



## India Meteorological Department

### FDP STORM Bulletin No. 6 (12-03-2018)

#### 1. CURRENT SYNOPTIC SITUATION:

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

- ♦ The well marked low pressure area over Equatorial Indian Ocean and adjoining Comorin area, south Sri Lanka & Southwest Bay of Bengal now lies over Equatorial Indian Ocean and adjoining south Sri Lanka & Maldives - Comorin Area. It is very likely to move initially west - north-westwards and then north-westwards and concentrate into a depression over southeast Arabian Sea (Maldives area) during next 36 hour.
- ♦ The Western Disturbance as an upper air cyclonic circulation over north Pakistan & neighbourhood now lies over northern parts of Jammu & Kashmir and neighbourhood at 3.1 km above mean sea level.
- ♦ A fresh Western Disturbance as a trough in mid tropospheric westerlies with its axis at 5.8 km above mean sea level runs roughly along Long 45°E to the north of Lat 25°N.
- ♦ The cyclonic circulation over southwest Rajasthan & neighbourhood persists and now extends upto 0.9 km above mean sea level persists.
- ♦ The north south trough in the westerlies roughly along Long. 94°E to the north of Lat. 24°N at 3.1 km above mean sea has moved away eastwards.
- ♦ A north south trough runs from central parts of Madhya Pradesh to south Madhya Maharashtra across west Vidarbha at 0.9 km above mean sea level.
- ♦ The cyclonic circulation over north Madhya Maharashtra & neighbourhood at 0.9 km above mean sea level has merged with the above system.
- ♦ A cyclonic circulation at 0.9 km above mean sea level lies over north Odisha & neighbourhood.
- ♦ The trough of low at mean sea level from Lakshadweep area to Konkan along the west coast has become less marked.

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

##### Current Observation (based on 0300UTC imagery of INSAT 3D):

##### LOW LEVEL CIRCULATION (LLC) :

Vortex over SE Arabian Sea, Comorin area, extreme SW Bay, Srilanka & neighbourhood centered within half a degree of Lat 3.5N/77.0E, Intensity T1.0 RPT T1.0, associated broken low/medium clouds with embedded intense to very intense convection seen over area between Equator to Lat 8.0N Long 72.0E to 83.0E Srilanka (Minimum CTT Minus 80 Deg C).

##### Clouds descriptions within India:

Broken low/medium clouds with embedded isolated weak to moderate convection seen over North Sub Himalayan West Bengal, Sikkim, Assam and Arunachal Pradesh. Scattered low/medium clouds with embedded isolated weak to moderate convection seen over exterior South Tamilnadu and Nicobar Islands. Scattered low/medium clouds with seen over Nagaland, South Bihar, Jharkhand, South Gangetic West Bengal, Odisha, Marathwada, Telangana and South Kerala. Scattered low/medium clouds with embedded isolated weak convection seen over rest Jammu & Kashmir.

##### Arabian Sea:

Isolated low medium clouds with embedded moderate to intense convection seen over Gulf of Mannar Comorin and extreme Southeast Arabian Sea.

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

Broken low/medium clouds with embedded moderate to intense convection seen over rest South Bay South of Lat. 10.0N. Scattered low/medium clouds with embedded isolated weak to moderate convection seen over Andaman Sea

### **Past Weather:**

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

Moderate to intense convection was observed over J & K and weak to moderate convection over Sikkim, Arunachal Pradesh & Assam.

#### **OLR:-**

Upto  $250 \text{ Wm}^{-2}$  was observed over J & K, North Himachal Pradesh, North Uttarakhand, Sikkim, Arunachal Pradesh, Kerala, Tamilnadu.

**Westerly Trough & Jet-Stream:** Jet wind speed in Upper levels seen between Long  $60^{\circ}\text{E}$  to  $75^{\circ}\text{E}$  along near Lat  $35^{\circ}\text{N}$ .

#### **Dynamic Features:**

Positive shear tendency is observed over the country.

Medium to high wind shear is observed over North & Central India.

#### **Precipitation:**

##### **IMR:**

Rainfall upto 1-20 mm observed over NW J&K North-East Himachal Pradesh Sikkim & Arunachal Pradesh.

##### **HEM:**

Rainfall upto 7 mm observed over NW J&K Sikkim and Arunachal Pradesh.

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

No convection was seen in Radar Composite at 1320 IST.

No convection is seen over India in RAPID RGB Satellite imagery at 1300IST.

#### **Environmental condition (dust etc) and its forecast based on 00UTC of date:**

Higher Dust concentration was observed over north Africa and Arab countries . Dust concentration is expected to increase over north-western part of India for next five days. PM10 concentration is expected to increase over IGP in next five days.

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

Delhi – SAFAR analysis & Forecast	12.03.2018	13.03.2018
PM10 (micro-g/m <sup>3</sup> )	149	155
PM2.5 (micro-g/m <sup>3</sup> )	81	85

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

### **NCMRWF (NCUM Forecasts based on 00 UTC of the day):-**

#### **1. Weather Systems: Low level Cycirs, Troughs:**

**12 UTC of Day 0-4:** CYCIR over equatorial Indian Ocean, moving west-north-westwards off southern peninsular India

**12 UTC of Day 0-2:** 850 hPa Trough over western Rajasthan

**12 UTC of Day 0:** Feeble trough at 850 hPa over WB & adjoining Bangladesh moving eastward and lies over NE India & adjoining Bangladesh in Day 1-2, 12 UTC of Day 1-2: Feeble trough over western coast of India

**Confluence & Wind Discontinuity Regions: 12 UTC of Day 0-2:** North - south wind discontinuity over central India extending from Maharashtra-MP-Chhattisgarh-Odisha.

**Synoptic Systems: 12 UTC Charts of Day 0-4 00UTC Charts show:** Feeble Western disturbance during Day 1-4 over J&K

**2. Location of jet and jet core (>60kt) at 500hPa:** Weaker core winds at 12 UTC on all days over India.

### 3. Convergence at 850 hPa:

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

Day0: Gangetic WB, Jharkhand, Jammu Kashmir, Odisha, East MP, Madhya Maharashtra, Coastal AP, Coastal Karnataka, SI Karnataka, Kerala,

Day1: NE NMMT, Odisha, Madhya Maharashtra, Coastal AP, Coastal Karnataka, NI Karnataka, SI Karnataka,

Day2: Odisha, West MP, East MP, Madhya Maharashtra, Coastal AP, Telangana, Coastal Karnataka, NI Karnataka, SI Karnataka,

Day3: NE NMMT, Jharkhand, West UP, Uttarakhand, Hry Chd Delhi, Himachal Pradesh, Odisha, Marathwada,

Day4: Arunachal Pradesh, Assam Meghalaya, Jammu Kashmir, East MP, Madhya Maharashtra, Coastal AP,

### 4. Spatial distribution of Low level Vorticity:

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

Day0: Assam Meghalaya, NE NMMT, Bihar, West UP, Uttarakhand, Himachal Pradesh, Jammu Kashmir, TN Puducherry, Kerala,

Day1: Sub Himalayan WB, Gangetic WB, Bihar, West UP, Uttarakhand, Himachal Pradesh, Madhya Maharashtra, Coastal AP, TN Puducherry, Coastal Karnataka, SI Karnataka, Kerala,

Day2: Assam Meghalaya, Sub Himalayan WB, Bihar, Punjab, West RJ, Odisha, TN Puducherry, NI Karnataka, SI Karnataka, Kerala,

Day3: Assam Meghalaya, Gangetic WB, Jharkhand, Bihar, East UP, West UP, Himachal Pradesh, Odisha, East MP, Marathwada, NI Karnataka,

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, East UP, Punjab, East RJ, Vidarbha,

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

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

Day0: Gangetic WB,

Day1: NE NMMT, Sub Himalayan WB, Uttarakhand, Himachal Pradesh,

Day2: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir,

Day3: Arunachal Pradesh, Sub Himalayan WB, Bihar, Jammu Kashmir, Coastal Karnataka,

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Punjab, Himachal Pradesh, Jammu Kashmir, TN Puducherry

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

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

Day0: Gangetic WB,

Day1: Sub Himalayan WB, Uttarakhand,

Day2: Arunachal Pradesh, Sub Himalayan WB,

Day3: Arunachal Pradesh, Sub Himalayan WB, Coastal Karnataka, SI Karnataka,

Day4: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Vidarbha, Coastal AP, Telangana, Rayalseema, TN Puducherry, NI Karnataka, SI Karnataka

### 7. Spatial distribution of TTI: TTI $> 50$ [Scattered Thunderstorms few severe]:

#### Day/Index : Subdivision with Total Totals Index $> 52$

Day0: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha,

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

Day2: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Punjab, Himachal Pradesh, Jammu Kashmir, West RJ,

Day3: Arunachal Pradesh, Sub Himalayan WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Hry Chd Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West RJ, East RJ, West MP, East MP,

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, East UP, West UP, Uttarakhand, Hry Chd Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, East RJ

## 8. Rainfall and thunder storm activity:

### Day/Index: Subdivisions with Precipitation > 2 cm

Day1: TN Puducherry,

Day2: Assam Meghalaya, NE NMMT, Jammu Kashmir, TN Puducherry,

Day3: Himachal Pradesh, Jammu Kashmir, TN Puducherry, Kerala,

Day4: Arunachal Pradesh, Assam Meghalaya, Himachal Pradesh, Jammu Kashmir, TN Puducherry, SI Karnataka,

Day5: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Himachal Pradesh, Jammu Kashmir, Coastal AP, Rayalseema, TN Puducherry, Coastal Karnataka, SI Karnataka, Kerala,

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

**1. Synoptic Systems:** The analysis based on 00 UTC shows a north-south oriented trough over north Madhya Maharashtra persists and orientation gradually becomes north-east to south-west during next 3 days. Forecast shows that a cyclonic circulation over north Pakistan and adjoining Panjab moves eastward and lies over Punjab and adjoining areas on day3. Forecasts also show the north-west to south-east trough from Bihar to Bangladesh persists during next 3 days. Cyclonic circulation over the Comorin area moves north-westward during next 3 days. Contour at 500 hPa shows a Western Disturbance would affect northwest parts of India during day3 to day4.

**2. Location of Jet and Jet Core (>60kt) at 500hPa):** Presence of no jet core over the Indian region for the next 3 days.

**3. Low Level Vorticity {850hPa Positive Vorticity ( $>12 \times 10^{-1}/s$ )}**: Mostly along the trough over north Madhya Maharashtra, along the foot hill of Himalaya, parts of Rajasthan, along Gangetic plain, parts of central India and north eastern states during next 3 days.

**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( > 4):** Higher than threshold value 4 over the Gangetic West Bengal on day1. Less than threshold value 4 all over the country but it is 3-3.5 along west coast and east coast during next 3 days.

**Lifted Index (< -2):** Higher than threshold value -2 all over the country during next 3 days but it is less than threshold value -2 over the Gangetic West Bengal on day 1 and along the east coast during next 3 days.

**Total Total Index ( > 50) :** Above threshold value over the central parts of India and Gangetic plain during next 3 days.

**Sweat Index ( > 300):** Mostly along Andhra Pradesh coast, Odisha coast and over the Gangetic West Bengal during next 3 days and parts of Gujarat and Rajasthan on day2 and day3.

**CAPE (> 1000):** Mostly along southern parts of west coast and east coast during next 3 days and over Gangetic West Bengal on day1.

**CIN (50-150):** Mostly along east coast, west coast and over parts of north eastern states during next 72 hours and parts of Rajasthan and Gujarat on day3.

## 5. Rainfall activity

10-20 mm rainfall: over parts of Arunachal Pradesh and Tripura on day1, 10 mm rainfall over the rest parts of north eastern states on day2 and day3.

Up to 10 mm rainfall: over parts of Madhya Pradesh and Karnataka on day3.

10-70 mm rainfall: over parts of Tamilnadu on day1, 10-20 mm rainfall on day2 and 10 mm rainfall on day3.

10 mm rainfall: over parts of Kerala on day1, 10-40 mm rainfall on day2 and 10-20 mm rainfall on day3.

Up to 10 mm rainfall: over Himachal Pradesh and Uttarakhand during next 3 days.

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

**1. Model Reflectivity (Max.dBz):** 5-30 dBZ Model reflectivity over parts of J&K during next 3 days

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

**Total Total Index ( > 50) :** Above threshold value is observed over most parts of the country except south peninsula, J&K and Arunachal Pradesh during next 72 hour.

**K-Index ( > 35):** Less than threshold value is observed over the country during the next 72 hour.

**CAPE (> 1000):** Greater than threshold value over the southern part of west coast, east coast, Gangetic West Bengal and parts of northeastern states during the next 72 hours.

**CIN (50-150):** Mostly over Panjab, Delhi & Haryana, Uttar Pradesh, west coast, east coast, Gangetic West Bengal and parts of north eastern states during next 3 days.

**3. Rainfall and thunderstorm activity:** Rainfall 10-40 mm over parts of J&K, Arunachal Pradesh and Tamilnadu on day1.

Rainfall 10-70 mm: over J&K on day2 and day3.

Rainfall 10-40 mm: over Tamilnadu on day2 and day3.

Rainfall 10-20 mm: over NMMT on day2.

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

#### Summary and Conclusions:

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

A north-south trough runs from central parts of Madhya Pradesh to south Madhya Maharashtra across west Vidarbha in lower level and a cyclonic circulation lies over north Odisha & neighbourhood both extends upto 0.9 km above mean sea level. Upper air jet core passes through between lat 27<sup>0</sup> North and 30<sup>0</sup> North. Under influence of above synoptic system Thermodynamic parameter & NWP guidance; the thunderstorm accompanied with gusty winds very likely at isolated places over Jharkhand and Gangetic west Bengal during next 24 hours and over Odisha during next 48 hours and Thunderstorms likely at isolated places over coastal area of South Tamilnadu and South Kerala during next 48 hours.

##### 24 hour Advisory for IOP:

###### Rainfall:

Nil

###### Thunderstorm with associated phenomena:

Jharkhand, Gangetic West Bengal, Odisha

##### 48 hour Advisory for IOP:

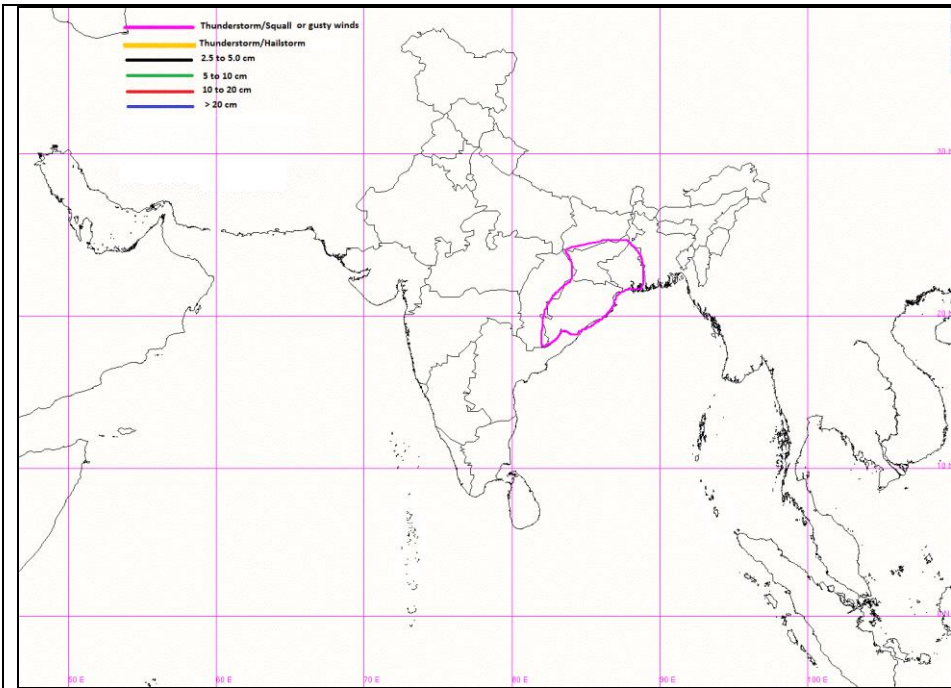
###### Rainfall:

Lakshadweep Islands

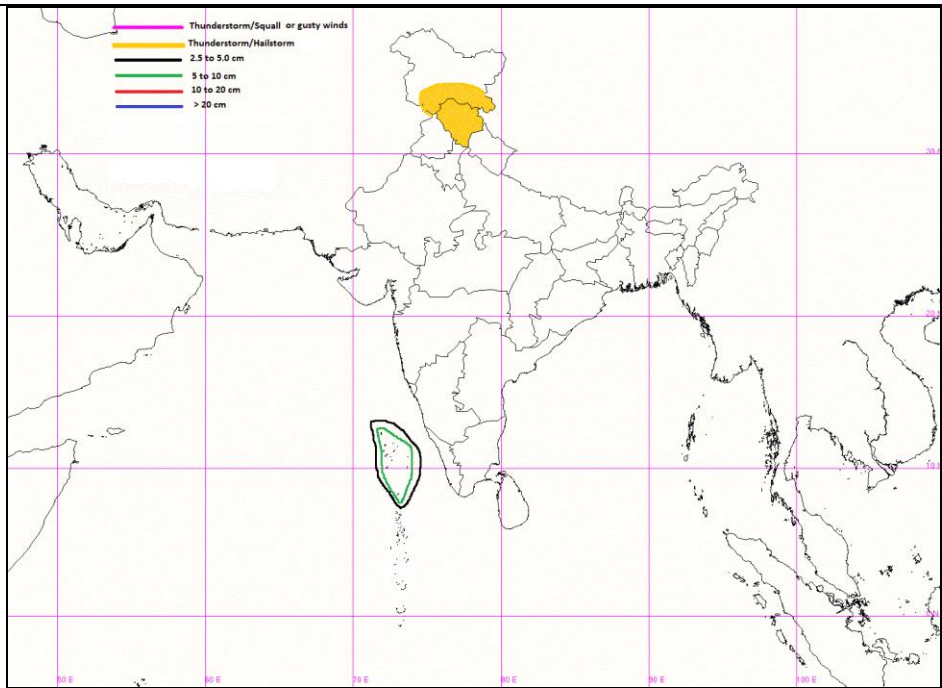
###### Thunderstorm with associated phenomena:

Jammu & Kashmir Division, Himachal Pradesh,

Graphical Presentation of Potential Areas for Severe Weather:

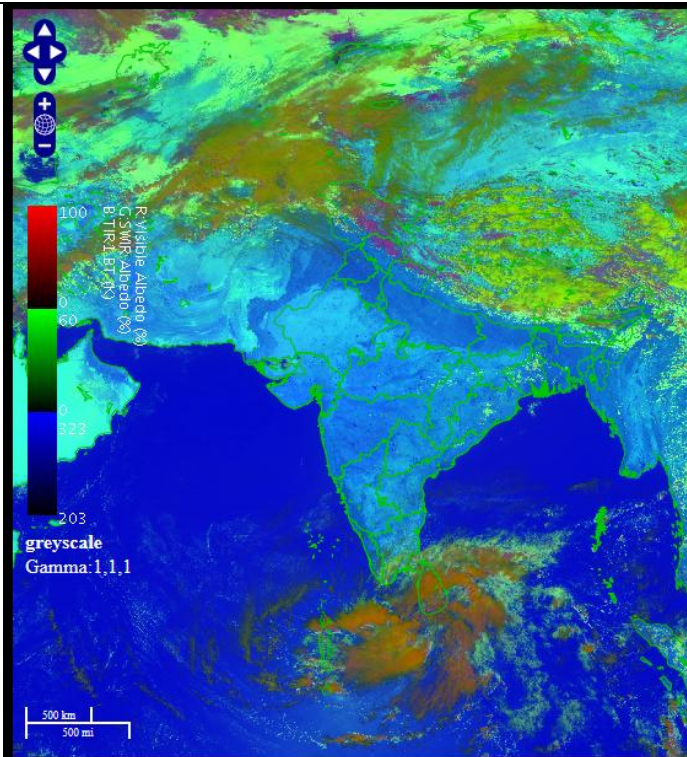


IOP Advisory for 24 hours

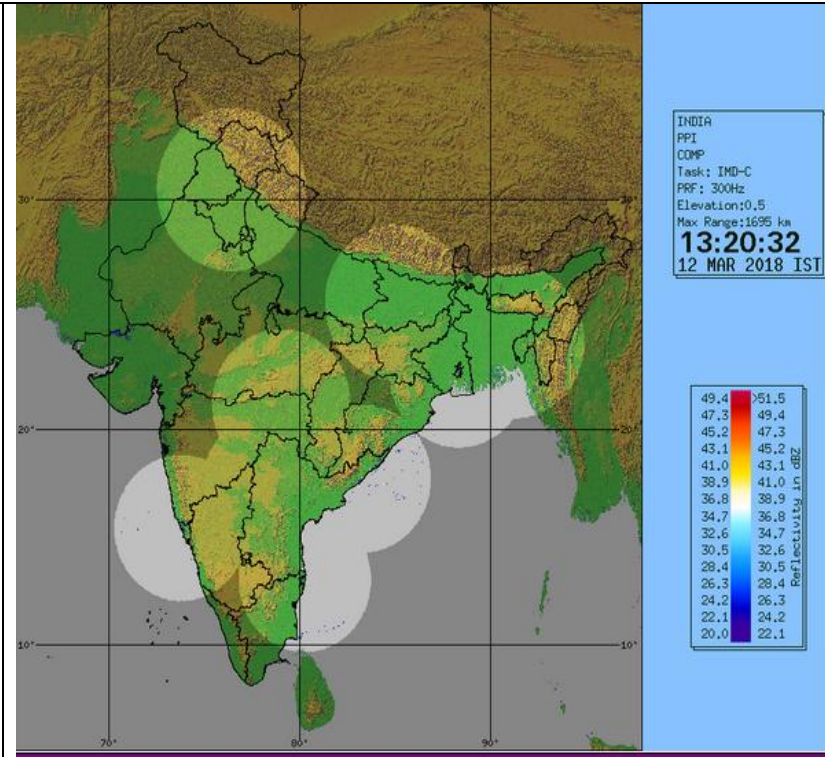


IOP Advisory for 48 hours

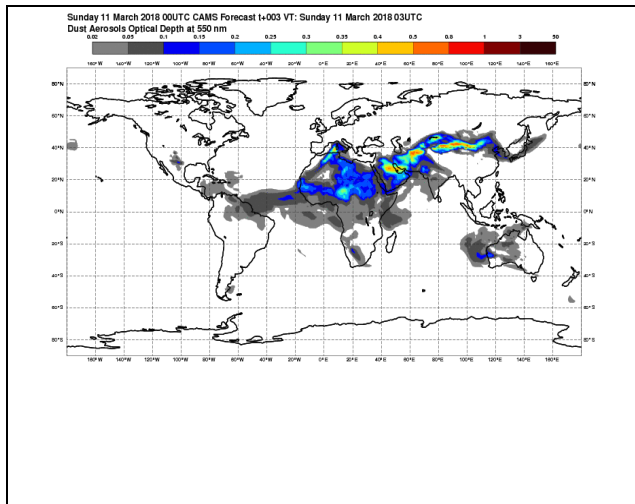




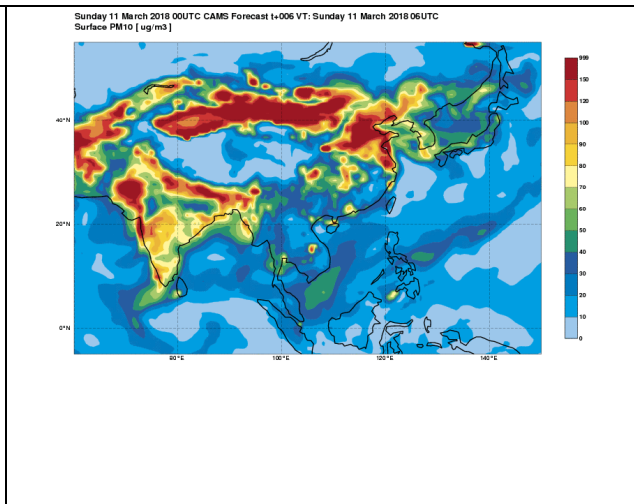
**RAPID RGB Imagery at 1300IST of the Day**



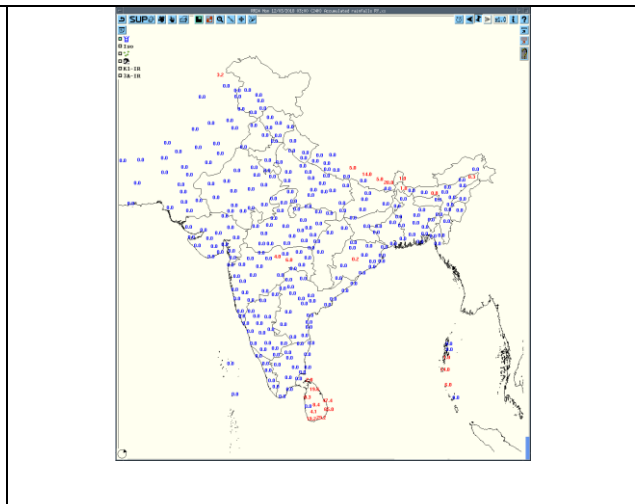
**DWR Composite at 1320 IST of the Day**



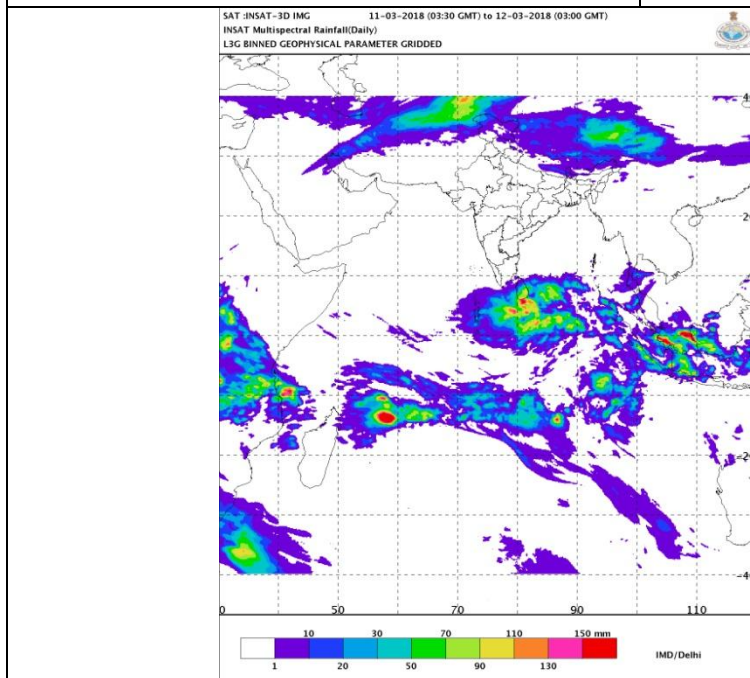
**Forecast Dust Concentration**



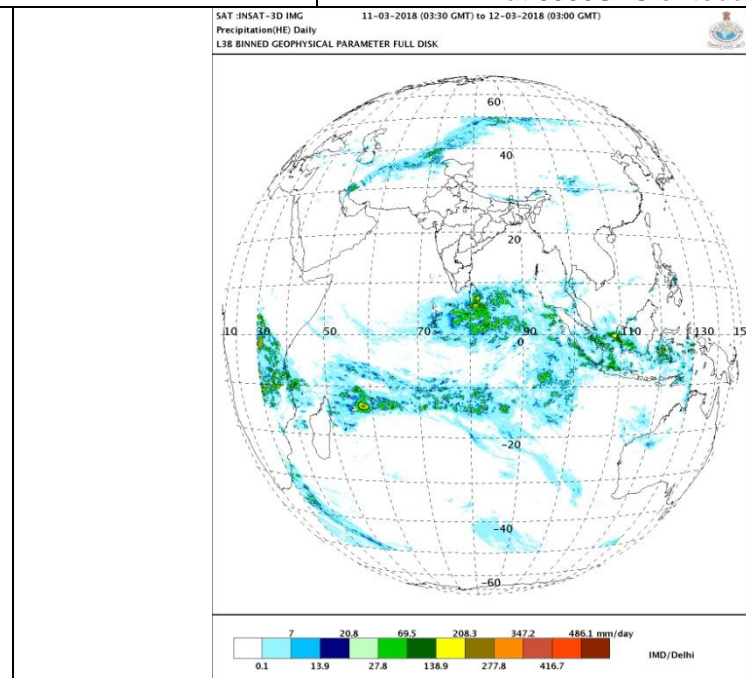
**PM10 Forecast**



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

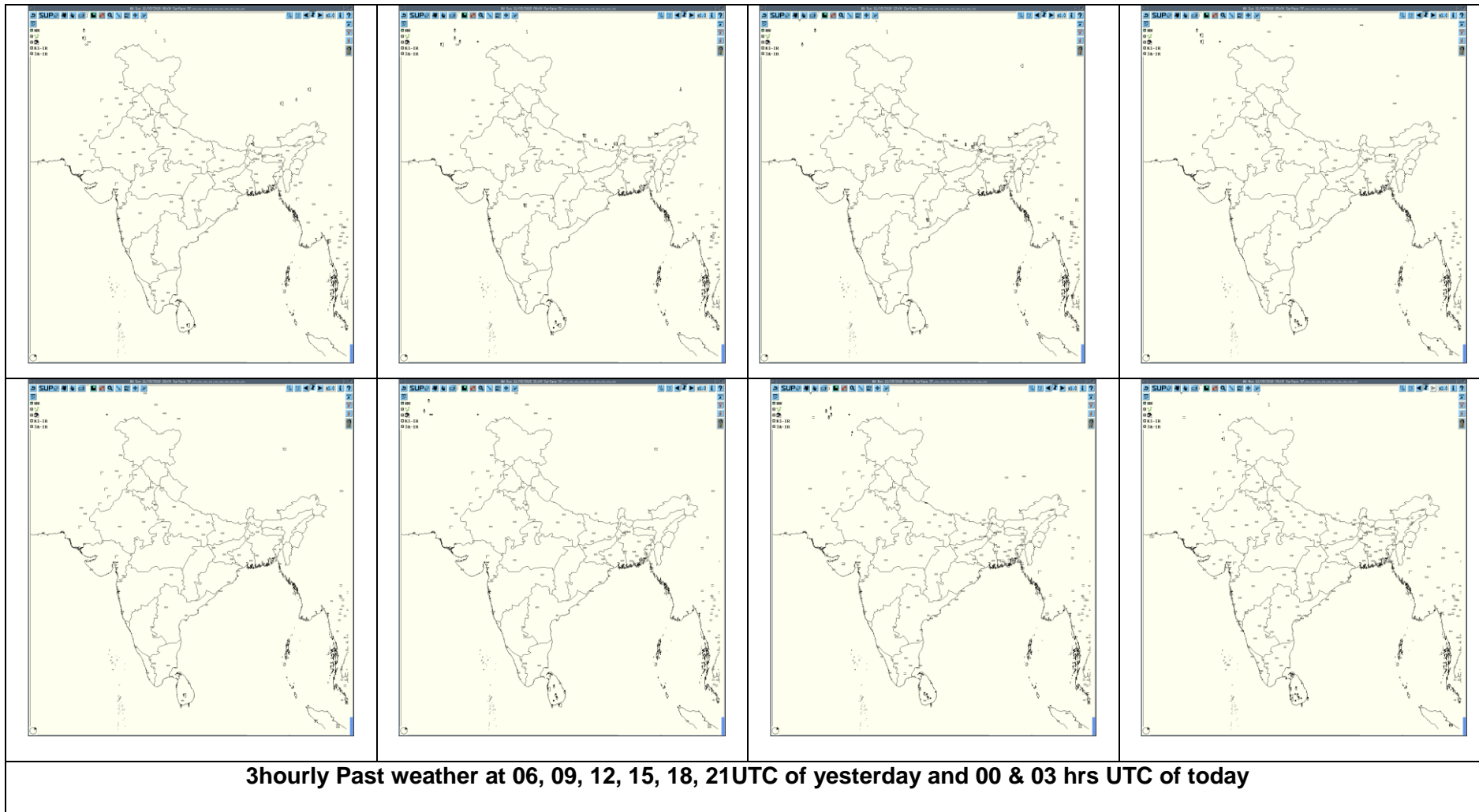


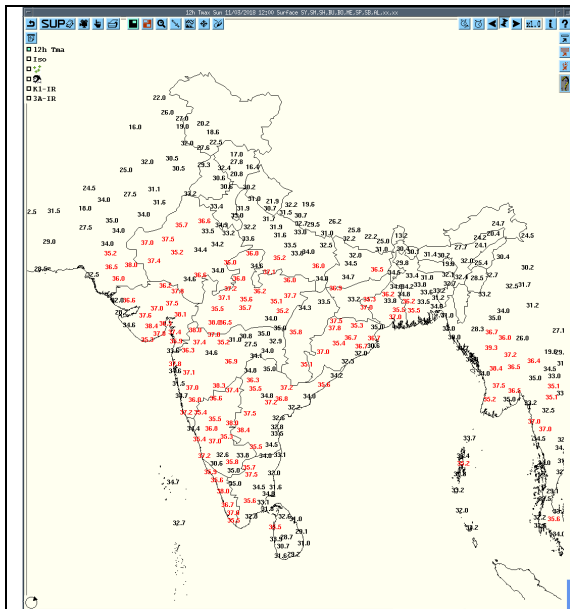
**IMR**



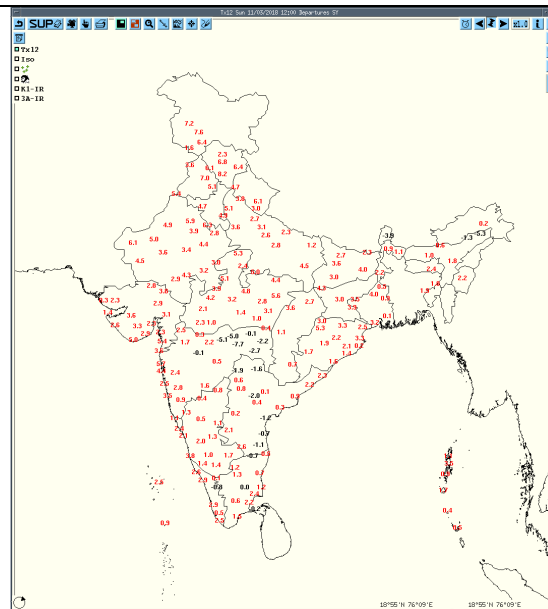
**HEM**



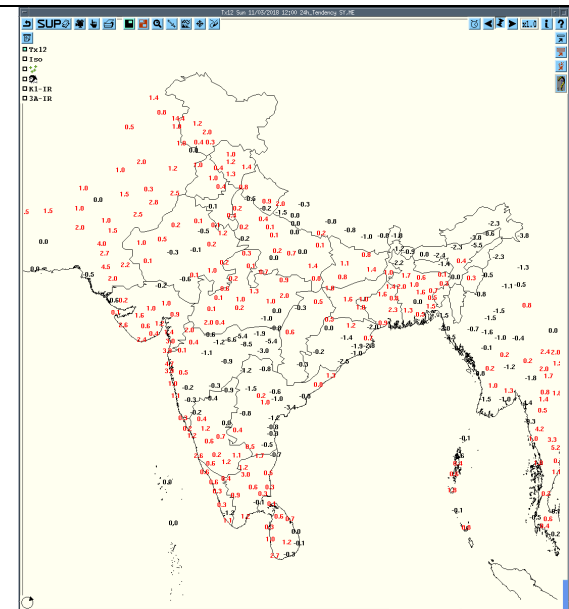




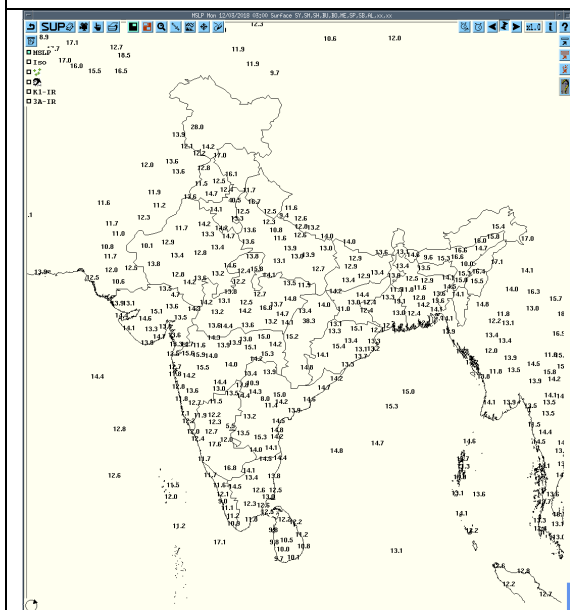
Tmax



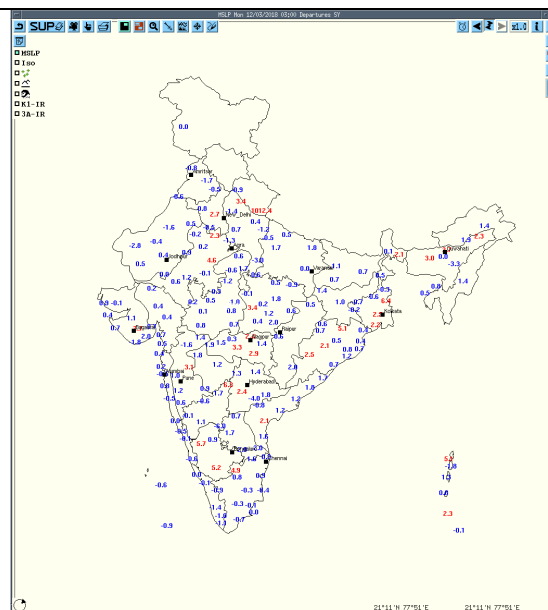
Departure Tmax



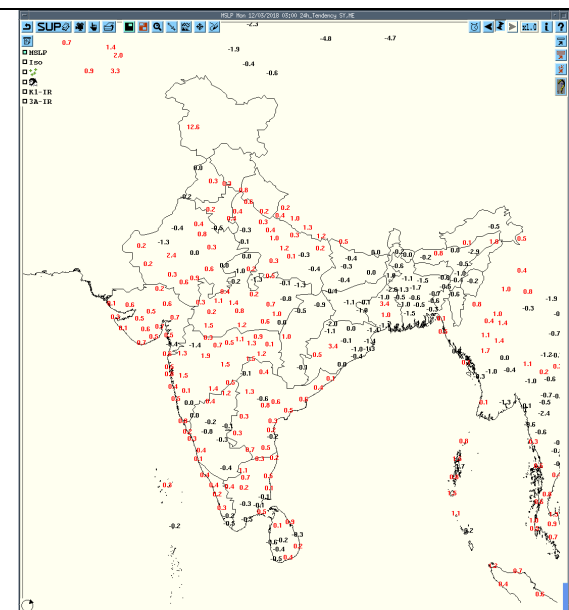
Tendency Tmax



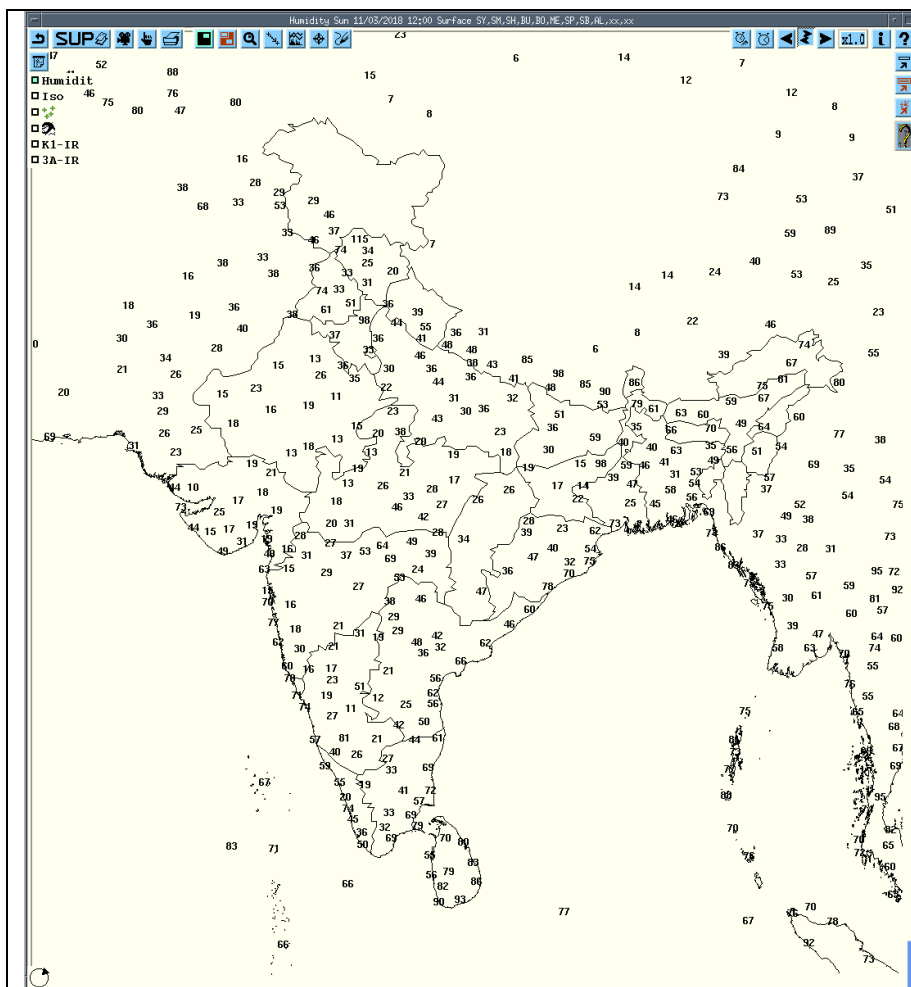
MSLP



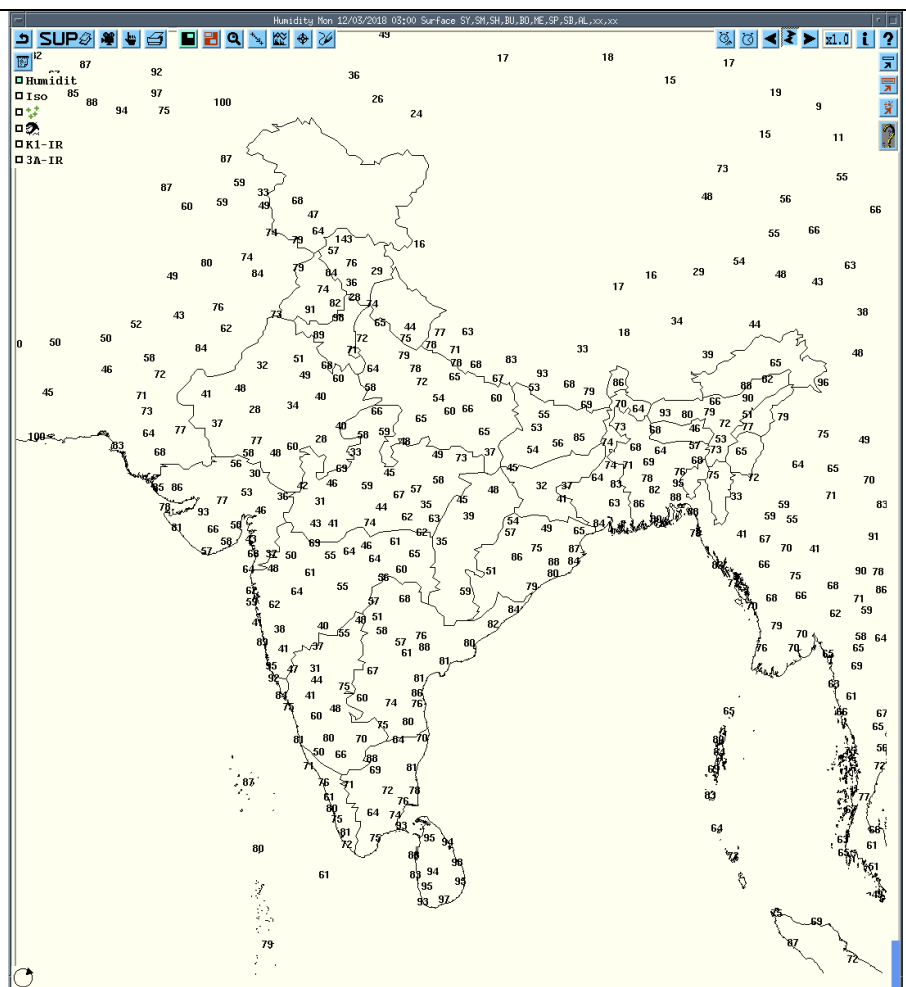
Departure MSLP



Tendency MSLP



**RH at 12UTC yesterday**



**RH at 03UTC today**

### Past 24 hours DWR Report:

DWR Station Name	Date of Report	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.e.f. radar station and Direction of movement	Remarks	Associated Severe Weather if any	Districts affected
Agartala	12-03-18	110300 -120300	Nil	Nil	Nil	Nil	Nil
Visakhapatnam	12-03-18	110300 -120300	Nil	Nil	Nil	Nil	Nil
Lucknow	12-03-18	110300 -120300	Nil	Nil	Nil	Nil	Nil
Patna	12-03-18	110300 -120300	Nil	Nil	Nil	Nil	Nil
Kolkata	12-03-18	110300 -120300	Nil	Nil	Nil	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 RAPID tool:

<http://rapid.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>

Upper level winds

<http://satellite.imd.gov.in/archive/INSAT-3D-IMAGER/3D-PRODUCTS/AMV/HLW/MAR 2017/?C=M;O=D>

Past 24 hour HEM and IMR rainfall (upto 03 UTC of 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)

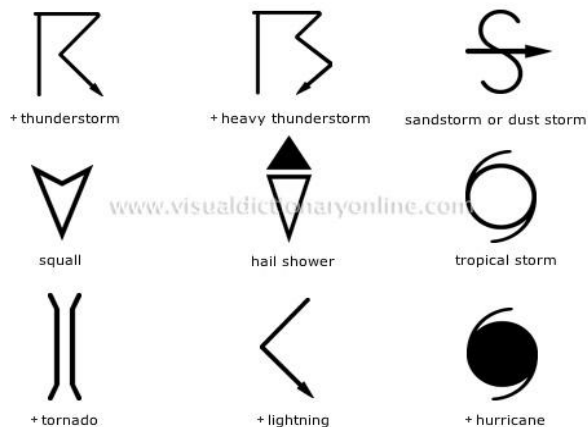
For Radar images of the past 24 hours including mosaic of images:

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

Satellite sounder based T- Phigram

[http://satellite.imd.gov.in/map\\_skm2.html](http://satellite.imd.gov.in/map_skm2.html)

## WEATHER SYMBOLS:



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