



# India Meteorological Department

## FDP STORM Bulletin No. 44 (19-04-2018)

### 1. CURRENT SYNOPTIC SITUATION:

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

- ◆ The Western Disturbance as an upper air cyclonic circulation extending upto 3.1 Km above mean sea level over Western parts of Afghanistan & neighbourhood persists. The trough aloft in mid and upper tropospheric levels with its axis at 5.8 Km above mean sea level now runs roughly along longitude 62°E to the north of latitude 30°N.
- ◆ The other Western Disturbance as a feeble cyclonic circulation at 3.1 km above mean sea level over Jammu & Kashmir & neighbourhood has moved away east-north-eastwards.
- ◆ The cyclonic circulation over Sub Himalayan West Bengal & neighbourhood extending upto 0.9 km above mean sea level has become less marked.
- ◆ An east west trough runs from east Bihar to south Assam across Sub Himalayan West Bengal at 0.9 km above mean sea level.
- ◆ A cyclonic circulation lies at 0.9 km above mean sea level over Chhattisgarh and adjoining Odisha.
- ◆ The north south trough from north Uttar Pradesh to north Telangana at 0.9 km above mean sea level now runs from east Bihar to the above cyclonic circulation, across Gangetic West Bengal.
- ◆ The trough in mid tropospheric westerlies with its axis at 5.8 km above mean sea level roughly along longitude 93°E to the north of latitude 22°N has moved away eastwards.
- ◆ The north south wind discontinuity from Rayalaseema to south Tamilnadu at 0.9 km above mean sea level now runs from North Interior Karnataka to south Tamilnadu across South Interior Karnataka.

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

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

##### Western disturbance (WD):

Scattered multi-layered clouds seen over Afghanistan adjoining Pakistan, Jammu & Kashmir, Himachal Pradesh, Punjab adjoining West Haryana, North Uttarakhand, Central Tibet adjoining China and over the area between lat 37.0°N to 47.0°N, long 70.0°E to 94.0°E in association with WD over the area. Broken low/medium clouds with embedded moderated to intense convection seen over Caspian Sea & neighbourhood in association with another WD over the area.

**Westerly Roughly:** Trough in Westerly Roughly Along Long 63.0E & North of Lat 30.0N.

### **Convective Activity:**

Convective cells are developing over extreme Northeast Odisha (**Minimum CTT Minus 69 Deg C**), South Interior Karnataka (**Minimum CTT Minus 80 Deg C**) and North Kerala (**Minimum CTT Minus 60 Deg C**)

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

Based on 0900 UTC satellite data indicate that precipitation is likely to take place during next three (03 hrs) over Jammu & Kashmir, South Interior Karnataka, Kerala, North Tamilnadu, South Coastal Andhra Pradesh and South Rayalaseema.

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

Broken low/medium clouds with embedded moderated to intense convection seen over Jammu & Kashmir (**Minimum CTT Minus 60 Deg C**), Himachal Pradesh and Punjab (**Minimum CTT Minus 48 Deg C**). Scattered low/medium clouds with embedded isolated moderate to intense convection seen over northeast Odisha (**Minimum CTT Minus 69 Deg C**), Sikkim, Northeast states, South Interior Karnataka, South Rayalaseema, Coastal Andhra Pradesh, North Kerala and North Tamilnadu. Scattered low/medium clouds with embedded isolated weak to moderate convection seen over West Haryana, North Uttarakhand, extreme Northwest Rajasthan, South Madhya Maharashtra, South Konkan & Goa, North of South Interior Karnataka, North Rayalaseema, South Kerala, South Tamilnadu, Lakshadweep and Andaman Islands. Scattered low/medium clouds seen over South Uttarakhand, East Haryana, Delhi, Uttar Pradesh, Chhattisgarh, rest Odisha, North Bihar, Sub Himalayan West Bengal, East Rajasthan, North Madhya Pradesh and rest Maharashtra.

### **Arabian Sea:-**

Scattered low/medium clouds with embedded weak to moderate convection seen over South Arabian Sea and South of Lat 10.0N.

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

Scattered low/medium clouds with embedded isolated weak to moderate convection seen over Southwest Bay and off North Tamilnadu Coast.

### **Past Weather:**

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

Moderate to Intense convection was observed over Gangetic West Bengal SHWB Odisha south Chhattisgarh north Andhra Pradesh Rayalaseema Maharashtra Konkan & Goa Karnataka Kerala Tamilnadu and Weak to Moderate convection observed over north-east states.

### **OLR:**

Up-to 230wm-2 observed over Jammu & Kashmir North Himachal Pradesh North Uttarakhand Sub-Himalayan West Bengal Sikkim Arunachal Pradesh Assam Meghalaya Nagaland Manipur Mizoram Odisha Rayalaseema south Maharashtra Karnataka Kerala

### **Dynamic Features:**

Up to 30- 60 knots **wind shear** is observed over North & Central India and 5-15 knots over south peninsula India.

A **positive Vorticity** field at 850 hPa is observed over J&K Himachal Pradesh Uttarakhand Uttar Pradesh Bihar south Gangetic West Bengal south Chhattisgarh west Gujarat Telangana and north Interior Karnataka.

### **Precipitation:**

#### **IMR:**

Rainfall upto 70-110 mm observed over some parts of south Odisha and north Andhra Pradesh.

Rainfall upto 10-50 mm observed over some parts of north Jammu & Kashmir north Gangetic West Bengal north Odisha north Andhra Pradesh Goa coastal Karnataka central Kerala and south Tamilnadu.

Rainfall upto 01-10 mm observed over rest Jammu & Kashmir north Himachal Pradesh

Arunachal Pradesh east Assam south Manipur north Mizoram south Gangetic West Bengal south Odisha south Karnataka rest Kerala and rest Tamilnadu

### RADAR and RAPID RGB Observation:

Isolated/multiple moderate echoes (dBZ >50 and height >10km) was seen in domain of DWR Patiala and light echoes were seen Delhi, Gopalpur, Hyderabad, Kolkata Mohanbari and Patna at around 1730IST.

RAPID RGB Satellite imagery at 1630IST indicates significant convection over Jammu & Kashmir, Himachal Pradesh, South Punjab adjoining Haryana, North Uttarakhand, Coastal Karnataka, South Interior Karnataka, Kerala and Central Tamilnadu.

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

Higher Dust concentration was observed over northern Africa, Arab countries and western part of India. Dust concentration is expected to decrease 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	19.04.2018	20.04.2018
PM10 (micro-g/m <sup>3</sup> )	210	231
PM2.5 (micro-g/m <sup>3</sup> )	78	86

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

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

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

**Low level CYCIRS, Troughs: 00 UTC of Day 2-5: 00UTC of Day 1-2:** 850 hPa trough from U.P to S. Peninsular India across MP and Maharashtra

**Confluence & wind Discontinuity regions: 12 UTC of Day 0-2:** 925hPa N-S discontinuity over Southern Peninsular India and in Day 0-4 SW-NE discontinuity over MP Chhattisgarh & Odisha

**Synoptic Systems: 12 UTC of Day 0-1:** WD as a trough over north Pakistan and adjoining J &K.

**12 UTC of Day 2-3:** A fresh WD as a deep trough and associated CYCIR at 500 hPa over Pakistan and adjoining J &K.

**2. Location of jet and jet core (>60kt) at 500hPa): 12UTC of Day 2** Over Gujarat & Rajasthan associated with approaching WD

#### **3. Convergence at 850 hPa:**

**Day/Index: Subdivisions with Lower Level Convergence > 15 x 10<sup>-5</sup> /s**

Day0: Odisha, West MP, Tamilnadu, Puducherry, NI Karnataka, SI Karnataka,

Day1: Arunachal Pradesh, Assam Meghalaya, Jharkhand, West UP, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, Odisha, Chhattisgarh, SI Karnataka,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Jharkhand, Madhya Maharashtra, Chhattisgarh, Telangana, Coastal Karnataka, NI Karnataka, SI Karnataka,

Day3: Assam Meghalaya, Jharkhand, Odisha, Madhya Maharashtra, Chhattisgarh, Tamilnadu, Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day4: Arunachal Pradesh, NE NMMT, Jharkhand, East MP, Madhya Maharashtra, Marathwada, Vidarbha, Tamilnadu, Puducherry, NI Karnataka, SI Karnataka,

#### 4. Low level Vorticity:-Positive Vorticity:

##### Day/Index: Subdivisions with Lower Level Vortex $> 15 \times 10^{-5} /s$

Day0: Assam Meghalaya, Gangetic WB, Bihar, East UP, Uttarakhand, Himachal Pradesh, Tamilnadu, Puducherry,

Day1: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Gangetic WB, Bihar, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West RJ, Telangana,

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

Day3: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Bihar, Uttarakhand, Himachal Pradesh, Madhya Maharashtra,

Day4: Arunachal Pradesh, Assam Meghalaya, Himachal Pradesh,

#### 5. Showalter Index: -3 to -4[Very unstable]:

##### Day/Index: Subdivisions with Showalter Index $< -4$

Day0: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Konkan Goa, Madhya Maharashtra, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu, Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Bihar, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Konkan Goa, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu, Puducherry, Coastal Karnataka, SI Karnataka, Kerala,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Tamilnadu, Puducherry, Coastal Karnataka, SI Karnataka, Kerala,

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

Day4: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Odisha, Madhya Maharashtra, Coastal AP, 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, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, Konkan Goa, Madhya Maharashtra, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu, Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka,

Day1: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West MP, Chhattisgarh, Coastal AP, Telangana,

Day2: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Vidarbha, Chhattisgarh, Coastal AP, Telangana,

Day3: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, East MP, Vidarbha, Chhattisgarh, Coastal AP, Telangana,

Day4: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Chhattisgarh,

#### 7. K-Index :> 35[Very Unstable thunderstorm likely]:

##### Day/Index: Subdivisions with K Index $> 40$

Day0: Arunachal Pradesh, Sub Himalayan WB, Odisha, Konkan Goa, Madhya Maharashtra, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu, Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day1: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Bihar, Himachal Pradesh, Odisha, Saurashtra Kutch, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu, Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day2: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Gangetic WB, Odisha, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu, Puducherry, Coastal Karnataka, SI Karnataka, Kerala,

Day3: Arunachal Pradesh, Sub Himalayan WB, Odisha, East MP, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu, Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day4: Arunachal Pradesh, Sub Himalayan WB, Odisha, Chhattisgarh, Coastal AP, Telangana, 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, Sub Himalayan WB, Himachal Pradesh, Jammu Kashmir, Coastal Karnataka, SI Karnataka, Kerala,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Uttarakhand, Himachal Pradesh, Jammu Kashmir,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT,

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT,

Day5: Arunachal Pradesh, Assam Meghalaya,

### **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 Chhattisgarh and adjoining Orissa. The forecast shows it will move eastward and lies over north Orissa and adjoining Jharkhand region on day 3. The analysis shows a North-South Trough extending from East Bihar to Chhattisgarh and adjoining Orissa across Gangetic West Bengal. The forecast shows it will persist for next 48 hours. The analysis shows an East-West trough from east Bihar to southern parts of Assam across GWB. It will persist for next 24 hour forecast. A North-South Trough is seen in the analysis over North Interior Karnataka up to south Tamil Nadu across South Interior Karnataka. The analysis also shows a feeble cyclonic circulation over north west Rajasthan and adjoining areas. The forecast shows a cyclonic circulation in lower troposphere (925 hPa) over East Uttar Pradesh adjoining Bihar and Jharkhand on day 2. The forecast shows it will move eastwards and lies over East Bihar, Jharkhand and GWB on day 4.

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

Although the presence of strong westerlies is found over northern parts of India, 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 along the foothills of Himalaya, J&K, Himachal Pradesh and Uttarakhand; along the north-south trough for next 3 days. Low level Positive Vorticity is also seen over J&K, adjoining Punjab, Himachal Pradesh, Uttarakhand, west Uttar Pradesh, Haryana and adjoining areas from day 1 onwards. It is inferred that East and North east India has Positive Vorticity from day 2 onwards.

#### **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 is seen 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, coastal Maharashtra including Mumbai, Konkan & Goa, Madhya Maharashtra, Marathwada, Vidarbha adjoining Chhattisgarh, coastal areas along the east coast and west coast, Assam, Meghalaya, Tripura and adjoining area, SHWB on all 3 days; over parts of Rajasthan on day 2; over parts of East Uttar Pradesh Sikkim and adjoining areas on day 2 and 3; Maximum value of the index is seen over parts of GWB, Orissa, Andhra Pradesh, coastal Maharashtra, Karnataka, Konkan and Goa, Chhattisgarh, coastal Tamil Nadu, Telangana during next 3 days; over parts of Bihar and Jharkhand on day 2 and 3; over some parts of Gujarat on day 2; over some parts of East Uttar Pradesh, Assam and adjoining areas on day 3.

**Lifted Index (< -2):** The threshold value of the index is below -2 over parts of Gujarat, coastal Andhra Pradesh, Karnataka, Telangana, Rayalaseema, Konkan and Goa, Kerala, Tamil Nadu, Karnataka, southern part of west coast, coastal areas along the east coast, Chhattisgarh, Bihar, Jharkhand, Vidarbha, southern parts of Madhya Maharashtra, Orissa, SHWB, Sikkim Tripura and adjoining areas on all 3 days; over parts of south west Rajasthan on day 1; over parts of East Rajasthan, Punjab, Haryana, J&K, Himachal Pradesh, East Uttar Pradesh, north Madhya Maharashtra, Assam, Meghalaya and adjoining areas on day 2; over parts of East Uttar Pradesh and most of the NE states on day 3; maximum negative value of the index less than -10 is seen over parts of East Uttar Pradesh, SHWB, GWB, Bihar and Jharkhand on day 2 and 3; over parts of Orissa on day 3.

**Total Total Index (> 50):** The threshold value of the index is > 50 is seen over most of the parts of country except J&K, Extreme south peninsular India and NE states during next 3 days; maximum value of the index >60 is seen over parts of east Rajasthan, Madhya Pradesh, Chhattisgarh, Vidarbha, Jharkhand, Orissa, southern parts of East and West Uttar Pradesh, Telangana, GWB, Karnataka, Madhya Maharashtra and Marathwada during next 3 days; over parts of Bihar, SHWB, west Rajasthan and Andhra Pradesh on day 2; over parts of Punjab, Haryana, Delhi, Rajasthan, Gujarat, Uttar Pradesh and south interior Karnataka on day 3.

**Sweat Index (> 300):** Although the threshold value of the Index >300 is seen in most parts of the country except central parts of Madhya Pradesh and northern parts of Chhattisgarh and adjoining areas during next 3 days, the maximum value of the index greater than 800 is seen over parts of GWB, Orissa, Bihar, Jharkhand, SHWB, Assam and adjoining areas on day 2 and 3.

**CAPE (> 1000):** Mostly in areas of southern peninsular India, along west coast and east coast, parts of Orissa, Andhra Pradesh, Telangana, Rayalaseema, Kerala, Tamil Nadu, Karnataka, coastal Maharashtra including Mumbai, Konkan and Goa, Gujarat, Bihar, Jharkhand, GWB, SHWB, Assam, Tripura and adjoining areas during next 3 days; over parts of Chhattisgarh, East Uttar Pradesh and East Vidarbha on day 2 and 3; Maximum value of the index greater than 2500 is seen mostly over parts of GWB, coastal Orissa, Coastal Andhra Pradesh, Coastal Tamil Nadu, coastal Maharashtra, Karnataka, Konkan & Goa, coastal Kerala and Telangana during next 3 days; over parts of Bihar, Jharkhand, SHWB and adjoining areas on day 2 and 3; over parts of Assam and adjoining areas on day 3; over parts of Tripura and adjoining areas on day 2.

**CIN (50-150):** Although the threshold value of the Index lies in the range of (50–150) over most part of the country except J&K, Himachal Pradesh, Uttarakhand, Haryana, Delhi, west Uttar Pradesh, south east Rajasthan, Madhya Pradesh, west Vidarbha, Madhya Maharashtra, Marathwada and northern parts of Chhattisgarh on day 1 and 3; over most parts of the country except west Rajasthan, south west Uttar Pradesh, Madhya Pradesh, northern parts of Chhattisgarh. Madhya Maharashtra and Marathwada on day 2, the maximum value of the index > 400 is seen over parts of Bihar on day 1; over parts of Gujarat on day 3.

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

70- 130 mm Rainfall: over parts of J&K on day 2.

40-70 mm Rainfall: over parts of J&K and adjoining Himachal Pradesh on day 2.

10- 40 mm Rainfall: over parts Karnataka, Kerala, Tamil Nadu, Sikkim and NE states during next 3 days; over parts of Jammu and Kashmir and Himachal Pradesh on day 1 and 2; over parts of Uttarakhand on day 2.

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

### **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, Punjab, north west Rajasthan, Haryana, adjoining west Uttar Pradesh, north west Madhya Pradesh, Sikkim and NE states on day 1 and 2; over parts of Haryana, Delhi and adjoining areas on day 2; over parts of J&K, Himachal Pradesh, Uttarakhand, Sikkim, SHW, GWB, Bihar and Jharkhand on day 3; maximum value of the Model reflectivity is seen over parts of Assam, Meghalaya, Tripura and adjoining areas on day 1 and 3; mostly over Jammu and Kashmir region on day 2.

## 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 extreme south peninsular India, southern parts of west coast and the east coast, southern parts of Andhra Pradesh, south interior Karnataka, Konkan and Goa, south coastal Maharashtra, Bihar, Jharkhand, Sikkim, GWB and NE states during all 3 days; below threshold value is seen over some parts of East Uttar Pradesh, North Interior Karnataka and Telangana day 1; over parts of J&K, southwest Rajasthan, Gujarat, North Interior Karnataka and Northern parts of Madhya Maharashtra on day 2; over parts of Gujarat, North Interior Karnataka, Telangana and northern parts of coastal Maharashtra including Mumbai on day 3; maximum value of the index is seen over parts of J&K, Himachal Pradesh, Uttarakhand, Punjab, Haryana, Delhi, Rajasthan, Uttar Pradesh, Madhya Pradesh, Jharkhand, Vidarbha, GWB, Telangana, Orissa, Chhattisgarh and North interior Karnataka on day 1 and 2; over parts of Gujarat, Madhya Maharashtra and Marathwada on day 1; over parts of Bihar on day 2; over parts of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, GWB, Orissa, Telangana, Karnataka, Andhra Pradesh, southern parts of Madhya Maharashtra and Marathwada on day 3.

**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, southern parts of Madhya Maharashtra, Vidarbha, Bihar, Jharkhand, Chhattisgarh, Orissa, GWB and Kolkata, SHWB, parts of Tamil Nadu, Kerala, Karnataka, Andhra Pradesh, Telangana, Rayalaseema, Extreme south peninsular India, Assam, Tripura and adjoining areas on all 3 days; Maximum value of the index greater than 3500 is seen over the parts of Karnataka, coastal Kerala, coastal Orissa, coastal Andhra Pradesh, coastal Maharashtra, Konkan and Goa, GWB, coastal Tamil Nadu, Telangana and Jharkhand for next 3 days; over parts of Chhattisgarh on day 1 and 2; over parts of Bihar, SHWB 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 except Uttar Pradesh, Madhya Pradesh, north Chhattisgarh and west Vidarbha during day 1; on day 2 and 3 over most of the parts of country except Madhya Pradesh, north Chhattisgarh, west Vidarbha, north Madhya Maharashtra and Marathwada; the maximum value of the index > 400 is seen over Gujarat, Bihar, Jharkhand, GWB, Orissa, East Madhya Pradesh, Chhattisgarh, Vidarbha, Telangana, Northern parts of Coastal Maharashtra and Andhra Pradesh on day 1; over parts of East Uttar Pradesh, Bihar, Jharkhand, Orissa and Vidarbha on day 2; over parts of Chhattisgarh, Orissa, GWB, Jharkhand and Andhra Pradesh on day 3.

## 3. Rainfall and thunderstorm activity:

70- 130 mm Rainfall: over parts of Assam, Meghalaya, Tripura, Mizoram and adjoining areas during next 3 days; over parts of J&K on day 1 and 2; over parts of Himachal Pradesh and Uttarakhand on day 2.

40-70 mm Rainfall: over parts of, Assam, Tripura, Meghalaya, Mizoram and adjoining areas during next 3 days; over parts of J&K on day 1 and 2; over parts of Kerala and Karnataka on day 1; over parts of Himachal Pradesh and Uttarakhand on day 2.

10- 40 mm Rainfall: over parts of Himachal Pradesh, Uttarakhand, Sikkim, SHWB, NE states, Kerala, Karnataka and Tamil Nadu during next 3 days; over some parts of Andhra Pradesh on day 1; over parts of Jammu and Kashmir on day 1 and 2; over parts of GWB on day 3.

Up to 10 mm Rainfall: Over parts of J&K, Himachal Pradesh, Uttarakhand, Punjab, foothills of Himalaya, Kerala, Tamil Nadu, Karnataka, Orissa, Bihar, Jharkhand, GWB, Andhra Pradesh, Telangana, Rayalaseema, Sikkim, SHWB and NE states during next 3 days; over parts of Punjab on day 1 and 2; over parts of Gujarat on day 2; over some parts of south Chhattisgarh on day 3; over parts of west Uttar Pradesh on day 1.

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

#### Summary and Conclusions:

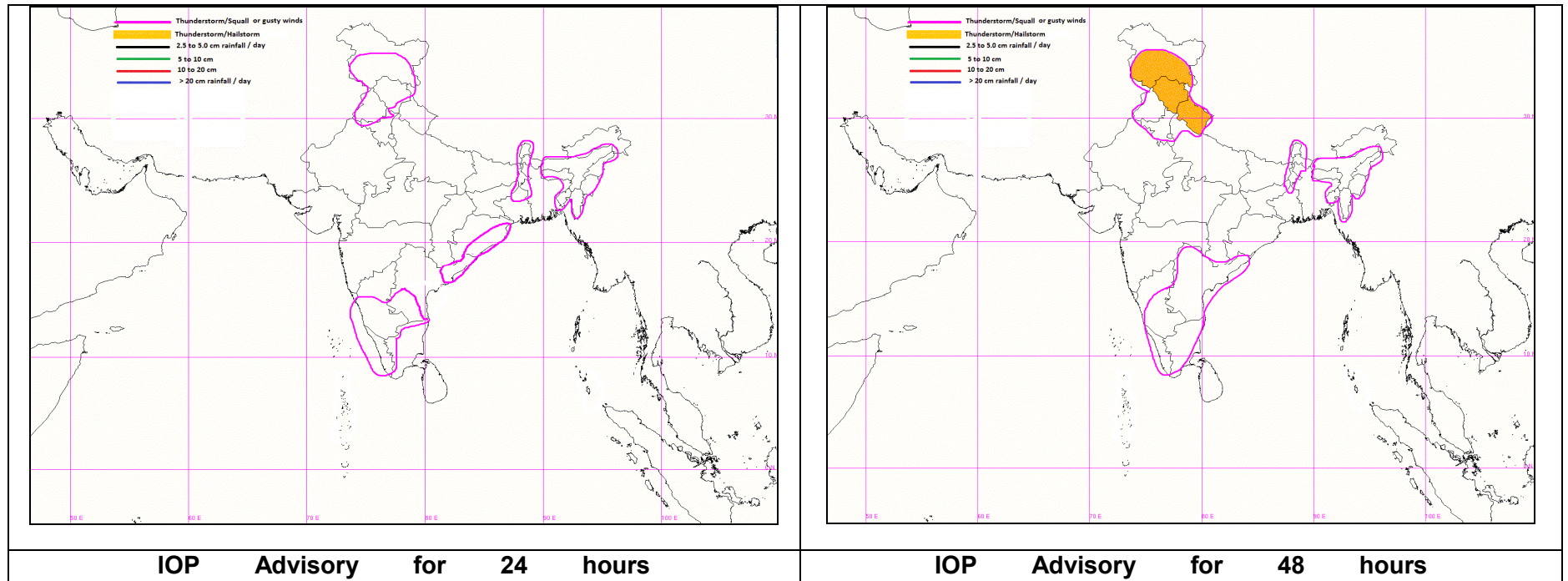
- Synoptic analysis indicates that an east west trough runs from east Bihar to south Assam across Sub Himalayan West Bengal and the cyclonic circulation over Jharkhand & adjoining Bihar, will give rise to a thunderstorm with gusty winds over Sub-Himalayan West Bengal & Sikkim on Day-1. With these systems, Assam, Meghalaya, Nagaland, Manipur, Mizoram & Tripura may get some thunderstorm with gusty winds activity on Day-1.
- The Western Disturbance as a feeble cyclonic circulation over Jammu & Kashmir & neighbourhood has moved away east north-eastwards. This will give rise to the thunderstorm with gusty winds activity mainly J&K and Himachal Pradesh on Day-1. This activity may continue to Day-2 over the same region.
- Due to the north south wind discontinuity from North Interior Karnataka to south Tamilnadu across South Interior Karnataka will be triggering the thunderstorm with gusty winds activity over Kerala, Interior Karnataka and Rayalaseema on Day-1.

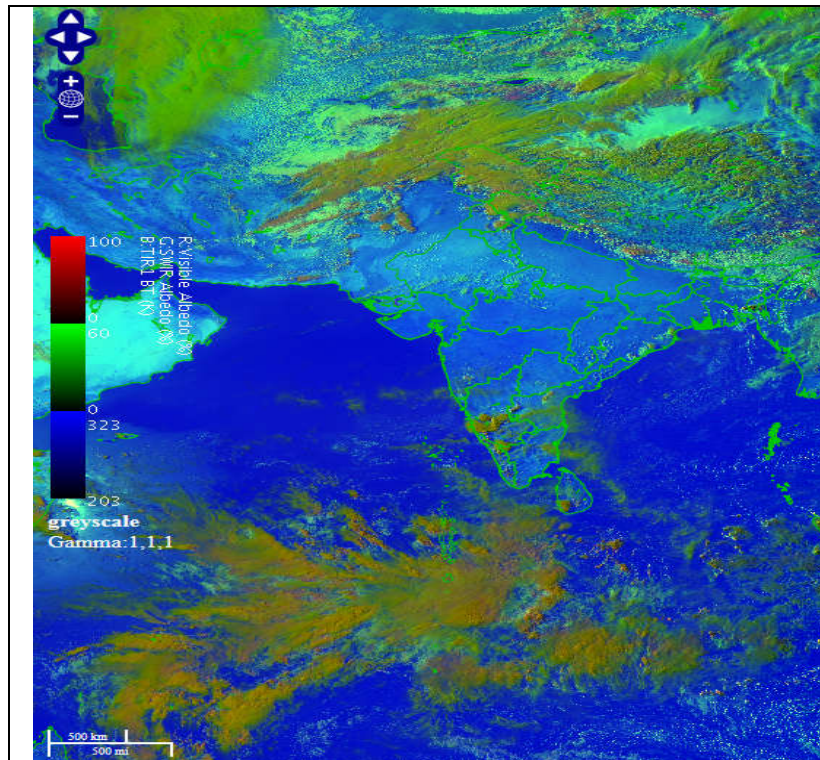
#### Day-1 & Day-2:

<p><b>24hour Advisory for IOP:</b></p> <p><b>Significant Rainfall:</b> Nil</p> <p><b>Thunderstorm with Squall/Gusty winds:</b> Jammu &amp; Kashmir, Himachal Pradesh, Punjab Assam, Meghalaya, Nagaland, Manipur, Mizoram &amp; Tripura Sub Himalayan West Bengal &amp; Sikkim, South Coastal Odisha North Coastal Andhra Pradesh, Rayalaseema, Coastal Karnataka, South Interior Karnataka, Kerala,</p> <p><b>Dust Storm</b> East Uttar Pradesh</p>	<p><b>48hour Advisory for IOP:</b></p> <p><b>Significant Rainfall:</b> Nil</p> <p><b>Thunderstorm with Squall &amp; Hailstorm:</b> Jammu &amp; Kashmir, Himachal Pradesh, Uttarakhand</p> <p><b>Thunderstorm with Squall/Gusty winds:</b> Punjab, Haryana, Chandigarh, Delhi Sub-Himalayan West Bengal &amp; Sikkim Assam, Meghalaya, Nagaland, Manipur, Mizoram &amp; Tripura North Coastal Andhra Pradesh, Telangana, South Interior Karnataka, Tamilnadu</p>
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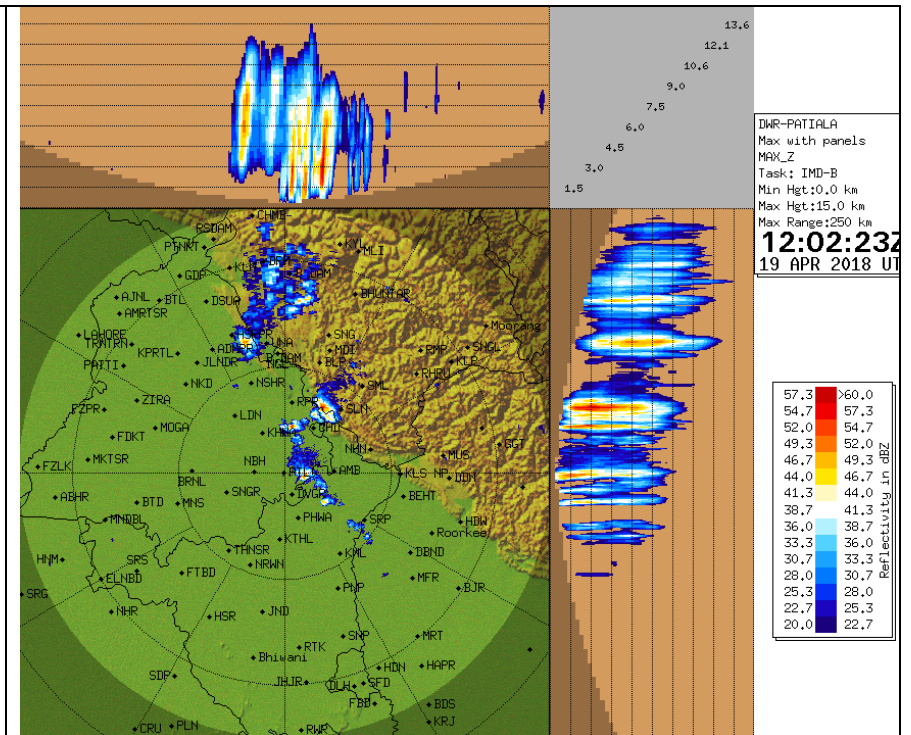


## Graphical Presentation of Potential Areas for Severe Weather:

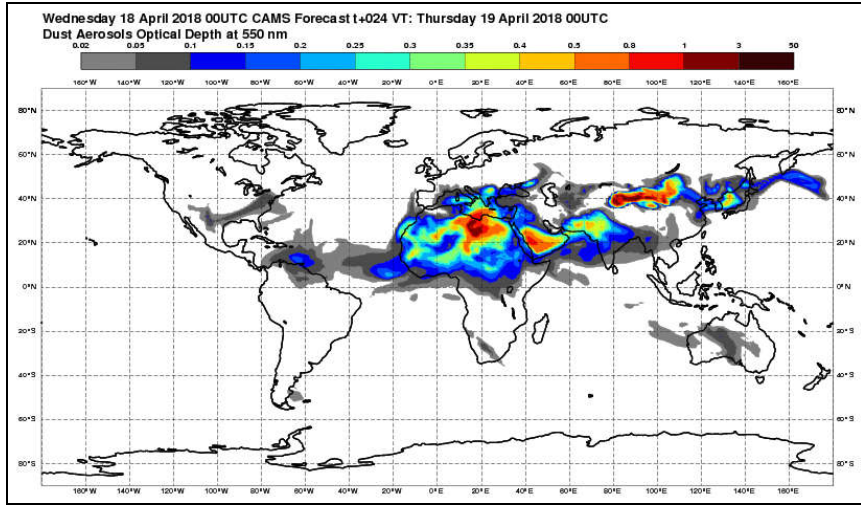




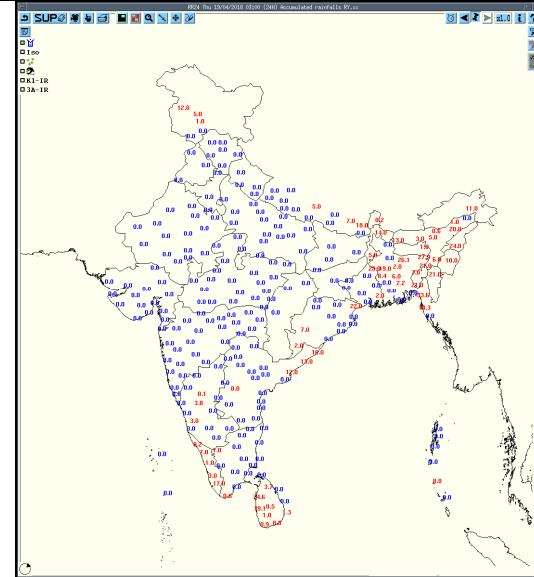
**RAPID RGB Imagery at 1630 IST of the Day**



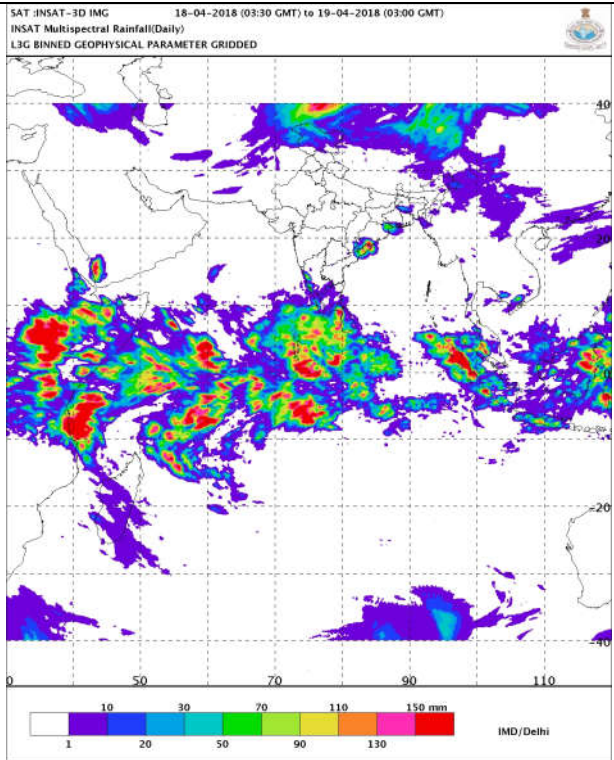
**DWR Patiala at 1732 IST of the Day**



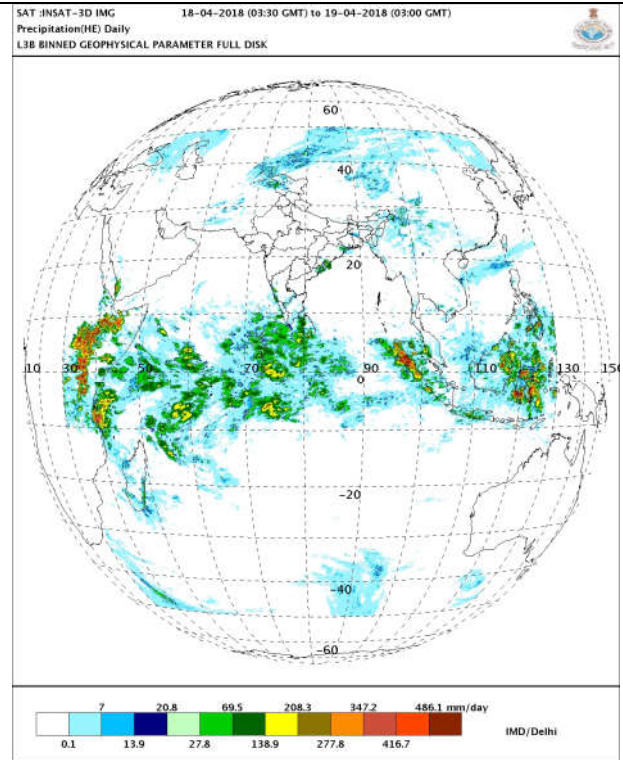
**Dust Forecast**



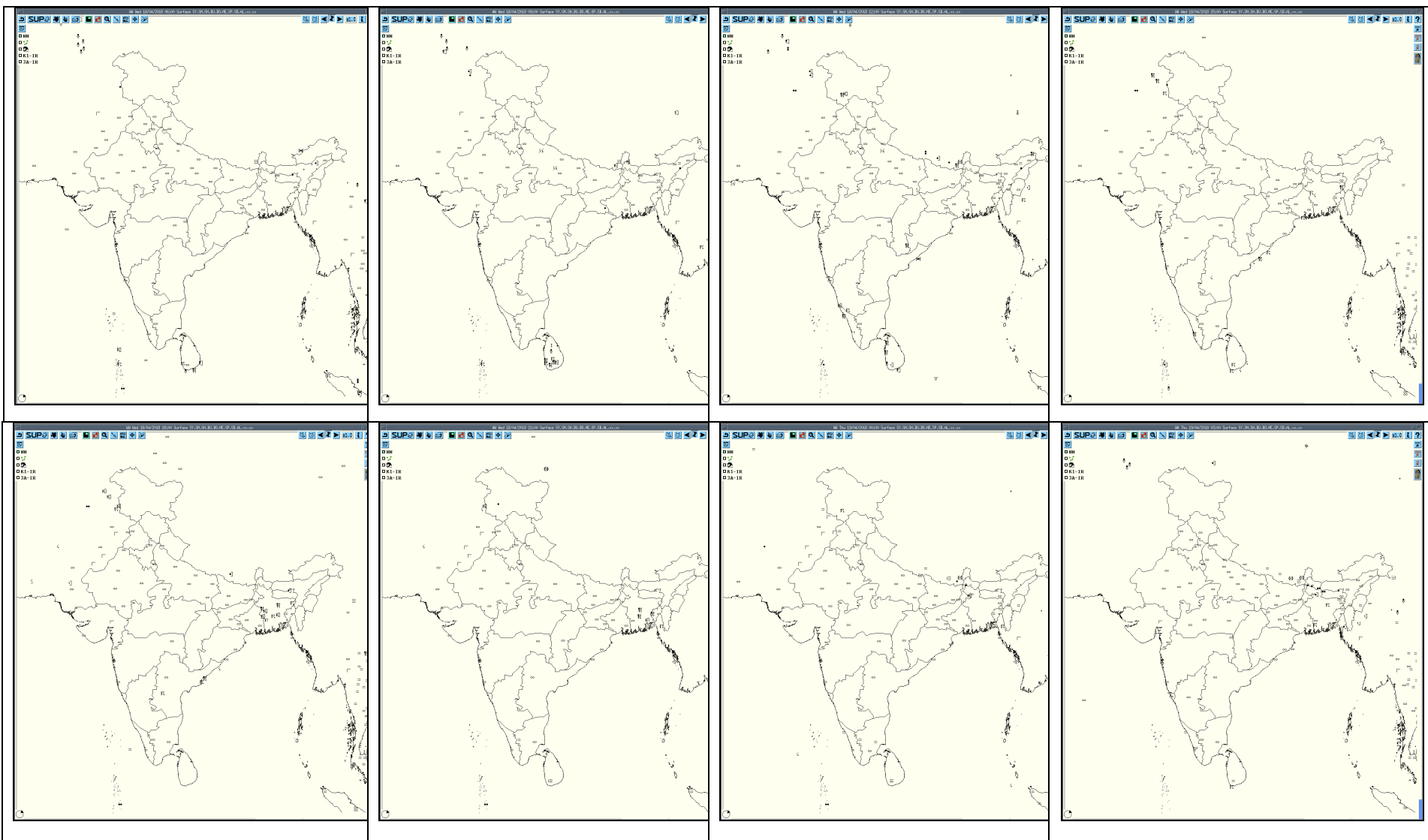
**Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today**



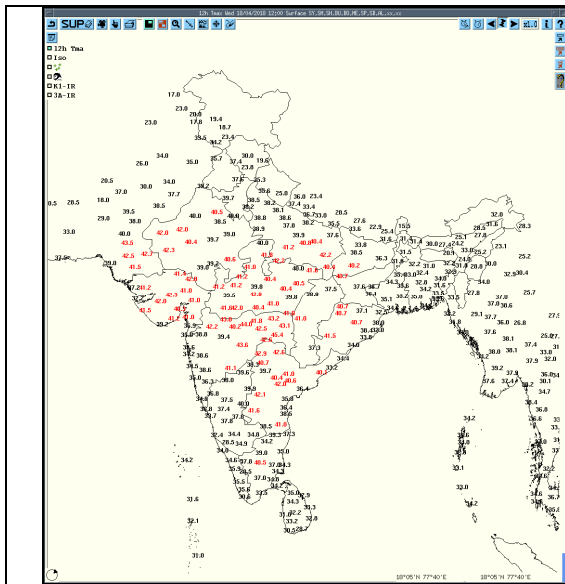
**IMR**



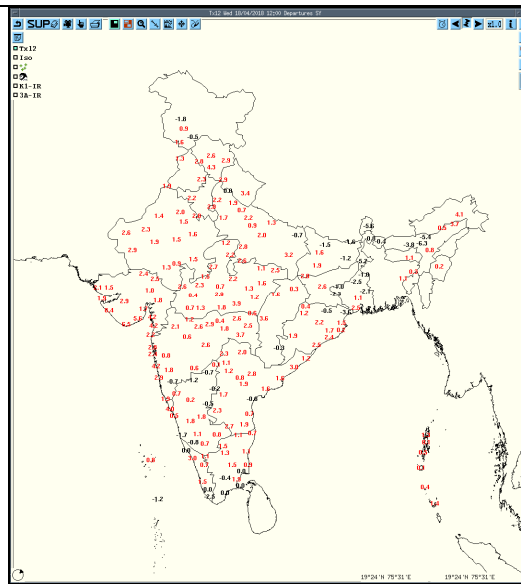
**HEM**



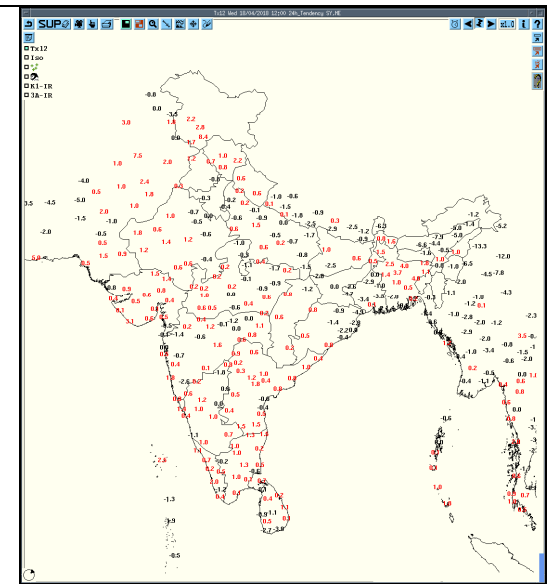
**3hourly Past weather at 06, 09, 12, 15, 18, 21 UTC of yesterday and 00 & 03 hrs UTC of today**



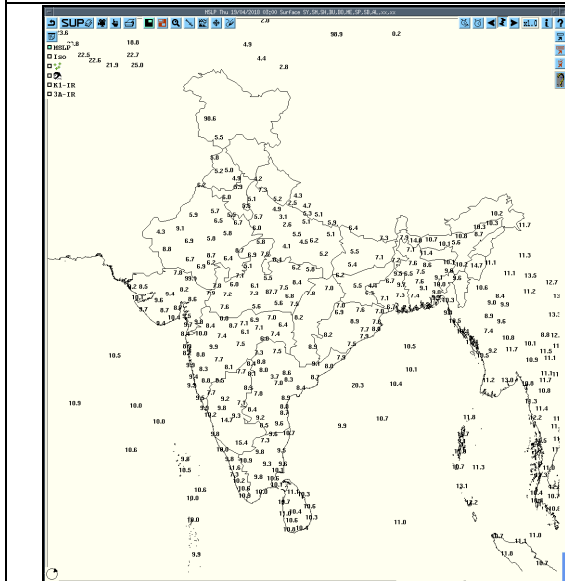
**Tmax**



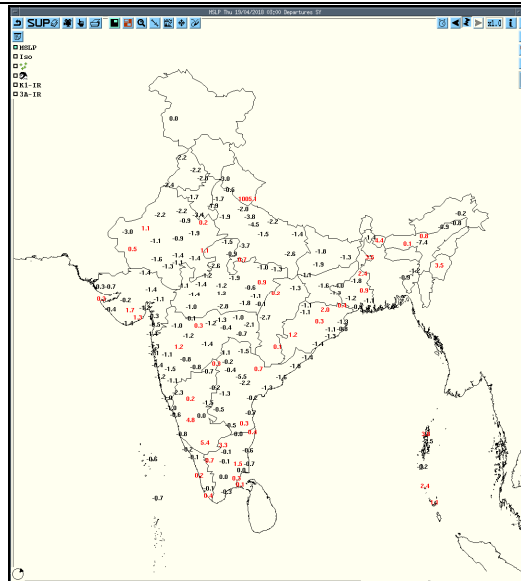
**Departure Tmax**



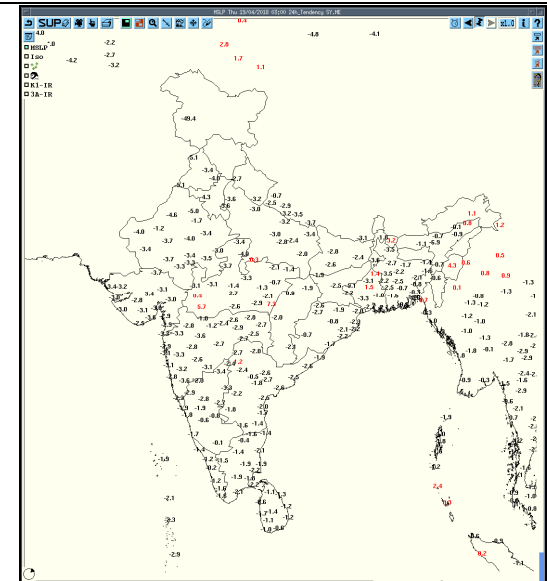
**Tendency Tmax**



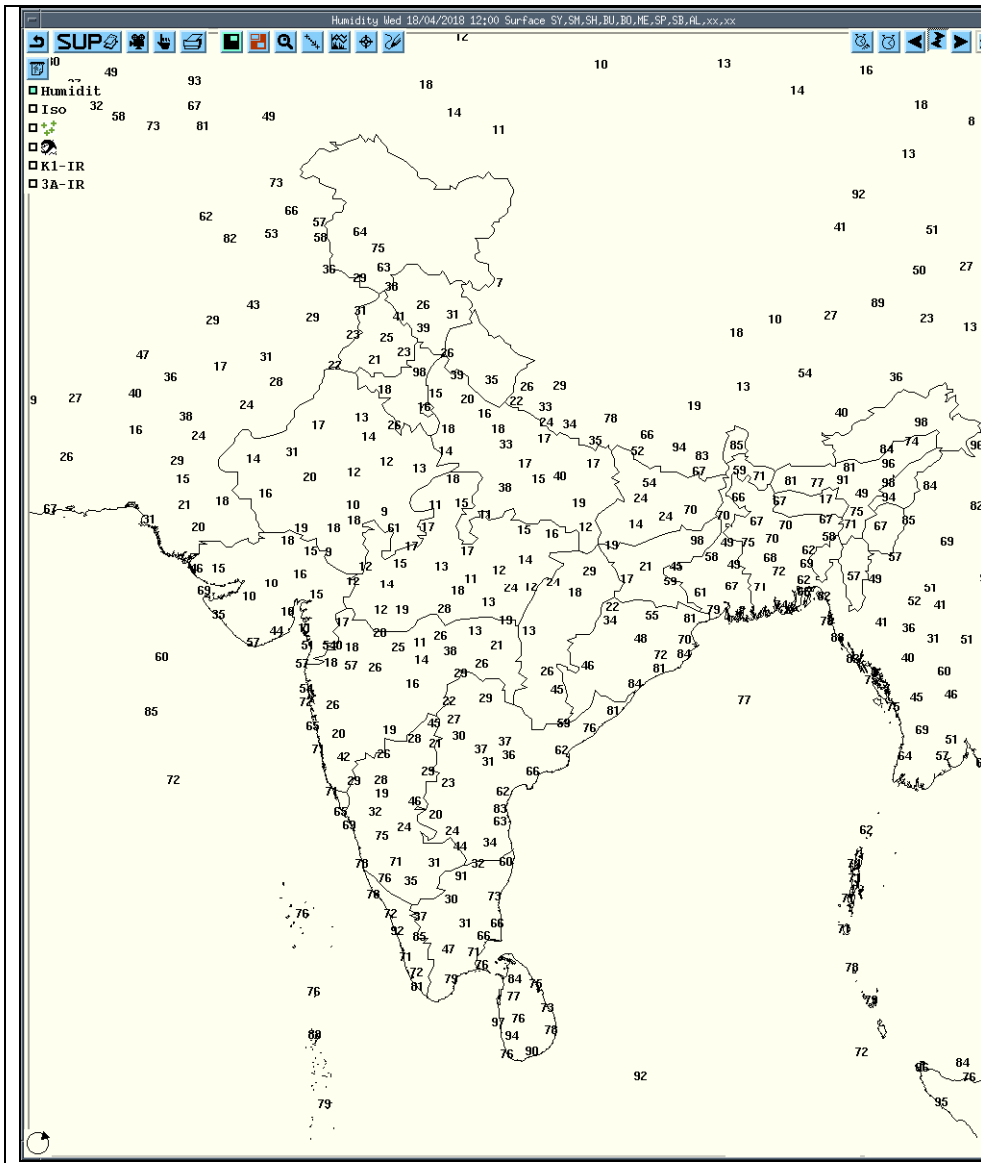
**MSLP**



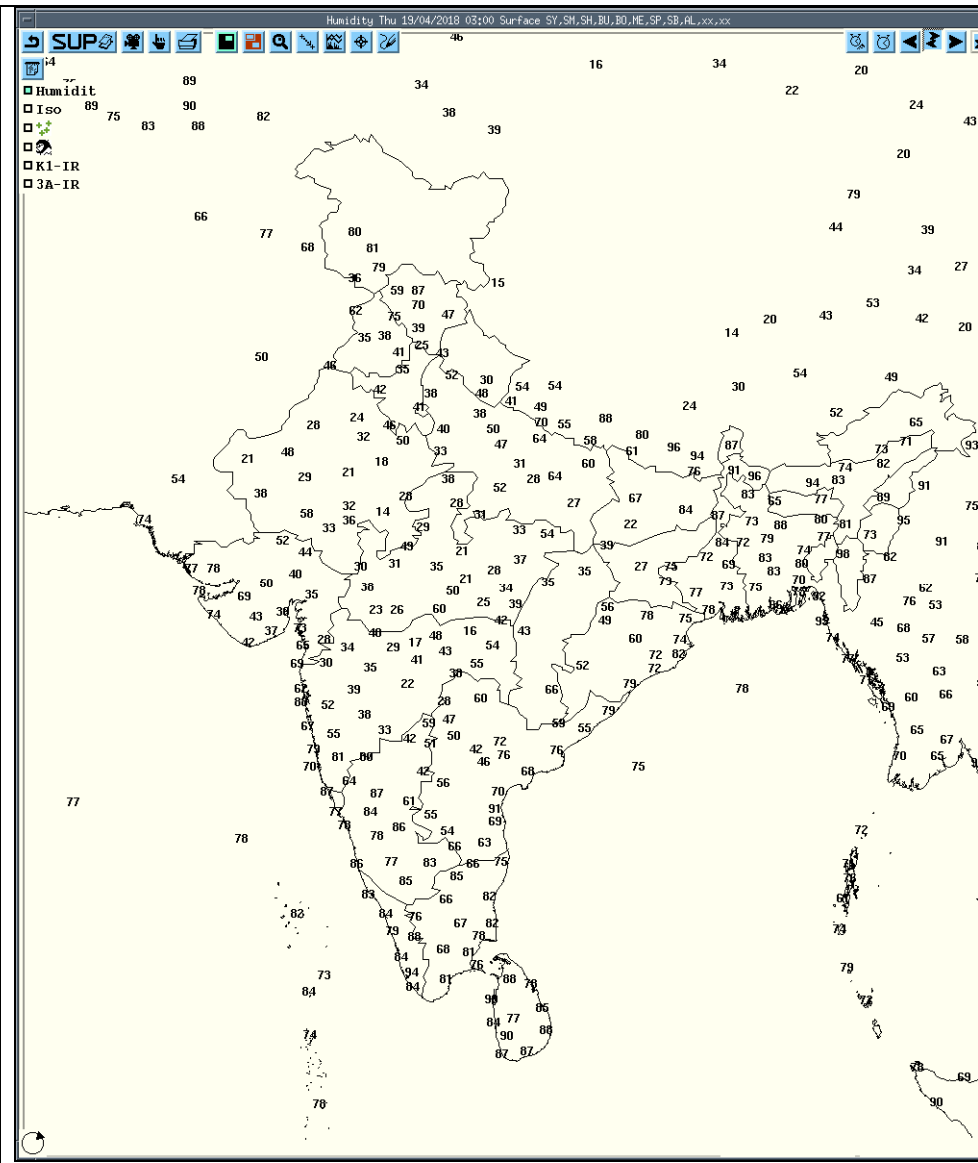
**Departure MSLP**



**Tendency MSLP**



RH at 12UTC yesterday



RH at 03UTC today

## Past 24 hours DWR Report:

Radar Station Name	Date	Time Interval of Observation (UTC)	Organisation of 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	18-04-18	0302 – 0931	NIL	NIL	NOSIG ECHO	NIL	NIL
		0941 – 1302	Isolated cell developed at a position 22.337 N/ 86.302 E/ 263.5 Degree/ 212.3 km away from radar transformed into big cell with maximum reflectivity of 58.0 dBz at 1121 UTC and maximum height of 7.12 Km at 1121 UTC	WSW (263.5 km) Moving in SE-ward direction.	Cell started forming at 0941 UTC at WSW (263.5 Km) from radar. Matured and moving into Bay of Bengal completely at 1302 UTC in SW at a distance of 146.3 Km from Radar.	Thunderstorm /Rain	N/A
		1241-1621	Single cell with maximum reflectivity of 66.0 dBz at 1341 UTC and maximum height 15.07 km at 1341 UTC	NNW (233.7km) Moving in SE-ward direction at a speed of 30 kmph.	Isolated Single Cell coming from NNW at 1241 UTC at a distance of 233.7 km from Radar, Matured and splitted into two parts at 1341 UTC in NNW at a distance 205.3 km from Radar and moving into Bangladesh in NNE at 1621 UTC at a distance of 134.8 km from Radar.	Thunderstorm/ Rain	N/A
		1602-1901	Single cell with maximum reflectivity of 58.5 dBz at 1621 UTC and maximum height 11.11 km at 1621 UTC	NNW (231.9km) Moving in SE-ward direction at a speed of 58 kmph.	Isolated Single Cell developed in NNW at 1602 UTC at a distance of 231.9 km from Radar, Matured and transformed into multi-celled system at 1631 UTC in NNW at a distance 218.1 km from Radar and moving completely into Bangladesh in NNE at 1901 UTC at a distance 180.0 km from Radar.	Thunderstorm/ Rain	N/A
	1911 –2400	NIL	NIL	NOSIG ECHO	NIL	NIL	
	19-04-18	0001 – 0301	NIL	NIL	NOSIG ECHO	NIL	NIL
Jaipur	19/04/18	0300 UTC	NIL	NIL	NIL	NIL	NIL
Patiala	19/04/18	0300 UTC	NIL	NIL	NIL	NIL	NIL
Patna	19/04/18	0300 UTC	NIL	NIL	NIL	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	18/04/18	0900	Isolated Cb cells with maximum reflectivity of 63 dBZ height of 10 kms	W (118 kms) moving S ly	Cb cells formed at 0811UTC matured at 0841 UTC	NIL	East Godavari dist.
		1200	Multiple Cb cells with maximum reflectivity of 66 dBZ with height of 13 kms	WSW ( 160 kms) N (37 KMS) moving S ly	Since last observation Cb cells developing matured at 1041 UTC and started dissipating from 1151 UTC	Thunderstorm lightening possibility of rain	Visakhapatnam srikakulam gajapati ganjam rayagada districts of orissa
		1500	Multiple Cb cells with maximum reflectivity of 64 dBZ with height of 18 kms	W ( 10 kms)NW(125 KMS) N (85 KMS) and NE(135 KMS) moving SE ly	Since last observation Cb cells developing, matured to Max. reflectivity of 64dBz at 1211 UTC and dissipating .	Thunderstorm, Lightning and Rain	Visakhapatnam Vizianagaram, srikakulam Dist. (AP) Gajapati, Ganjam, Koraput districts (Orissa) Bastar (Chatisgarh)
		1800	Multiple Cb cells with maximum reflectivity of 56 dBZ with height of 18 kms	CB cells are close to the SW of Radar, W ( 38kms) and NE(90 KMS) moving SE ly	Since last observation Cb cells are developing and dissipating. Convective region formed in Bay of Bengal region at 1731UTC.	-	Visakhapatnam, East Godavari Dist. (AP)
	19/04/18	0000	Convective region with maximum reflectivity of 50 dBZ with height of 9 kms	S& SW(50 kms) moving SEly	Since last observation Convective region formed in Bay of Bengal region and dissipating from 1811UTC.	-	Visakhapatnam, Dist. (AP)
	19/04/18	0300UTC	Convective region with maximum reflectivity of 43 dBZ with height of 4 kms	S& SW(188 kms) moving SEly	Convective region formed in Bay of Bengal region and dissipating from 0251UTC.	-	-
Lucknow	19/04/18	180300-182332 -	NIL	NIL	NIL	NIL	NIL
		182332-190252	Multiple cell system formed at around 2332 UTC over 150 Km NW. Max. reflectivity observed was 42.5 dBZ and height reached 7 Km on ( 20 dBZ echo top).	System moved SEly approaching the station with avg. velocity 60 Km/hr.	Weakened after passing the station and dissipated at around 0252 UTC over 50 Km E to the station.	TS	Unnao Hardoi



## 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)
Srinagar	Northwest India	Jammu & Kashmir	Thunderstorm	18-04-18	0100	0140
Qazigund	Northwest India	Jammu & Kashmir	Thunderstorm	18-04-18	1650	1715
Pahalgam	Northwest India	Jammu & Kashmir	Thunderstorm	18-04-18	1900	1915
Kukernag	Northwest India	Jammu & Kashmir	Thunderstorm	18-04-18	1705	1720
Banihal	Northwest India	Jammu & Kashmir	Thunderstorm	18/19-04-18	1635 0520	1725 0525
Dumdum	East India	Gangetic West Bengal	Thunderstorm	19-04-18	0450	0830
Digha	East India	Gangetic West Bengal	Thunderstorm	18-04-18	1835	2035
Balasore	East India	Odisha	Thunderstorm	18-04-18	1740	1915
Passighat	Northeast India	Arunachal Pradesh	Thunderstorm	18-04-18	1630	1830
Jorhat	Northeast India	Assam	Thunderstorm	18-04-18	1340	1410
Silchar	Northeast India	Assam	Thunderstorm	18/19-04-18	2030	0330
Tezpur	Northeast India	Assam	Thunderstorm	18-04-18	2300	2330
Shillong	Northeast India	Meghalaya	Thunderstorm	18-04-18	1135 1700	1145 1900
Imphal	Northeast India	Manipur	Thunderstorm	18-04-18	1535	1650
Kailasahar	Northeast India	Tripura	Thunderstorm	18-04-18	2040	2300
Agartala	Northeast India	Tripura	Thunderstorm	19-04-18	0100	0320
Kalingapatnam	South India	Coastal Andhra Pradesh	Thunderstorm	18-04-18	1840 2200	1840 2200
Tuni	South India	Coastal Andhra Pradesh	Thunderstorm	18-04-18	2045 2310	2120 2400
Visakhapatnam	South India	Coastal Andhra Pradesh	Thunderstorm	18-04-18	1705	2200
Kakinada	South India	Coastal Andhra Pradesh	Thunderstorm	18-04-18	2200	2305
Kurnool	South India	Rayalaseema	Thunderstorm	18-04-18	2200	2350
AMS Bajpe	South India	Coastal Karnataka	Thunderstorm	18-04-18	1644	1720
Gadag	South India	North Interior Karnataka	Thunderstorm	18-04-18	1800	1910
Madkeri	South India	South Interior Karnataka	Thunderstorm	18-04-18	1640	1815
CIAL Kochi	South India	Kerala	Thunderstorm	18-04-18	1630	1810
Kannur	South India	Kerala	Thunderstorm	18-04-18	1630	1800
Minicoy	South India	Minicoy	Thunderstorm	18-04-18	0940	1055
Kanyakumari	South India	South Tamilnadu	Thunderstorm	18-04-18	0830	0900

## 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:



+ thunderstorm



+ heavy thunderstorm



sandstorm or dust storm



squall



hail shower



tropical storm



+ tornado



+ lightning



+ hurricane

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