



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

Dated: 07 September, 2020

Subject: Weather Status for August, 2020 & its verification and Outlook for September, 2020

Salient features of August, 2020

- **5 low pressure systems** formed over north Bay of Bengal during 4-10, 9-11, 13-18, 19-26 and 24-31 August 2020. All these systems moved nearly west-northwestwards across central India upto West Madhya Pradesh/Rajasthan.
- The total numbers of low pressure days during August, 2020 was 27 against normal of about 15 days.
- The monsoon trough was active and south of its normal position during most days of the August, 2020.
- During August 2020, the rainfall was 27% above normal. Last such excess rain occurred in August 1983, when it was 24% above normal. So far during period 1901-2020, highest August rainfall occurred in 1926 (33% above normal) (**Annexure 1**)
- Due to active monsoon conditions, riverine floods occurred over Odisha, Telangana, Madhya Pradesh, Maharashtra, Gujarat and Rajasthan. The active monsoon conditions consecutively for 4 weeks leading to excess rainfall activity over the country indicated in the weekly weather videos and extended weather bulletin issued by IMD.
- **Extremely heavy rainfall warnings, expected impact & suggested actions were issued 3-4 days ahead.**

Major weather features of August, 2020

5 low pressure systems formed during August, 2020 and excess rainfall activity over the country as a whole. The details of these systems are as follow:

- The 1st Low pressure area of August, 2020 formed over North Bay of Bengal and neighbourhood in the early morning hours of 4th August, became well marked Low pressure area over Northwest Bay of Bengal off north Odisha-West Bengal coasts in the evening of 4th; it maintained its intensity for about 24 hours then weakened into a Low pressure area over Jharkhand and adjoining Chhattisgarh in the evening of 5th August 2020. This Low pressure area along with its associated cyclonic circulation extending upto 7.6 km above mean sea level have caused fairly widespread to widespread rainfall/thundershowers along with intense to very intense rainfall activity over Odisha and with intense rainfall activity over Gangetic West Bengal during the week.
- 2nd Low pressure area formed over Northwest & adjoining Westcentral Bay of Bengal off Odisha-north Andhra Pradesh coasts in the early morning hours of 9th August 2020; it laid over Northwest Bay of Bengal off north Odisha-Gangetic West Bengal coasts in the afternoon and over Chhattisgarh & neighbourhood in the evening of the same day and over northeast Madhya Pradesh & neighbourhood on 10th and become less marked on 11th, however, its remnant cyclonic circulation laid over northeast Rajasthan & neighbourhood in the lower tropospheric levels on 11th and became less marked on 12th August 2020. This system and its associated cyclonic circulation tilting south-westwards with height, during its course of movement across the central parts of the country have caused fairly widespread to widespread rainfall/thunderstorms along with intense to very intense rainfall activity over parts of Central India. Strengthening of the monsoon flow due to the formation of the system, presence of a cyclonic circulation in the mid tropospheric levels over north Maharashtra coast & neighbourhood and positioning of the monsoon trough to the south of its normal position have caused widespread rainfall/thundershowers along with very intense rainfall activity over Gujarat state and over Konkan & Goa and Madhya Maharashtra during the first half of the 2nd week (06 - 12 AUGUST 2020).
- 3rd Low pressure area formed over Northwest Bay of Bengal off north Odisha & West Bengal coasts on 13th August 2020; it concentrated into a well marked Low pressure area over north coastal Odisha and adjoining areas of Northwest Bay of Bengal and Gangetic West Bengal in the afternoon of 14th; it maintained the same intensity and remained almost over the same area for about 36 hours and then weakened into a Low pressure area in the early morning hours of 16th and laid over south Jharkhand

& neighbourhood on 16th; while moving west-northwestwards, it maintained the same intensity for about 48 hours before getting less marked in the early morning hours of 18th; however, its remnant cyclonic circulation extending upto 5.8 km above mean sea level laid over northeast Madhya Pradesh & neighbourhood on same day and become less marked on 19th August 2020. This system moved nearly west-northwestwards. This system caused fairly widespread to widespread rainfall/thunderstorms along with intense to very intense rainfall activity over Odisha, Central India, Gujarat State, northern parts of Maharashtra, Telangana and East Rajasthan during the 3rd week of the August (13 - 19 August 2020).

- 4th Low pressure formed over North Bay of Bengal & neighbourhood in the early morning hours of 19th; it concentrated into a well marked Low Pressure Area over Northwest Bay of Bengal & neighbourhood in the forenoon of 19th; laid over north Coastal Odisha & neighbourhood in the afternoon of 19th August 2020. Thereafter, it moved nearly west-northwestwards and laid over central parts of East Madhya Pradesh & neighbourhood on 21st and over northwest Madhya Pradesh & neighbourhood on 22nd; it weakened into a Low pressure area over central parts of East Rajasthan & neighbourhood on 23rd, laid over southwest Rajasthan & neighbourhood on 24th and over southwest Rajasthan & adjoining Pakistan on 25th before getting less marked over south Pakistan & neighbourhood on 26th August 2020. This Low pressure system sustained all through the week leading to active monsoon conditions during the week (20 - 26 August 2020); the system along with its associated cyclonic circulation extending upto mid tropospheric level tilting southwestwards with height caused fairly widespread to widespread rainfall/thunderstorms along with intense to very intense rainfall activity along its path of movement and neighbourhood areas covering east & central India, northern parts of Peninsular India, Gujarat State and Rajasthan during the week (20 - 26 August 2020).
- 5th Low pressure area formed over North Bay of Bengal & neighbourhood in the early morning hours of 24th August 2020; it intensified into a well marked Low Pressure Area over North Bay of Bengal & neighbourhood on 25th; maintaining the same intensity, it laid over Northwest Bay of Bengal and adjoining coastal areas of Gangetic West Bengal and north Odisha in the forenoon and over southern parts of Gangetic West Bengal and neighbourhood in the afternoon of 26th August 2020. It moved nearly west-northwestwards and laid over north Chhattisgarh & adjoining East Madhya Pradesh on 28th and over central parts of north Madhya Pradesh & adjoining south Uttar Pradesh on 29th; it weakened into a Low pressure area in the

early morning hours of 30th and over West Madhya Pradesh and adjoining East Rajasthan; over West Rajasthan & neighbourhood on 31st August 2020 and over Pakistan & adjoining West Rajasthan on 1st September 2020 before merging with the heat low in the early morning hours of 2nd September, 2020. This system caused fairly widespread to widespread rainfall/thunderstorms along with intense to very intense rainfall activity over east, central and northwest India and over Gujarat State and northern parts of Maharashtra.

Monthly Rainfall Scenario (01 to 31 August, 2020)

During August, 2020, rainfall was above Long Period Average (LPA) by 27% over the country as a whole. Details are given below:

Regions	Actual Rainfall (mm)	Normal Rainfall (mm)	% Departure from LPA
Country as a whole	327.0	258.2	27
Northwest India	212.3	202.7	05
Central India	495.2	307.3	61
South Peninsula	256.2	189.2	35
East & northeast India	279.9	346.0	-19

- During this month, 06 sub-divisions received large excess, 10 excess, 15 normal and 5 deficient. Thus, the rainfall has been well distributed over the country with 31 sub-divisions with normal to excess rainfall. In area wise distribution, **50% sub-divisional area received excess, 35% normal and 15% deficient rainfall (Annexure II).**

Seasonal Rainfall Scenario (01 June to 31 August, 2020)

The southwest monsoon rainfall from 01 June to 31 August, 2020 was above 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	780.3	710.4	10
Northwest India	446.7	490.2	-09
Central India	966.8	799.3	21
South Peninsula	680.1	566.1	20
East & northeast India	1153.2	1125.1	02

- Till 31 August, 2020, 02 sub-divisions received large excess, 09 excess, 22 normal and 3 deficient. Thus, the rainfall till 31 August has been well distributed over the

country with 33 sub-divisions with normal to excess rainfall. Out of 3 deficient sub-divisions, 2 are from northwest India and 1 from northeastern state. (In area wise distribution, **30% sub-divisional area received excess, 58% normal and 12% deficient rainfall (Annexure III).**

Heavy Rainfall Events:

- **Heavy to very heavy rainfall with extremely heavy rainfall (≥ 20 cm)** at isolated places occurred over Odisha and South Interior Karnataka on ten days each; over Gujarat Region on nine days; over West Madhya Pradesh and Saurashtra & Kutch on eight days each; over Chhattisgarh and Madhya Maharashtra on seven days each; over Tamil Nadu, Puducherry & Karaikkal, Konkan & Goa and East Rajasthan on six days each; over East Madhya Pradesh, Assam & Meghalaya and Kerala & Mahe on four days each; over Sub Himalayan West Bengal & Sikkim on three days; over Arunachal Pradesh, Telangana and Coastal Karnataka on two days each; over Vidarbha on one day during the month.
- **Heavy to very heavy rainfall (≥ 12 cm)** at isolated places occurred over Gujarat Region on thirteen days; over Konkan & Goa on eleven days; over Telangana on ten days; over East Rajasthan on nine days; over Coastal Karnataka, Saurashtra Assam & Meghalaya, Chhattisgarh and East Madhya Pradesh on eight days each; over Himachal Pradesh, Uttarakhand and Tamil Nadu, Puducherry & Karaikkal on seven days each; over West Madhya Pradesh, Odisha, Madhya Maharashtra and Kerala & Mahe on six days each; over South Interior Karnataka, Gangetic West Bengal, Haryana, Chandigarh & Delhi, Bihar and West Rajasthan on five days each; over Uttar Pradesh and Vidarbha on four days each; over Jammu & Kashmir and Arunachal Pradesh on three days each; over Punjab, Jharkhand and North Interior Karnataka on two days each; over Coastal Andhra Pradesh & Yanam, Rayalaseema, Nagaland, Manipur, Mizoram & Tripura and Andaman & Nicobar Islands on one day each during the month.
- **Heavy rainfall (≥ 6.5 cm)** at isolated places occurred over Assam & Meghalaya on seventeen days; over East Rajasthan, West Madhya Pradesh and Madhya Maharashtra on thirteen days; over Jharkhand, East Uttar Pradesh, Punjab, Vidarbha and Coastal Karnataka on 11-12 days, over Gangetic West Bengal, Odisha, Uttarakhand, Haryana, Chandigarh & Delhi, Himachal Pradesh, East Madhya Pradesh, Saurashtra & Kutch, Konkan & Goa, Chhattisgarh, Coastal Andhra Pradesh & Yanam and Tamil Nadu, Puducherry & Karaikkal on 9-10 days, over South Interior Karnataka,

Gujarat Region, West Rajasthan, Jammu Kashmir & Ladakh, West Uttar Pradesh, Bihar, Sub Himalayan West Bengal & Sikkim, Nagaland, Manipur, Mizoram & Tripura and Arunachal Pradesh on 7-8 days; over Andaman& Nicobar islands, Telangana and Rayalaseema on 5-6 days; over Kerala & Mahe and Marathwada on 3-4 days; over North Interior Karnataka and Lakshadweep on one or two days 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 Heidke skill score (HSS) in %) during the month is given below:

No. of days with Heavy/Very Heavy Rainfall Events (>64.4 mm): 596				
warning issued for	POD	FAR	CSI	HSS
Day 1 / 24 Hours	0.79	0.36	0.60	0.43
Day 2 / 48 Hours	0.73	0.31	0.58	0.43
Day 3 / 72 Hours	0.69	0.28	0.55	0.41
Day 4 / 96 Hours	0.70	0.31	0.55	0.39
Day 5 / 120 Hours	0.65	0.34	0.50	0.31

Thundersquall & Hailstorm activity:

- Thundersquall & Hailstorm activity during the month (till 0830 IST of last date of the month) is given in the table below:

S. No.	Region	TS Days	Date of Maximum TS Activity	Hail Events	Squall Events
1.	South Peninsular India	28	01-08-20	Nil	Nil
2.	Northwest India	31	19-08-20	Nil	Nil
3.	Northeast India	31	06-08-20	Nil	Nil
4.	East India	30	04-08-20	Nil	02 (Port Blair on 11/08/20 & 13/08/20)
5.	Central India	28	01-08-20	Nil	Nil
6.	West India	03	-	Nil	Nil

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

Large scale features as on 07 September, 2020

- The Madden Julian Oscillation (MJO) index lies currently over Maritime Continent (Phase 4) with weak amplitude (less than 1). It is very likely to remain over Maritime Continent with weak amplitude during next 15 days.
- Currently, sea surface temperatures (SSTs) and atmospheric conditions over equatorial Pacific Ocean indicate cool El Niño-Southern Oscillation (ENSO) - neutral conditions.
- The Monsoon Mission Climate Forecasting System (MMCFS) model forecast and other global models indicate SSTs over the region to cool further. However, ENSO neutral conditions to continue during remaining part of monsoon season.
- At present, negative Indian Ocean Dipole (IOD) conditions are observed over equatorial Indian Ocean. MMCFS forecast indicates negative IOD condition will continue during rest of the season.

Rainfall Forecast for September, 2020

Week 1 (till 10 September, 2020)

- A Low Pressure Area lies over Eastcentral Arabian Sea off Karnataka coast with the associated cyclonic circulation extending upto 3.1 km above mean sea level. It is very likely to weaken over the same region by tomorrow, the 8 September, 2020. An east-west shear zone runs roughly along 13°N across the cyclonic circulation associated with the above low pressure area at 3.1 km above mean sea level. It is very likely to persist during next 3-4 days. Under its influence, fairly widespread to widespread rainfall and thunderstorm & lightning very likely over Peninsular India during next 4-5 days. **Heavy rainfall** at isolated places also very likely over Karnataka and Kerala & Mahe till 11 September; over Tamilnadu, Puducherry & Karaikal till 9 September, 2020. Isolated heavy to very heavy falls also very likely over Coastal Karnataka on 7, 9 & 10 September and over Kerala & Mahe on 7 & 8 September, 2020.
- The western end of monsoon trough at mean sea level lies near normal position and its eastern end lie north of its normal position. The eastern end of monsoon trough is likely to be north of its normal position or along the foothills of Himalayas during next 5 days. Fairly widespread to widespread rainfall with thunderstorm & lightning and heavy rainfall at isolated places over Sub-Himalayan West Bengal & Sikkim and northeastern states till 11 September, 2020. Isolated heavy to very heavy falls also very likely over Sub-Himalayan West Bengal & Sikkim and Assam & Meghalaya on today, the 7 September, 2020.
- **Overall, rainfall is very likely to be above normal over most parts of Peninsular India and normal to above normal over Indo-Gangetic plains (Uttar Pradesh, Bihar**

and West Bengal). Rainfall is very likely to be below normal over central & adjoining East India (Annexure IV & V).

Week 2 (11-17 September 2020)

- The monsoon trough is likely to remain north of its normal position or close to the foothills of the Himalayas.
- **Development of features for monsoon withdrawal from western parts Rajasthan likely during the week.**
- Formation of low pressure area is unlikely.
- Above normal rainfall activity likely over northeastern states, Maharashtra, Goa, Karnataka and Kerala.
- Below normal rainfall activity is likely over remaining parts of the country with significant reduction in rainfall activity over northwest India.

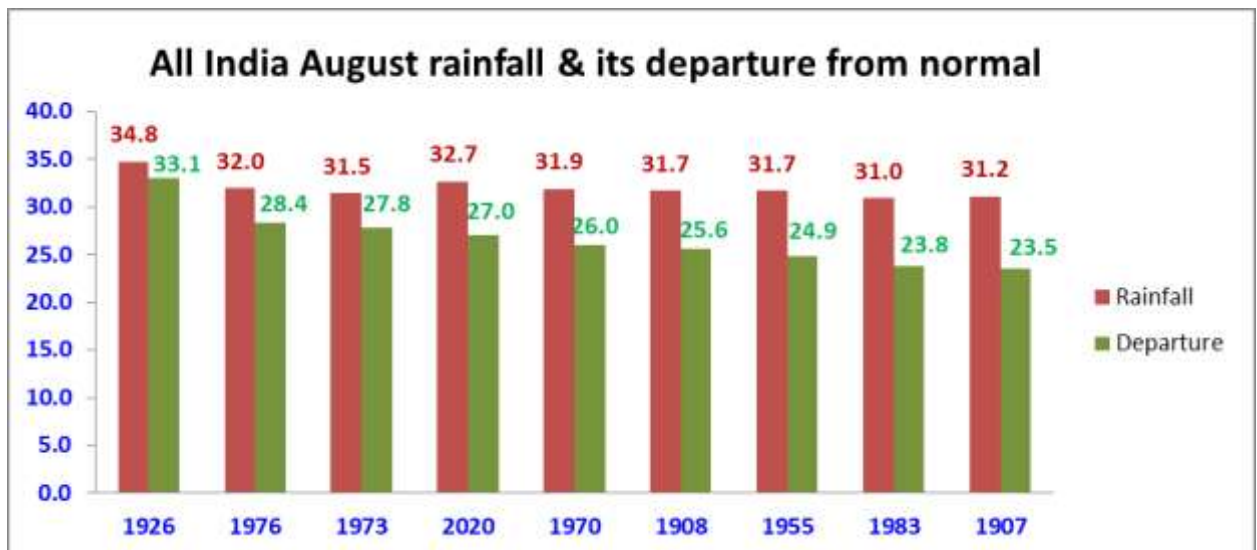
Week 3 (11-17 September 2020)

- Rainfall is very likely to be above normal over extreme south Peninsular India, Andaman & Nicobar Islands, Gujarat and northern parts of Maharashtra.
- Rainfall is very likely to be near normal/below normal over rest parts of the country.

Week 4 (11-17 September 2020)

- Rainfall is very likely to be above normal along west coast, Andaman & Nicobar Islands, Gujarat and northern parts of Maharashtra, Madhya Pradesh and Uttar Pradesh.
- Rainfall is very likely to be below normal over south Peninsular India and near normal over rest parts of the country.

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



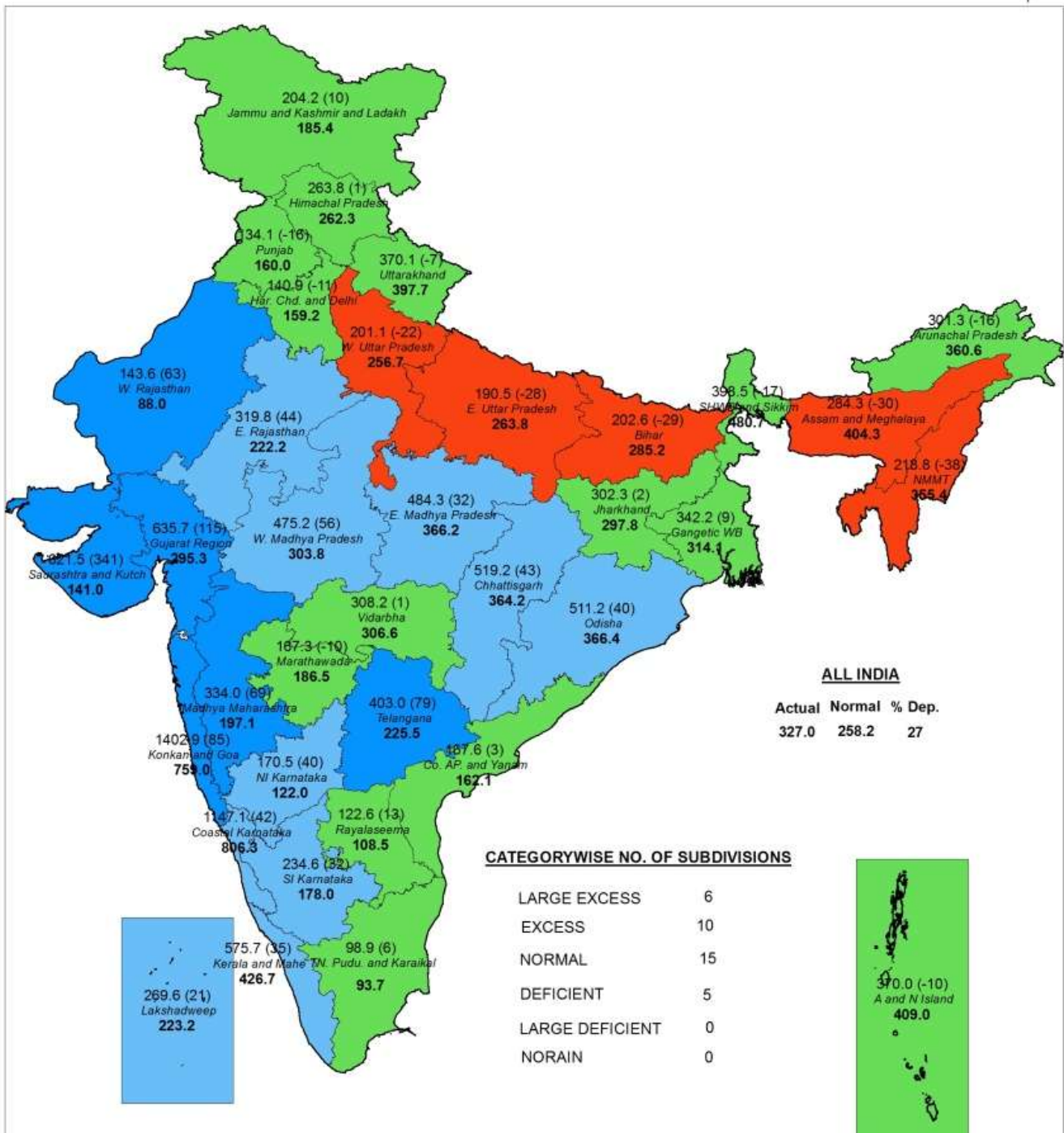


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INDIA METEOROLOGICAL DEPARTMENT

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HYDROMET DIVISION, NEW DELHI

SUBDIVISION RAINFALL MAP

Period : 01-08-2020 To 31-08-2020



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

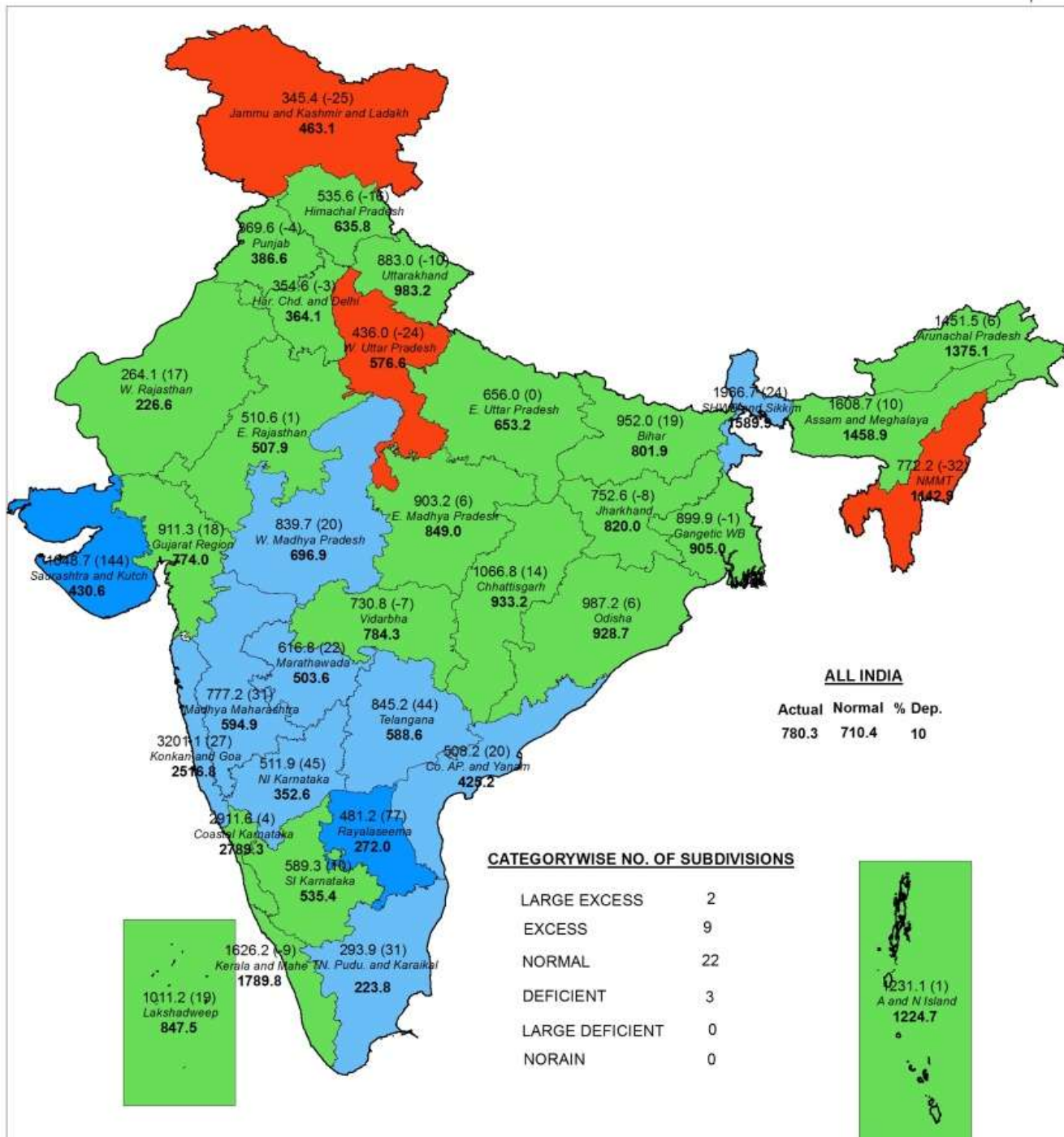


भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT

जल मौसम विज्ञान प्रभाग, नई दिल्ली
HYDROMET DIVISION, NEW DELHI

SUBDIVISION RAINFALL MAP

Period : 01-06-2020 To 31-08-2020



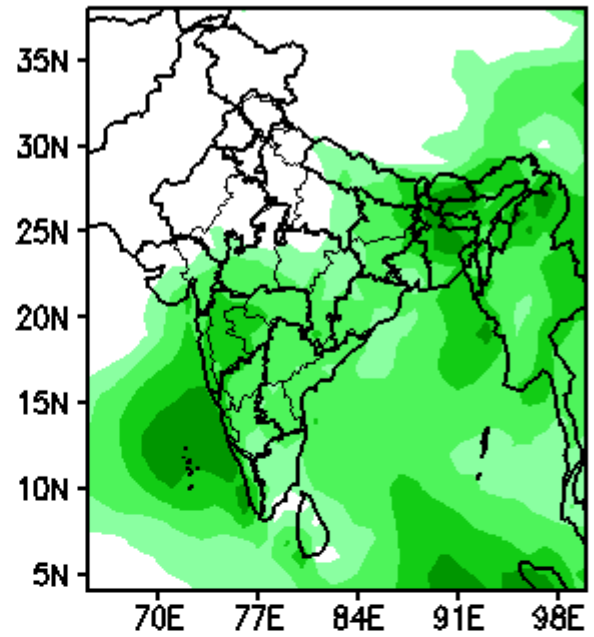
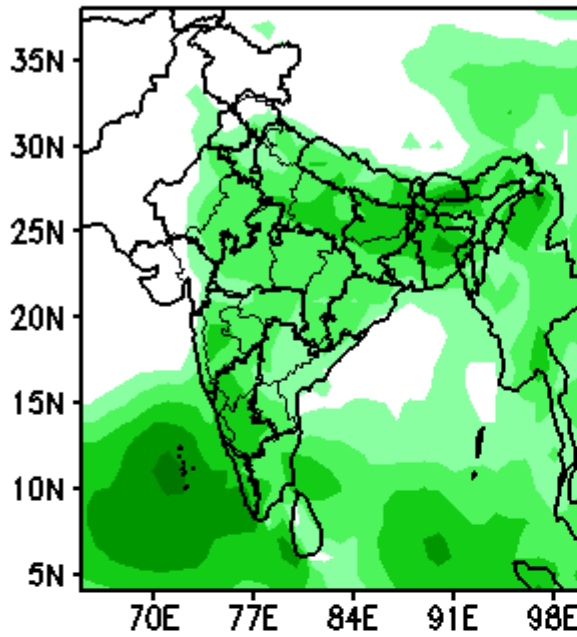
Legend

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

Forecast Rainfall (mm/day)

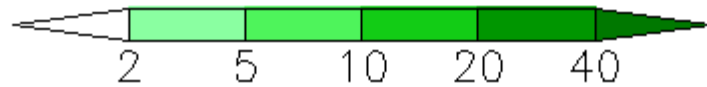
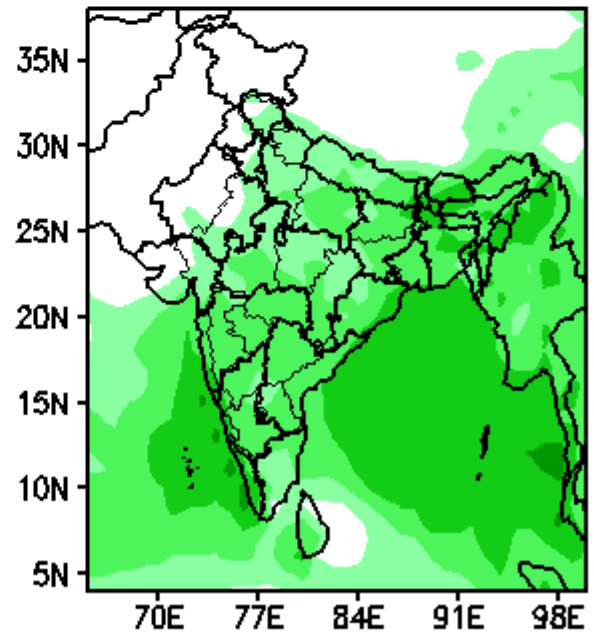
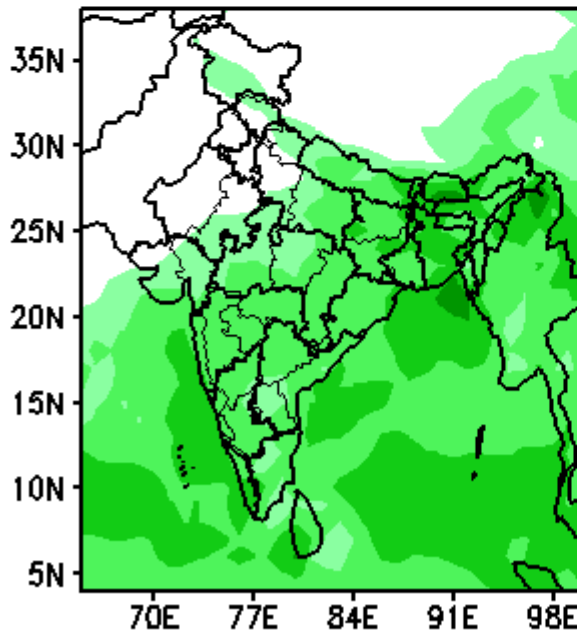
(Week1: 04Sep-10Sep)

(Week2: 11Sep-17Sep)



(Week3: 18Sep-24Sep)

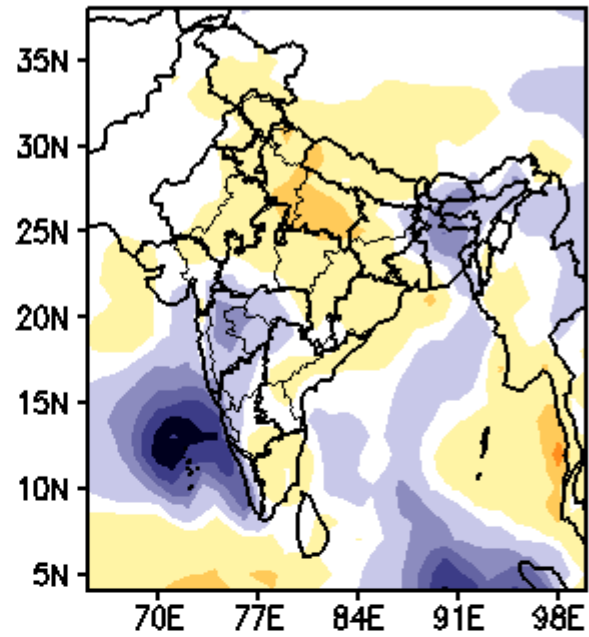
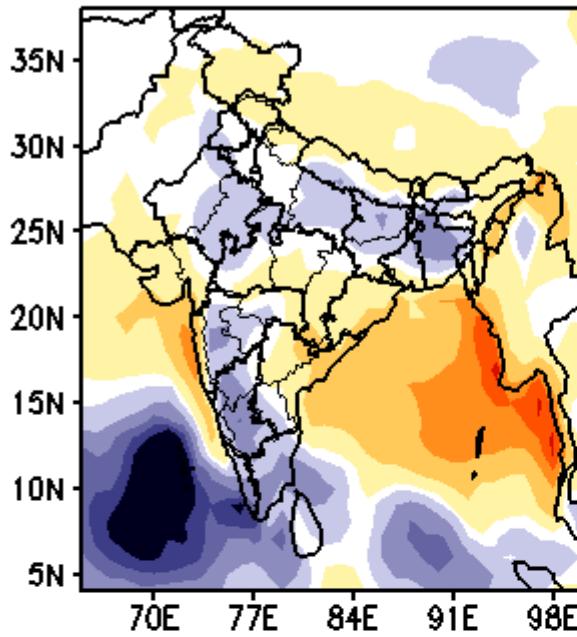
(Week4: 25Sep-01Oct)



Forecast Rainfall Anomaly (mm/day)

(Week1: 04Sep-10Sep)

(Week2: 11Sep-17Sep)



(Week3: 18Sep-24Sep)

(Week4: 25Sep-01Oct)

