



Government of India
Earth System Science Organization
Ministry of Earth Sciences
India Meteorological Department

Dated: 10 August, 2020

Subject: Weather Status of July 2020 & its verification and Outlook for August 2020

Salient features of July, 2020

- During the first week of the month, a **Low pressure area** formed over southern parts of Gujarat & neighbourhood and became more marked in the second half of the week. In addition, an off shore trough laid off the west coast, a shear zone ran roughly around 16° N and the monsoon trough was south of its normal position; especially during the second half of the week. Under the influence of these systems, widespread rain/thunderstorms along with intense to very intense rainfall activity occurred over Gujarat State and over coastal & interior parts of Maharashtra on most of the days during the week.
 - Another **Low pressure area** formed over northwest Bay of Bengal off Odisha & Gangetic West Bengal coasts in the mid of the first week and it moved inland subsequently maintaining its intensity for about 48 hours before merging with the monsoon trough. Under its influence, fairly widespread to widespread rain/thunderstorms along with heavy to very heavy and **extremely heavy** rainfall observed over East India, eastern parts of Central India and East Uttar Pradesh during the first week of the month.
 - Shifting of the eastern end of the monsoon trough to the north towards close to the foot hills of the Himalayas and convergence of strong southwesterly to southerly winds from Bay of Bengal caused fairly widespread to widespread rainfall with heavy to very heavy and **extremely heavy falls** over Northeast & adjoining parts of East India in two to three spells during the month leading to floods over Assam & Bihar.
 - Interaction of the western end of monsoon trough with a trough in mid-latitude westerlies supported by strong moisture incursion from the Arabian Sea and circulations at lower tropospheric levels caused fairly widespread to widespread
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rainfall/thunderstorms along with intense to very intense rainfall activity over Western Himalayan Region and plains of northwest & adjoining Central India during 3rd week of the month.

- Formation of a cyclonic circulation in the lower & middle tropospheric levels over Comorin & adjoining Maldives area and its subsequent northward movement along & off the west coast caused fairly widespread to widespread rainfall/thunderstorms along with intense to very intense rainfall activity along the west coast and adjoining interior parts of peninsular India.

Monthly Rainfall Scenario (01 to 31 July, 2020)

During July, 2020, rainfall was below Long Period Average (LPA) by 10% over the country as a whole. Details are given below:

Regions	Actual Rainfall (mm)	Normal Rainfall (mm)	% Departure from LPA
Country as a whole	257.6	285.3	-10%
Northwest India	157.7	212.2	-26%
Central India	250.7	322.8	-22%
South Peninsula	251.7	216.7	16%
East & northeast India	471.8	432.0	9%

- During this month, 4 sub-divisions received large excess, 7 excess, 13 normal and 12 deficient. Thus, the rainfall has been well distributed over the country with 24 sub-divisions with normal to excess. Out of 12 deficient sub-divisions, 7 are from central parts of the country (**Annexure I**).

Seasonal Rainfall Scenario till 31 July, 2020

During 1 June to 31 July, 2020, rainfall was normal 0% above LPA) over the country as a whole. Details are given below:

Regions	Actual Rainfall (mm)	Normal Rainfall (mm)	% Departure from LPA
Country as a whole	453.3	452.2	0%
Northwest India	234.4	287.5	-18%
Central India	471.6	492.0	-4%
South Peninsula	423.9	376.9	12%
East & northeast India	873.3	779.1	12%

- During this period, 1 sub-division received large excess, 10 excess, 18 normal and 7 deficient. Thus, the rainfall has been well distributed over the country with 29 sub-

divisions with normal to excess. Out of 7 deficient sub-divisions, 4 are from northwest India (**Annexure II**).

Heavy Rainfall Events during July, 2020:

- **Heavy to Very heavy rainfall with Extremely heavy rainfall (≥ 20 cm)** occurred at isolated places over Assam & Meghalaya on eleven days; over Sub-Himalayan West Bengal & Sikkim on eight days; over Saurashtra & Kutch and Bihar on three days each; over Konkan & Goa on two days; over Uttarakhand, East Uttar Pradesh, Arunachal Pradesh, Chhattisgarh and Gujarat Region on one day each during the week.
- **Heavy to Very heavy rainfall (≥ 12 cm)** occurred at isolated places over Bihar and Konkan & Goa on 13 to 14 days; over East Uttar Pradesh and Coastal Karnataka on 9 days each; over Arunachal Pradesh, Assam & Meghalaya, Sub Himalayan West Bengal & Sikkim, Odisha, Uttarakhand, and Telangana on 6 to 7 days; over West Uttar Pradesh, Punjab, West Madhya Pradesh, Gujarat Region, Madhya Maharashtra, Chhattisgarh, Kerala & Mahe and South Interior Karnataka on 4 to 5 days; over Nagaland, Manipur, Mizoram & Tripura, Gangetic West Bengal, Haryana, Chandigarh & Delhi, East Rajasthan, East Madhya Pradesh, Saurashtra & Kutch, Coastal Andhra Pradesh & Yanam, Rayalaseema, Tamil Nadu, Puducherry & Karaikal and North Interior Karnataka on 2 to 3 days; over Himachal Pradesh, Jammu & Kashmir, West Rajasthan, Marathwada and Vidharbha on one day each during the month.
- **Heavy rainfall (≥ 6.5 cm)** had occurred at isolated places over East Rajasthan, West Madhya Pradesh, Madhya Maharashtra and Tamil Nadu, Puducherry & Karaikkal on 15 to 16 days; over Jharkhand, East Madhya Pradesh, Coastal Andhra Pradesh & Yanam and South Interior Karnataka on 13 to 14 days; over East & West Uttar Pradesh, Chhattisgarh and Telangana on 11 to 12 days; over Assam & Meghalaya, Sub-Himalayan West Bengal & Sikkim, Odisha, Uttarakhand, Himachal Pradesh, Gujarat Region, Saurashtra & Kutch, Konkan & Goa, Marathwada, Rayalaseema, Coastal Karnataka and Kerala & Mahe on 9 to 10 days; over Arunachal Pradesh, Nagaland, Manipur, Mizoram & Tripura, Bihar, Punjab, Haryana, Chandigarh & Delhi and Vidharbha on 7 to 8 days; over Andaman & Nicobar islands and Gangetic West Bengal on 5 to 6 days; over Jammu & Kashmir, West Rajasthan and North Interior Karnataka on 3 to 4 days; over Lakshadweep on one day during the month.

Heavy /Very Heavy Rainfall Warning Skill:

No. of Heavy/Very Heavy Rainfall Events (>64.4mm) and Warning Skill (Probability of Detection (POD), False Alarm Rate (FAR), Critical Success Rate (CSI) and Missing Rate (MR) in %) during the month is given below:

No. of days with Heavy/Very Heavy Rainfall Events (>64.4 mm): 566				
warning issued for	POD	FAR	CSI	MR
Day 1 / 24 Hours	78	44	55	22
Day 2 / 48 Hours	70	37	52	30
Day 3 / 72 Hours	68	36	50	32
Day 4 / 96 Hours	67	38	49	33
Day 5 / 120 Hours	62	30	48	38

Temperature Scenario:

The Mean Temp for the month for the country as a whole was 28.54°C; this was near normal (+0.56°C above the monthly normal temperature of 27.98°C). Heat wave conditions had been observed at isolated pockets over East and West Rajasthan on one day each during the week. The highest maximum temperature of 46.3° C recorded at Ganganagar (West Rajasthan) on 4th July, 2020 over the plains of the country during the month.

Thundersquall & Hailstorm activity:

Thundersquall & Hailstorm activity during the month (till 0830 IST of 31-07-2020) is recorded as under:

S. No.	Region	TS Days	Date of Maximum TS Activity	Hail Events	Squall Events
1.	South Peninsular India	31	28/07/20	Nil	Nil
2.	Northwest India	31	19/07/20	Nil	02 (Amritsar on 04/07/20 & 10/07/20)
3.	Northeast India	30	01/07/20	Nil	Nil
4.	East India	31	21/07/20	Nil	04 (Port Blair on 02/07/20, 03/07/20, 03/07/20 & 14/07/20)
5.	Central India	28	05/07/20	Nil	Nil
6.	West India	15	09/07/20	Nil	02 (Ahmedabad on 08/07/20 & 09/07/20)

Note: The convective activities mentioned above predicted and corresponding warnings were issued about 4-5 days in advance of the occurrence of the event. In addition, nowcasts were also issued by corresponding RMCs/MCs with respect to these events.

Large scale features as on 10 August, 2020

- The Madden Julian Oscillation (MJO) index lies currently over Maritime Continent (Phase 5) with amplitude greater than 1. It is very likely to move towards Western Hemisphere (Phase 7 & 8) during next two weeks.
- Currently, El Niño-Southern Oscillation (ENSO)-neutral conditions are prevailing over equatorial Pacific Ocean and the latest Monsoon Mission Climate Forecasting System (MMCFS) forecast indicates, these conditions are likely to continue for the entire forecast period.
- At present, near neutral Indian Ocean Dipole (IOD) conditions are observed over Indian Ocean and the latest MMCFS forecast indicates same IOD conditions are likely to continue during the entire forecast period.

Forecast for August, 2020

Rainfall Forecast

Medium Range Forecast:

- As on today, the 10th August, 2020, a **low pressure area** lies over northeast Madhya Pradesh & neighbourhood. It is likely to move northwestwards and merge with the monsoon trough during next 2 days. The monsoon trough lies in its near normal position with embedded low pressure area. Also, an east-west shear zone passes across central India in the mid-tropospheric levels tilting southwards with height.
- A fresh **low pressure area** is likely to form over Northwest Bay of Bengal & neighbourhood around 13th August
- Under the above scenario, (i) Fairly widespread to widespread rainfall with **heavy to very heavy rainfall** at isolated places very likely over major parts of northwest India (Western Himalayan region, Punjab, Haryana, Chandigarh & Delhi, Uttar Pradesh and East Rajasthan) during 10th - 12th August. (ii) Fairly widespread to widespread rainfall with heavy to very heavy rainfall at isolated places are also very likely over parts of Madhya Pradesh and Gujarat region during 10th - 14th August with likely further enhancement of rainfall intensity over north Gujarat and southwest Madhya Pradesh on 13th & 14th August, 2020.

Week-wise Extended Range Forecast:

- **Week 1 (till 13 August):**
 - ✓ Northwest & northeast India are very likely to get below normal rainfall.
 - ✓ Central and south India are very likely to get normal to slightly above normal rainfall.

- **Week 2 (14 to 20 August, 2020):**
 - ✓ Northwest & central India are likely to get above normal rainfall.
 - ✓ Northeast India & south peninsula are very likely to get below normal rainfall.
- **Week 3 (21 to 27 August, 2020)**
 - ✓ Above normal rainfall likely over Northwest & central India.
 - ✓ Northeast India & south peninsula are likely to get near normal rainfall.
- **week 4 (28 August to 03 September, 2020)**
 - ✓ Normal to above normal rainfall activity likely over north and central India.
 - ✓ Below normal rainfall likely over south peninsula.

(Annexure III & IV)

Long Range Forecast for the Rainfall during Second Half (August –September) of the 2020 Southwest Monsoon:

- **The season (June to September) rainfall over the country as a whole is likely to be normal (96% - 104% of LPA).**
- **Quantitatively**, the rainfall for the country as a whole during the second half of the season is likely to be 104% of LPA with a model error of $\pm 8\%$.
- **The probabilistic forecast suggests the rainfall over the country as a whole during second half of southwest monsoon season (August to September) most likely to be normal (94-106% of LPA). However, the probability of above normal rainfall (>106% of LPA) is also higher than the corresponding climatological probability.**
- **The rainfall over the country as a whole during August is likely to be $97 \pm 9\%$ of LPA.**

Next monthly update will be issued on first week of September, 2020

Annexure I

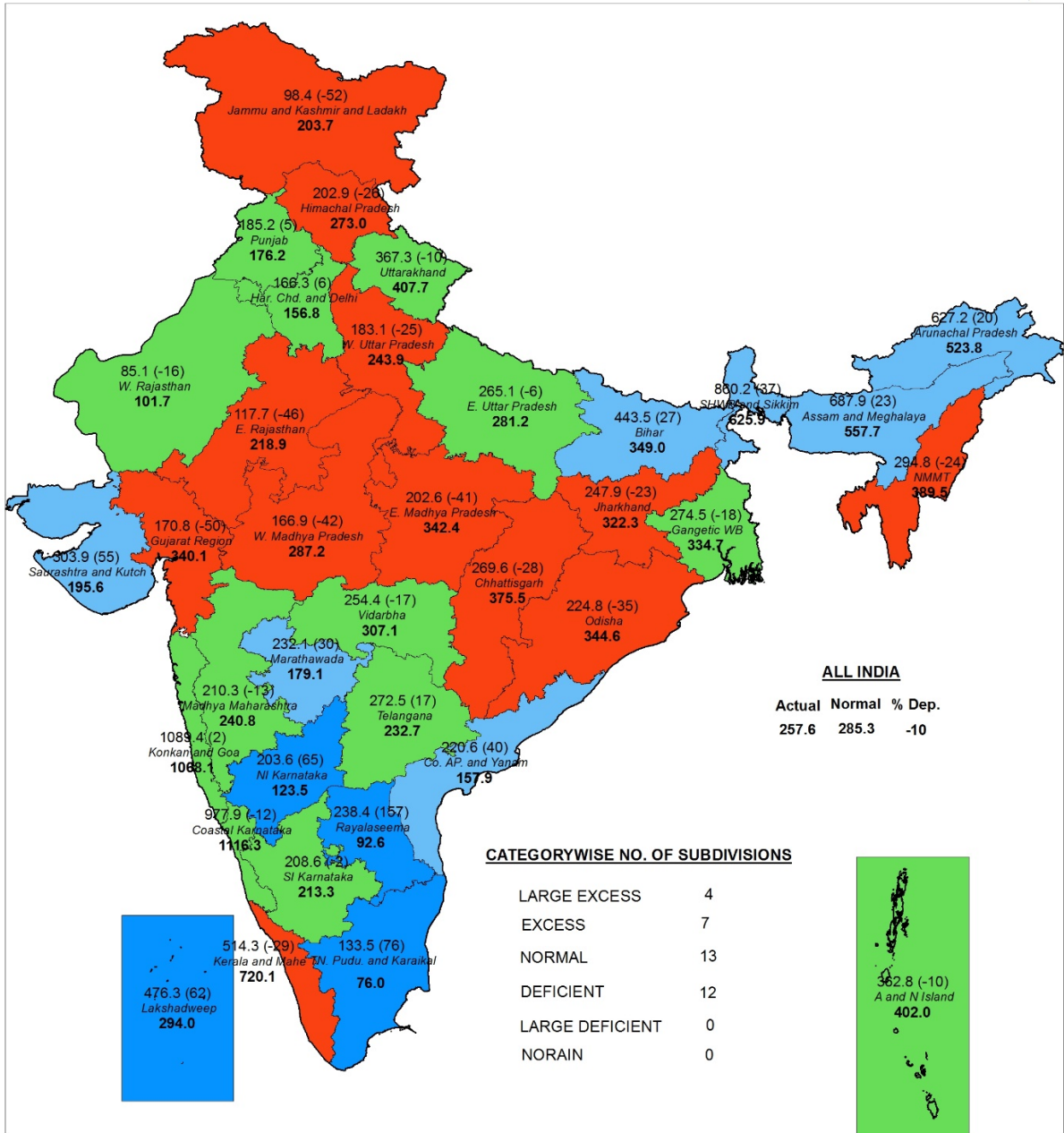


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HYDROMET DIVISION, NEW DELHI

SUBDIVISION RAINFALL MAP

Period : 01-07-2020 To 31-07-2020



Legend

Large Excess [60% or more] Excess [20% to 59%] Normal [-19% to 19%] Deficient [-59% to -20%] Large Deficient [-99% to -60%] No Rain [-100%] No Data

NOTES :

- a) Rainfall figures are based on operation data.
- b) Small figures indicate actual rainfall (mm), while bold figures indicate Normal rainfall (mm).
- c) Percentage Departures of rainfall are shown in brackets.

Annexure II

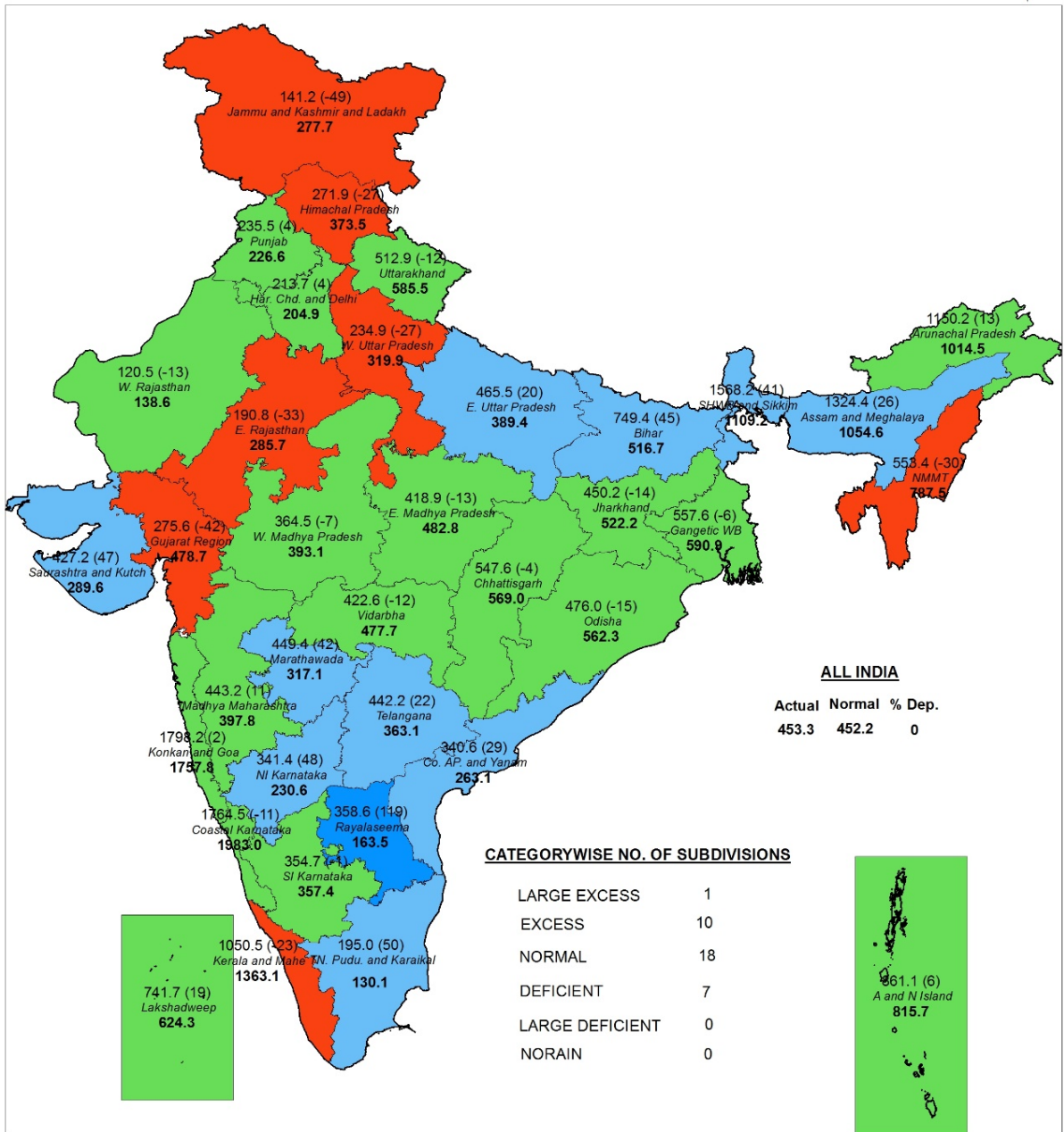


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SUBDIVISION RAINFALL MAP

Period : 01-06-2020 To 31-07-2020



Legend

■ Large Excess [60% or more]
 ■ Excess [20% to 59%]
 ■ Normal [-19% to 19%]
 ■ Deficient [-59% to -20%]
 ■ Large Deficient [-99% to -60%]
 ■ No Rain [-100%]
 ■ No Data

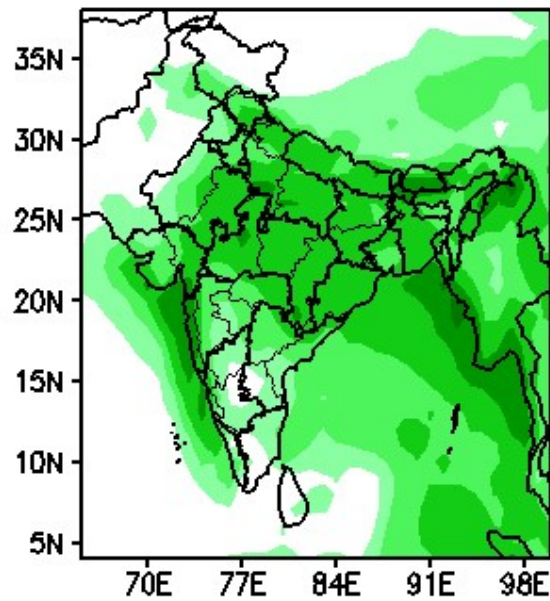
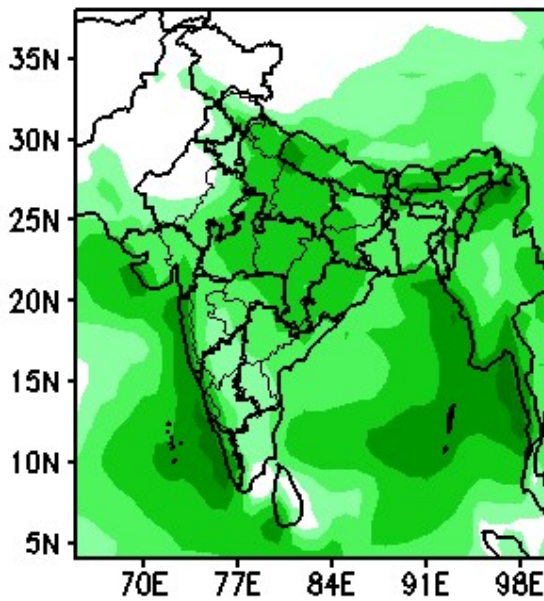
NOTES :

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Forecast Rainfall (mm/day)

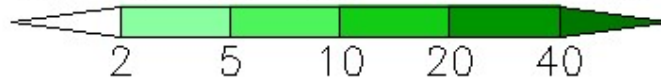
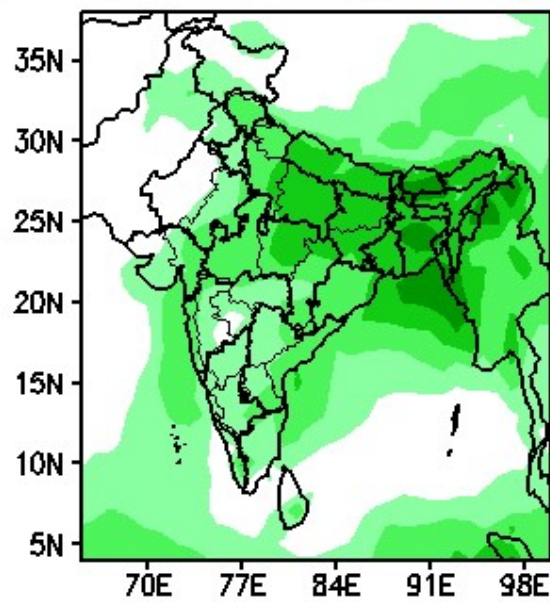
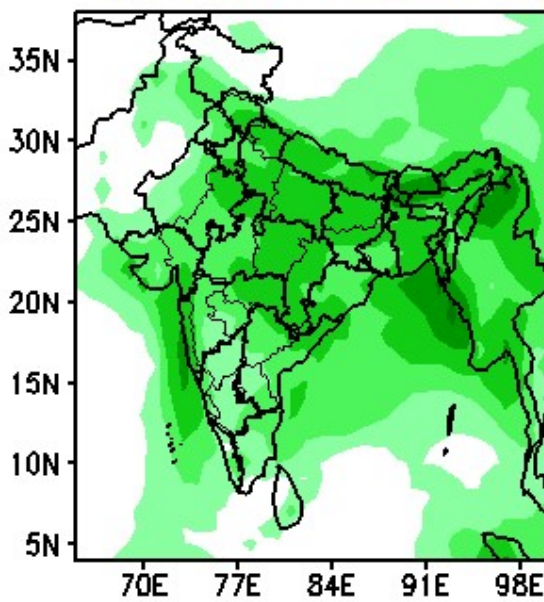
(Week1: 07Aug-13Aug)

(Week2: 14Aug-20Aug)



(Week3: 21Aug-27Aug)

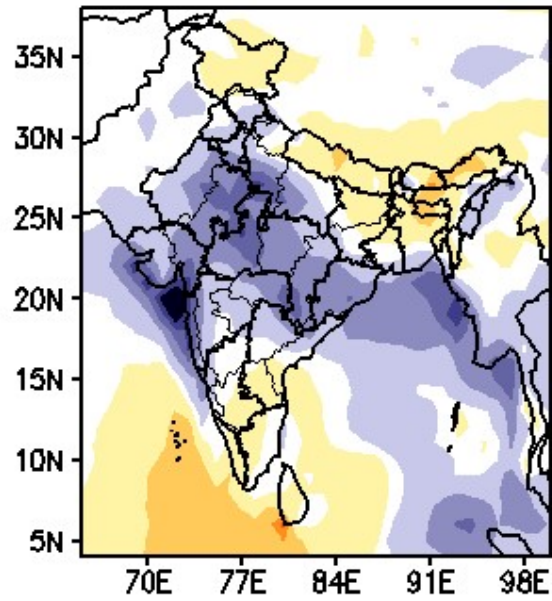
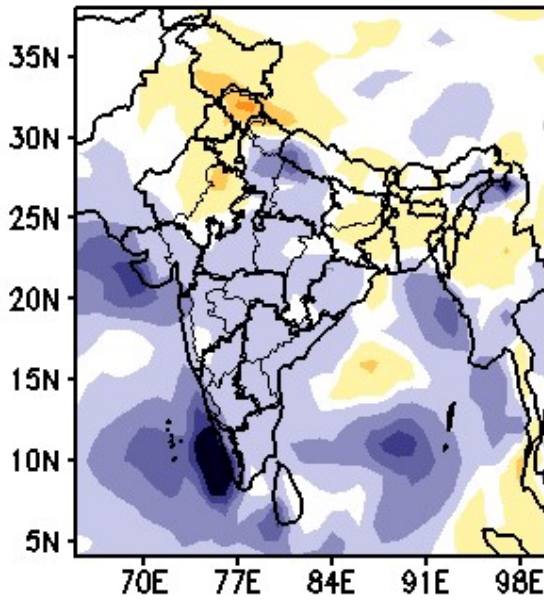
(Week4: 28Aug-03Sep)



Forecast Rainfall Anomaly (mm/day)

(Week1: 07Aug-13Aug)

(Week2: 14Aug-20Aug)



(Week3: 21Aug-27Aug)

(Week4: 28Aug-03Sep)

