



# India Meteorological Department

## FDP STORM Bulletin No. 36 (11-04-2018)

### 1. CURRENT SYNOPTIC SITUATION:

#### NWFC INFERENCE (0300UTC of the Day):

- ◆ The Western Disturbance as an upper air cyclonic circulation at 3.1 km above mean sea level over central parts of Afghanistan & neighbourhood now lies over north Pakistan and neighbourhood and the trough aloft with its axis at 5.8 km above mean sea level now runs roughly along Long 72° E to the north of Lat. 30°N.
- ◆ A cyclonic circulation extending upto 0.9 km above mean sea level lies over southwest Uttar Pradesh and neighbourhood.
- ◆ The cyclonic circulation over East Uttar Pradesh & adjoining Bihar extending upto 0.9 km above mean sea level persists.
- ◆ The cyclonic circulation over northern parts of Bangladesh and neighbourhood persists and now seen at 0.9 km above mean sea level.
- ◆ The cyclonic circulation over southwest Madhya Pradesh and neighbourhood now lies over southwest Madhya Pradesh and adjoining Gujarat region and southeast Rajasthan. A trough runs from this cyclonic circulation to coastal Karnataka across Madhya Maharashtra at 0.9 km above mean sea level.
- ◆ The cyclonic circulation over Gujarat Region extending upto 0.9 km above mean sea level has merged with the above system.
- ◆ The north south wind discontinuity from north interior Tamilnadu to north Interior Karnataka across south Interior Karnataka at 0.9 km above mean sea level has become less marked.
- ◆ A trough in easterlies at 0.9 km above mean sea level from runs Comorin area to South Interior Karnataka across interior Tamilnadu.
- ◆ The trough of low at mean sea level over Equatorial Indian Ocean & adjoining southeast Bay of Bengal now lies over Equatorial Indian Ocean and adjoining southwest Bay of Bengal.

#### SATELLITE OBSERVATIONS during past 24 hrs and current observation:

##### Current Observation (based on 0900UTC imagery of INSAT 3D):

##### Western Disturbance (WD):

Broken multi-layered clouds with embedded moderate to intense convection seen over Northeast Pakistan, Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Punjab, North Haryana, East Rajasthan, Uttar Pradesh and over area between Lat 37.0°N to 49.0°N Long 72.0°E to 102.0°E in association with Western Disturbance over the area.

**Westerly Trough:** Trough in Westerlies roughly along long 66.0E & north of lat 32.0N

##### Convective Activity:

Convective cells that are developed over north Haryana, Uttarakhand, East-central Uttar Pradesh, Nagaland, Manipur, East Assam are moving in East ward direction. New cells are developing over South Rajasthan and Jharkhand.

**Precipitation Nowcast Based on WMO Scope Product:** Based on 0900UTC precipitation is likely to take place during next three (03 hrs) over J & K, HP, Haryana, Uttarakhand, Central-east Uttar Pradesh, East Assam, Nagaland and Manipur.

**Clouds descriptions within India:**

Broken low/medium clouds with embedded moderate to intense convection seen over Jammu & Kashmir, Himachal Pradesh, Uttarakhand, adjoining Northwest Uttar Pradesh, Northeastern parts of East Uttar Pradesh, Arunachal Pradesh, East Assam, Nagaland, Manipur, North Mizoram, Jharkhand, South Chhattisgarh and Odisha. Scattered low/medium clouds with embedded moderate to intense convection seen over Nicobar Islands. Scattered low/ medium clouds with embedded weak to moderate convection seen over Punjab, Delhi and South Rajasthan. Scattered low/ medium clouds with embedded weak convection seen over Sikkim, rest Chhattisgarh and rest Rajasthan. Scattered low/medium clouds seen over rest parts of North India. Isolated to scattered low/medium clouds seen over rest parts of south India and isolated low/medium clouds over rest parts of West India.

**Arabian Sea:-**

Scattered low/medium clouds with embedded moderate to intense convection seen over extreme South Arabian Sea south of lat 10.0°N.

**Bay of Bengal & Andaman Sea:**

Scattered low/medium clouds with embedded moderate to intense convection seen over Andaman Islands, Southeast Bay and Southwest Andaman Sea.

**Past Weather:****Convection (during last 24 hrs):**

Moderate to Intense convection was observed over Jammu & Kashmir, Punjab, Himachal Pradesh, north Rajasthan, Haryana, Delhi, Uttarakhand, Uttar Pradesh, South Jharkhand, Chhattisgarh, Odisha, Gangetic West Bengal, Sub-Himalayan West Bengal, Sikkim, NE States Kerala and Tamilnadu. Weak to Moderate convection was observed over rest Maharashtra, Madhya Pradesh, Gujarat and Uttar Pradesh

**OLR:**

Up-to 230  $\text{wm}^{-2}$  observed over Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Punjab, North Rajasthan, Haryana, Delhi, West Uttar Pradesh, North Madhya Pradesh, Sub Himalaya West Bengal, adjoining Bihar, North-East States, south Kerala, South Tamilnadu and south Karnataka .

**Synoptic Features (Westerly Trough & Jet Stream):** Trough in westerlies roughly along Long 66.0E & north of Lat 30.0N.

**Dynamic Features:-**

Up to 40- 80 Knots wind shear is observed over North India 30-40 knots wind shear is observed over central India and Up to 40 Knots wind shear observed over rest India.

Negative Shear tendency (-20kts) is observed over North J & K, Karnataka, Kerala, Tamilnadu, Andhra Pradesh and Telangana and Positive Shear tendency (20kts) over Gujarat Rajasthan and Madhya Pradesh .

A positive Vorticity field at 850 hPa is observed over west Gujarat north Punjab and south J & K.

Negative Low Level Convergence observed over Jammu & Kashmir, North Uttarakhand, Himachal Pradesh, Bihar, South Gujarat, north Maharashtra, Uttar Pradesh, central India Arunachal Pradesh, and Positive Low Level Convergence observed over Rajasthan, Punjab and Haryana.

**Precipitation:****IMR:**

Rainfall upto 150mm observed over south west J&K

Rainfall upto 70 mm observed over North and West Jammu and Kashmir South East Himachal Pradesh North Uttarakhand, North sub Himalayan west Bengal

Rainfall upto 50 mm observed over rest J & K, Himachal Pradesh, Rest Uttarakhand north Punjab south Madhya Pradesh Orissa south Chhattisgarh south Kerala and west Tamilnadu

Rainfall upto 10 mm observed over East J&K rest Punjab west Gujarat north west Rajasthan West East Madhya Pradesh north central and west Uttar Pradesh Orissa rest Chhattisgarh rest Karnataka sub Himalayan west Bengal west Assam Sikkim Arunachal Pradesh and Manipur .

**HEM:**

Rainfall upto 140 mm observed over South and West Jammu and Kashmir north Uttarakhand north Himachal Pradesh

Upto 7mm observed over rest J&K Himachal Pradesh Uttarakhand west Rajasthan East Madhya Pradesh central Uttar Pradesh Bihar sub Himalayan Gangetic west Bengal north east states Chhattisgarh east Maharashtra north Karnataka south Kerala and Tamilnadu

**Convective Activity over Indian Region:**

Cell No	Date /Time(UTC)	Location	Minimum CTT -Deg C	Remarks/ Movement
1	0800	W J&K	75	
	0900	DO	65	
	1200	DO	80	
	1500	W J&K ADJ NE PAK	89	
	1700	DO	91	
	2130	J&K N HP PJB NE PAK	81	
	11/0000	DO	76	
	0300	C J&K C HP ADJ N UTRKND	65	EMBEDDED WITH WD
2	0300	C PJB	70	ENE-WARD
3	2130	SC UP	61	
	11/0000	DO	59	
	0300	C UP	59	EAST WARD
4	0300	N UP	64	EAST WARD
5	0300	W UP	63	EAST WARD
6	2130	SHWB	54	
	11/0000	SHWB ADJ ASSAM	65	
	0300	MEGHA ADJ SHWB W ASSAM BHUTAN	65	EAST WARD
7	0800	SE MP	62	DEVELOPING
	0900	S E M P	55	ENLARGING AREA
	1200	E MP	57	
	1500	DO	52	
	1700	NC MP	63	
	2130	DO	42	
	11/0000	NW MP ADJ RAJ	59	
	0300	DO	-	WEAKNED
8	0800	S TN	61	DEVELOPING
	0900	DO	61	NE WARD
	1200	S TN ADJ S KER	86	
	1500	S KER ADJ S TN	76	
	1700	DO	73	
	2130	KER ADJ TN	70	
	0300	DO	53	STATIONARY

### RADAR and RAPID RGB Observation:

Isolated/multiple moderate to strong echoes (dBZ >52 and height > 12km) were seen on domain of DWR Delhi, Bhopal, Kolkata, Paradip, Machilipatnam, and Vishakhapatnam and Isolated/multiple light to moderate echoes (dBZ 45-50 and height around 10km) were seen on DWR Agartala, Jaipur, Nagpur, Patna, Hyderabad and Srinagar at around 1700 IST.

RAPID RGB Satellite imagery at 1600IST indicates significant convection over Jammu & Kashmir, Himachal Pradesh, Haryana, Delhi adjoining Uttar Pradesh, Uttarakhand, East Rajasthan, West Bihar adjoining parts of Uttar Pradesh, Central parts of Jharkhand, Arunachal Pradesh East Assam, Nagaland, Manipur, isolated parts of Madhya Pradesh, Vidarbha, Marathwada, South Interior Karnataka, Interior Kerala and Interior Tamilnadu.

### Environmental Condition (dust etc) and its Forecast based on 00UTC of date:

Higher Dust concentration was observed over Arab countries and western part of India. Dust concentration is expected to increase over north-western part of India for next few days.

Particulate matter concentration is expected to remain in moderate category for next 2 days in Delhi.

Delhi – SAFAR analysis & Forecast	11.04.2018	12.04.2018
PM10 (micro-g/m <sup>3</sup> )	169	185
PM2.5 (micro-g/m <sup>3</sup> )	73	81

## **2. NWP MODEL GUIDANCE:**

### NCMRWF (NCUM forecast based on 00UTC the day):

#### **1. Weather Systems:**

**Low level CYCIRS, Troughs: 12 UTC of Day 0:** 925 & 850 hPa a weak CYCIR over Punjab and adjoining Pakistan

**12 UTC of Day 0:** 925 & 850 hPa trough over Gujarat region

**00 UTC of Day 1-5:** 850 hPa trough over Bangladesh and NE India in Day 2-4

**Confluence & wind Discontinuity regions: 12 UTC of Day 0-1:** 925hPa N-S discontinuity over Southern Peninsular India

**Synoptic Systems: 00 UTC of Day 1-3: 00 UTC of Day 1-2:** WD as a trough at 500 hPa over Pakistan and adjoining J & K. A fresh WD approaching J & K in Day 4

**00UTC of Day 1-5:** 925 hPa anticyclone over Bay of Bengal leading to moisture incursion.

#### **2. Location of jet and jet core (>60kt) at 500hPa:**

#### **3. Convergence at 850 hPa: Day/Index: Subdivisions with Lower Level Convergence > 15 x 10<sup>-5</sup> /s**

Day0: Punjab, Odisha, Chhattisgarh, Tamilnadu, Puducherry, NI Karnataka, SI Karnataka,

Day1: Assam Meghalaya, NE NMMT, Jammu Kashmir, Madhya Maharashtra, NI Karnataka,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Madhya Maharashtra,

Day3: Arunachal Pradesh, Assam, Meghalaya, NE NMMT, Jharkhand, East MP, Madhya Maharashtra, Chhattisgarh, NI Karnataka, SI Karnataka,

Day4: Assam, Meghalaya, Madhya Maharashtra, Vidarbha, NI Karnataka, SI Karnataka

**4. Low level Vorticity:-Positive Vorticity: Day/Index: Subdivisions with Lower Level Vortex > 15 x 10<sup>-5</sup> /s**

Day0: Gangetic WB, Bihar, Punjab, West Rajasthan,

Day1: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Saurashtra Kutch,

Day2: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Bihar, Uttarakhand,

Day3: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Himachal Pradesh,

Day4: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Uttarakhand, Himachal Pradesh,

**5. Showalter Index: -3 to -4[Very unstable]: Day/Index: Subdivisions with Showalter Index < -4**

Day0: Arunachal Pradesh, Sub Himalayan WB, Jharkhand, East UP, West UP, Uttarakhand, Punjab, Himachal Pradesh, Jammu Kashmir, Tamilnadu Puducherry, Coastal Karnataka, SI Karnataka, Kerala,

Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Bihar, East UP, West UP, Punjab, Himachal Pradesh, Jammu Kashmir, Odisha, Coastal AP, Tamilnadu Puducherry, SI Karnataka, Kerala,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Bihar, Odisha, Coastal AP, Tamilnadu Puducherry, SI Karnataka, Kerala,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Coastal AP, Telangana, Tamilnadu Puducherry, Coastal Karnataka, SI Karnataka, Kerala,

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Konkan Goa, Tamilnadu Puducherry, Coastal Karnataka, SI Karnataka, Kerala,

**6. Spatial distribution of TTI: TTI >50 [Scattered Thunderstorms few severe]: Day/Index: Subdivision with Total Totals Index > 52**

Day0: Arunachal Pradesh, Sub Himalayan WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West Rajasthan, West MP, Gujarat Region, Saurashtra Kutch, Konkan Goa, Madhya Maharashtra, Marathwada, Vidarbha, Telangana, NI Karnataka,

Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, Odisha, Vidarbha, Chhattisgarh, Coastal AP,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Vidarbha, Chhattisgarh,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Gangetic WB, Jharkhand, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Vidarbha,

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Saurashtra Kutch,

**7. K-Index :-> 35[Very Unstable thunderstorm likely]: Day/Index: Subdivisions with K Index > 40**

Day0: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Bihar, Uttarakhand, Punjab, Marathwada, Chhattisgarh, Telangana, Rayalaseema, Tamilnadu Puducherry, NI Karnataka, SI Karnataka, Kerala,

Day1: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Bihar, East UP, West UP, Odisha, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, Tamilnadu Puducherry, NI Karnataka, SI Karnataka, Kerala,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, Odisha, Vidarbha, Chhattisgarh, Coastal AP, Rayalaseema, Tamilnadu Puducherry, NI Karnataka, SI Karnataka, Kerala,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Jharkhand, Uttarakhand, Odisha, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, Tamilnadu Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,  
Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Uttarakhand, Odisha, Madhya Maharashtra, Chhattisgarh, Coastal AP, Tamilnadu Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka,

#### **8. Rainfall and thunder storm activity: Day/Index: Subdivisions with Precipitation > 2 cm**

Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Uttarakhand, Punjab, Himachal Pradesh, Jammu Kashmir, Tamilnadu Puducherry, Kerala,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Himachal Pradesh, Jammu Kashmir, Tamilnadu Puducherry,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Tamilnadu, Puducherry,

Day4: Arunachal Pradesh, Assam, Meghalaya, NE NMMT,

Day5: Arunachal Pradesh, Assam, Meghalaya, NE NMMT, Jammu Kashmir,

#### **IMD GFS (T1534) based on 00UTC the day:**

##### **1. Synoptic Systems:**

The analysis based on 00 UTC indicates a cyclonic circulation in lower troposphere (925 hPa) over south west Uttar Pradesh and adjoining areas. It will persist for next 48 hour forecast. The analysis shows another cyclonic circulation over East Uttar Pradesh and adjoining Bihar in lower troposphere (925hPa). The forecast shows it will move eastward till day 3. The analysis shows a cyclonic circulation over southwest Madhya Pradesh adjoining Gujarat and southeast Rajasthan. A trough is seen in the analysis from this cyclonic circulation up to coastal Karnataka across Madhya Maharashtra. The forecast shows an eastward shift of the trough till day 3. The analysis also shows a trough in easterlies extending from Comorin area up to south interior Karnataka. Analysis shows a feeble cyclonic circulation over north Pakistan and adjoining northwest Rajasthan in lower troposphere.

**2. Location of Jet and Jet Core (>60kt) at 500hPa:** Although the presence of strong westerlies is found over east and northeast India but no jet core over the Indian region for the next 3 days.

**3. Low Level Vorticity {850hPa Positive Vorticity (>12 x 10<sup>-1</sup>/s):** Low level Positive Vorticity is seen mostly over the cyclonic circulation, along the trough extending from southwest Madhya Pradesh to coastal Karnataka, foothills of Himalaya and NE states for next 3 days. It is inferred that some parts of West Uttar Pradesh and adjoining areas has Positive Vorticity on day 1.

##### **4. Spatial distribution of T-storm Initiation Index, Lifted Index, Total Total Index, CAPE, CIN and Sweat Index [High potential for thunderstorm]:**

**T-Storm Initiation Index (> 3):** The threshold value of the index > 3 over Punjab, Haryana, Delhi, Uttar Pradesh, coastal areas of Gangetic West Bengal and Kolkata, parts of Orissa, Bihar, Jharkhand, Andhra Pradesh, Telangana, Rayalaseema, Kerala, Karnataka, Tamil Nadu, parts of Gujarat, Rajasthan, coastal Maharashtra including Mumbai, Konkan & Goa, Vidarbha adjoining Chhattisgarh, coastal areas along the east coast and west coast, extreme south peninsular India, Assam, Tripura and adjoining area, SHWB on day 1; over parts of Haryana, Delhi, West Uttar Pradesh, Sikkim, SHWB, Bihar, Jharkhand, Assam, Tripura and adjoining area, Orissa, Chhattisgarh, Vidarbha, Coastal areas along the east coast and west coast, Gujarat on day 2; Uttarakhand, Assam and adjoining areas on day 2 and 3; over parts of south west Rajasthan and west Madhya on day 3; Maximum value of the index is seen over parts of Gujarat, coastal areas Maharashtra, GWB, Orissa on day 1; over parts of Bihar, Jharkhand, GWB, SHWB, Orissa, coastal Andhra Pradesh, Assam, Tripura and adjoining areas, Gujarat on day 2 and 3.

**Lifted Index (< -2):** The threshold value of the index is below -2 over parts of Gujarat, Saurashtra region, Rajasthan, coastal Andhra Pradesh, coastal Karnataka, Telangana, Rayalaseema, Konkan and Goa, Kerala, Tamil Nadu, southern part of west coast, coastal areas along the east coast, Orissa, Madhya Pradesh, Chhattisgarh, Vidarbha, GWB, Bihar, Jharkhand, Sikkim, Assam, Tripura and adjoining areas on all 3 days; over parts of J&K, Punjab, Haryana, Delhi, Uttar Pradesh, Uttarakhand, Himachal Pradesh on day 1 and 2; maximum negative value of the index less than -8 is seen over parts of coastal Gujarat, coastal Orissa and GWB on day 1; over parts of Tripura and adjoining areas on day 2; on day 3 over coastal Orissa, GWB and coastal Gujarat.

**Total Index (> 50):** The threshold value of the index is > 50 over some parts of Rajasthan and West Madhya Pradesh on day 1; on day 2 over some parts of Gujarat, Himachal Pradesh, Uttarakhand and adjoining west Uttar Pradesh; over parts of J&K, Rajasthan, Himachal Pradesh, Punjab, Haryana, Delhi, Uttarakhand, Uttar Pradesh and foothills of Himalaya on day 3; maximum value of the index >60 is seen over parts of south west Rajasthan J&K, Himachal Pradesh, Haryana and adjoining areas, Uttarakhand and west Uttar Pradesh on day 3.

**Sweat Index (> 300):** Although the threshold value of the Index >300 is seen in most parts of the country but the maximum value of the index greater than 700 is seen over parts of J&K and Himachal Pradesh on day 1; on day 2 over parts of J&K, Himachal Pradesh, foothills of Himalaya, GWB, Orissa, Assam, Arunachal Pradesh, Tripura and adjoining areas on day 2; on day 3 over western part of Gujarat, Sikkim, Orissa, GWB, SHWB and NE states.

**CAPE (> 1000):** Mostly in areas of southern peninsular India, along west coast and east coast and coastal areas of GWB, Orissa, Andhra Pradesh, Telangana, Rayalaseema, Kerala, Tamilnadu, Karnataka, Gujarat, coastal Maharashtra, Konkan and Goa, Bihar, Jharkhand, GWB, SHWB during all 3 days; over parts of West Uttar Pradesh, Haryana and adjoining areas on day 1; over parts of Assam Tripura and adjoining areas on day 2; on day 3 over most of the NE states and Sikkim; over some parts of south west Rajasthan on day 1; Maximum value of the index greater than 2500 is seen mostly over parts of GWB and Orissa and its coastal areas on day 2 and 3; over parts of coastal Andhra Pradesh, coastal Karnataka and Tamil Nadu on day 3.

**CIN (50-150):** Although the threshold value of the Index lies in the range of (50–150) over most part of the country except during all 3 days but the maximum value of the index > 200 is seen over parts of Punjab Haryana, Delhi, Himachal Pradesh, Uttarakhand, East Uttar Pradesh, Gujarat, Bihar, Jharkhand, GWB, Orissa, Telangana, Chhattisgarh, coastal Maharashtra on all 3 days; over parts of Punjab, Haryana, Delhi, Himachal Pradesh, Uttarakhand and west Uttar Pradesh on day 1.

### **5. Rainfall Activity:**

40-70 mm Rainfall: over parts of Arunachal Pradesh and adjoining areas on day 2 and 3; over some parts of Manipur and adjoining areas on day 3.

10-40 mm Rainfall: over parts of Sikkim, NE states, Foothills of Himalayas, SHWB, Kerala, Karnataka, Tamil Nadu, on all 3 days; over parts of J&K, Himachal Pradesh, Uttarakhand, Punjab, Haryana and West Uttar Pradesh on day 1.

Up to 10 mm rainfall: Over parts of Sikkim, NE states, Foothills of Himalaya, J&K, Uttarakhand, Punjab, Haryana, Delhi, Himachal Pradesh, Rajasthan, Uttar Pradesh, Bihar, Jharkhand, Orissa, Chhattisgarh, Madhya Pradesh, Vidarbha, Marathwada, Madhya Maharashtra, GWB, SHWB, Andhra Pradesh, Kerala, Karnataka, Tamil Nadu, Telangana and Rayalaseema on day 1 and 2; over parts of J&K Himachal Pradesh Uttarakhand Haryana, Rajasthan, Madhya Pradesh, Vidarbha, Marathwada, Madhya Maharashtra, Telangana, Chhattisgarh, Jharkhand, Orissa, GWB, Sikkim, NE states, Gujarat, Andhra Pradesh, Kerala, Karnataka, Tamil Nadu on day 3.

### 3. IOP ADVISORY FOR 24 and 48Hrs:

#### Summary and Conclusions:

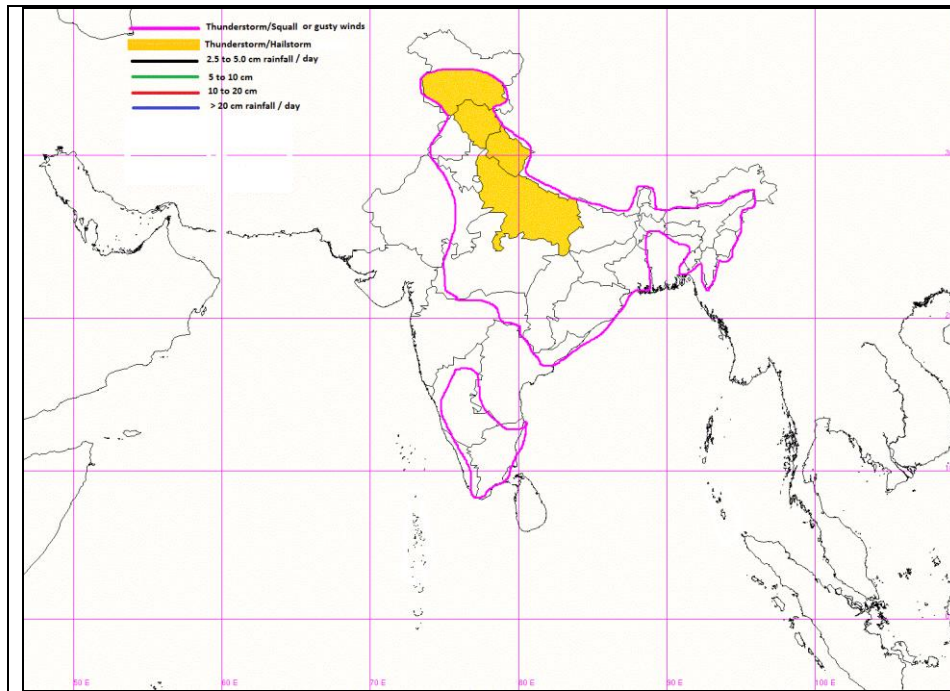
- Synoptic analysis indicates that due to cyclonic circulation over southwest Uttar Pradesh and neighbourhood area and the Western Disturbance as an upper air cyclonic circulation over north Pakistan and neighbourhood, the northwest region will get thundersquall with hail specifically over J&K, Himachal Pradesh, Uttrakhand. The thunderstorm with gusty winds may be experienced over Punjab, Haryana on Day-1.
- Due to the the cyclonic circulation over East Uttar Pradesh & adjoining Bihar, the eastern parts will experienced thunderstorm with gusty winds on Day-1. This activity may continue to Day-2 over the same region.
- The cyclonic circulation over northern parts of Bangladesh will be triggering the thunderstorm with gusty winds activity over Assam, Meghalaya and NMMT on Day-1. On Day-2, Arunachal Pradesh may experience heavy rainfall.
- The thunderstorm with gusty winds over North and South Interior Karnataka, Tamilnadu on Day-1 due to the the north-south wind discontinuity from north interior Tamilnadu to north Interior Karnataka across south Interior Karnataka.

#### Day-1 & Day-2:

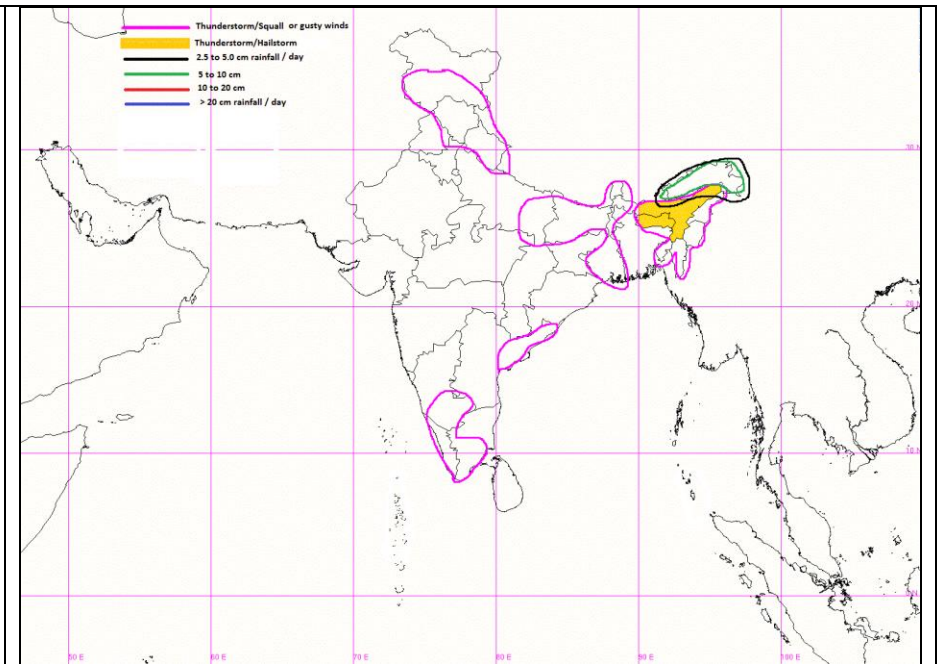
24 hour Advisory for IOP:	48 hour Advisory for IOP:
<b>Significant Rainfall:</b> Nil	<b>Significant Rainfall:</b> Arunachal Pradesh
<b>Thunderstorm with Squall/Gusty winds:</b> Odisha, Gangetic West Bengal, Jharkhand, Bihar East and West MP, Vidarbha Chhattisgarh Punjab, Haryana, Delhi North and South Interior Karnataka, Tamilnadu	<b>Thunderstorm with Squall/Gusty winds:</b> Odisha, Gangetic West Bengal, Jharkhand, Chhattisgarh, Bihar
<b>Thunderstorm with Squall/Hailstorm:</b> Sub Himalayan West Bengal, Jammu and Kashmir, Himachal Pradesh, Uttrakhand, West and East UP Assam, Meghalaya, Nagaland, Manipur, Mizoram and Tripura	<b>Thunderstorm with Squall/Hailstorm:</b> Sub Himalayan West Bengal, Himachal Pradesh
<b>Thunderstorm/Duststrom:</b> Nil	<b>Thunderstorm/Duststrom:</b> Nil



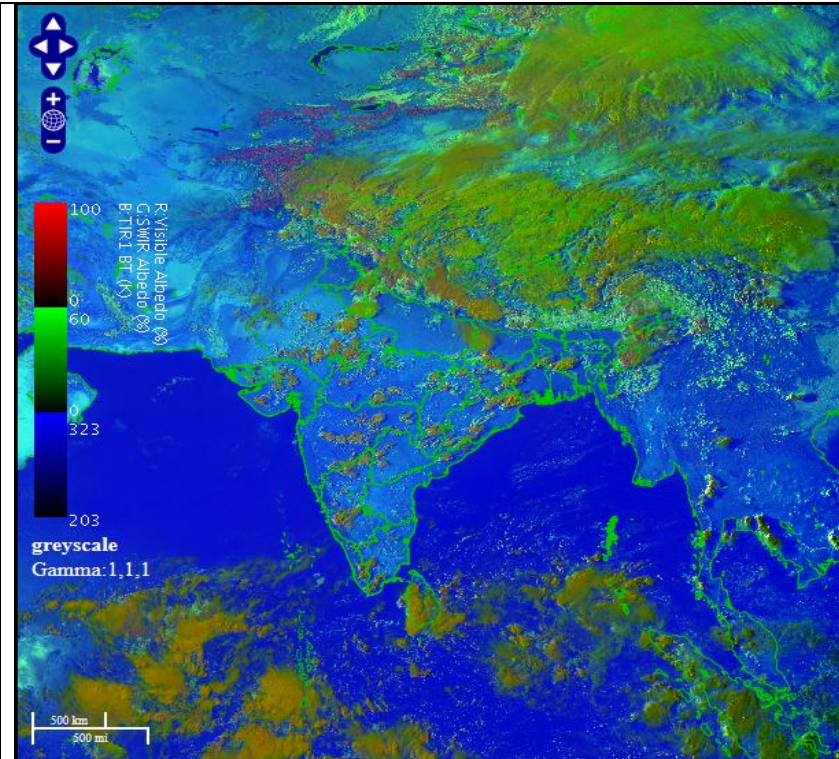
### Graphical Presentation of Potential Areas for Severe Weather:



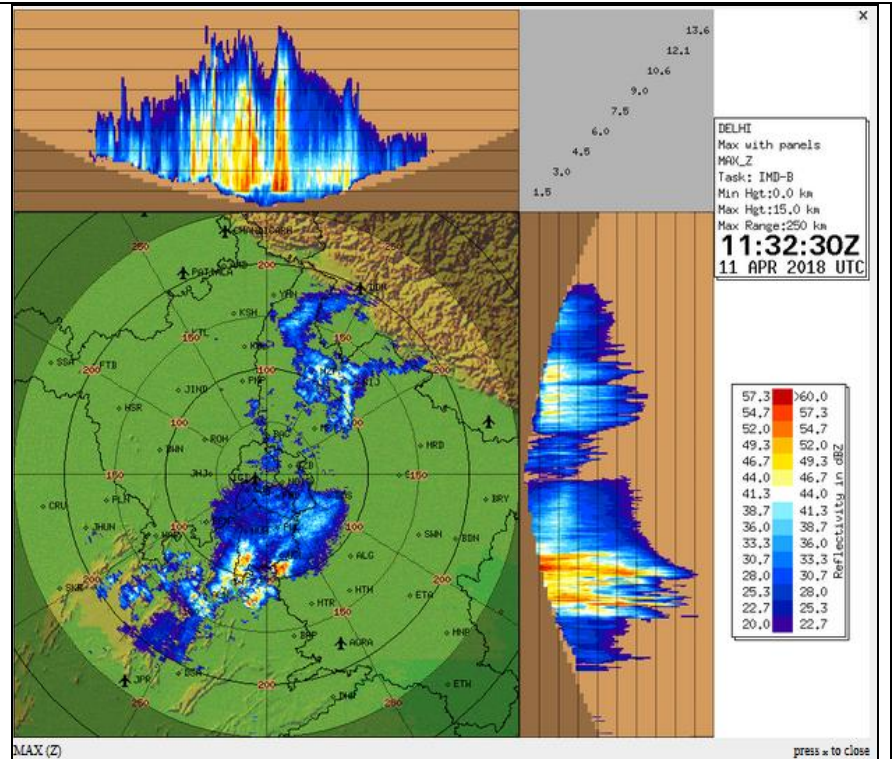
IOP Advisory for 24 hours



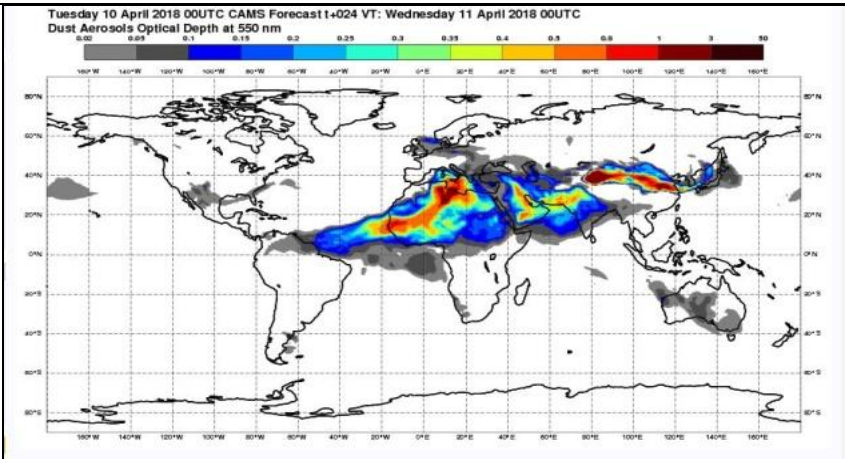
IOP Advisory for 48 hours



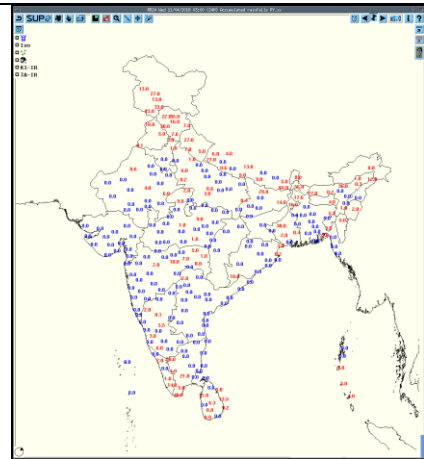
**RAPID RGB Imagery at 1600 IST of the Day**



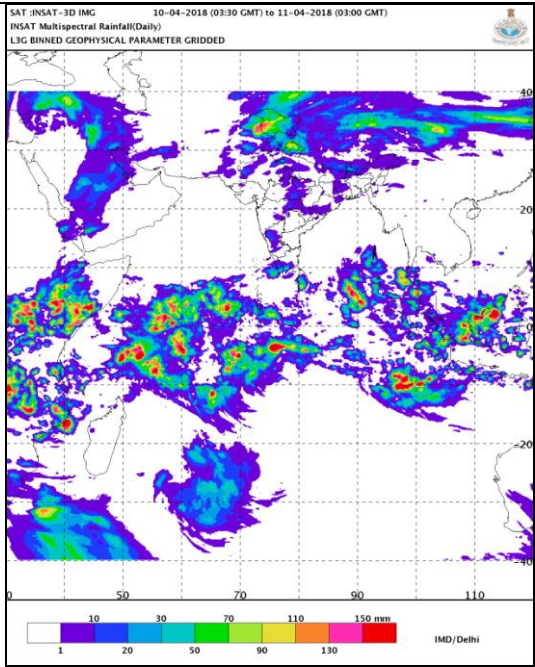
**DWR Delhi at 1702 IST of the Day**



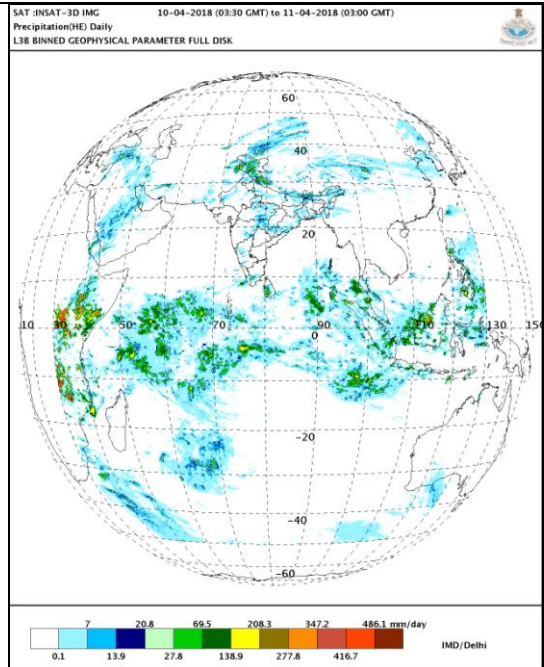
Dust Forecast



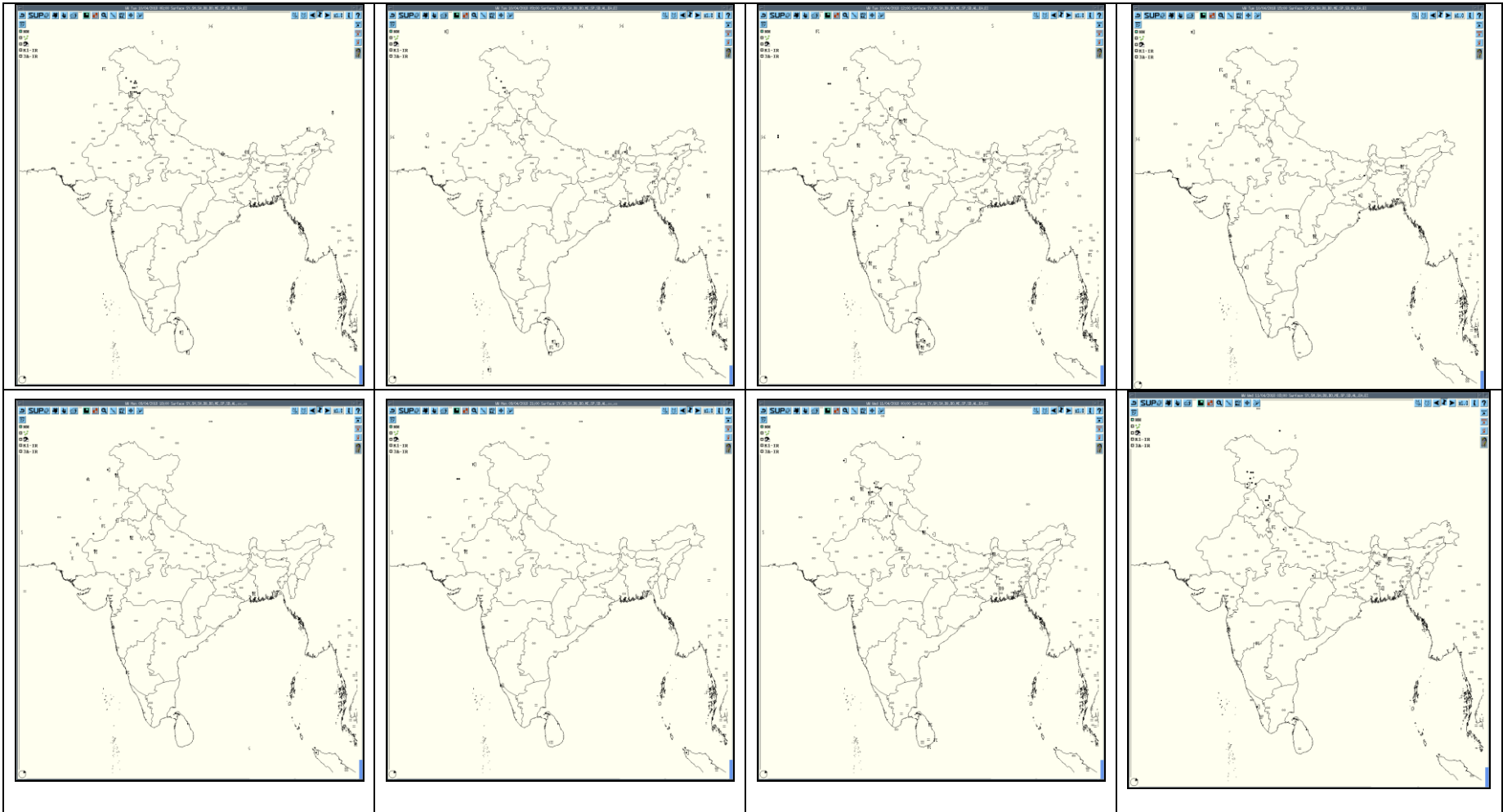
Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today



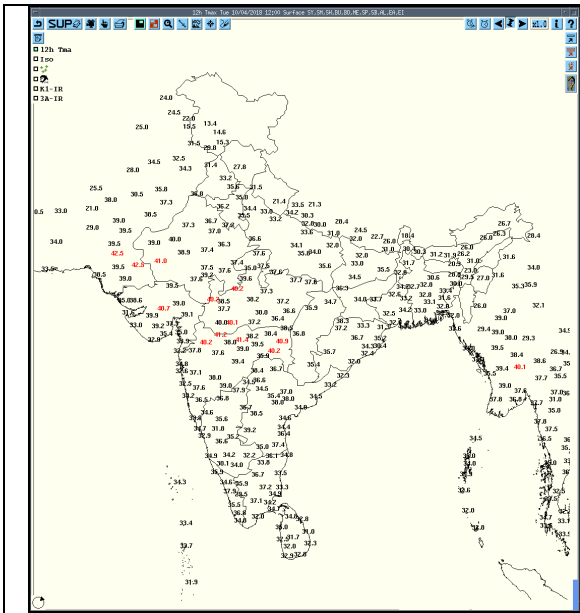
IMR



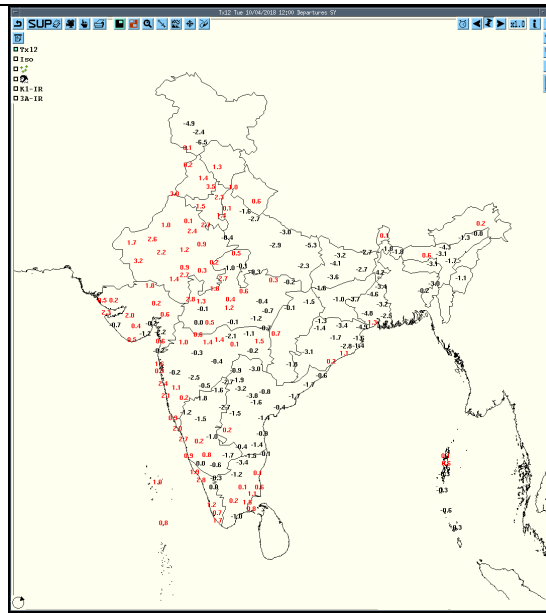
HEM



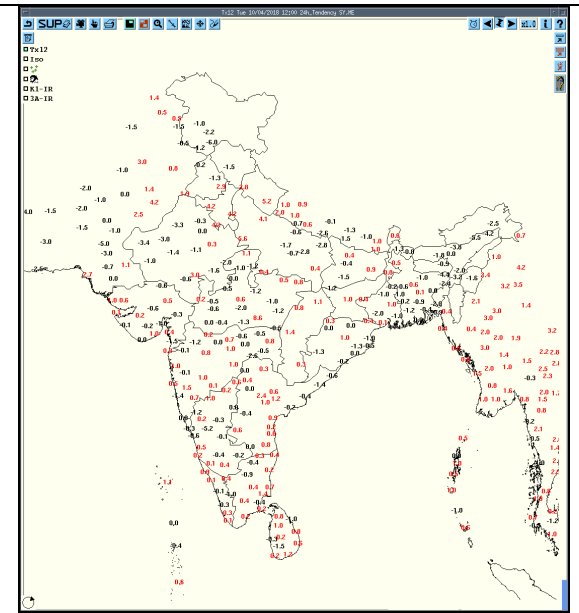
**3hourly Past weather at 06, 09, 12, 15, 18, 21 UTC of yesterday and 00 & 03 hrs UTC of today**



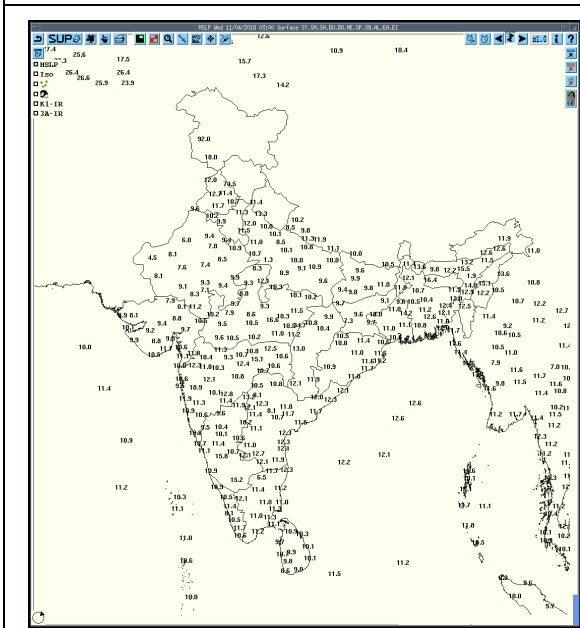
Tmax



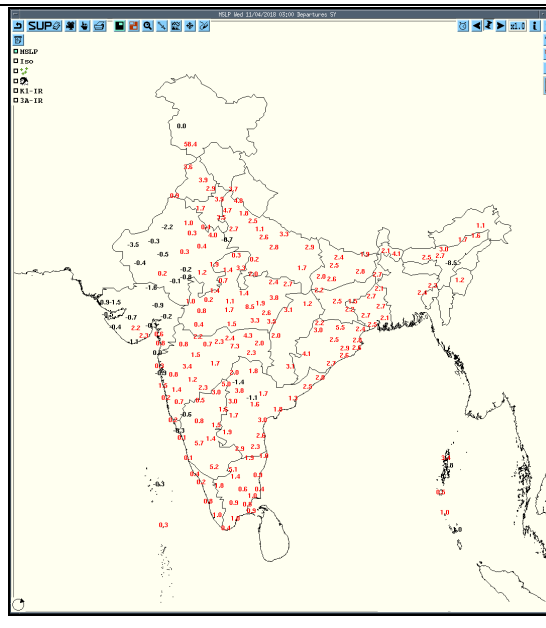
Departure Tmax



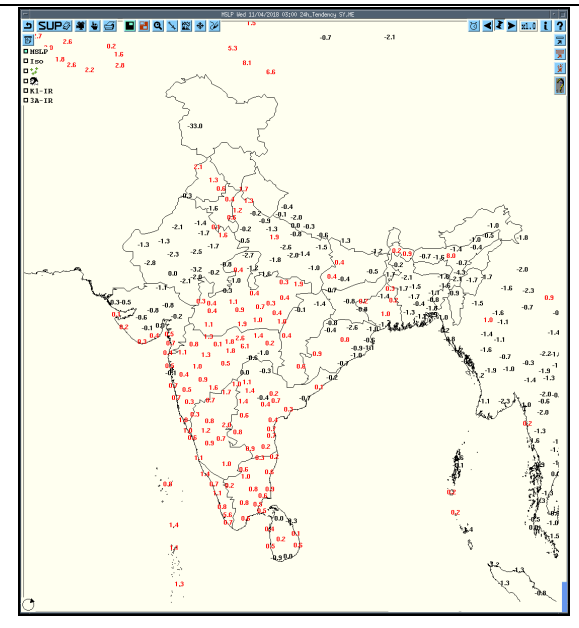
Tendency Tmax



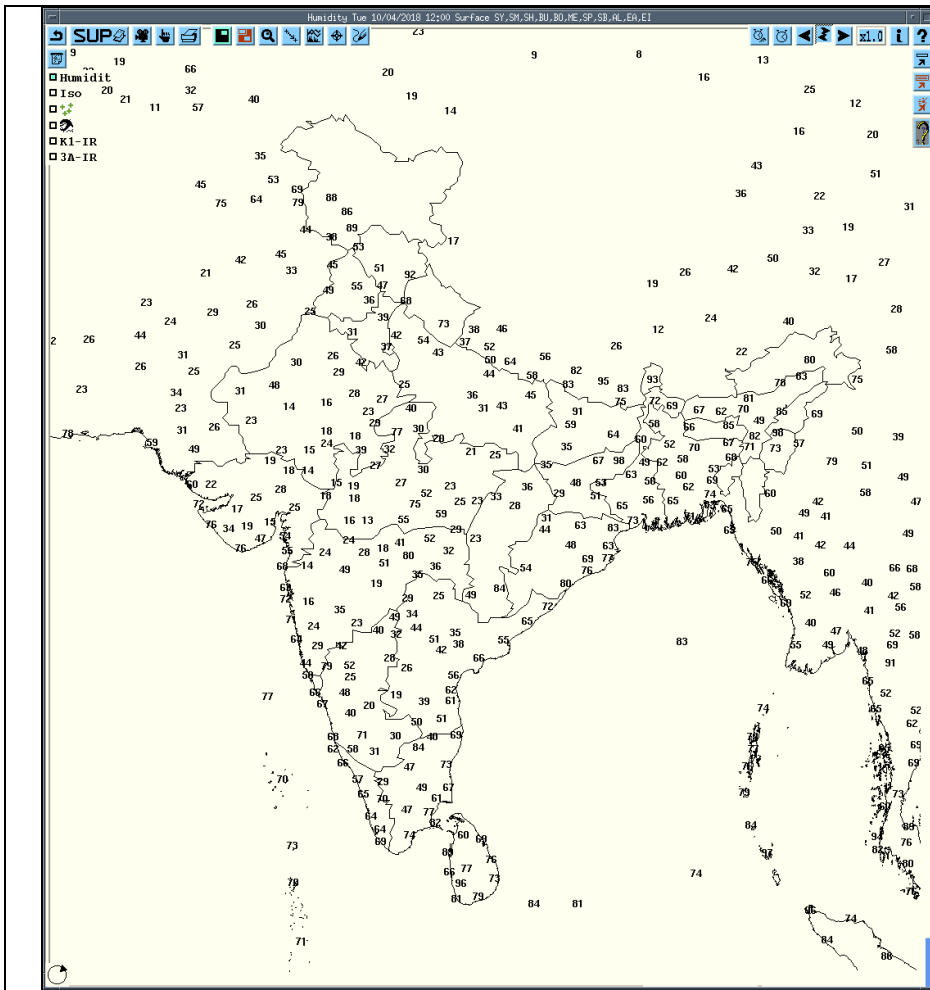
MSLP



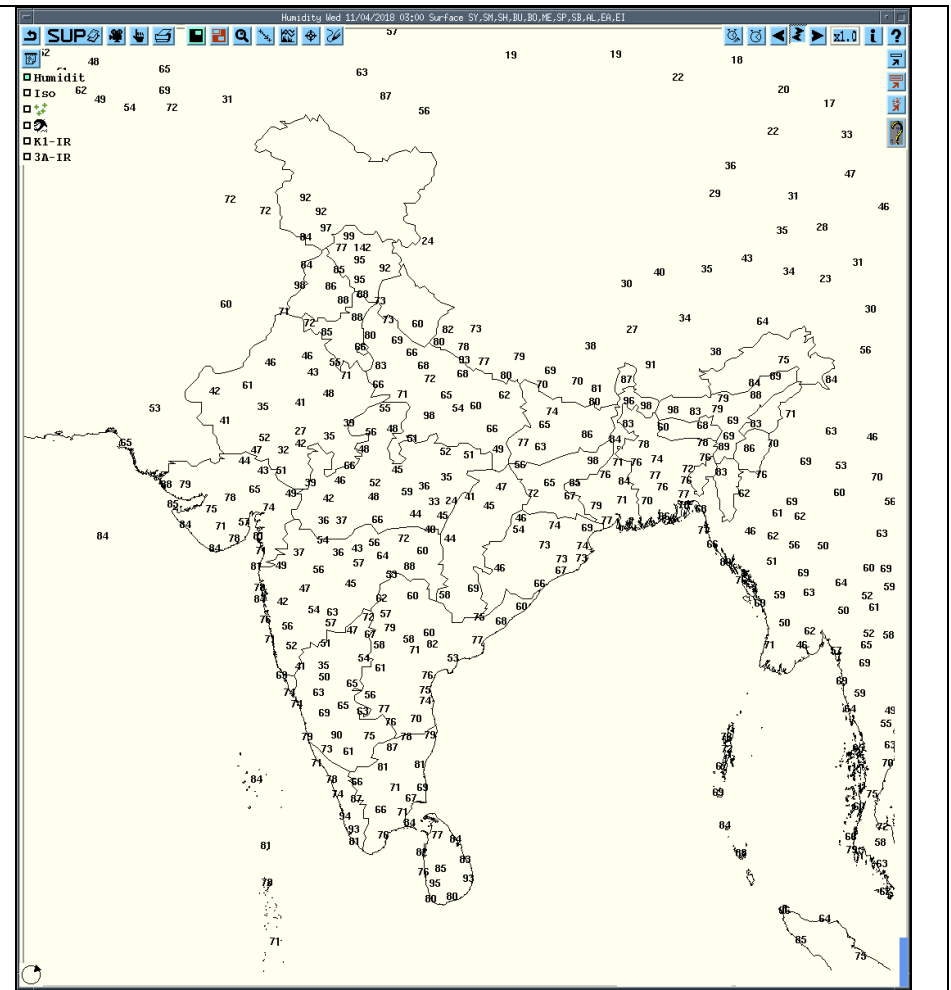
Departure MSLP



Tendency MSLP



RH at 12UTC yesterday



RH at 03UTC today

**Past 24 hours DWR Report:**

<b>Radar Station name</b>	<b>Date</b>	<b>Time interval of observation (UTC)</b>	<b>Organization of the cells (Isolated single cells/multiple cells/ convective regions/ squall lines) with height of 20 dBZ echo top and maximum reflectivity</b>	<b>Formation w.r.t radar station and Direction of movement</b>	<b>Remarks</b>	<b>Associated severe weather if any</b>	<b>Districts affected</b>
Kolkata	11-04-18	100300-100731	NIL	NIL	NOSIG ECHO	NIL	NIL
		100741-101031	Single cell with maximum reflectivity of 57.50 dBz at 0941 UTC and maximum height 5.35 km at UTC	SW (204.8 km ) Moving in SE-ly direction	Cell formed at 0741 UTC in SW at a distance of 204.8 km from Radar. Dissipated at 1031 UTC in SE at 175.1 km from Radar	Thunderstorm/Rain	N/A
		100941-101731	Multi cell with maximum reflectivity of 64.50 dBz at 1131 UTC and maximum height 7.98 km at 1131UTC	WNW (246.5km ) Moving in SE-ly direction	Cell formed at 0941 UTC in WNW at a distance of 246.5 km from Radar. Matured and convert multi cells. Dissipated at 1731 UTC in SES at 38 km from Radar	Thunderstorm/Hail/Rain	N/A
			Single cell with maximum reflectivity of 61.0 dBz at 1303 UTC and maximum height 5.45 km at 1311UTC	East (43.7 km ) Moving in NE-ly direction	Cell formed at 1232 UTC in East at a distance of 43.7 km from Radar. Dissipated at 1342 UTC in ENE at 60.3 km from Radar	Thunderstorm/Hail/Rain	
		101741-110251	NIL	NIL	NOSIG ECHO	NIL	NIL

<b>Radar Station name</b>	<b>Date</b>	<b>Time interval of observation (UTC)</b>	<b>Organization of the cells (Isolated single cells/multiple cells/ convective regions/ squall lines) with height of 20 dBZ echo top and maximum reflectivity</b>	<b>Formation w.r.t radar station and Direction of movement</b>	<b>Remarks</b>	<b>Associate d severe weather if any</b>	<b>Districts affected</b>
Visakhapatnam	11-04-18	100900	Multiple cb cells formed towards NNW and NE with maximum reflectivity of 60dbz with max. height of 10 kms	NNW(74 Km), NE (202 Km) and moving Ely	Multiple cb cells formed from 0701 UTC, developing and convective well at 0851 UTC.	-	Visakhapatnam (AP) Ganjam and Gajapati dist. Of Orissa
		101200	Multiple strong cb cells towards W, NNW and NE with maximum reflectivity of 62dbz with max. height of 14 kms	NNW(74 Km), NE (202 Km) and moving Ely	CB cells are well developed and dissipating started from 1121 UTC.	-	East Godavari, Visakhapatnam, Vizianagaram (AP) and Ganjam, Koraput and Nabarangapur (Orissa)
		101500	Multiple strong cb cells towards W, NW and NE with maximum reflectivity of 64dbz with max. height of 15 km	W(40 km)NW(150-220 Km), NE (180-250 Km) and moving Ely	CB cells are developing, matured well and start dissipating. NE CB cells have max reflectivity of 64dBz and Max. height of 15 kms.	-	Visakhapatnam, Vizianagaram , Srikakulam Dist(AP) and Ganjam, Gajapati, Koraput and Rayaguda Dist (Orissa)
		101800	Multiple cb cells towards NE with maximum reflectivity of 62dbz with max. height of 15 km	NW(116 km), NE (110-250 Km) and moving ESEly	NE CB cells matured well Since last observation . CB cells start dissipating from 1345 UTC	-	Vizianagaram , Srikakulam Dist(AP) Ganjam, Gajapati and Rayaguda Dist (Orissa)
		110000	Isolated cb cells towards NW and NE with maximum reflectivity of 46dbz with max. height of 8 km	NW(75 km), NE (135 Km) and moving Ely	CB cells are in dissipating stage Since last observation and dissipated at 1941 UTC	-	Vizianagaram , Srikakulam Dist(AP)



DWR Station	Date	Time interval of observation	Organization of the cells (isolated single cell/multiple cells convective regions/squall lines) with height of 20 dBZ echo top and maximum reflectivity	Formation w.r.t. radar station & direction of movement	Remarks	Associated severe weather, if any	Districts affected
Patiala	11-04-18	100300-100900	No Echo	--	--	--	--
		100900-101200	MULTIPLE CELLS DBZ 55.5 HT. 9 TO 14 KM	E & SE SECTORS. MOVMENT TOWARDS E-WARDS.		RA/TS	Moga, Malerkotla, Mansa, Nabha, Tohana, Solan, Dehradoon, Mussoorie And Adj. Areas.
		101200-101500	MULTIPLE CELLS DBZ 56.5 HT. 10 TO 14 KM	NW & NE SECTORS. MOVMENT TOWARDS E-DIRECTION		RA/TS	Khanna, Patiala, Pehowa, Kurukshetra, Yamunanagar, Rishikesh And Adj. Areas.
		101500-101800	No Echo	--	--	--	--
		101800 - 102100	MULTIPLE ECHOES DBZ 45.5 HT. 6-9 KM	NW AND SW SECTORS. MOV. NE-WARDS. MOVEMENT IN E DIRECTION	-----	RA/TS	Adampur, Hoshiarpur, Jalandhar, Moga, Barnala, Malerkotla, Nawanshahr And Adj. Areas.
		102100-110000	MULTIPLE ECHOES DBZ 50.5 HT. 8-10 KM	NW AND SW SECTORS.MOVEMENT IN NE DIRECTION	-----	RA/TS	Patiala, Adampur, Hoshiarpur, Jalandhar, Moga, Barnala, Malerkotla, Nawanshahr, Bilaspur, Mandi, Sundernagar And Adj. Areas.
		110000-110252	MULTIPLE ECHOES DBZ 38.0 HT. 9-10 KM	NW SECTOR. MOVEMENT IN NE WARDS.	-----	RA/TS	Kurukshetra, Patiala, Ambala, Kalsi, Solan, Shimla, Hoshiarpur, Nadaun And Adj. Areas.

DWR Station	Date	Time interval of observation	Organization of the cells (isolated single cell/multiple cells convective regions/squall lines) with height of 20 dBZ echo top and maximum reflectivity	Formation w.r.t. radar station & direction of movement	Remarks	Associated severe weather, if any	Districts affected
Patna	11-04-18	100300-100542	Multiple Cells Maximum Reflectivity: 40 dBZ Echo Top: 9 KM	Range: 110 KM from DWR Patna in WNW direction Movement: North-Easterly	N/A	N/A	Siwan, Saran Buxar, Bhojpur, Gopalganj
		100300-101402	Multiple Cells Maximum Reflectivity: 51 dBZ Echo Top: 12 KM	Range: 201 KM from DWR Patna in NNW direction Movement: South-Easterly	WARNING ISSUED	THUNDERSTORM & HAILSTORM	West Champaran, East Champaran, Gopalganj, Sheohar, Sitamadhi, Madhubani, Darbhanga, Supaul, Muzzafarpur, Shamastipur, Sharsha, Patna, Begusarai, Khagaria, Lakhisarai, Munger, Sheikhpura, Jamui, Banka, Bhagalpur
		101202-101242	Single cell Maximum Reflectivity: 42 dBZ Echo Top: 10.6 KM	Range: 240 KM from DWR Patna in NE direction Movement: Easterly	WARNING ISSUED	N/A	Araria, Kishanganj, Purnea, Katihar
		101402-102000	NIL	N/A	N/A	N/A	N/A
		102002-102300	Multiple Cells Maximum Reflectivity: 51 dBZ Echo Top: 10.6 KM	Range: 155 KM from DWR Patna in NNE direction Movement: Easterly	WARNING ISSUED	N/A	SHEOHAR, SITAMADHI, MADHUBANI
		102302-110300	NIL	N/A	N/A	N/A	N/A

## Realised past 24hrs TS/SQ/HS Data:

Realised TS/HS/SQ during past 24 hours ending at 0300UTC of today(received from RMCs/MCs)						
Name of Station Reporting	Region	State/Sub Division	Weather Event (TS/Hail/Squall)	Date	Time of Commencement (IST)	Time of end (IST)
Dehradun	Northwest India	Uttarakhand	Thunderstorm	10-04-18	1635 2250	1700 2300
Pantnagar	Northwest India	Uttarakhand	Thunderstorm	10-04-18	2215	2300
Mukteshwar	Northwest India	Uttarakhand	Thunderstorm	10-04-18	1210	1340
Tehri	Northwest India	Uttarakhand	Thunderstorm	10-04-18	1420	1820
			<b>Hailstorm (diameter: xx)</b>	<b>10-04-18</b>	<b>1505</b>	<b>1525</b>
Sundernagar	Northwest India	Himachal Pradesh	Thunderstorm	10/11-04-18	101648 110521	101650 110722
Shimla	Northwest India	Himachal Pradesh	Thunderstorm	10/11-04-17	101405 110700	101415 110730
Jammu	Northwest India	Jammu & Kashmir	Thunderstorm	10/11-04-17	102350	110250
Banihal	Northwest India	Jammu & Kashmir	Thunderstorm	10/11-04-17	101030	101045
Batote	Northwest India	Jammu & Kashmir	Thunderstorm	10/11-04-17	100840	100850
					100945	101030
					110140	110300
Katra	Northwest India	Jammu & Kashmir	Thunderstorm	10/11-04-17	100915	101030
					101122	101240
					110005	110200
					110300	110410
Jaipur	Northwest India	East Rajasthan	Thunderstorm	10-04-18	1920	2000
Pilani	Northwest India	East Rajasthan	Thunderstorm	10-04-18	0315	0400
Ajmer	Northwest India	East Rajasthan	Thunderstorm	10-04-18	1850	1912
Sikar	Northwest India	East Rajasthan	Thunderstorm	10-04-18	0300	0500
Sawai Madhopur	Northwest India	East Rajasthan	Thunderstorm	10-04-18	0330	0400
Ganganagar	Northwest India	West Rajasthan	Thunderstorm	10-04-18	0200	0740
Bikaner	Northwest India	West Rajasthan	Thunderstorm	10-04-18	1650	1845
Jaisalmer	Northwest India	West Rajasthan	Thunderstorm	10-04-18	2220	2230
Ballia	Northwest India	East Uttar Pradesh	Thunderstorm	10-04-18	0830	0840
Kanpur(City)	Northwest India	East Uttar Pradesh	Thunderstorm	11-04-18	0400	0500
Bareilly	Northwest India	West Uttar Pradesh	Thunderstorm	10-04-18	2310	110100
Najibabad	Northwest India	West Uttar Pradesh	Thunderstorm	10-04-18	2030	2200
Moradabad	Northwest India	West Uttar Pradesh	Thunderstorm	10-04-18	2200	2245
Hamirpur	Northwest India	West Uttar Pradesh	Thunderstorm	11-04-18	0800	0830
Muzaffarnagar	Northwest India	West Uttar Pradesh	Thunderstorm	10-04-18	1900	2000
Ambala	Northwest India	Haryana	Thunderstorm	11-04-18	0630	0715
Patiala	Northwest India	Punjab	Thunderstorm	11-04-18	0300	0425
					0540	0610
Hissar	Northwest India	Haryana	Thunderstorm	11-04-18	0545	0700
Amritsar	Northwest India	Punjab	Thunderstorm	10/11-04-18	101925	110540
Ludhiana	Northwest India	Punjab	Thunderstorm		During Night	
Chandigarh	Northwest India	Chandigarh	Thunderstorm	11-04-18	0540	0630
Karnal	Northwest India	Haryana	Thunderstorm	10/11-04-18	101735	101740
					110715	110750

**Realised TS/HS/SQ during past 24 hours ending at 0300UTC of today(received from RMCs/MCs)**

<b>Name of Station Reporting</b>	<b>Region</b>	<b>State/Sub Division</b>	<b>Weather Event (TS/Hail/Squall)</b>	<b>Date</b>	<b>Time of Commencement (IST)</b>	<b>Time of end (IST)</b>
Silchar	Northeast India	Assam	Thunderstorm	10-04-18	0830	0900
Dibrugarh	Northeast India	Assam	Thunderstorm	10-04-18	1110	1310
Tezpur	Northeast India	Assam	Thunderstorm	10-04-18	0830	1015
Guwahati	Northeast India	Assam	Thunderstorm	10/11-04-18	101925	110025
Dhubri	Northeast India	Assam	Thunderstorm	11-0418	0600	0829
Cherrapunjee	Northeast India	Meghalaya (NMMT)	Thunderstorm	10-04-18	0847	0950
Imphal	Northeast India	Meghalaya (NMMT)	Thunderstorm	10-04-18	0900	1120
Lengpui	Northeast India	Meghalaya (NMMT)	Thunderstorm	10-04-18	1425	1740
Nizamabad	South India	Telangana	Thunderstorm	11-04-18	0245	0430
Tirupati AP	South India	Andhra Pradesh (Rayalaseema)	Thunderstorm	10-04-18	1645	1850
Kanyakumari	South India	Tamilnadu	Thunderstorm	10/11-04-18	101207 110100	101210 110315
Belagavi Airport	South India	Karnataka (NIK)	Thunderstorm	10-04-18	1630	2000
Gadag	South India	Karnataka (NIK)	Thunderstorm	10-04-18	1815	1835
Dharwad PTO	South India	Karnataka (NIK)	Thunderstorm	10-04-18	1700	1740
Madikeri	South India	Karnataka (SIK)	Thunderstorm	10-04-18	1738	1940
Shivamogga	South India	Karnataka (SIK)	Thunderstorm	10-04-18	1645	1745
Nagpur	Central India	Maharashtra (Vidarbha)	Thunderstorm	10-04-18	1755	2210
Bramhapuri	Central India	Maharashtra (Vidarbha)	Thunderstorm	10-04-18	2040	2110
Gadchiroli	Central India	Maharashtra (Vidarbha)	Thunderstorm	10-04-18	2030	2300
Sagar	Central India	East Madhya Pradesh	Thunderstorm	10-04-18	1630	1900
Chhindwada	Central India	East Madhya Pradesh	Thunderstorm	10-04-18	1445	1820
Jagdapur	Central India	Chhattisgarh	Thunderstorm	10-04-18	1710	2200
Kailasahar	Northeast India	Tripura	Thunderstorm	10-04-18	0910 1400	0935 1520
Gangtok	East India	Sikkim	Thunderstorm	10-04-18	1500	1630
Tadong	East India	Sikkim	Thunderstorm	10-04-18	1500	1625
Coochbehar	East India	Sub-Himalayan West Bengal	Thunderstorm	11-04-18	xxxx	830
Jalpaiguri	East India	Sub-Himalayan West Bengal	Thunderstorm	11-04-18	0400	0730
Malda	East India	Sub-Himalayan West Bengal	Thunderstorm	10-04-18	2145	2240
DumDum	East India	Gangetic West Bengal	Thunderstorm	10-04-18	2240	2359
Diamond Harbour	East India	Gangetic West Bengal	Thunderstorm	10-04-18	2205	2250
Digha	East India	Gangetic West Bengal	Thunderstorm	10-04-18	1640	1825
Asansol	East India	Gangetic West Bengal	Thunderstorm	10-04-18	1550	1820
Bankura	East India	Gangetic West Bengal	Thunderstorm	10-04-18	1740	1945
Bhagalpur	East India	Bihar	Thunderstorm	10-04-18	1815	1930
Balasore	East India	Odisha	Thunderstorm	10-04-18	1600	1700
Keonjhar	East India	Odisha	Thunderstorm	10-04-18	1545	1635

## IMPORTANT LINKS:

For NCMRWF NWP products:(<http://www.ncmrwf.gov.in/HomePage/NEPS-prod-1.php>)

For IMD NWP products:([http://nwp.imd.gov.in/diagpro\\_new.php](http://nwp.imd.gov.in/diagpro_new.php))

For Synoptic plotted data and charts

<http://amssdelhi.gov.in/>

<http://www.amsskolkata.gov.in/>

For RANDHRA PRADESHID tool:

[http://rAndhra\\_Pradeshid.imd.gov.in/](http://rAndhra_Pradeshid.imd.gov.in/)

Low Level Winds

[http://satellite.imd.gov.in/archive/INSAT-3D-IMAGER/3D-PRODUCTS/AMV/LLW/MAR\\_2017/?C=M;O=D](http://satellite.imd.gov.in/archive/INSAT-3D-IMAGER/3D-PRODUCTS/AMV/LLW/MAR_2017/?C=M;O=D)

Upper level winds

[http://satellite.imd.gov.in/archive/INSAT-3D-IMAGER/3D-PRODUCTS/AMV/HLW/MAR\\_2017/?C=M;O=D](http://satellite.imd.gov.in/archive/INSAT-3D-IMAGER/3D-PRODUCTS/AMV/HLW/MAR_2017/?C=M;O=D)

Past24hourHEMandIMRrainfall(upto03UTCoftoday)

IMR: [http://satellite.imd.gov.in/img/3Ddaily\\_imr.jpg](http://satellite.imd.gov.in/img/3Ddaily_imr.jpg)

HEM: [http://satellite.imd.gov.in/img/3Ddaily\\_he.jpg](http://satellite.imd.gov.in/img/3Ddaily_he.jpg)

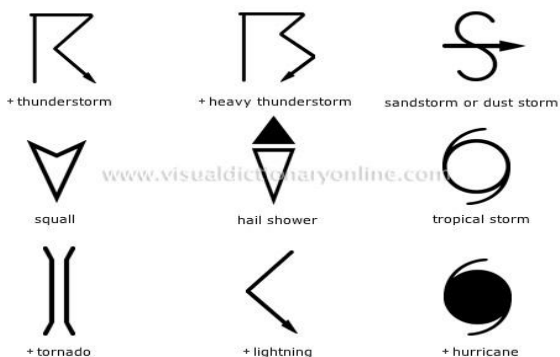
ForRadarimagesofthepast24hoursincludingmosaicofimages:

[http://ddgmui.imd.gov.in/dwr\\_img/](http://ddgmui.imd.gov.in/dwr_img/)

Satellite sounder based T- Phigram

[http://satellite.imd.gov.in/mAndhra\\_Pradesh\\_skm2.html](http://satellite.imd.gov.in/mAndhra_Pradesh_skm2.html)

## WEATHER SYMBOLS:



∞	haze
☁	smoke
☄	dust or sand storm
☁	fog
☂	drizzle
•	rain
✪	snow
▽	showers
△	hail
☄	thunderstorm
<b>Weather Symbols</b>	