



# India Meteorological Department

## FDP STORM Bulletin No. 37 (12-04-2018)

### 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 north Pakistan & adjoining Jammu & Kashmir has become less marked. However the trough aloft with its axis at 5.8 km above mean sea level roughly along Long. 75° E to the north of Lat. 30°N persists.
- ♦ A fresh Western Disturbance is likely to affect Western Himalayan region from 15th April.
- ♦ The cyclonic circulation extending upto 0.9 km above mean sea level over southwest Uttar Pradesh and neighbourhood persists.
- ♦ The cyclonic circulation at 0.9 km above mean sea level over northern parts of Bangladesh and neighbourhood now lies over eastern parts of Bangladesh and neighbourhood.
- ♦ A trough runs from east Bihar to Gangetic West Bengal and extends upto 1.5 km above mean sea level.
- ♦ The cyclonic circulation over southwest Madhya Pradesh and adjoining Gujarat region & southeast Rajasthan now lies over southeast Rajasthan and adjoining West Madhya Pradesh & Gujarat region. The trough from this cyclonic circulation to coastal Karnataka across Madhya Maharashtra at 0.9 km above mean sea level has become less marked.
- ♦ A trough at 1.5 km above mean sea level runs from northwest Rajasthan to southwest Madhya Pradesh.
- ♦ The trough in easterlies at 0.9 km above mean sea level from Comorin area to South Interior Karnataka now runs from south Tamilnadu to North Interior Karnataka across South Interior Karnataka.
- ♦ The trough of low at mean sea level over Equatorial Indian Ocean and adjoining southwest Bay of Bengal now lies over southwest Bay of Bengal and adjoining Sri Lanka.

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

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

Scattered multi-layered clouds with embedded weak to moderate convection seen over Jammu & Kashmir, Tibet, and over area between Lat 37.0°N to 40.0°N Long 75.0°E to 90.0°E in association with Western Disturbance over the area.

Broken multi-layered clouds with embedded moderate to intense convection seen over South Caspian Sea, Iran, Gulf of Persia, East Saudi Arabia in association with another WD over the area.

##### Convective Activity:

Convective cells that are developed over Northeast Odisha, adjoining Jharkhand, adjoining South Gangetic West Bengal, and extreme South Tamilnadu are moving in east-ward direction.

Cell No	Date /Time (UTC)	Location	Minimum CTT (minus Deg C)	Remarks/Movement
1	12/0900	NE ORS ADJ SE JHRKND ADJ S GWB	88	
2	0900	EXT S TN	84	
3	0900	S SKM ADJ SHWB	61	

#### **Precipitation Nowcast Based on WMO Scope Product:**

Based on 0900UTC satellite data precipitation is likely to take place during next three hours over North Odisha adjoining South Gangetic West Bengal, Southeast Jharkhand, and South Tamilnadu.

#### **Clouds descriptions within India:**

Broken low/medium clouds with embedded moderate to intense convection seen over North Himachal Pradesh, Uttarakhand and extreme South Tamilnadu. Scattered low/medium clouds with embedded moderate to intense convection seen over Southeast Jharkhand, Sub-Himalayan West Bengal, Sikkim and Odisha. Scattered low/medium clouds with embedded isolated weak to moderate convection seen over extreme Southeast Rajasthan and Madhya Pradesh. Scattered low/medium clouds with embedded weak convection seen over Jammu & Kashmir, rest Himachal Pradesh, Bihar, rest Jharkhand, rest Odisha, Chhattisgarh, Nagaland, Manipur, Arunachal Pradesh, Northeast Assam, North Coastal Andhra Pradesh and rest Tamilnadu. Scattered low/medium clouds seen over East Uttar Pradesh, North Madhya Maharashtra and rest parts of South India.

#### **Arabian Sea:-**

Scattered low/medium clouds with embedded weak to moderate convection seen over South Arabian Sea. Scattered low/medium clouds over Lakshadweep Islands.

#### **Bay of Bengal & Andaman Sea:**

Scattered low/medium clouds with embedded moderate to intense convection seen over Southeast Bay South of lat 11.5°N.

#### **Past Weather:**

#### **Convection (during last 24 hrs):**

Moderate to Intense convection was observed over Jammu & Kashmir Punjab Himachal Pradesh north Rajasthan Gujarat Haryana Delhi Uttarakhand Uttar Pradesh Bihar Gangetic West Bengal Sub-Himalayan West Bengal east Orissa Sikkim north west Assam North west Arunachal Pradesh Meghalaya Manipur north Madhya Pradesh east Maharashtra north interior Karnataka Kerala Tamilnadu. Weak to Moderate convection was observed over rest Rajasthan Gujarat Madhya Pradesh Karnataka and Jharkhand

#### **OLR:-**

Up-to 230  $\text{wm}^{-2}$  observed over Jammu & Kashmir Himachal Pradesh Uttarakhand North Uttar Pradesh North West Bihar North Chhattisgarh south Jharkhand North-East States Kerala Tamilnadu and Telangana.

**Synoptic Features (Westerly Trough & Jet Stream):** Trough in westerlies roughly along Long 73.0E & north of Lat 28.0N.

#### **Dynamic Features:-**

Up to 60 Knots wind shear is observed over North I West Gujarat Rajasthan .Up to 40 knots wind shear is observed over east Andhra Pradesh Orissa Jharkhand Chhattisgarh East Uttar Pradesh North East Uttarakhand North-East states Kerala Tamilnadu South interior Karnataka. . Negative Shear tendency (**-20kts**) is observed over Karnataka Kerala Tamilnadu Andhra Pradesh and Telangana Orissa Gangetic West Bengal North East States Except Sikkim and Positive Shear tendency (**20kts**) over rest India.

**A positive Vorticity** field at 850 hPa is observed over west Gujarat south east Rajasthan adjoining North West Madhya Pradesh (.)  
**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 50-70mm observed over Kerala and Tamilnadu

Rainfall upto 20-50 mm observed over North and South Jammu and Kashmir Delhi South East Haryana North West Uttar Pradesh Kerala and Tamilnadu

10-20mm observed over central J&K east Himachal Pradesh East Uttarakhand North West Uttar Pradesh Gangetic west Bengal

Rainfall upto 10 mm observed over rest J&K Himachal Pradesh Uttarakhand Uttar Pradesh Punjab Haryana Bihar and north east states North Rajasthan north Madhya Pradesh east Maharashtra central Karnataka and rest Kerala and Tamilnadu

##### **HEM**

70-140mm observed over Central and south J&K east Himachal Pradesh North West Uttarakhand south Kerala and south Tamilnadu

Upto mm 14mm observed over rest J&K Himachal Pradesh Uttarakhand Punjab Rajasthan Madhya Pradesh Uttar Pradesh Bihar sub Himalayan Gangetic west Bengal north east states and adjoining area east Maharashtra and adjoining area south Kerala and Tamilnadu

#### **Convective Activity over Indian Region:**

Cell No	Date /Time(UTC)	Location	Minimum CTT -Deg C	Remarks/ Movement
1	12/0300	W UP	40	EASTWARD
2	0300	C CHTGH	46	EASTWARD
3	0300	W ASSAM	51	EASTWARD
4	0300	COT KER	73	EASTWARD

#### **RADAR and RAPID RGB Observation:**

Isolated/multiple moderate to strong echoes (dBZ >50 and height >10km) were seen on domain of DWR Jaipur, Bhopal, Paradip, Gopalpur, Machilipatnam, and Vishakhapatnam and Isolated/multiple light to moderate echoes were seen on DWR Agartala, and Patiala at around 1730 IST.

RAPID RGB Satellite imagery at 1600IST indicates significant convection over Himachal Pradesh, Uttarakhand, Sikkim, Madhya Pradesh, South Chhattisgarh, North Coastal Andhra Pradesh, Odisha, Gangetic West Bengal adjoining Jharkhand, Coastal Karnataka, Kerala and South 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 satisfactory to moderate category for next 2 days in Delhi.

Delhi – SAFAR analysis & Forecast	12.04.2018	13.04.2018
PM10 (micro-g/m <sup>3</sup> )	96	106
PM2.5 (micro-g/m <sup>3</sup> )	54	59

## 2. NWP MODEL GUIDANCE:

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

#### 1. Weather Systems:

##### Low level CYCIRS, Troughs:

00 UTC of Day 1-2: 850 hPa trough over Bangladesh and adjoining NE India

##### Confluence & wind Discontinuity regions:

12 UTC of Day 0-4: 925hPa N-S discontinuity over Southern Peninsular India. SW-NE over MP, Chhattisgarh, Odisha

##### Synoptic Systems:

12 UTC of Day 0: WD as a trough at 500 hPa over J & K. A fresh WD over J & K in 12 UTC of Day 2-4

00UTC of Day 1-5: 925 hPa anticyclone over Bay of Bengal leading to moisture incursion but associated winds are weaker.

#### 2. Location of jet and jet core (>60kt) at 500hPa): 12UTC - Nil (>50kts) Day 2-3: Bihar and NE states

#### 3. Convergence at 850 hPa: Day/Index: Subdivisions with Lower Level Convergence > $15 \times 10^{-5}$ /s

Day0: Jammu Kashmir, East Rajasthan, Odisha, Madhya Maharashtra, Coastal AP, NI Karnataka, SI Karnataka,

Day1: Arunachal Pradesh, Assam Meghalaya, SI Karnataka,

Day2: Arunachal Pradesh, Jammu Kashmir, Madhya Maharashtra, Chhattisgarh, Tamilnadu Puducherry, NI Karnataka, SI Karnataka,

Day3: Madhya Maharashtra, Chhattisgarh, SI Karnataka,

Day4: Jharkhand, Odisha, Madhya Maharashtra, NI Karnataka, SI Karnataka, Kerala,

#### 4. Low level Vorticity:-Positive Vorticity: Day/Index: Subdivisions with Lower Level Vortex > $15 \times 10^{-5}$ /s

Day0: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Tamilnadu Puducherry,

Day1: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Uttarakhand, Himachal Pradesh,

Day2: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, West UP, Uttarakhand, Himachal Pradesh,

Day3: Assam Meghalaya, Sub Himalayan WB, Jharkhand, Bihar, Uttarakhand, Himachal Pradesh,

Day4: Assam Meghalaya, Bihar, Uttarakhand, Himachal Pradesh

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

Day0: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, East UP, West UP, Uttarakhand, Odisha, Coastal AP, Tamilnadu Puducherry, Coastal Karnataka, SI Karnataka, Kerala,

Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Uttarakhand, Odisha, Coastal AP, Tamilnadu Puducherry, Coastal Karnataka, Kerala,

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

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

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Bihar, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Konkan Goa, Madhya Maharashtra, Tamilnadu Puducherry, Coastal Karnataka, NI 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, Gangetic WB, Jharkhand, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, East Rajasthan, Odisha, West MP, East MP, Chhattisgarh, Coastal AP,

Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Vidarbha, Chhattisgarh,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, East Rajasthan, Odisha, West MP, Vidarbha, Chhattisgarh,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, West MP, East MP, Vidarbha, Chhattisgarh, Telangana,

Day4: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Uttarakhand, Punjab, Himachal Pradesh,

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

Day0: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Jharkhand, Odisha, Vidarbha, Coastal AP, Telangana, Rayalaseema, Tamilnadu Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Odisha, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, Tamilnadu Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day2: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Gangetic WB, Jharkhand, Odisha, East MP, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Telangana, Rayalaseema, Tamilnadu Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka,

Day3: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Odisha, West MP, East MP, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, Tamilnadu Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day4: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Bihar, Uttarakhand, Odisha, East MP, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, Tamilnadu Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala

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

Day1: Arunachal Pradesh, Assam Meghalaya, Jammu Kashmir, Odisha, Tamilnadu Puducherry, Kerala,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, SI Karnataka, Kerala,

Day4: Arunachal Pradesh,

Day5: Arunachal Pradesh, Assam Meghalaya, NE NMMT

**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 a trough in lower troposphere extending from North Madhya Maharashtra up to north Kerala across south interior Karnataka. The forecast shows it will persist till day3. The analysis shows a cyclonic circulation over southeast Rajasthan adjoining west Madhya Pradesh and Gujarat region. It will become less marked in next 48 hour forecast. The analysis also shows a trough in easterlies extending from south Tamil Nadu to north interior Karnataka across south interior Karnataka. The forecast shows it will persist for next 24 hours. The forecast shows a trough runs from east Bihar up to Gangetic West Bengal on day2.

**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 ( $>12 \times 10^{-1}/s$ ):** Low level Positive Vorticity is seen mostly along the foothills of Himalaya from J&K, Himachal Pradesh, Uttarakhand up to NE states, also seen along the cyclonic circulation and along the trough for next 3 days. It is inferred that some parts of West Rajasthan and adjoining areas has Positive Vorticity on day 2 and 3.

**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 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 all 3 days; over parts of Haryana and adjoining south east Rajasthan on day 1; Maximum value of the index is seen over parts of Gujarat, GWB, Orissa and some parts of Jharkhand on day 1; over parts of Gujarat, coastal Maharashtra, Konkan and Goa, GWB, Orissa, coastal Andhra Pradesh, Assam, Tripura and adjoining areas on day 2; over parts of Gujarat, coastal Maharashtra, Konkan and Goa, GWB, SHWB, Orissa, coastal Andhra Pradesh, Telangana, Assam, Tripura and adjoining areas, Bihar and Jharkhand on day 3.

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

**Total Index (> 50):** The threshold value of the index is > 50 over some parts of Rajasthan, Gujarat and Himachal Pradesh on day 1; over parts of J&K, Himachal Pradesh, Punjab, Haryana, Delhi, Uttarakhand, Uttar Pradesh, Rajasthan, Madhya Pradesh and Gujarat on day 2; over parts of Himachal Pradesh, Uttarakhand, Haryana, Uttar Pradesh, Rajasthan, Madhya Pradesh, foothills of Himalaya, Bihar, Jharkhand, SHWB on day 3; maximum value of the index >60 is seen over parts of Rajasthan, Uttarakhand and West Uttar Pradesh on day 2; over parts of Uttarakhand, east Uttar Pradesh, Rajasthan, Bihar, Jharkhand, East Madhya Pradesh and adjoining areas 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 Orissa, Assam, Arunachal Pradesh, Tripura and adjoining areas on day 1; on day 2 mostly over NE states and Foothills of Himalaya; on day 3 over parts of GWB, Orissa, Assam, Arunachal Pradesh, Tripura and adjoining areas, some parts of Andhra Pradesh and south Chhattisgarh.

**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, Chhattisgarh, Telangana, Assam, Tripura, Arunachal Pradesh and adjoining areas during all 3 days; Maximum value of the index greater than 2500 is seen mostly over parts of coastal Orissa, coastal Andhra Pradesh, coastal Karnataka and Kerala on day 2; over parts of coastal Andhra Pradesh, coastal Orissa, GWB, Assam, Tripura and adjoining areas 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 during all 3 days except J&K, Punjab, Himachal Pradesh on day1 and J&K, North Rajasthan, Punjab, Haryana, Himachal Pradesh, Delhi, Uttar Pradesh and northern parts of Madhya Pradesh and Chhattisgarh on day 2 and 3; but the maximum value of the index > 400 is seen over parts of Sikkim and adjoining Assam on day 3.



## **5. Rainfall Activity:**

70-130 mm Rainfall: over parts of Arunachal and adjoining areas on day 2.

40-70 mm Rainfall: over parts of Arunachal Pradesh and adjoining areas on day 1 and 2.

10-40 mm Rainfall: over parts of Sikkim, NE states, Kerala, Karnataka, Tamil Nadu, on all 3 days; over parts of Orissa and foothills of Himalaya on day 1.

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

## **IMD WRF (9km based on 00UTC of the day):**

### **1. Model Reflectivity (Max. dBZ):**

**> 25 dBZ Model Reflectivity:** Over parts of J&K, Himachal Pradesh, Uttarakhand, Haryana, West and East Uttar Pradesh, East Madhya Pradesh, Orissa, GWB, SHWB, Bihar, Jharkhand, Sikkim, NE states, some parts of west Rajasthan, Kerala and Tamil Nadu and its coastal areas on day 1; over parts of west Rajasthan, coastal Kerala and Tamil Nadu, Assam, Arunachal Pradesh and adjoining areas on day 2; over parts of J&K, West Rajasthan, Madhya Pradesh, Chhattisgarh, Assam, Arunachal Pradesh, Mizoram and adjoining areas on day 3; maximum value of the Model reflectivity is seen over parts of Orissa and adjoining GWB on day 1; over parts of Assam, Arunachal Pradesh and adjoining areas on day 3.

### **2. Spatial distribution of Total Total Index, K-Index, CAPE and CIN [High potential for thunderstorm]:**

**Total Index (> 50):** Above threshold value is observed over most parts of the country except south peninsular India, southern parts of west coast and the east coast, coastal Andhra Pradesh, Karnataka, Sikkim, NE states, GWB, SHWB during all 3 days; below threshold value is seen over parts of Orissa, Chhattisgarh, Vidarbha, south Madhya Maharashtra, Konkan and Goa, Telangana, Rayalaseema, some parts of east and southwest Madhya Pradesh on day 1; over parts of Telangana, Rayalaseema, Konkan and Goa, Orissa, Chhattisgarh, south Madhya Maharashtra and Marathwada on day 2; on day 3 over parts of Telangana, Rayalaseema, Orissa, Chhattisgarh, Madhya Maharashtra and Marathwada, Konkan and Goa; maximum value of the index is seen over parts of Haryana, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand and Vidarbha on day 1; over parts of Rajasthan, Gujarat and west Madhya Pradesh on day 2; on day 3 over parts of Haryana, Rajasthan, Madhya Pradesh, Chhattisgarh, Gujarat and Orissa.

**K-Index (> 35):** Less than threshold value is observed over most of the part of the country during the next 3 days.

**CAPE (> 1500):** Greater than threshold value over parts of Gujarat, coastal areas of west coast, coastal Maharashtra, Konkan and Goa, coastal areas along the east coast, coastal Orissa, GWB and Kolkata, SHWB, parts of Tamil Nadu, Kerala, Karnataka, Andhra Pradesh, Extreme south peninsular India, Assam, Tripura and adjoining areas on all 3 days; over parts of Telangana, Orissa, Jharkhand and Karnataka on day 1 and 2; over parts of Telangana, Orissa, Chhattisgarh, Orissa, Vidarbha and Karnataka on day 3; Maximum value of the index greater than 3500 is seen over the parts of south coastal Karnataka and coastal Kerala on all 3 days; over parts of south coastal Maharashtra on day 2; over parts of south coastal Maharashtra adjoining Konkan and Goa 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 during all 3 days the maximum value of the index > 400 is seen over Rajasthan, Gujarat, Madhya Pradesh, Jharkhand, Orissa, GWB on day 1; over parts of Gujarat, west Rajasthan and northern parts of coastal Maharashtra on day 2; on day 3 over parts of Gujarat, Madhya Pradesh, south west Uttar Pradesh, Bihar, Jharkhand, GWB and Orissa.

### 3. Rainfall and thunderstorm activity:

70- 130 mm Rainfall: over some parts of Orissa on day 1; over parts of Arunachal Pradesh and adjoining Assam on day 2.

40-70 mm Rainfall: over parts of Assam, Arunachal Pradesh and adjoining areas on day 1 and 2; over some parts of Orissa and Kerala on day 1.

10- 40 mm Rainfall: over parts of J&K, Foothills of Himalaya, Orissa, Jharkhand, GWB and Sikkim on day1; over NE states, parts of Kerala, Karnataka, Tamil Nadu and adjoining areas on all 3 days.

Up to 10 mm Rainfall: Over parts of J&K, Himachal Pradesh, Uttarakhand, Rajasthan, Gujarat, East and West Uttar Pradesh, foothills of Himalaya, Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Telangana, Rayalaseema, Vidarbha, Madhya Pradesh, Chhattisgarh, Bihar, Jharkhand, Orissa, GWB, Sikkim and NE states on day 1; over parts of south west Rajasthan, Foothills of Himalaya, Chhattisgarh, Vidarbha, East Madhya Pradesh, Madhya Maharashtra, Marathwada, Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, Orissa, NE states and GWB on day2; over parts of J&K, east Gujarat, Chhattisgarh, Vidarbha, East Madhya Pradesh, Madhya Maharashtra, Marathwada, south peninsular India, Orissa, GWB and NE states on day 3.

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

#### Summary and Conclusions:

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

- Synoptic analysis indicates that due to the cyclonic circulation over southwest Uttar Pradesh and neighbourhood and another cyclonic circulation over eastern parts of Bangladesh and neighbourhood. The thunderstorm with gusty winds activity mainly over Uttar Pradesh & Bihar, Orissa and Jharkhand may likely to be observed on Day-1. The northwest region will get thunder squall with hail specifically over Assam & Meghalaya on Day-1. This activity may continue to Day-2 over the same region.
- Due to the trough at 1.5 km above mean sea level runs from northwest Rajasthan to southwest Madhya Pradesh, East Rajasthan and North Madhya Pradesh may experience thunderstorm with gusty winds on Day-1.
- The trough from south Tamilnadu to North Interior Karnataka across South Interior Karnataka will trigger the thunderstorm with gusty winds activity over North and South Interior Karnataka, Tamilnadu, Kerala on Day-1.
- A fresh Western Disturbance is likely to affect Western Himalayan region from 15th April.



### 24 hour Advisory for IOP:

#### Significant Rainfall:

Assam, Meghalaya, Arunachal Pradesh

#### Thunderstorm with Squall/Gusty winds:

Kerala, South Tamil Nadu, Coastal & Interior Karnataka  
Sub-Himalayan West Bengal & Sikkim, Gangetic West Bengal, Odisha,  
Jharkhand, Bihar  
Uttar Pradesh, East Rajasthan  
Madhya Pradesh, South Chhattisgarh, North Coastal Andhra Pradesh  
Nagaland, Manipur, Mizoram & Tripura

#### Thunderstorm with Squall/Hailstorm:

Assam & Meghalaya

#### Thunderstorm/Duststorm:

Nil

### 48 hour Advisory for IOP:

#### Significant Rainfall:

Assam, Meghalaya, Arunachal Pradesh

#### Thunderstorm with Squall/Gusty winds:

Kerala, South Tamil Nadu, Coastal & Interior Karnataka  
Sub-Himalayan West Bengal & Sikkim, Gangetic West Bengal,  
Odisha, Jharkhand  
Nagaland, Manipur, Mizoram & Tripura

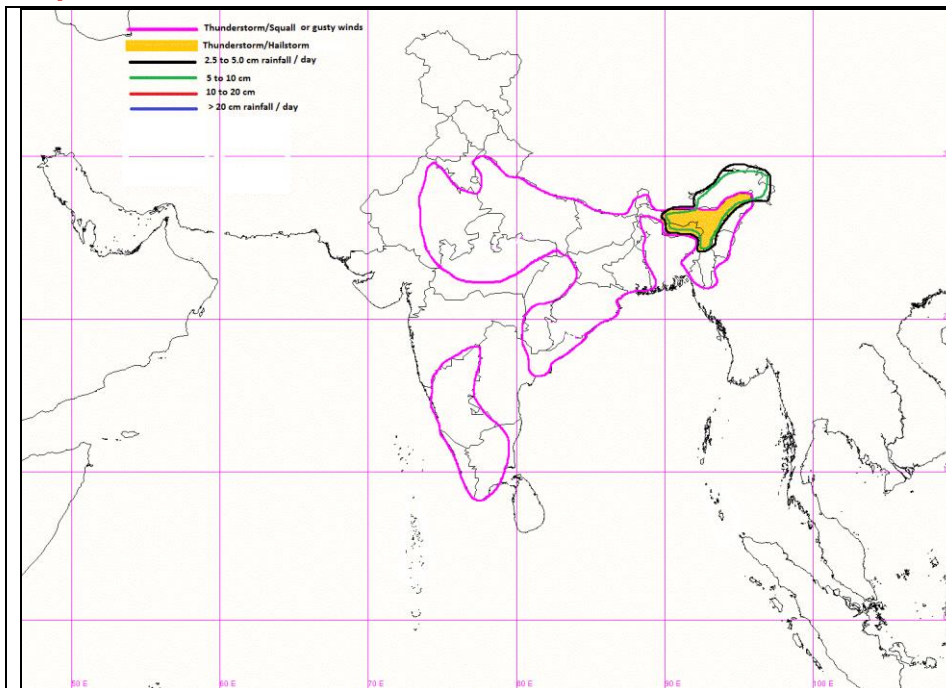
#### Thunderstorm with Squall/Hailstorm:

Assam & Meghalaya

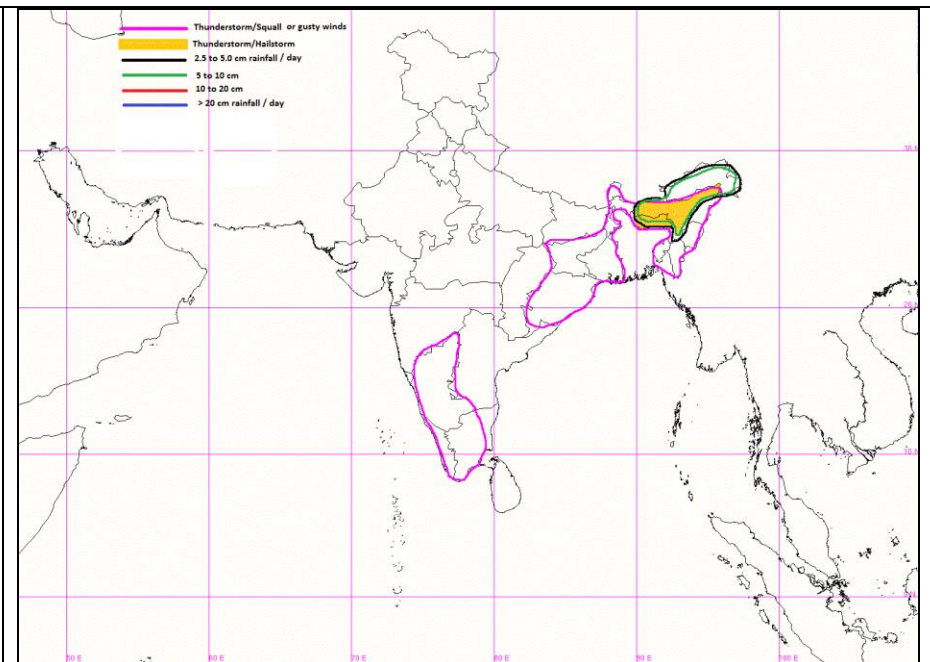
#### Thunderstorm/Duststorm:

Nil

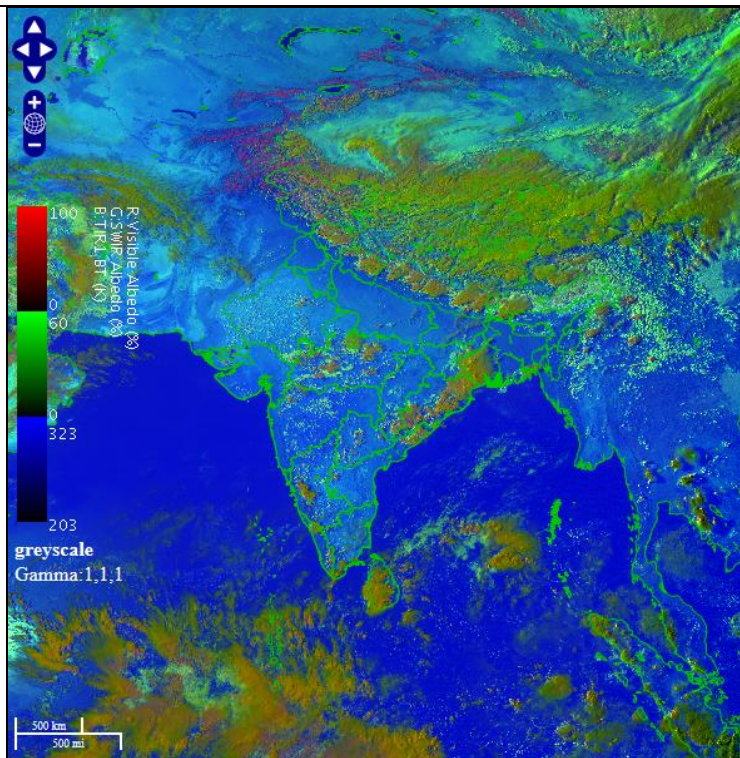
### Graphical Presentation of Potential Areas for Severe Weather:



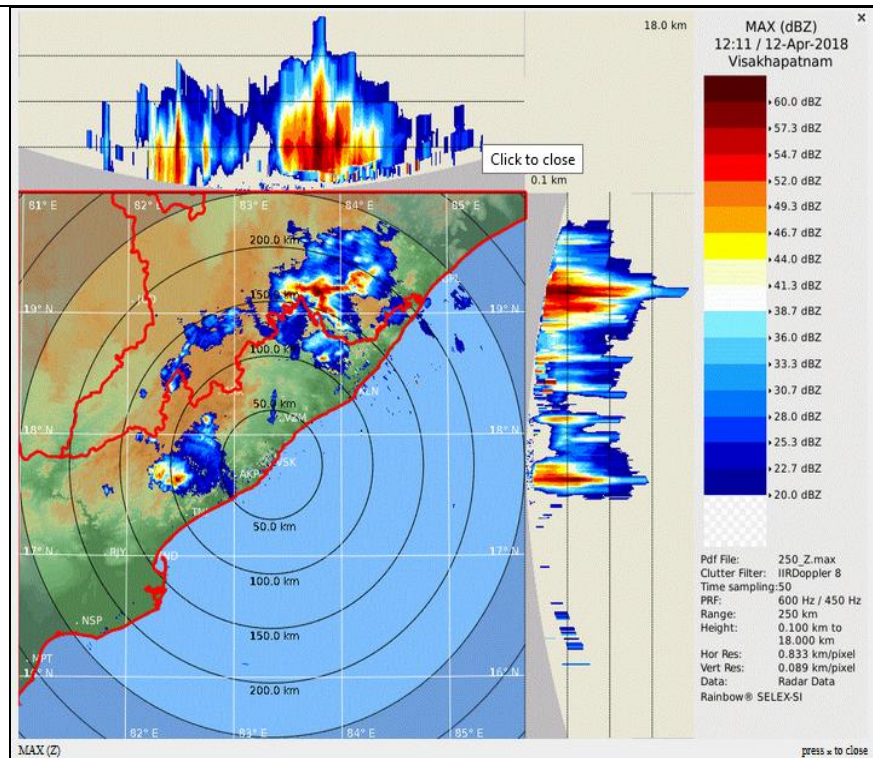
IOP Advisory for 24 hours



IOP Advisory for 48 hours

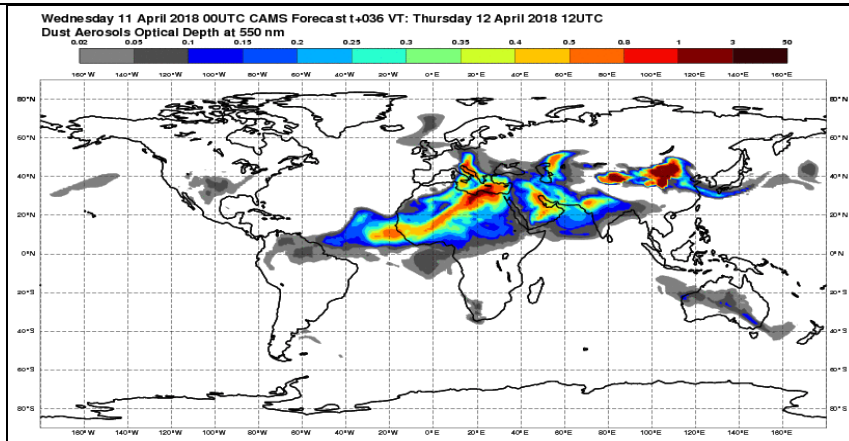


**RAPID RGB Imagery at 1600 IST of the Day**

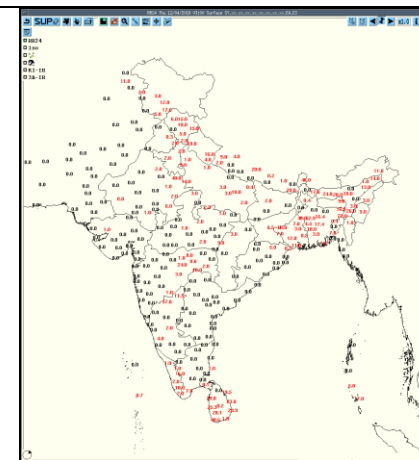


**DWR Vishakhapatnam at 1741 IST of the Day**

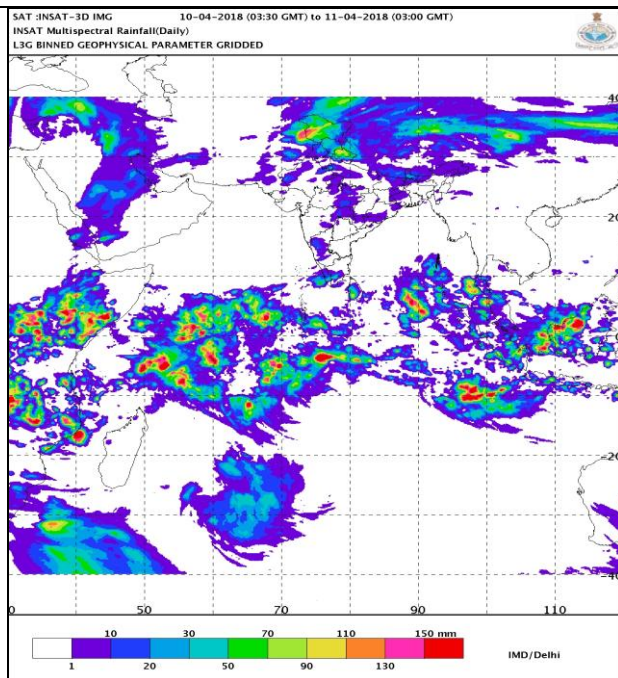




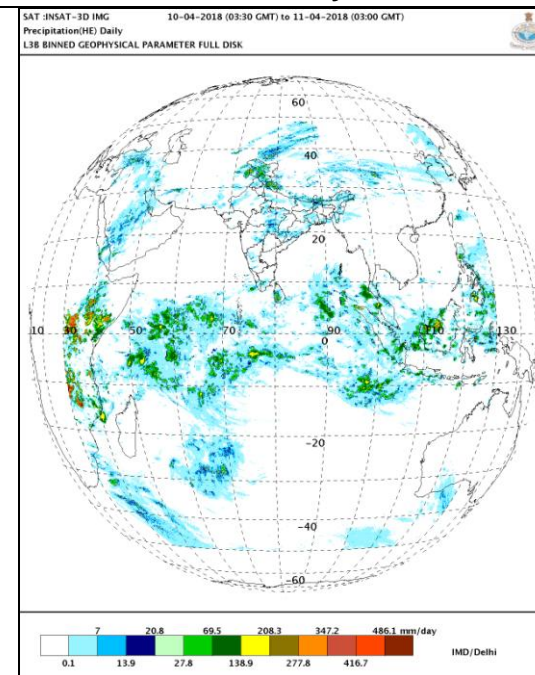
**Dust Forecast**



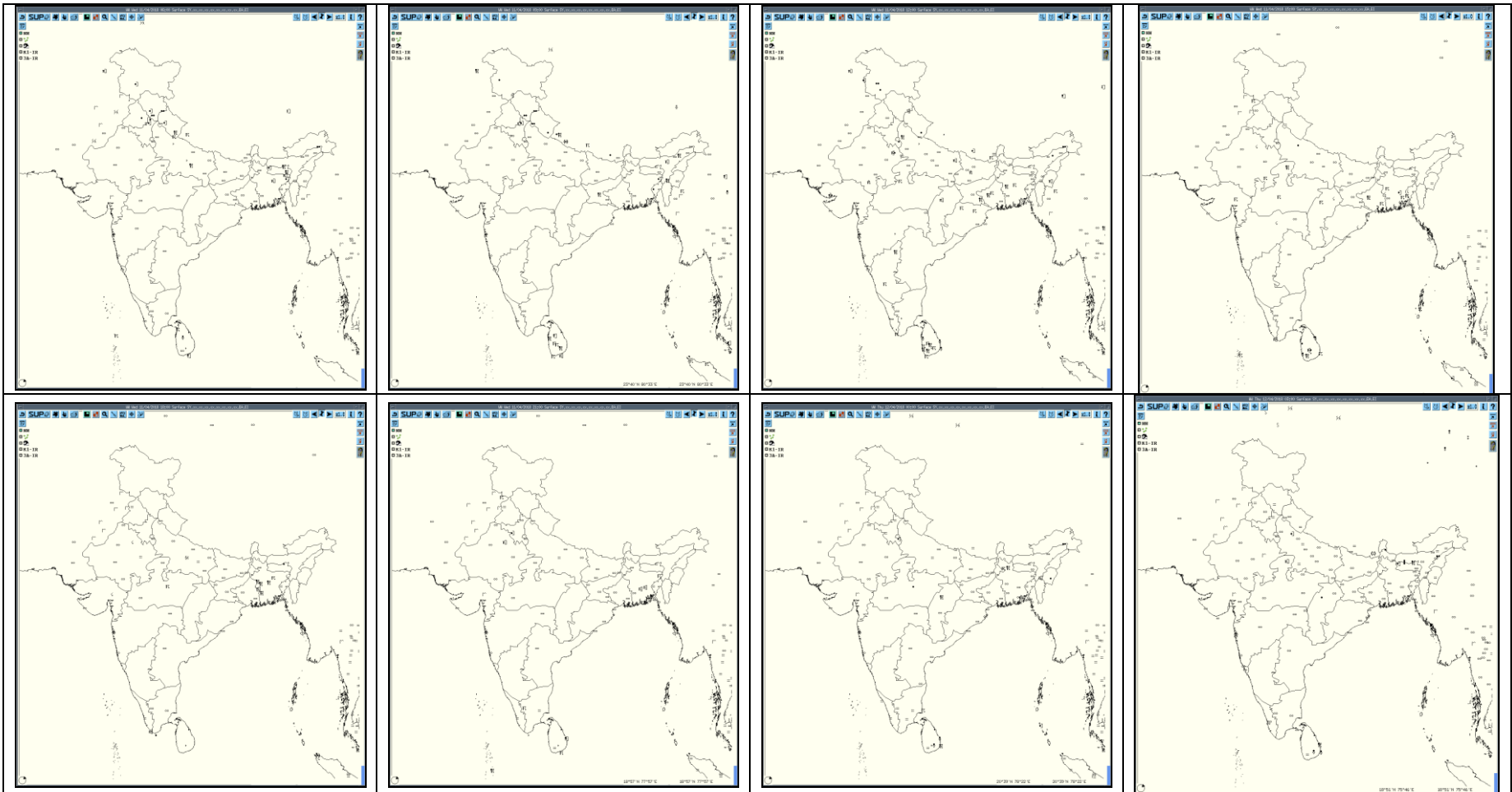
**Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today**



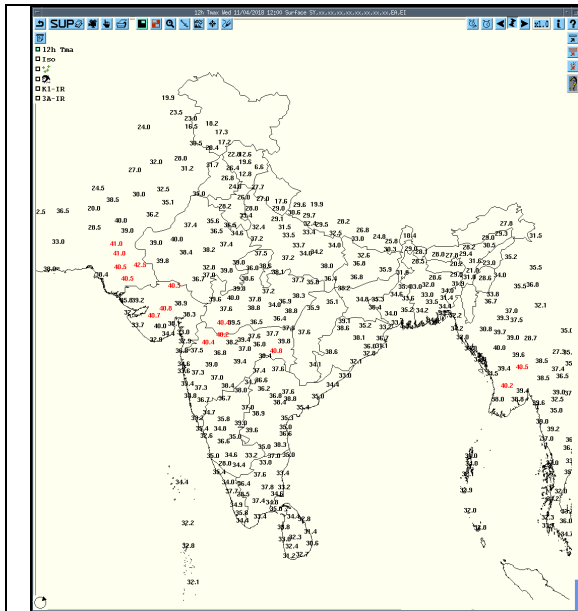
**IMR**



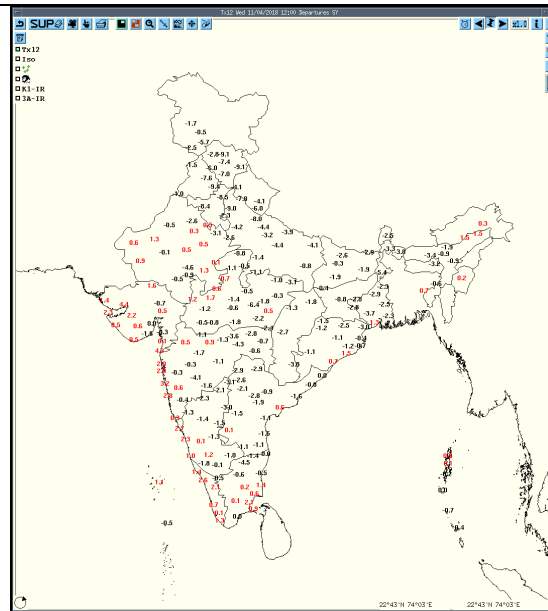
**HEM**



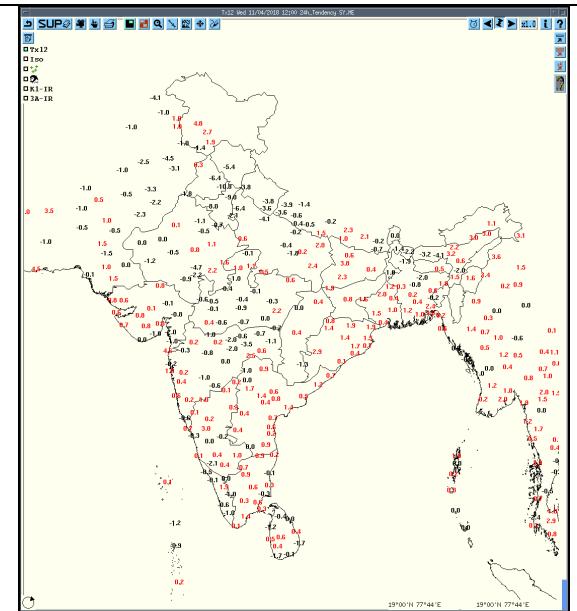
3hourly Past weather at 06, 09, 12, 15, 18, 21 UTC of yesterday and 00 & 03 hrs UTC of today



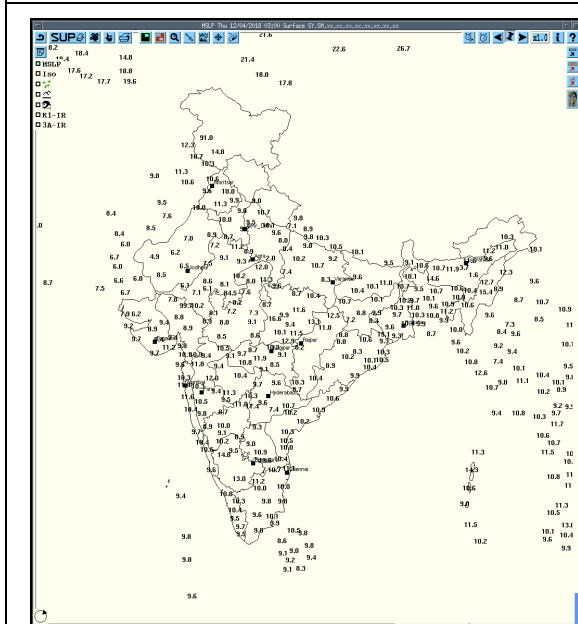
Tmax



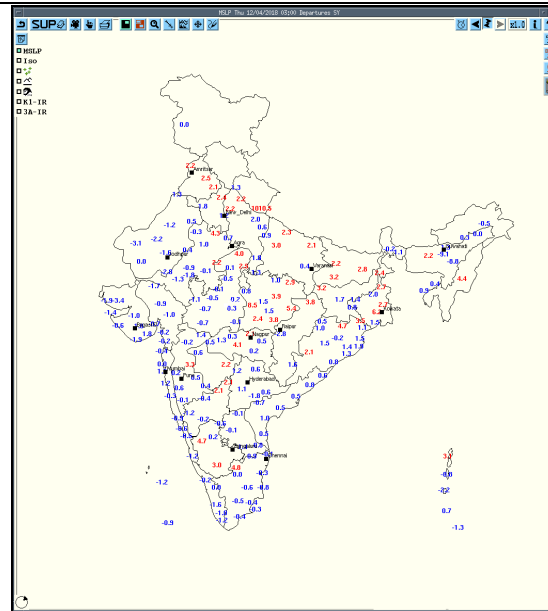
Departure Tmax



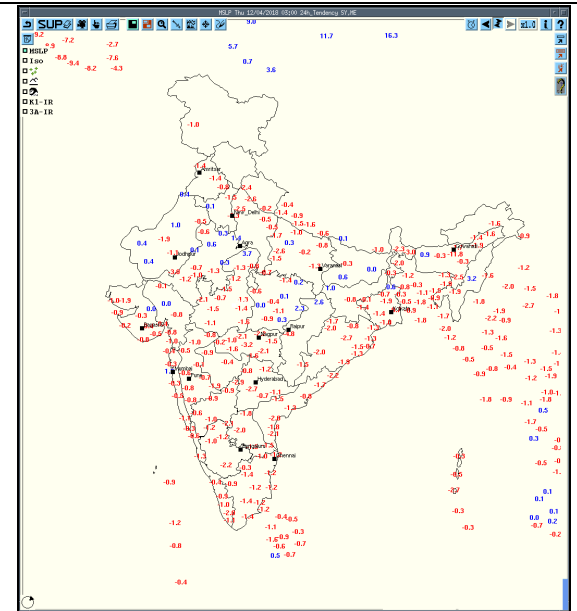
Tendency Tmax



MSLP



Departure MSLP



Tendency MSLP





## Past 24 hours DWR Report:

Radar Station name	Date	Time interval of observation (UTC)	Organization of the cells (Isolated single cells/multiple cells/ convective regions/ squall lines) with height of 20 dBZ echo top and maximum reflectivity	Formation w.r.t radar station and Direction of movement	Remarks	Associated severe weather if any	Districts affected
Kolkata	12-04-18	110300--110921	NIL	NIL	NO SIG ECHO	NIL	NIL
		110921-111042 1	Cluster of isolated single cells with maximum reflectivity of 63.5 dBz at 1252 UTC and maximum height of 13.44 Km at 1042 UTC.	WNW (236.7 km) To N NW (204.8km). Moving E to ESW-wards direction with a speed of 4.2mps	Formation started at 0921 UTC of in between WNW (236.7 km) To NNW (204.8 km) from Radar. One cell to the North is dissolved at 1151 UTC at a Distance of 140.6 km from Radar. Others are merged and formed a single cell at 11:21 UTC at a distance of 173.7 km from Radar matured.	Thunderstorm /Rain /hail/squall	
		111042-112400 1	Multi Isolated cells with position 23.051 deg N / 86.507 deg E, 286.2 deg / 196.6 km with maximum reflectivity of 61.0 dBz at 1151 UTC and maximum height of 12.12 Km at 1222 UTC	W (196.6 km) Moving in SE-ly direction	A Big cell formed at 1151 UTC in West at a distance of 153.5 km from radar. Matured to Multiple cells and dissipated at 1902 UTC	Thunderstorm Hail/ Rain	NA
		120000--120300	NIL	NIL	NO SIG ECHO	NIL	NIL
Patna	12-04-18	110300-110922	NIL	N/A	N/A	N/A	N/A
		110922-111452	<b>Multiple Cells</b>  Lat-25.5970N Long-84.7736E Maximum Reflectivity: 54.5 dBZ Echo Top: 12 KM	Range: 117.2 KM from DWR Patna in West direction Movement: towards East	Warning issued	Thunderstorm, Hailstorm, Rain	Buxar, Bhojpur, Siwan, Saran, Patna, Vaishali, Muzaffarpur, Nalanda, Nawada, Shekhpura, Lakhisarai, Jamui, Banka

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
Lucknow	12-04-18	110302 -110632	Multiple cell with average height of 8.5KM with Maximum Reflectivity of 55 dBZ.	N(50KM) moving in SE'ly Direction at speed of 47 km/hr.	Multiple cells at 03:02 UTC at N(50KM) moved in SE'ly direction and Remained stable at 06:32 UTC and became stronger.	TS/HS /RA	Barabanki, <b>Raebareli</b> ,Faizabad, Ambedkar Nagar,Sultanpur, <b>Amethi</b>
		110302 – 110502-	Multiple cell with average height of 8.5KM with Maximum Reflectivity of 51 dBZ.	WNW(225KM) moving in E'ly Direction at speed of 75 km/hr.	Multiple cells at 02:52 UTC at WNW(250KM) moved in E'ly direction and dissipated at WNW(160KM).	TS/RA	Kasganj,Etah
		110302 - 110632	Squall line convective system with average height of 8.2KM with maximum Reflectivity of 53dBZ.	SW to WNW ranging from 45KM to 150KM moving in E'ly direction at speed of 75 km/hr.	Squall line convective system at 0252 UTC ranging from 50 KM to 160 KM from SW to WNW moved towards E'ly direction and weakened at 06:32 UTC at ESE(75KM)	TS/RA	Kannauj,Auraiya,Mainpuri, Kanpur,Unnao,Fatehpur, Barabanki,Raebareli,Amethi, Pratapgarh
		110452 - 110822	Multiple cells with average height of 12KM with Maximum Reflectivity of 58.5 dBZ.	NNW(200KM ) moving in NE'ly Direction at speed of 65 km/hr.	Multiple cells at 05:02 UTC at NNW(200KM), moving in NE'ly Direccction and developed in Squall line system at 06:32 UTC and dissipated at 08:22 UTC.	TS,RA IN	Bareilly,Shahjahanpur, Pilibhit,Lakhimpur Kheri
		110632- 110852	Squall line convective system with average height of 12KM with maximum Reflectivity of 58.5dBZ.	E to ESE(100KM) moving in E'ly Direction at speed of 65 km/hr.	Multiple cells at S(50KM) and multiple cells at E(120KM) get intermixed to generate a squall line convective system which moved towards E'ly direction and dissipated at 08:52UTC	HS,TS ,RAIN	<b>Faizabad</b> ,Amethi,Sultanpur, Pratapgarh, <b>Azamgarh</b> , <b>Ambedkar Nagar</b> ,Mau,Jaunpur, Ghazipur
		111332- 111442	Single cell with average height of 10KM with Max. Reflectivity of 44 dBZ.	SW(200KM) moving in E'ly Direction at speed of 60 km/hr.	Cells did not intensified much and dissipated at 14:42UTC.	-	-
		111412- TO 112342	Squall line MCS convective system with average height of 10KM with maximum Reflectivity of 56 dBZ.	W(250KM) moving in E'ly Direction at speed of 65 km/hr to 75km/hr.	The MCS system entered into LKN-DWR range of 250 KM at W(250KM) and moved in E'ly direction and dissipated at 23:32 UTC at SE(200KM)	TS/HS /RA	<b>Etawah</b> ,Auraiya,Hathras, Firozabad,Agra,Mathura,Etah, Aligarh,Kasganj,Farrukhabad, Mainpuri,Jalaun,Auraiya, Kannauj,Kanpur,Unnao, Fatehpur,Raebarely,Allahabad , Pratapgarh,Jaunpur,Hardoi, Unnao,Lucknow,Fatehpur, Faizabad,Raebarely <b>Note:</b> (Delhi-Dwr Has Also Been Seen For Reporting The Stations Mentioned Here)

## 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)
Pahalgam	Northwest India	Jammu & Kashmir	Thunderstorm			1810
Kukernag	Northwest India	Jammu & Kashmir	Thunderstorm	11-04-18	1640 1840	1655 1850
Banihal	Northwest India	Jammu & Kashmir	Thunderstorm	11-04-18	1600 1750 2020	1635 1850 2325
Batote	Northwest India	Jammu & Kashmir	Thunderstorm	11-04-18	1950	2250
Bhaderwah	Northwest India	Jammu & Kashmir	Thunderstorm	11-04-18	1815	1840
Gorakhpur	Northwest India	East Uttar Pradesh	Thunderstorm	11-04-18	1510	1600
Varanasi (BHU)	Northwest India	East Uttar Pradesh	Thunderstorm	12-04-18	0230	0300
Ballia	Northwest India	East Uttar Pradesh	Thunderstorm	12-04-18	0315	0345
Churk	Northwest India	East Uttar Pradesh	Thunderstorm	12-04-18	0400	0430
Allahabad	Northwest India	East Uttar Pradesh	Thunderstorm	12-04-18	0455	0510
Kanpur (City)	Northwest India	East Uttar Pradesh	Thunderstorm	12-04-18	2230	0020
Bareilly	Northwest India	West Uttar Pradesh	Thunderstorm	11-04-18	1500 2200	1620 2400
Shahjahanpur	Northwest India	West Uttar Pradesh	Thunderstorm	11-04-18	2400	0030
Moradabad	Northwest India	West Uttar Pradesh	Thunderstorm	11-04-18	1830	1900
Jhansi	Northwest India	West Uttar Pradesh	Thunderstorm	11-04-18	2000	2130
Etawah	Northwest India	West Uttar Pradesh	Thunderstorm	11-04-18	2100	2200
Orai	Northwest India	West Uttar Pradesh	Thunderstorm	11-04-18	2130	2200
Orai	Northwest India	West Uttar Pradesh	Thunderstorm	11-04-18	0730	0745
Hamirpur	Northwest India	West Uttar Pradesh	Thunderstorm	11-04-18	2300	0030
Agra(Taj)	Northwest India	West Uttar Pradesh	Thunderstorm	11-04-18	Evening	
Aligarh	Northwest India	West Uttar Pradesh	Thunderstorm	11-04-18	1830	2200
Muzaffarnagar	Northwest India	West Uttar Pradesh	Thunderstorm	11-04-18	1800	1900
Jaipur	Northwest India	East Rajasthan	Thunderstorm	11-04-18	1600 2110	1700 2345
Pilani	Northwest India	East Rajasthan	Thunderstorm	12-04-18	0115	0300
Alwar	Northwest India	East Rajasthan	Thunderstorm	11-04-18	1700	1830
Bharatpur	Northwest India	East Rajasthan	Thunderstorm	11-04-18	1830	1915
Kota	Northwest India	East Rajasthan	Thunderstorm	11-04-18	1950	2050
Bhilwara	Northwest India	West Rajasthan	Thunderstorm	11-04-18	1430	1530
Chittorgarh	Northwest India	West Rajasthan	Thunderstorm	11-04-18	1650	1920
Udaipur	Northwest India	West Rajasthan	Thunderstorm	11-04-18	1540	1725
Churu	Northwest India	West Rajasthan	Thunderstorm	12-04-18	0005	0200
Pantnagar	Northwest India	Uttarakhand	Thunderstorm	11-04-18	1055	1230
Mukteshwar	Northwest India	Uttarakhand	Thunderstorm	11-04-18	1030	1310
Tehri	Northwest India	Uttarakhand	Thunderstorm	11-04-18	0915	1040

Realised TS/HS/SQ during past 24 hours ending at 0300UTC of today(received from RMCs/MCs)						
Region	State/Sub Division	Weather Event (TS/Hail/Squall)		Date	Time of Commencement (IST)	Time of end (IST)
Amravati	Central India	Vidarbha	Thunderstorm	11-04-18	1700	1800
Wardha	Central India	Vidarbha	Thunderstorm	11-04-18	2345	0035
Washim	Central India	Vidarbha	Thunderstorm	11-04-18	1800	1845
Yeotmal	Central India	Vidarbha	Thunderstorm	11-04-18	2300	0120
Sagar	Central India	Madhya Pradesh	Thunderstorm	11-04-18	2235 0000	2240 0045
Chhindwada	Central India	Madhya Pradesh	Thunderstorm	11-04-18	1800	2045
Ambikapur	Central India	Chhattisgarh	Thunderstorm	11-04-18	1900	1935
Pendra Road	Central India	Chhattisgarh	Thunderstorm	11/12-04-18	1630 1930 0400 0600	1700 2100 0525 0730
Bilaspur	Central India	Chhattisgarh	Thunderstorm	12-04-18	0715	0830
Palayamkottai	South India	South Tamilnadu	Thunderstorm	11-04-18	2230	2240
Kanyakumari	South India	South Tamilnadu	Thunderstorm	11-04-18	2245	2300
				11/12-04-18	2325 0220	0115 0230
Nagapattinam	South India	North coastal Tamilnadu	Thunderstorm	11-04-18	0450	0525
Karaikal	South India	North coastal Tamilnadu	Thunderstorm	11-04-18	0445	0505
Karipur AP	South India	Kerala	Thunderstorm	12-04-18	0330	0600
Thiruvananthapuram C	South India	Kerala	Thunderstorm	11-04-18	1640	1750
					1905	1945
					2040	2115
					2205	2240
Thiruvananthapuram AP	South India	Kerala	Thunderstorm	11-04-18	1735	2315
Gadag	South India	North Interior Karnataka	Thunderstorm	11-04-18	1445	1530
Kalaburgi	South India	North Interior Karnataka	Thunderstorm	11-04-18	1645	1830
Madikeri PTO	South India	South Interior Karnataka	Thunderstorm	11-04-18	1400	1445

## THUNDERSTORM / SQUALL / HAILSTORM REPORT OF RMC KOLKATA REGION

**Date: 12.04.2018** (24 hours' weather from 0830 IST of **11.04.2018** to 0830 IST of **12.04.2018**)

Sub-Division	State	Name of Station Reporting	THUNDERSTORM (TS)
Sikkim And SHWB	Sikkim	Gangtok	NIL
		Tadong	NIL
	West Bengal	Coochbehar	/// - 0620
		Jalpaiguri	NIL
		Malda	NIL
GWB	West Bengal	Alipore	1955-2200
		Dum Dum	2022-2205
		Canning	NIL
		Diamond Harbour	2005-2215
		Haldia	2015-2200
		Digha	NIL
		Asansol	1930-2300
		Bankura	1640-2210
		Sriniketan	At Night
Bihar	Bihar	Patna	1710-1735
		Gaya	1558-1710
		Bhagalpur	NIL
		Purnia	NIL
Jharkhand	Jharkhand	Ranchi	1410-1510
		Daltonganj	NIL
		Jamshedpur	1610-1800
Odisha	Odisha	Bhubaneswar	NIL
		Balasore	1900-1950
		Jharsuguda	1502-1800
		Chandbali	NIL
		Paradeep	NIL
		Puri	NIL
		Gopalpur	NIL
		Sambalpur	NIL
		Hirakund	NIL
		Keonjharharh	1545-1800
A And N Islands	A And N Islands	Port Blair	1800-2045

Station	Sub-Division	State		Thunderstorm
			Started At (Ist)	Ended At (Ist)
Passighat	Arunachal Pradesh	Arunachal Pradesh	Nil	Nil
Itanagar	Arunachal Pradesh	Arunachal Pradesh	11/1315	11/1340
Jorhat	Assam & Meghalaya	Assam	Nil	Nil
Silchar	Assam & Meghalaya	Assam	11/1200,11/1500,12/0200	11/1500,12/0200,12/0500
Dibrugarh	Assam & Meghalaya	Assam	Nil	Nil
N/Lakhimpur	Assam & Meghalaya	Assam	11/1400	11/1500
Tezpur	Assam & Meghalaya	Assam	11/1400	11/1415
Dhubri	Assam & Meghalaya	Assam	11/0805,12/0547	11/0850,12/0640
Guwahati	Assam & Meghalaya	Assam	11/1025	11/1215
Tura	Assam & Meghalaya	Assam	Nil	Nil
Barapani	Assam & Meghalaya	Meghalaya	11/1135	11/1315
Cherrapunjee	Assam & Meghalaya	Meghalaya	11/1057	11/1225
Shillong	Assam & Meghalaya	Meghalaya	11/1115	11/1245
Imphal	Nmmt	Manipur	11/1535	11/1720
Lengpui	Nmmt	Mizoram	11/1525	11/1630
Aizawl	Nmmt	Mizoram	Nil	Nil
Kohima	Nmmt	Nagaland	Nil	Nil
Kailasahar	Nmmt	Tripura	11/1255	11/1410
Agartala	Nmmt	Tripura	Nil	Nil



## 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)

Past24hourHEMandIMRainfall(upto03UTCof today)

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)

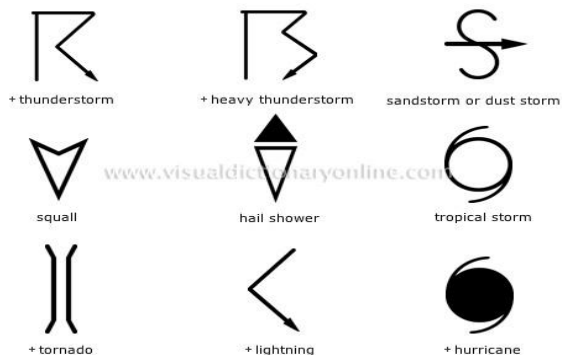
For Radar images of the past 24 hours including mosaic of images:

[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>	