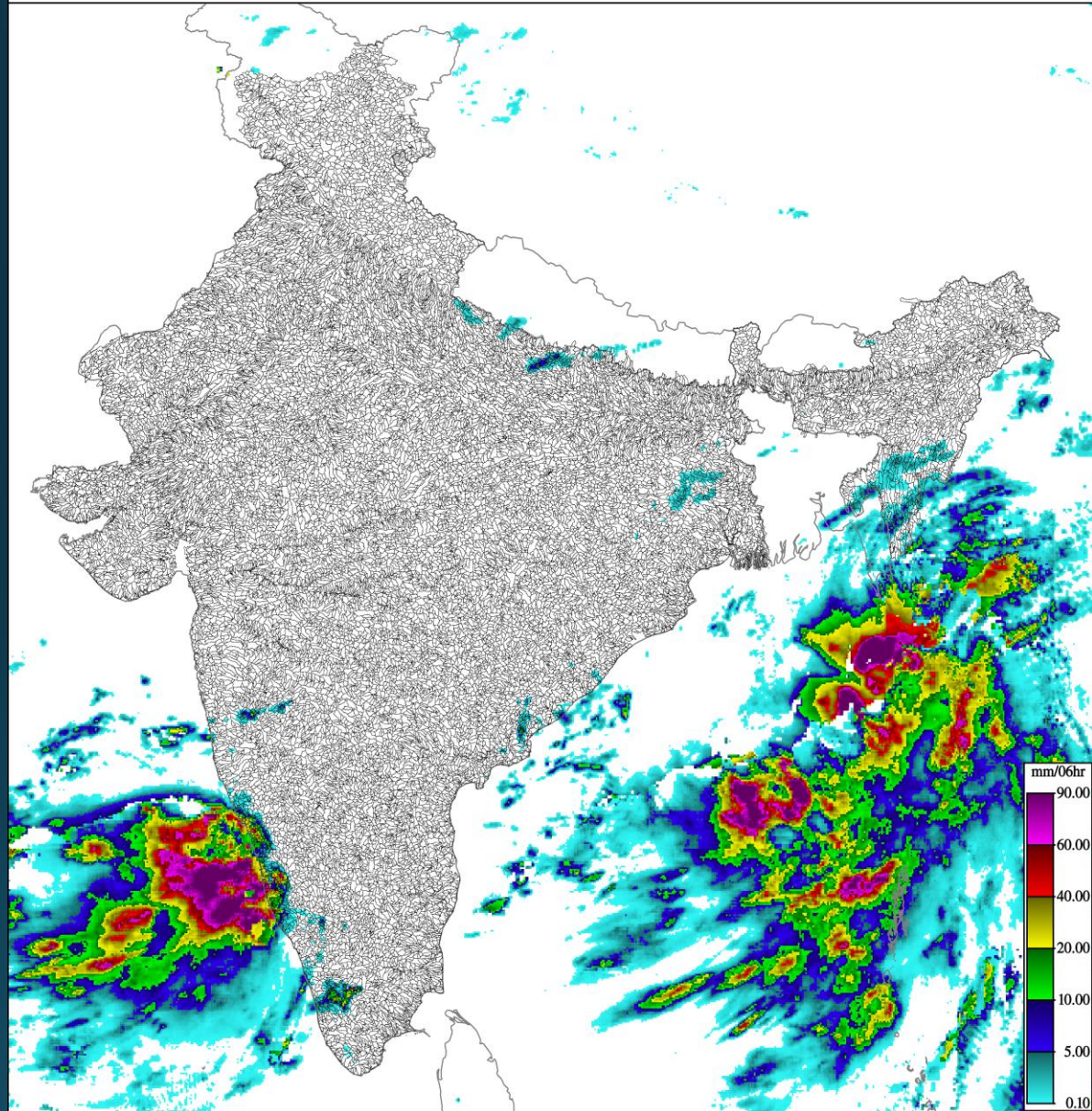


GHE - 24 hr 2018-05-29 00:00 UTC INDIA

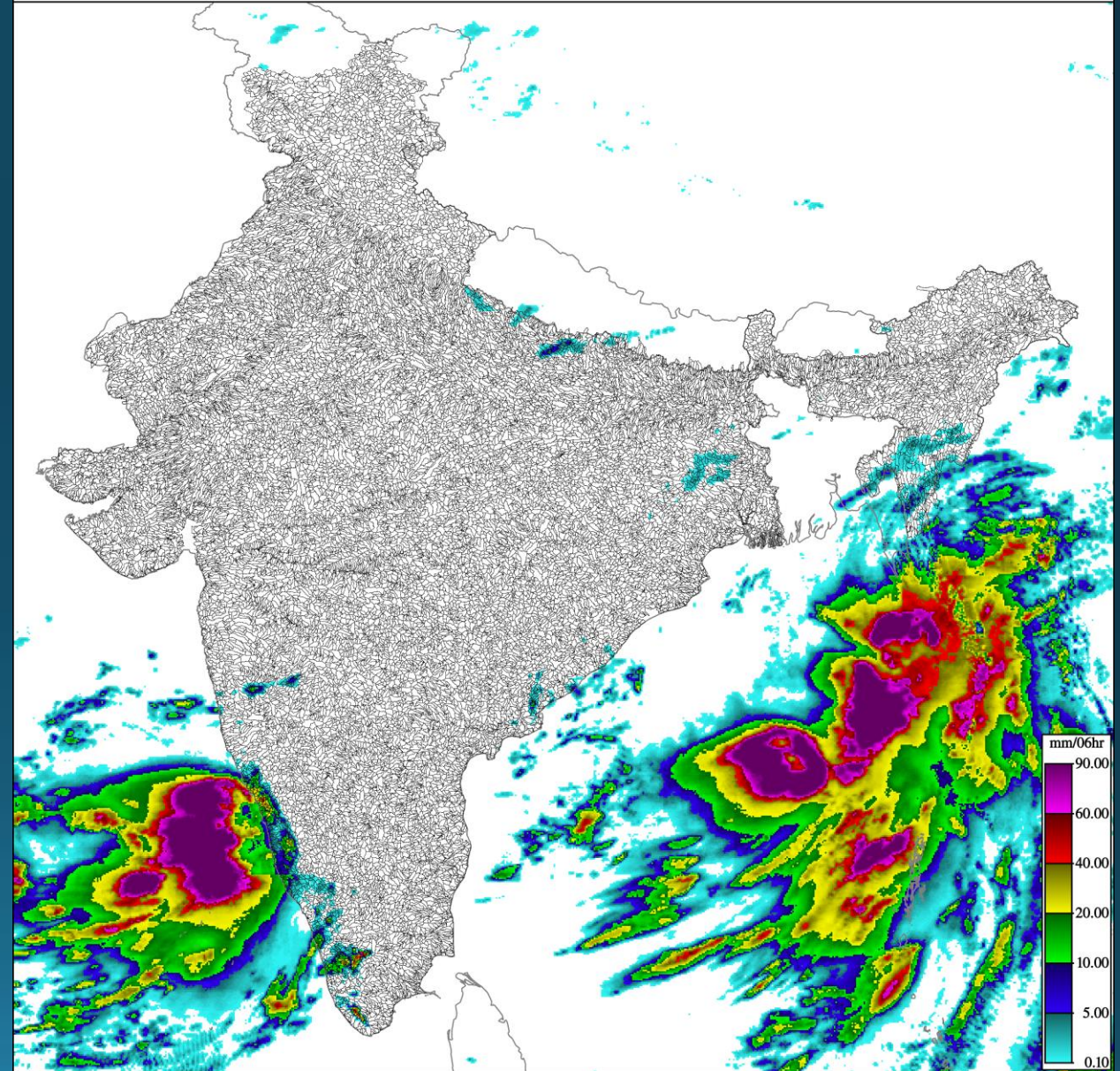


MWGHE and GHE 29th May -06 UTC

MWGHE - 06 hr 2018-05-29 06:00 UTC INDIA



GHE - 06 hr 2018-05-29 06:00 UTC INDIA

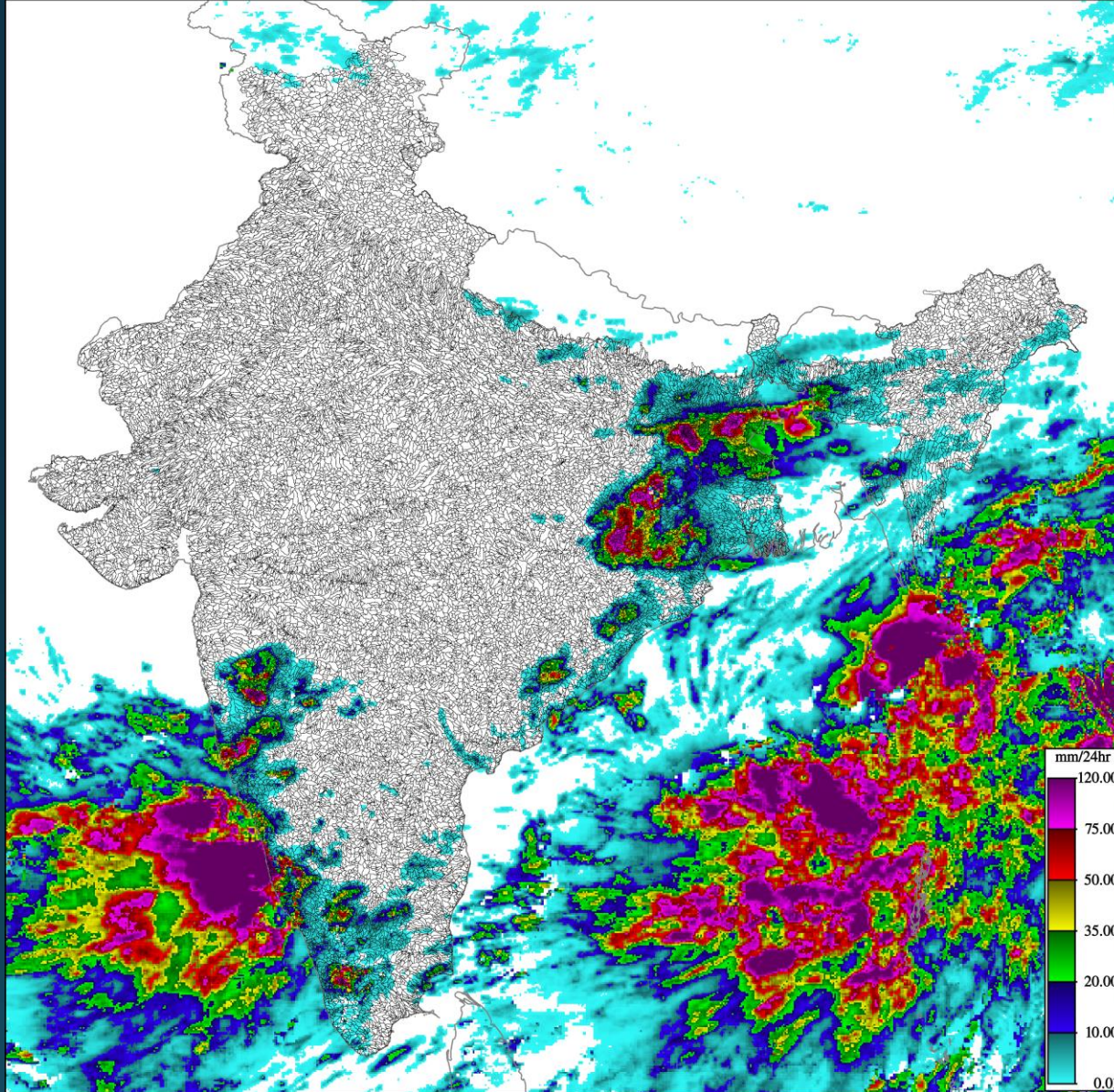


MWGHE and GHE 29th May -06 UTC

MWGHE - 24 hr

2018-05-29 06:00 UTC

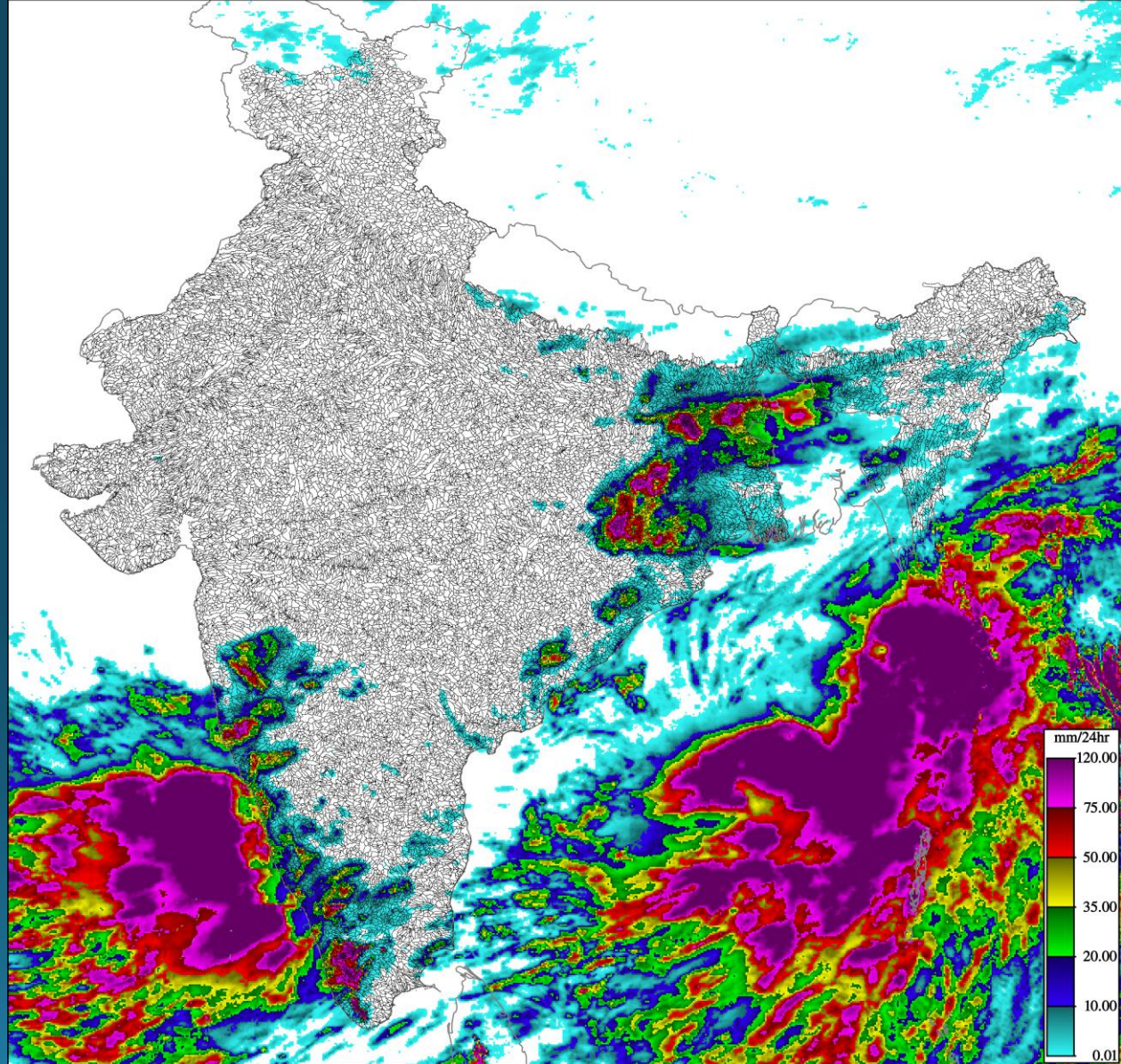
INDIA



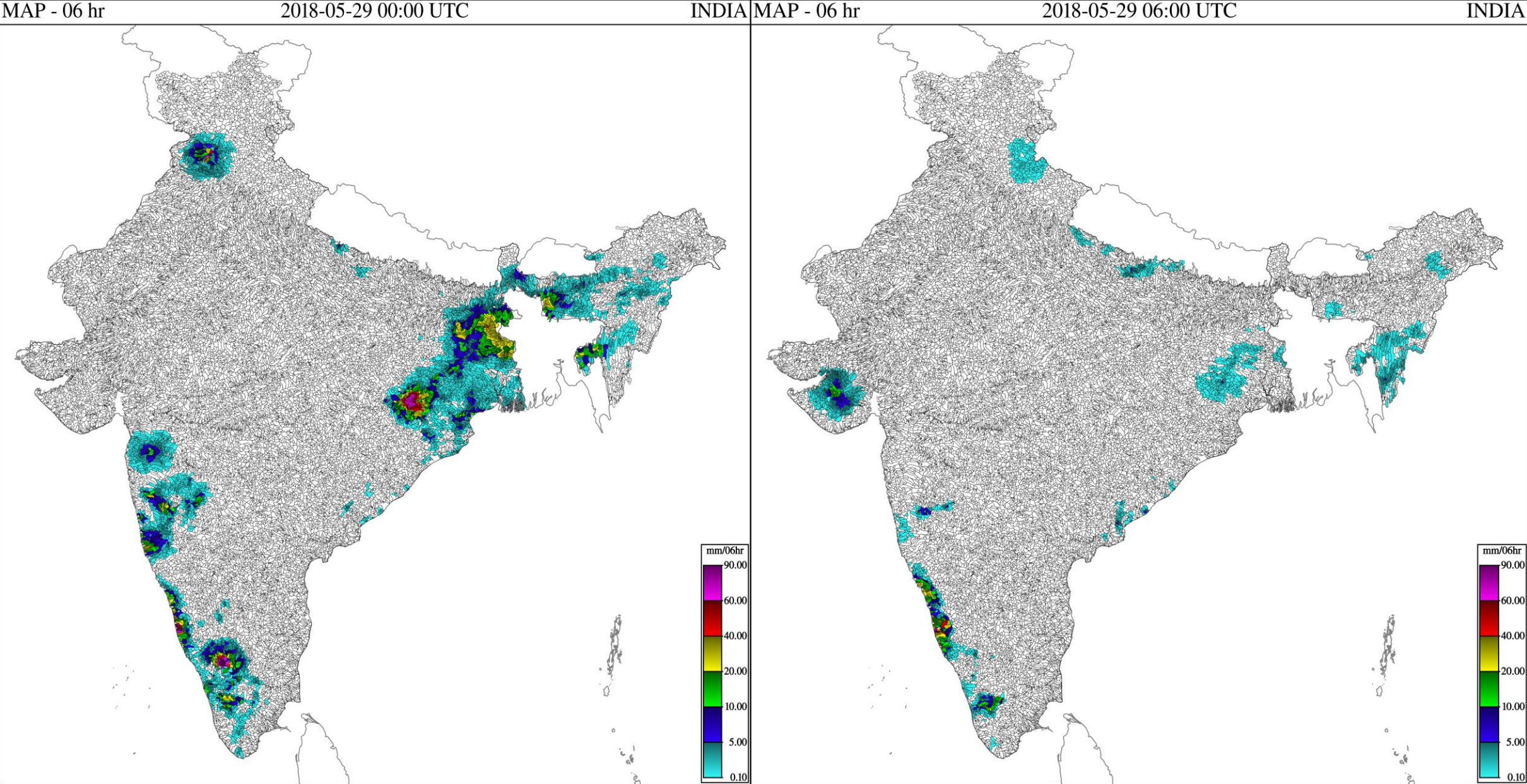
GHE - 24 hr

2018-05-29 06:00 UTC

INDIA

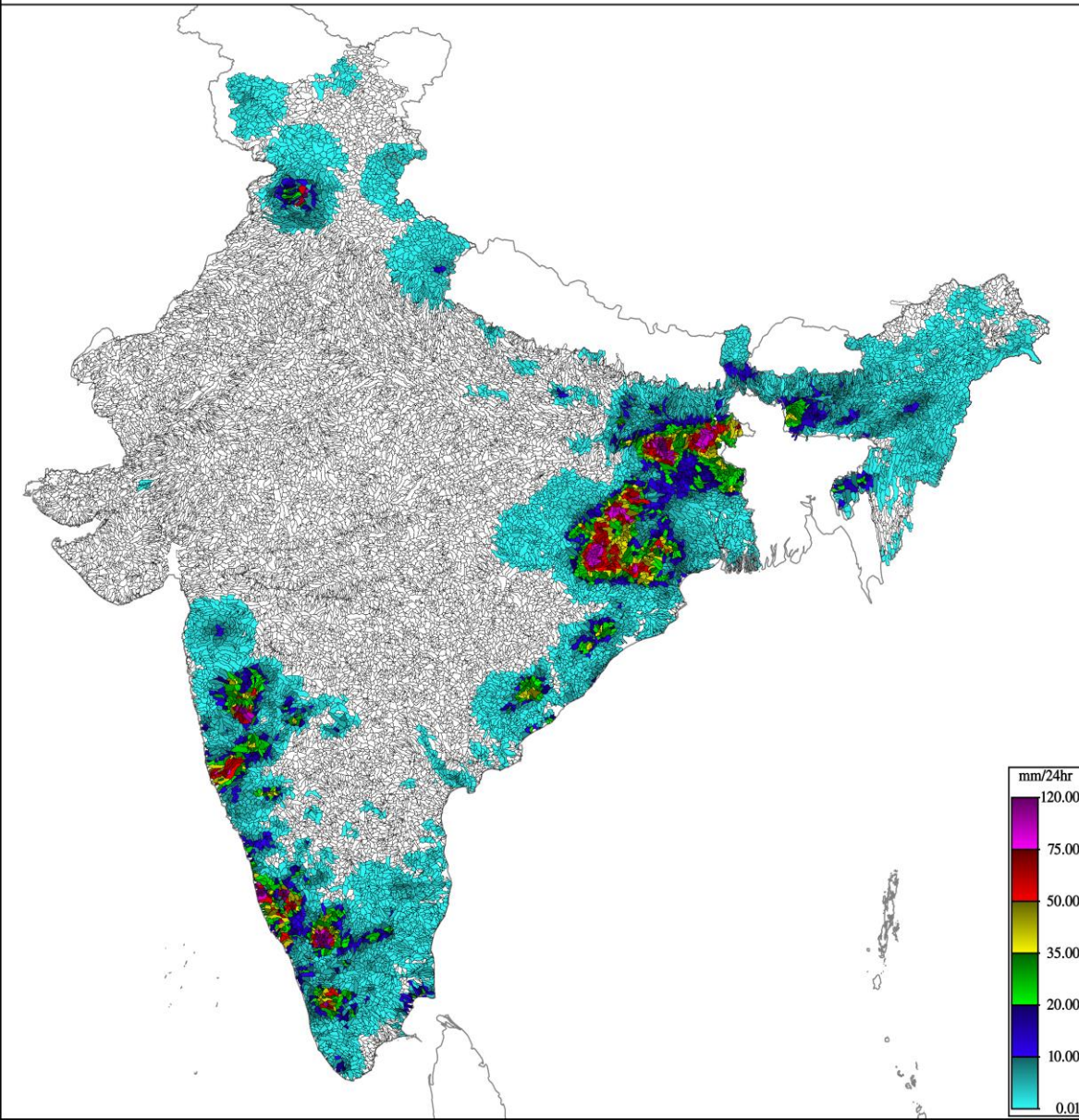


Merged Mean Area Precipitation 29th May – 00&06UTC

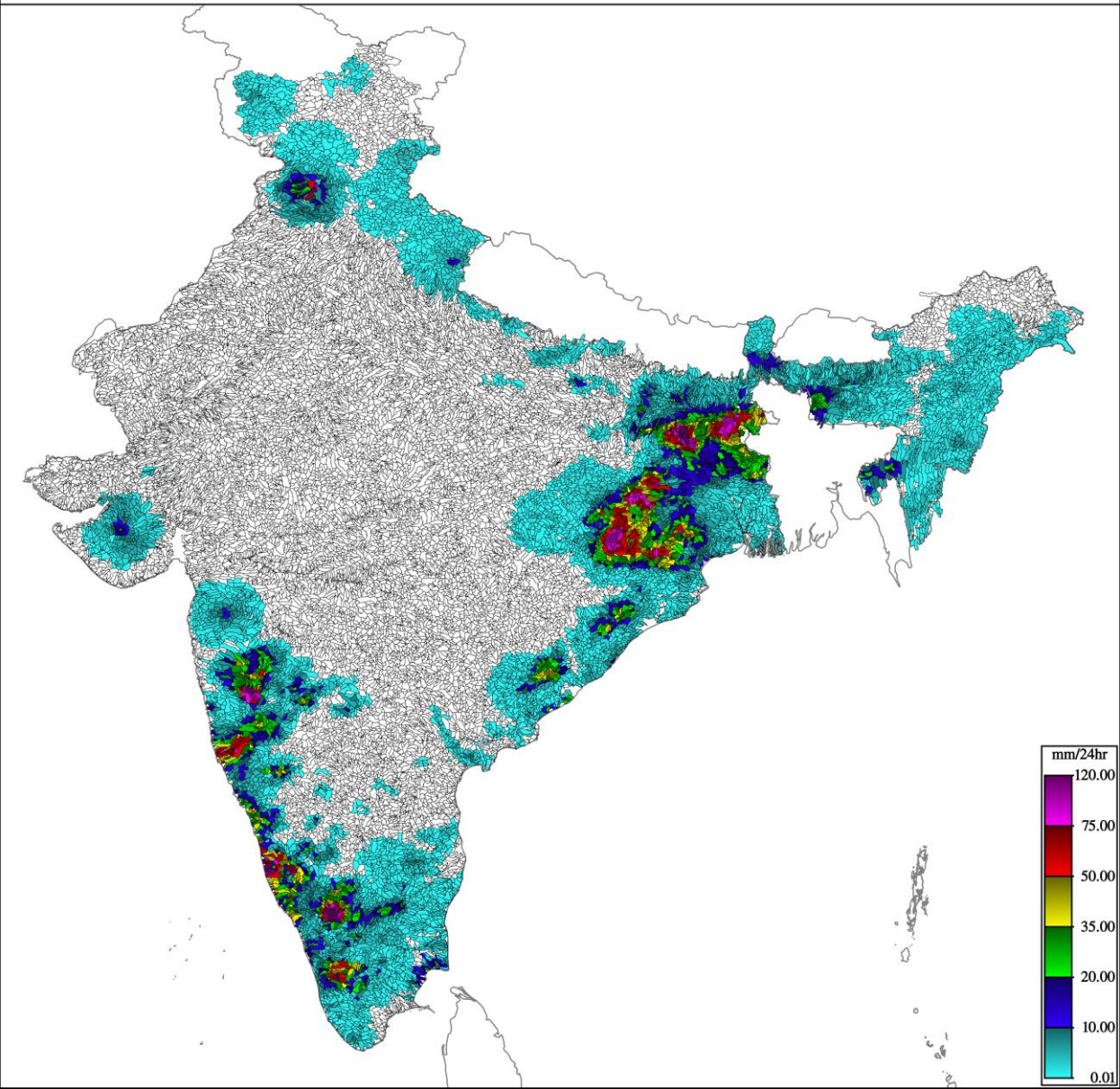


Merged Mean Area Precipitation 29th May – 00&06UTC

MAP - 24 hr 2018-05-29 00:00 UTC INDIA

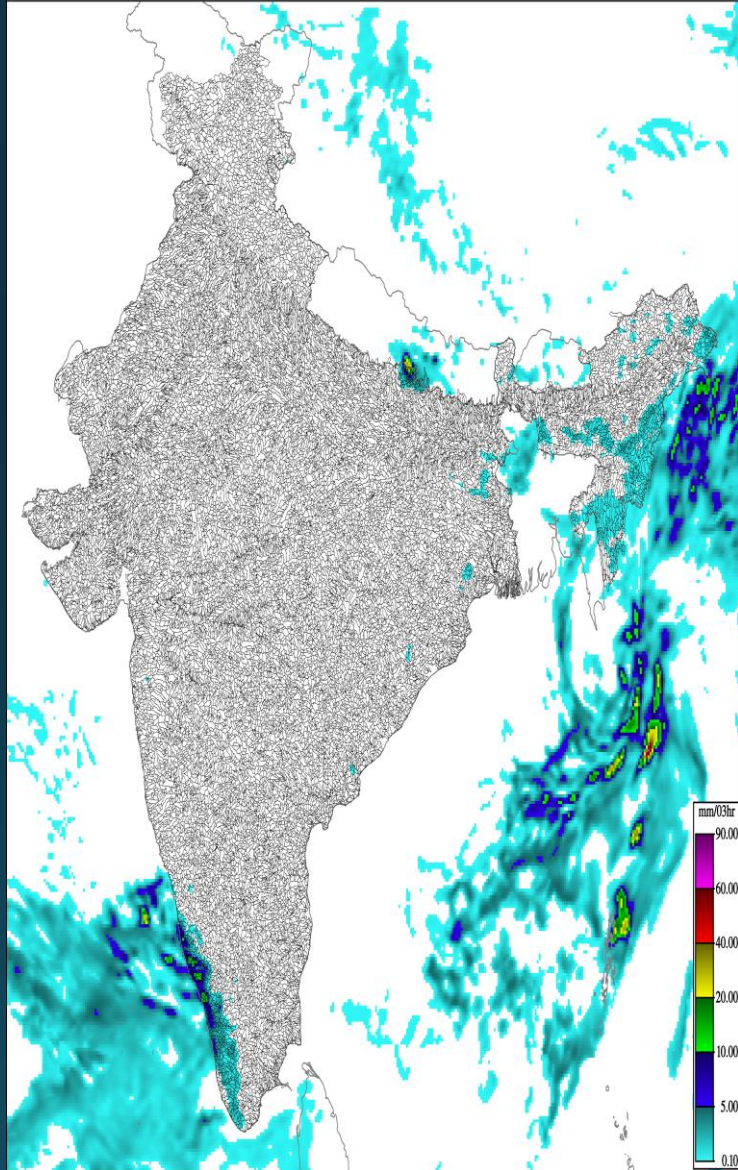


MAP - 24 hr 2018-05-29 06:00 UTC INDIA

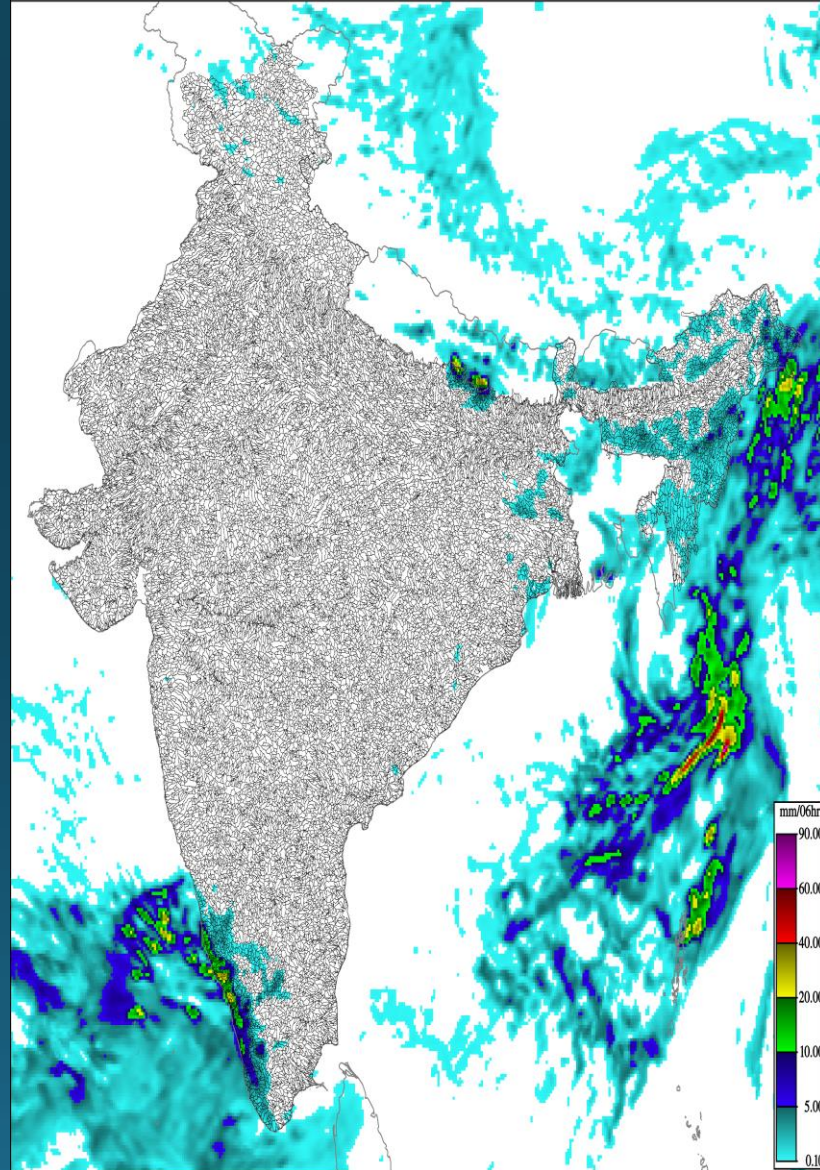


FORECAST 29th May - 00UTC

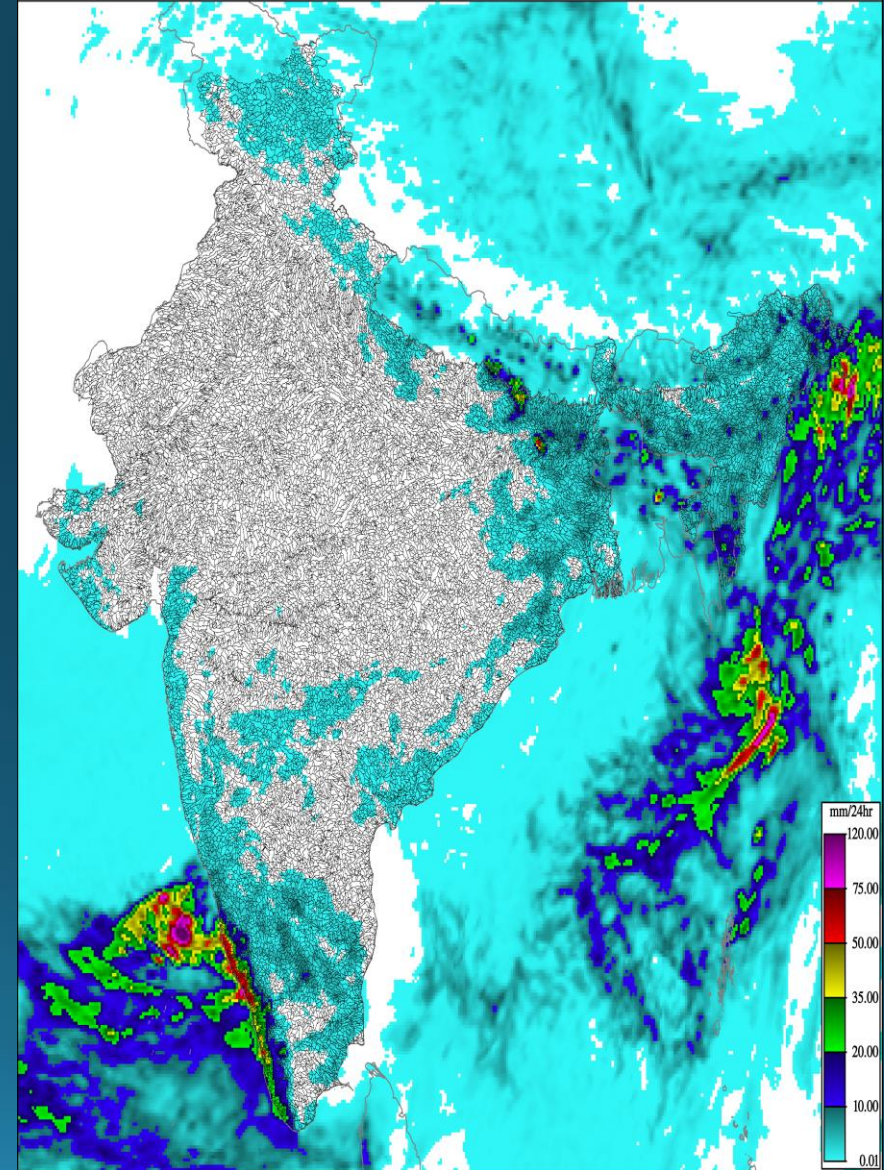
FCST1 - 03 hr 2018-05-29 00:00 UTC INDIA



FCST1 - 06 hr 2018-05-29 00:00 UTC INDIA

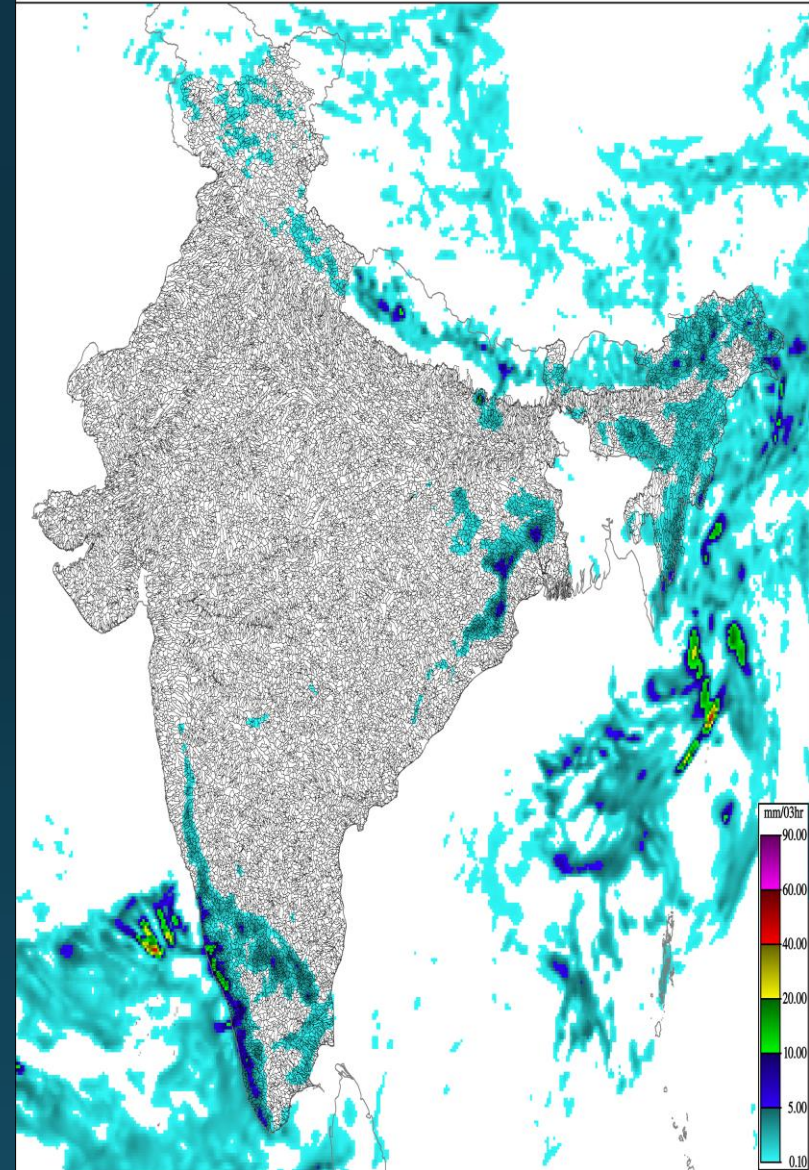


FCST1 - 24 hr 2018-05-29 00:00 UTC INDIA

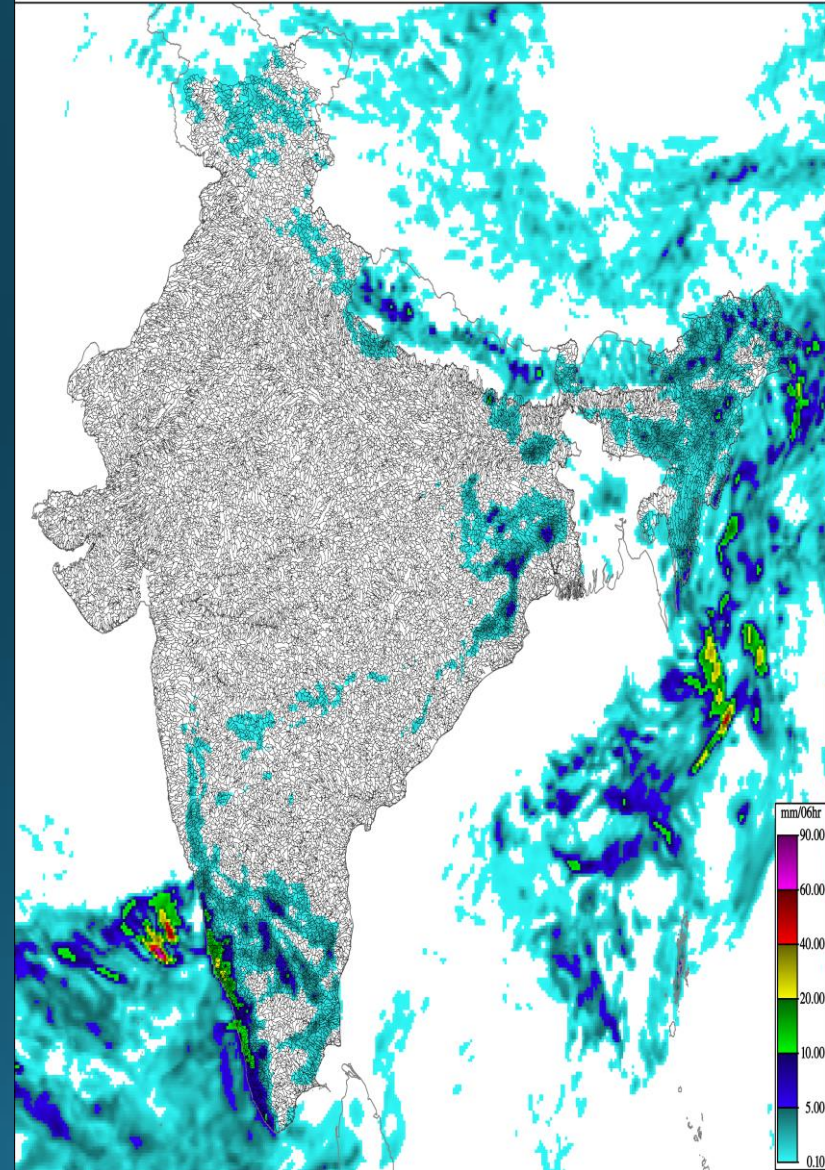


FORECAST 29th May - 06UTC

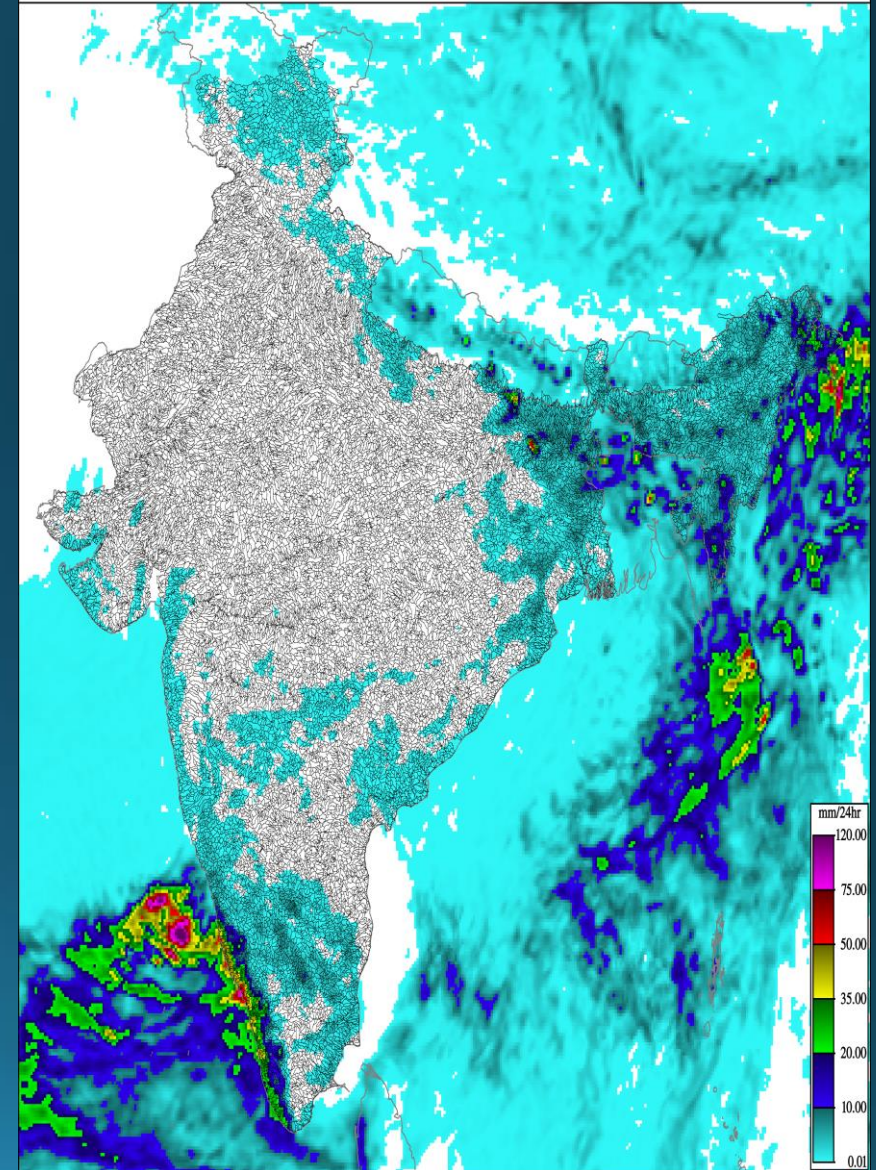
FCST1 - 03 hr 2018-05-29 06:00 UTC INDIA



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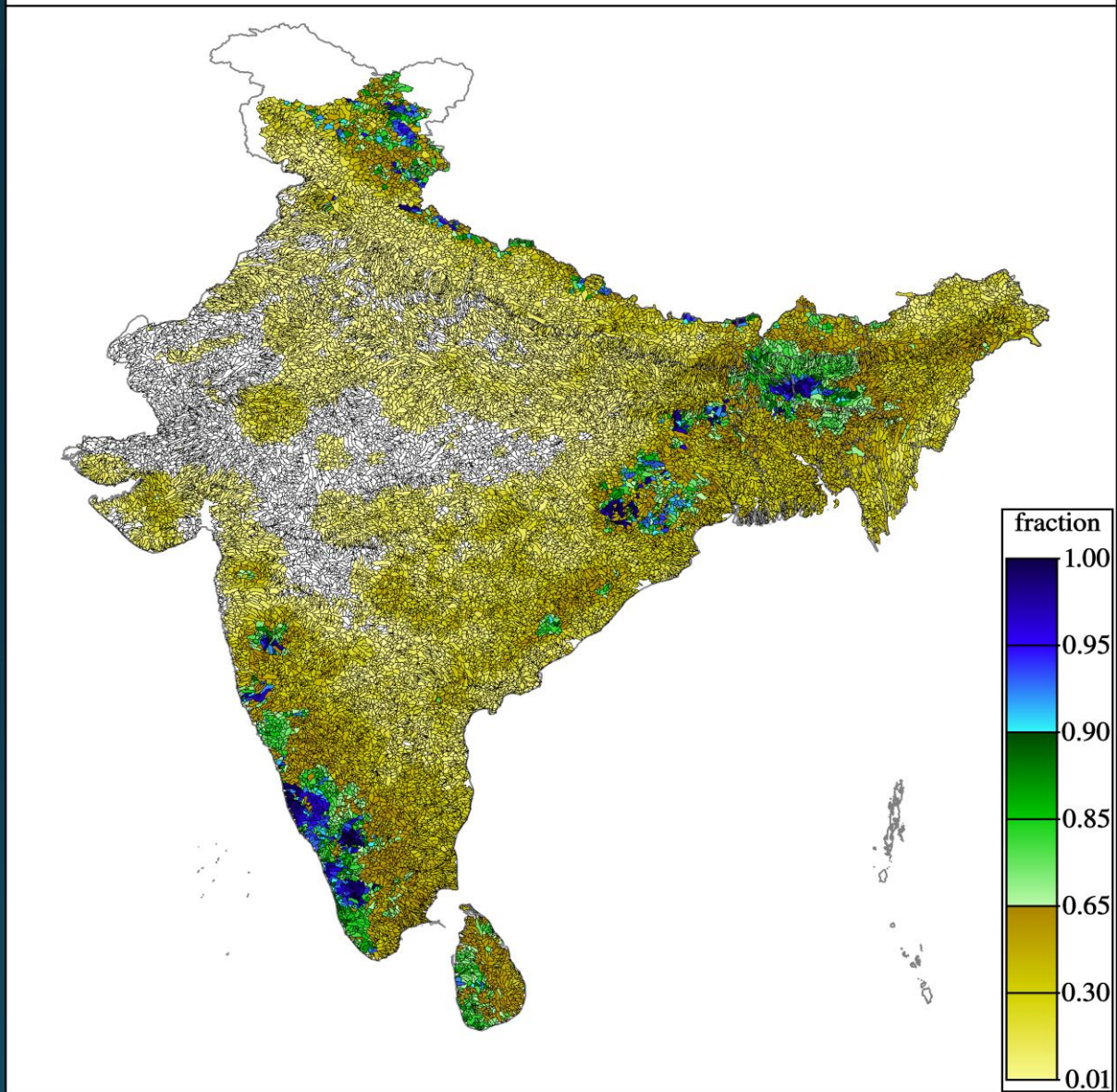


FCST1 - 24 hr 2018-05-29 06:00 UTC INDIA

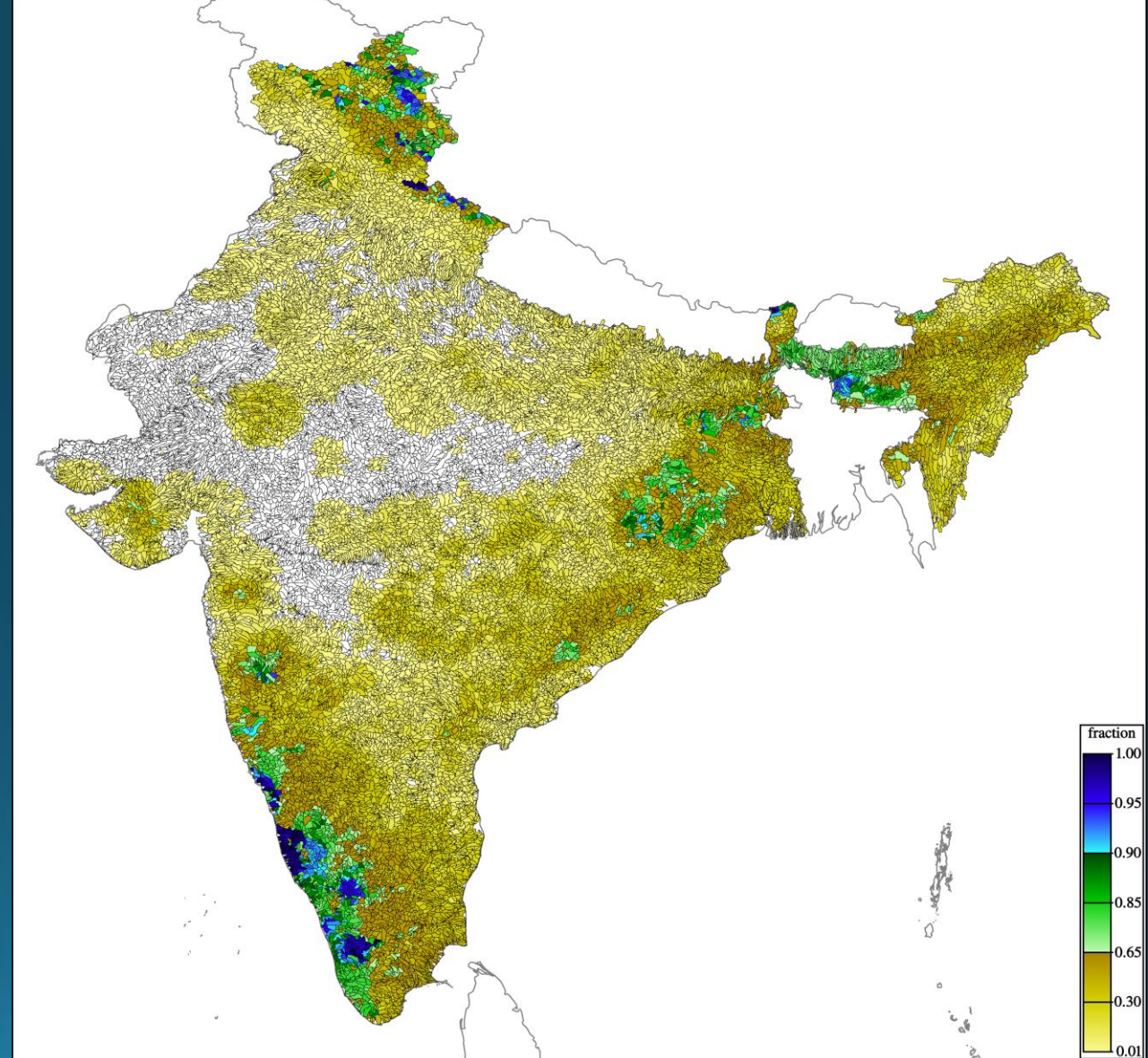


Average Soil Moisture 29th May – 00 & 06UTC

ASM - 06 hr 2018-05-29 00:00 UTC REGIONAL

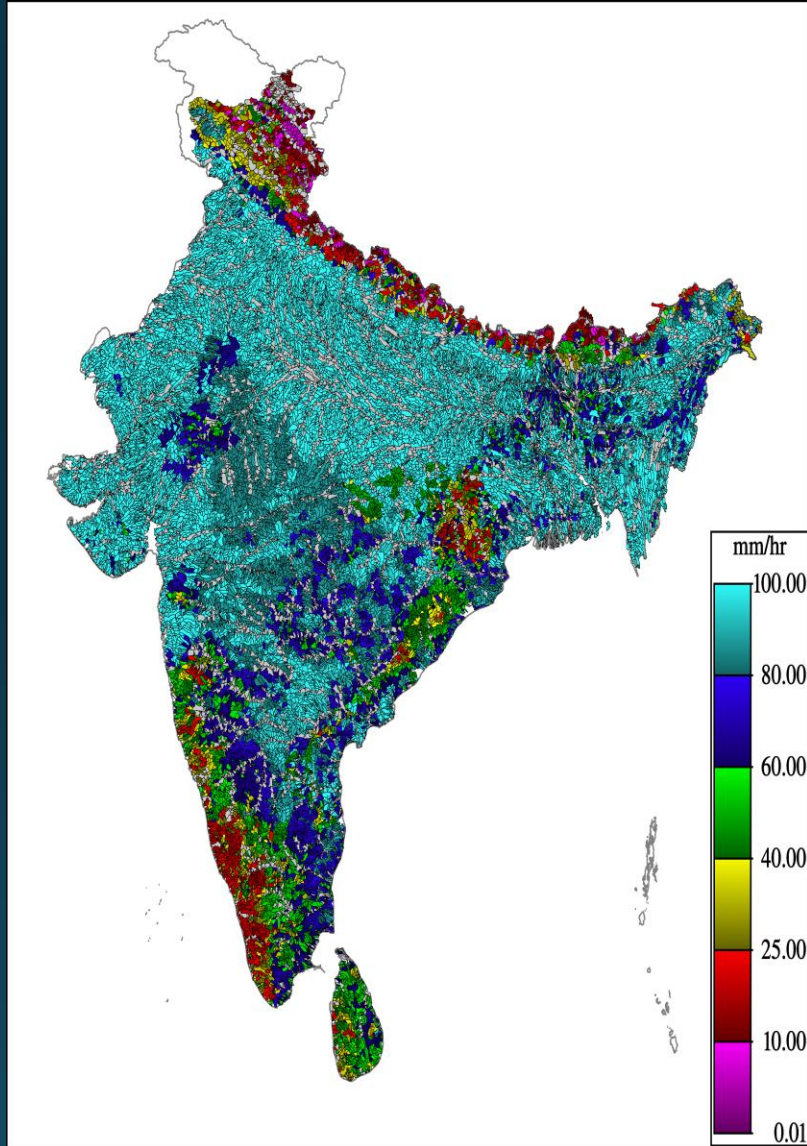


ASM - 06 hr 2018-05-29 06:00 UTC INDIA

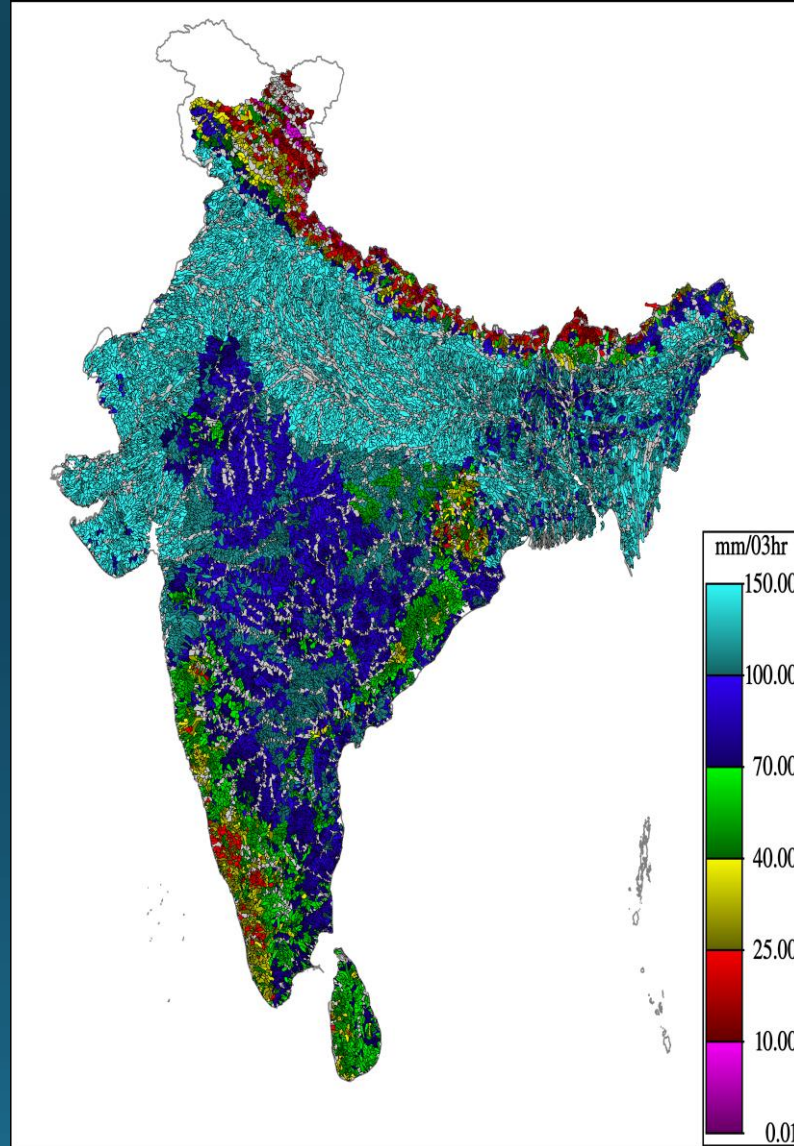


Flash Flood Guidance 29th May - 00UTC

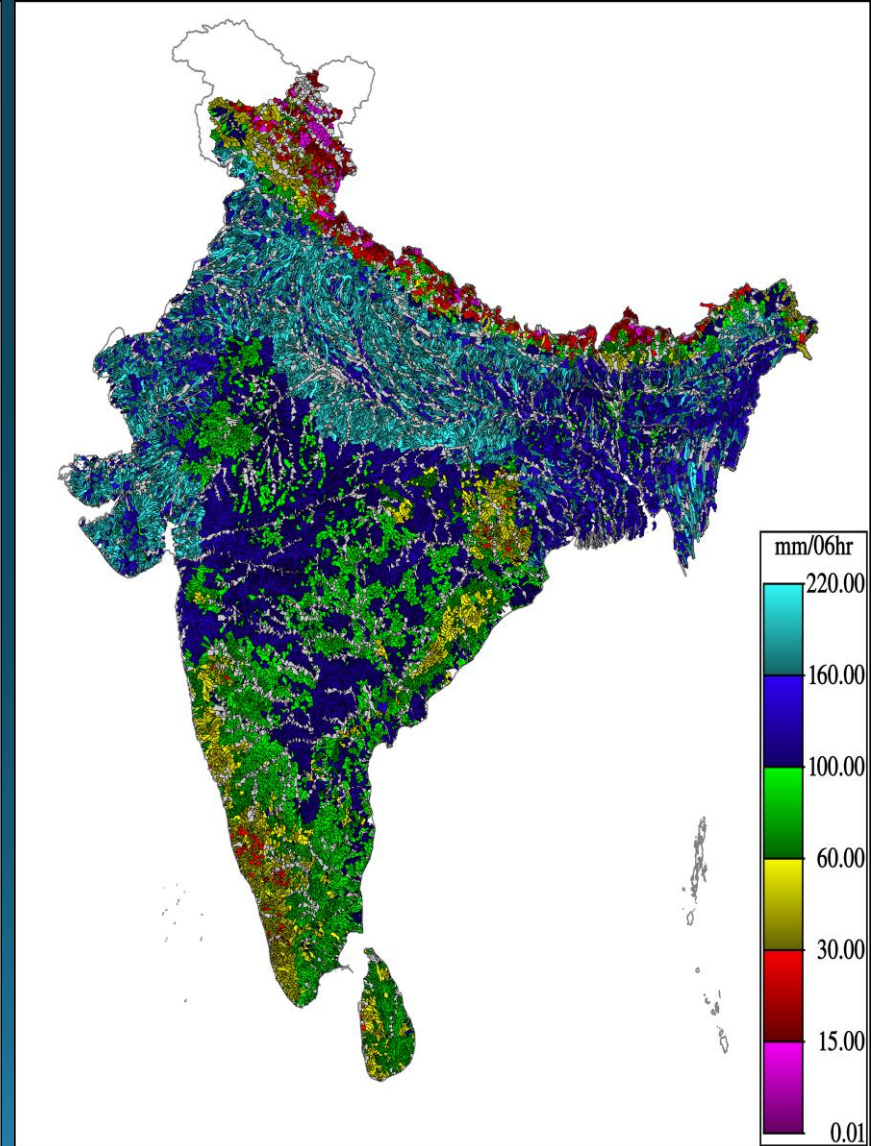
FFG - 01 hr 2018-05-29 00:00 UTC REGIONAL



FFG - 03 hr 2018-05-29 00:00 UTC REGIONAL

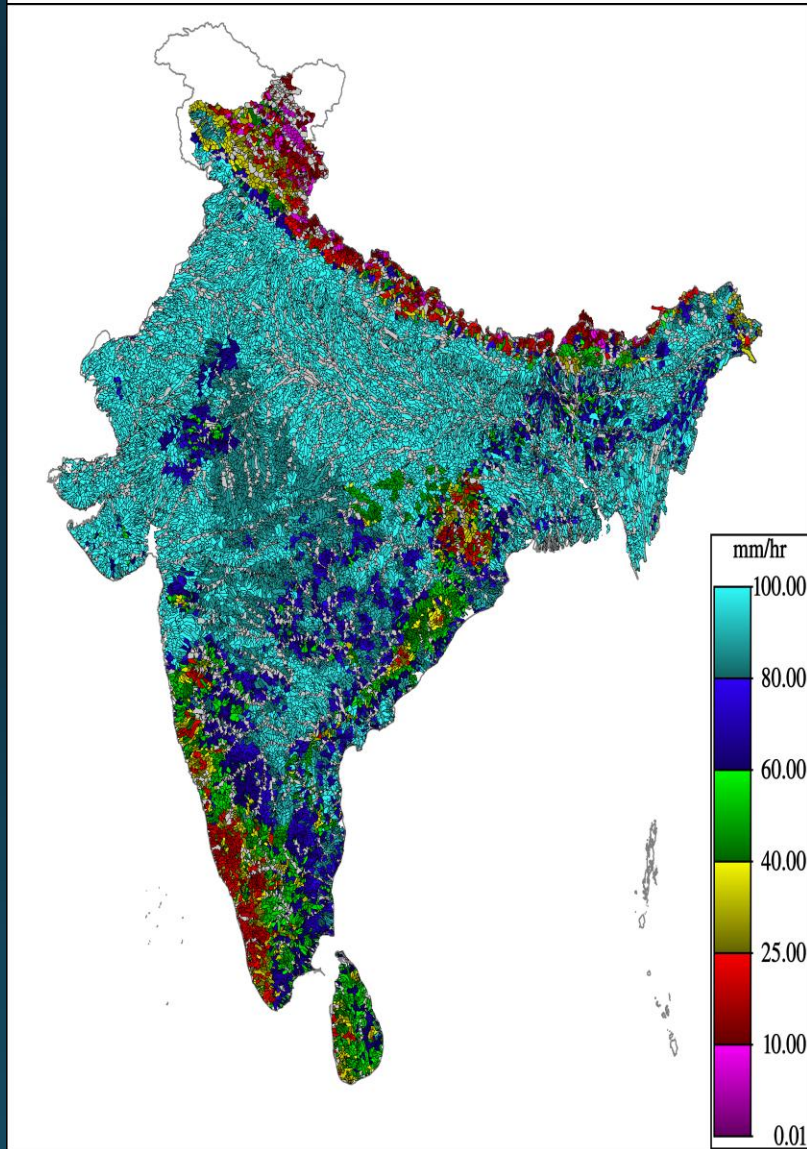


FFG - 06 hr 2018-05-29 00:00 UTC REGIONAL

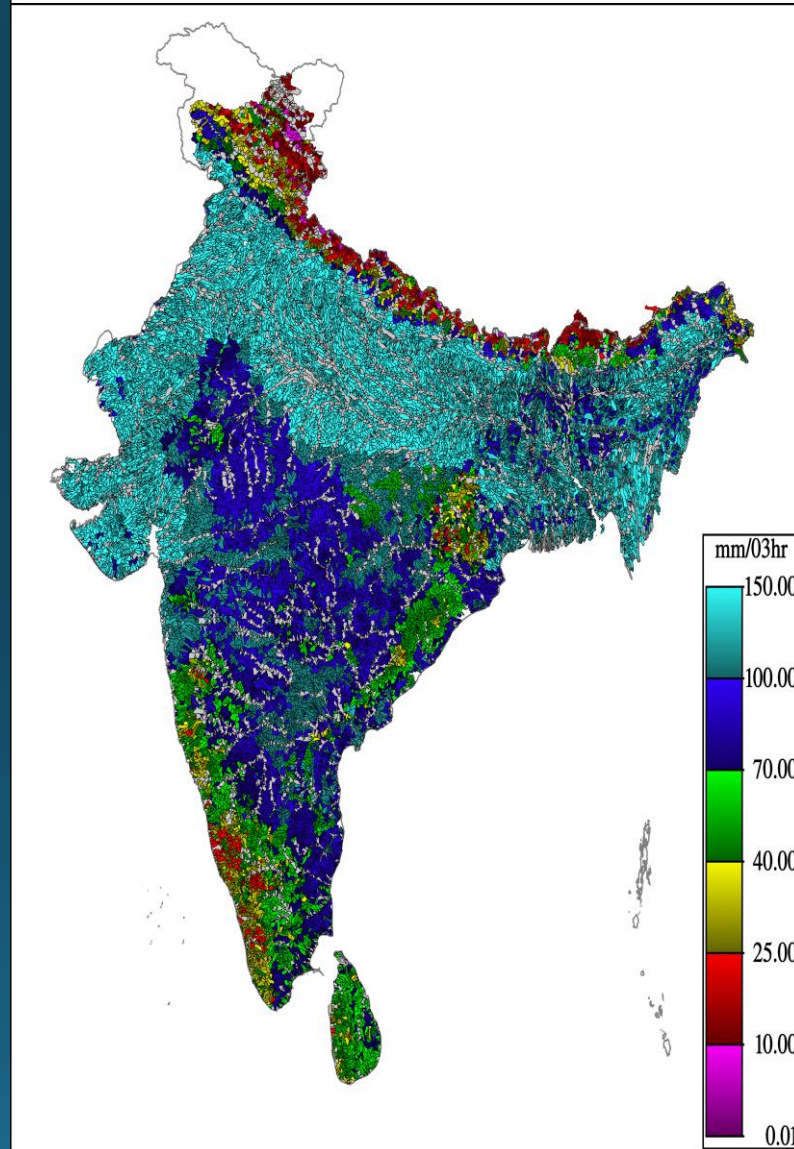


Flash Flood Guidance 29th May - 06UTC

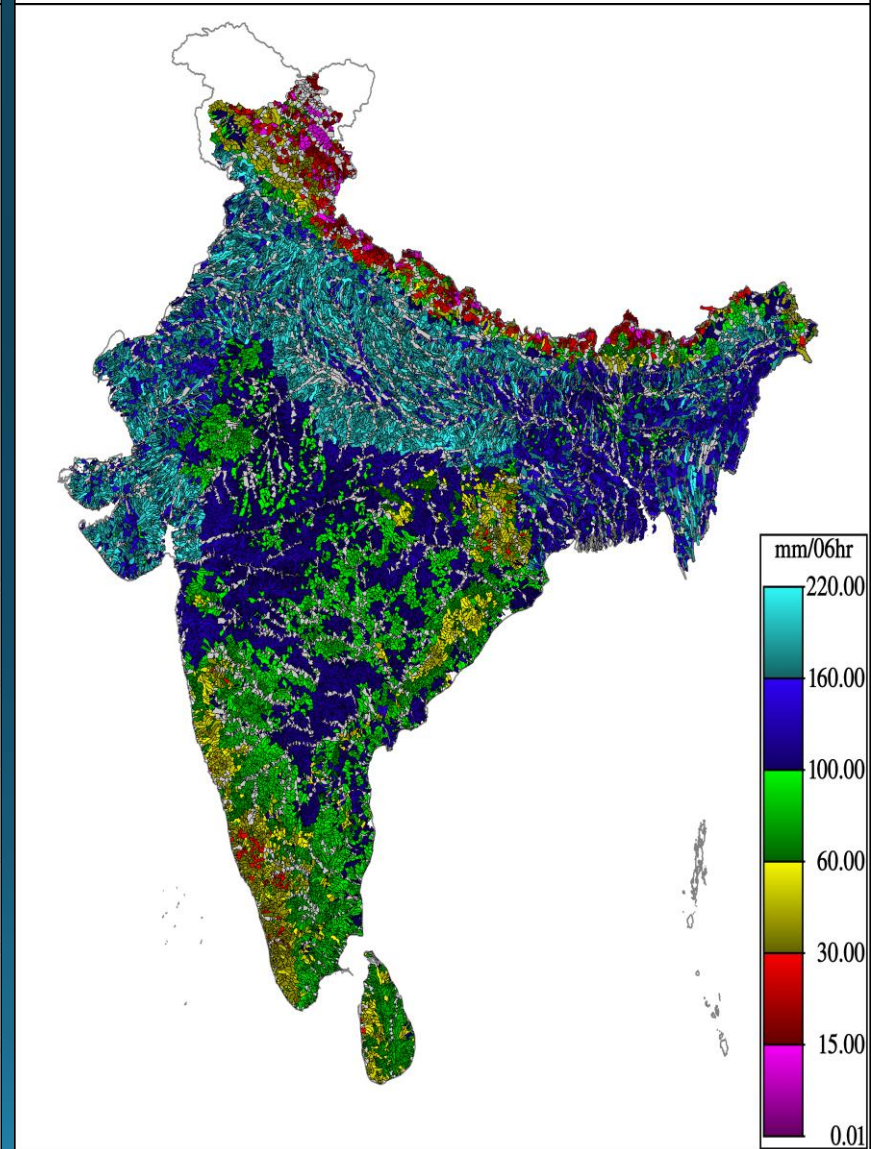
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FFG - 03 hr 2018-05-29 00:00 UTC REGIONAL

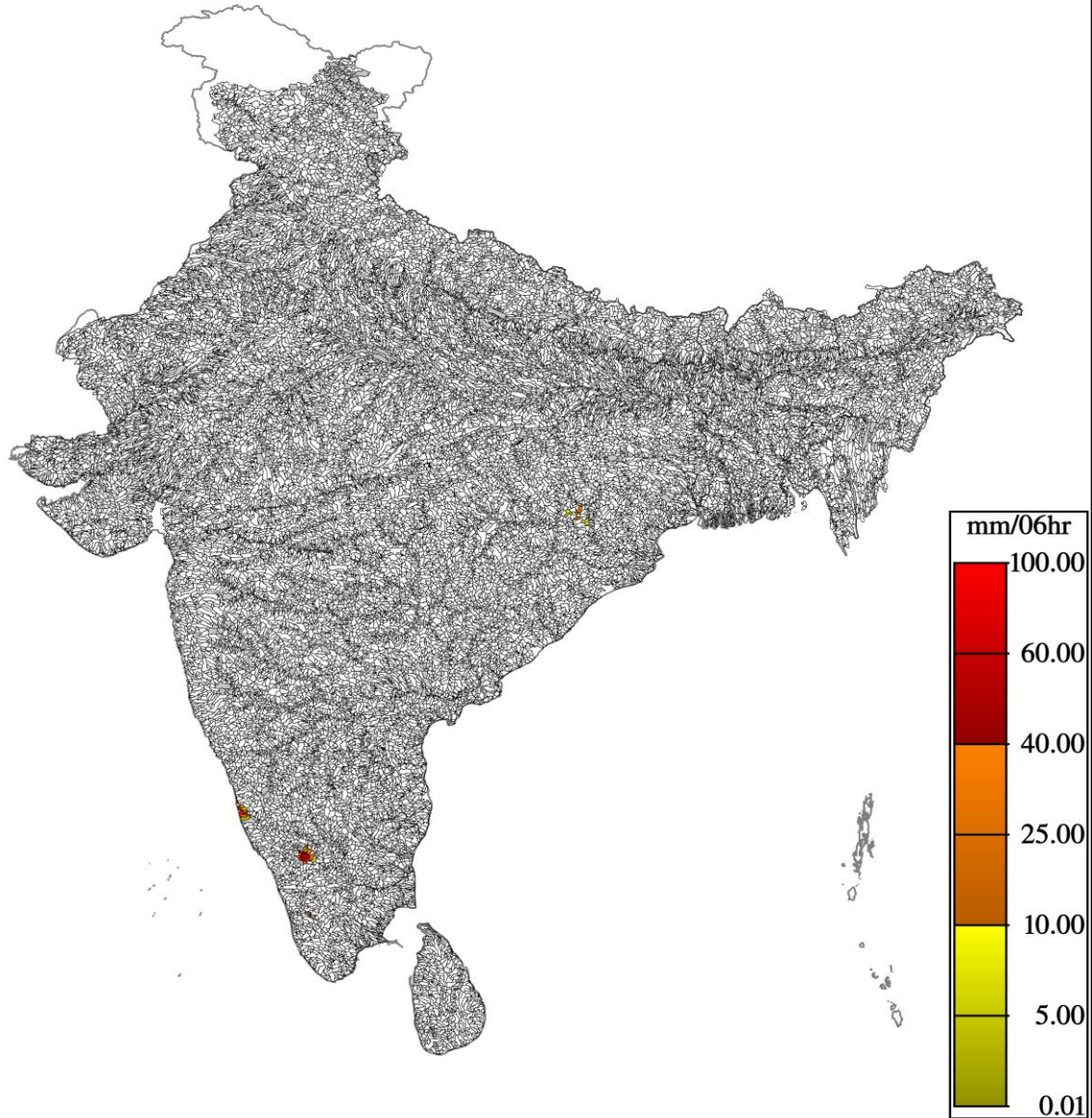


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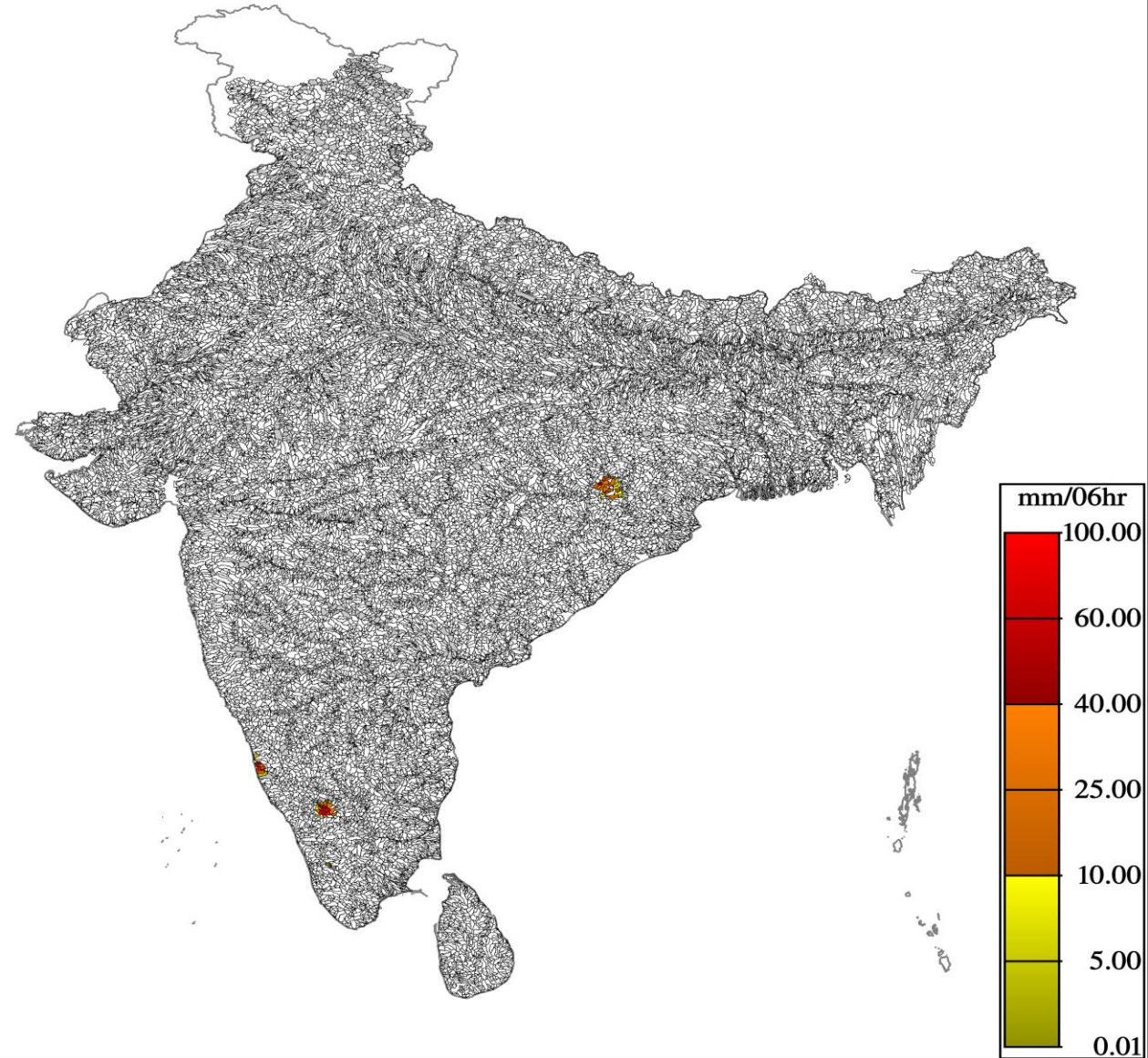


Flash Flood Threat 29th May - 00UTC

IFFT - 06 hr 2018-05-29 00:00 UTC REGIONAL

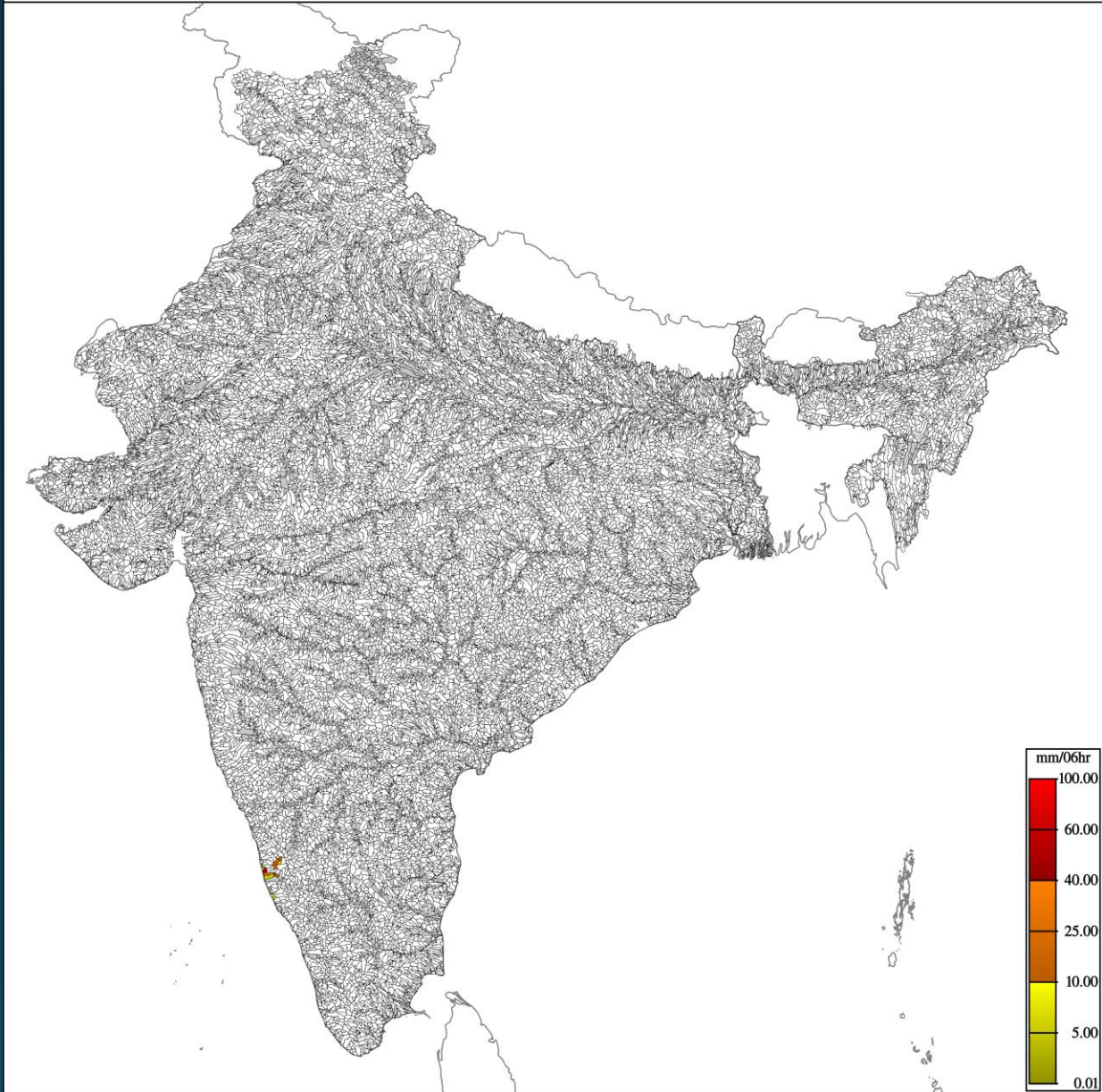


PFFT - 06 hr 2018-05-29 00:00 UTC REGIONAL

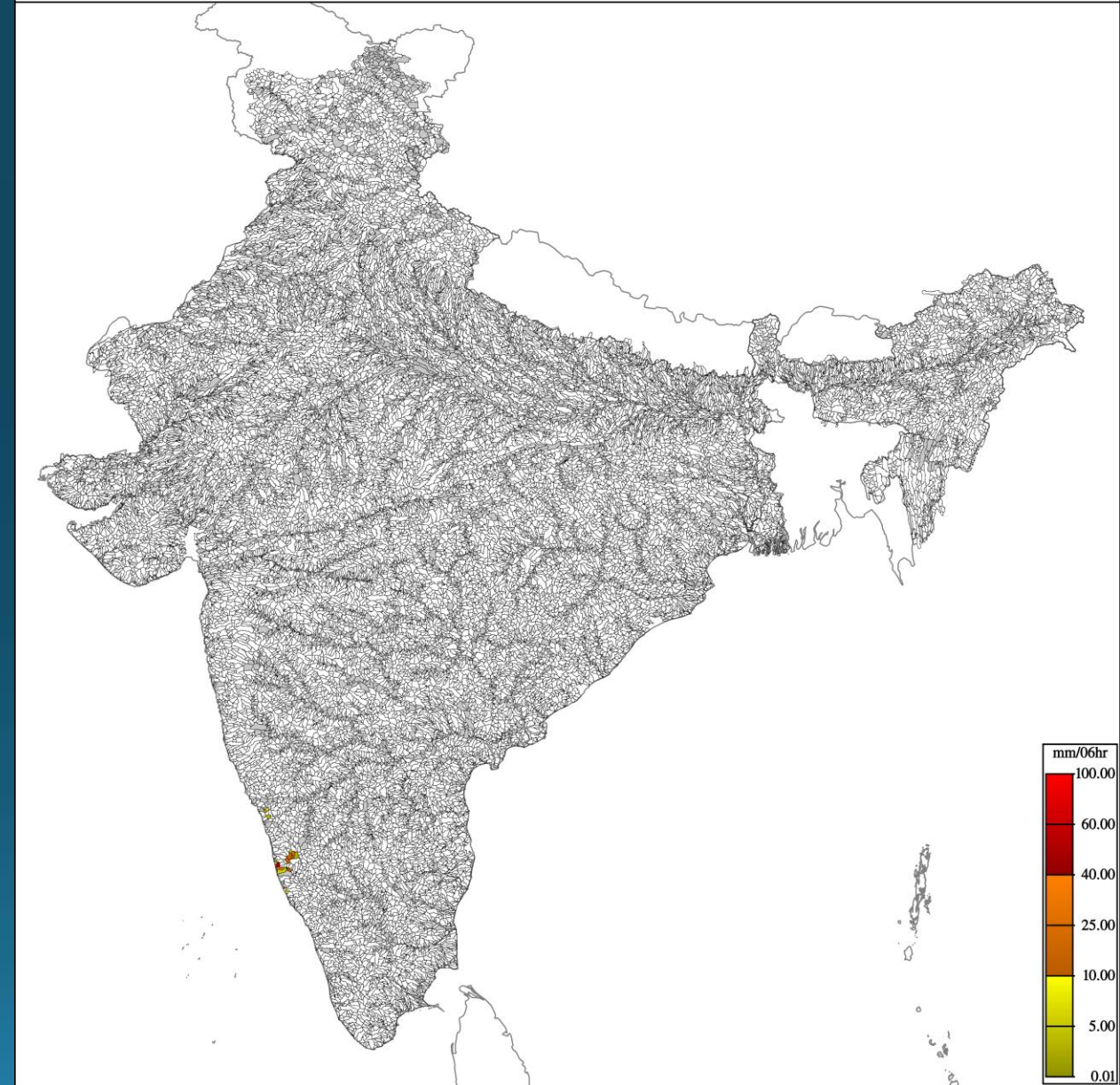


Flash Flood Threat 29th May - 06UTC

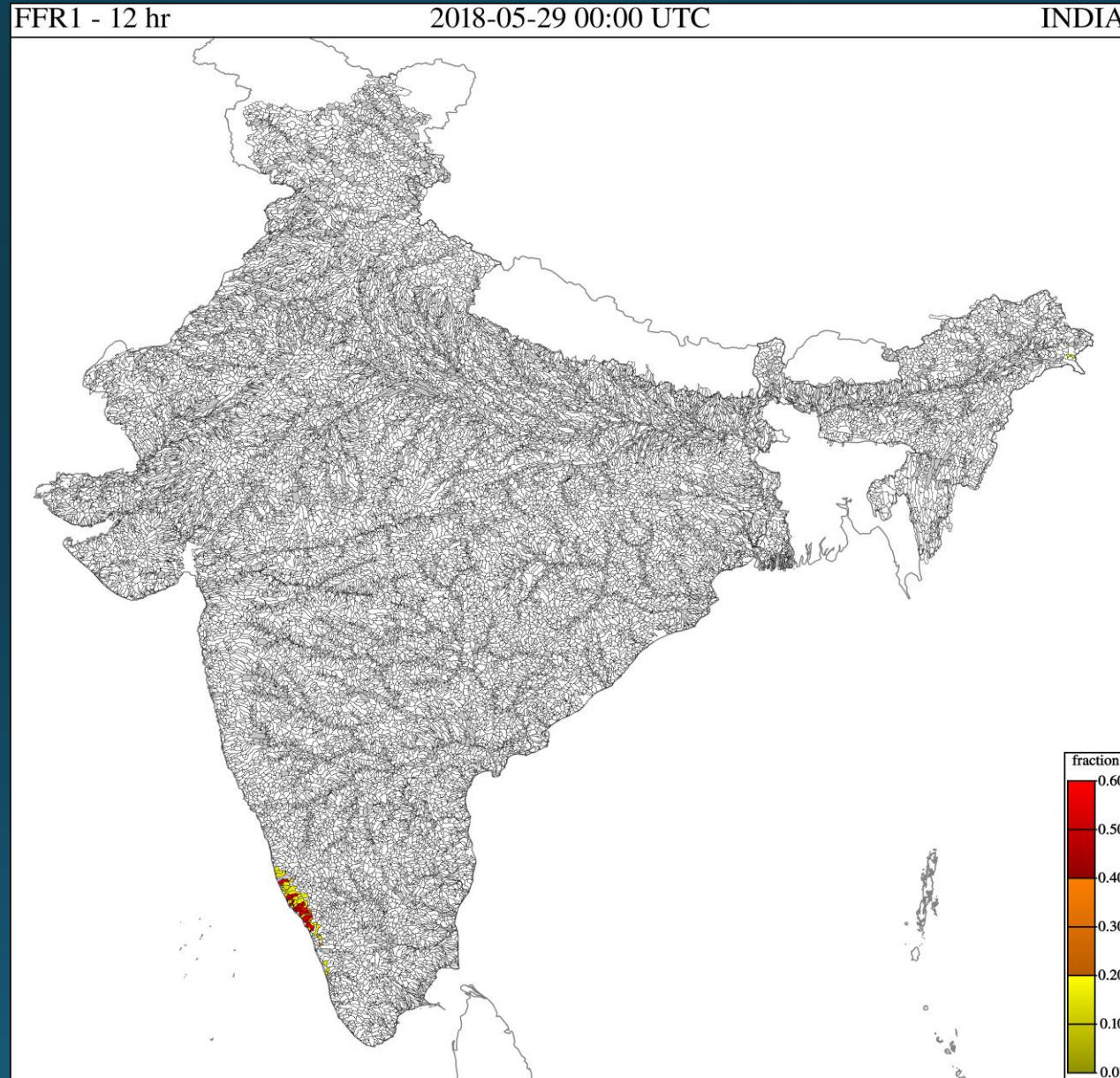
IFFT - 06 hr 2018-05-29 06:00 UTC INDIA



PFFT - 06 hr 2018-05-29 06:00 UTC INDIA



Flash Flood Risk 29th May – 00UTC



ADVISORY

- 1) 29th May 2018 – 00 UTC valid till 06 UTC
- 2) 29th May 2018 – 06 UTC valid till 12 UTC

Generally, in time steps of 6 hours for next 12 hours with **Watch (Be Updated)** to **Alert (Be Prepared)** to **Warning (Take Action)**.

Main area of concentration is Coastal Karnataka.

Rainfall Observation on 30th May'18

DISTRICT: DAKSHINA KANNADA	26	27	28	29	30
BANTWAL					
BELTHANGADI					
DHARMASTHALA	42.2	2.6	58.2	38.2	37.6
MANGALURU	57	11.4	44.4	49.6	285
MANGALURU AP OBSY	38.2	12.5	18.7	26.4	283.8
MANI	45.4	0.4	26.8	2.2	48.2
MUDUBIDRE	40.2	4.2	40.2	17.4	212.4
MULKI	14.2	16.4	21.5	78.4	
PANAMBUR OBSY	47.4	23.4	38.3	37.5	333.8
PUTTUR HMS	63	1	38	4	214
SUBRAMANYA	32.2	4.4	66.6	13.6	75.8
SULYA	124	2.4	80.8	13	122.2
SULYA ARG					
UPPINANGADI					
VITLA ARG					
DISTRICT: UDUPI					
BRAHMAVAR AWS					
KARKALA	31.4	1.2	30.8	85.8	131.4
KOLLUR	0	0	25	4.4	
KOTA	6.4	0	68	58.4	90.8
KUNDAPUR	2	1.4	20.8	27	29.4
SIDDAPURA	0	0	24.8	2.2	36.6
SIDDAPURA ARG					
UDUPI	6.5	0.1	58.6	49.5	160.8

Mangaluru: Heavy downpour leaves city in a shambles

Stanley Pinto | TNN | Updated: May 29, 2018, 14:55 IST

✉️ 🖨️ A- A+



Many low lying areas in the city witnessed artificial flooding.

MANGALURU: Torrential rains that lashed that the city on Tuesday morning inundated most of the low lying areas in the city. The rains which started at 9am left the city in a shambles with the steady drizzle turning to a downpour by mid-afternoon. Many low lying areas in the city witnessed artificial flooding and water entered many compounds – making it difficult for residents to venture out or come in.

Major areas that saw inundation were Kodialguthu, Kottara Chowki, PVS, Kadri Kambala, Panjimogeru, Adyar, Yekkuru and other areas. Most of the roads in the city were ankle deep water due to either drains being full or lack of drains.



MANGALURU

South west monsoon: Heavy rains lash Mangaluru, schools to be closed tomorrow



Anil Kumar Sastry

MANGALURU, MAY 29, 2018 14:34 IST

UPDATED: MAY 29, 2018 16:32 IST

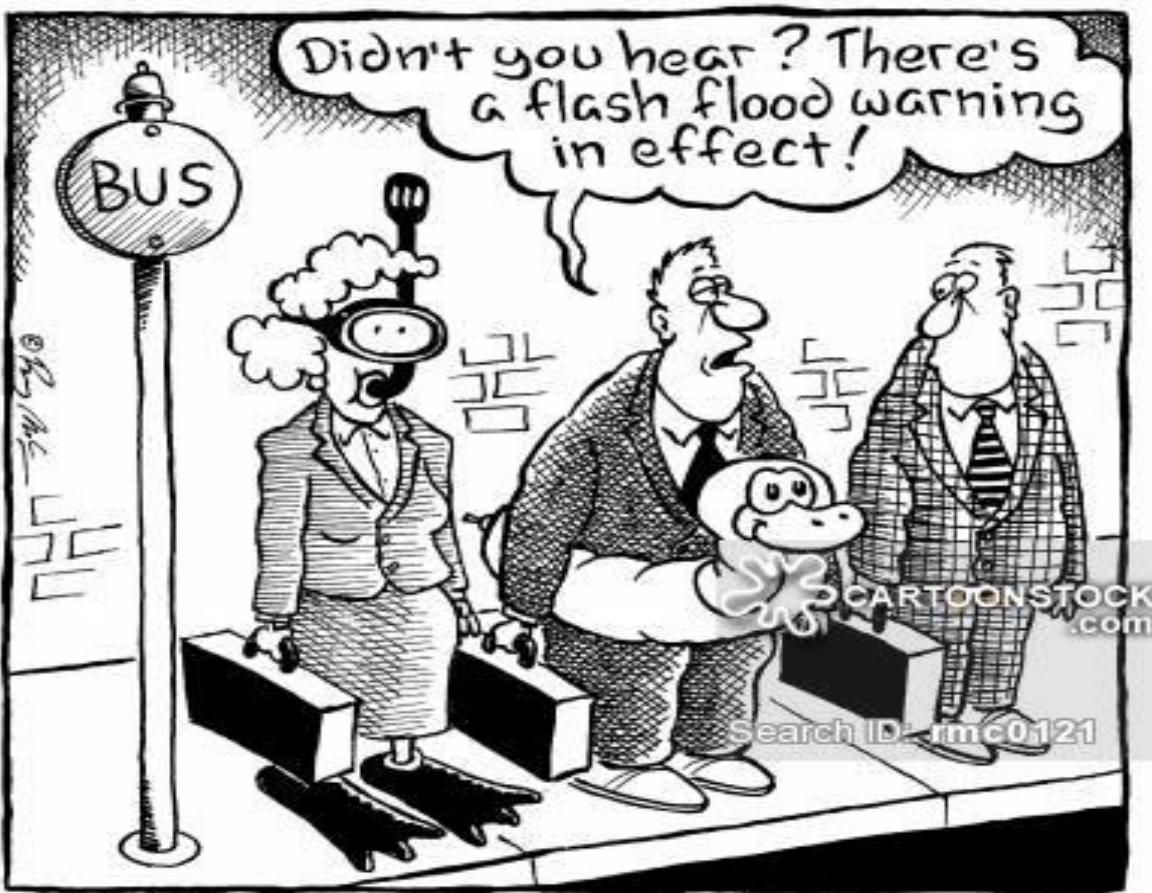
Mangalore Rain: The south-west monsoon had hit the Karnataka coast earlier than usual. Mangalore and areas around it have been receiving heavy rains since Monday night. Although there was a sigh of relief for the locals during the early hours of Tuesday, there has been unabated rainfall since 9:30 am, according to a report by The Hindu. Various low-lying areas including Kottara Chowki and Ballal Bagh experienced waterlogging on Day 1 of the season.

One Air India, one SpiceJet and one Air India Express was diverted from Karnataka's Mangalore airport due to rain and poor visibility. Air traffic control (ATC) says 'it will improve soon'. Rescue operations are underway in Mangalore's Panambur as streets got water-logged following pre-monsoon rains.

The Mangaluru Central Railway Station and the adjacent Railway Mail Service office were completely inundated with rainwater and overflowing sewage

Acknowledgments

- World Meteorological Organisation
- Hydrologic Research Centre, San Diego, United States
- Hydrology Division, India Meteorological Department, New Delhi
- National Weather Forecasting Centre, India Meteorological Department, New Delhi
- Numerical Weather Prediction Division, India Meteorological Department, New Delhi
- Upper Air Instrument Division, India Meteorological Department, New Delhi
- Satellite Meteorology Division, India Meteorological Department, New Delhi
- Surface Instrument Division, CRS, Pune
- Regional Meteorological Centre, Mumbai
- Meteorological Centre, Bangaluru



THANK



YOU