



## India Meteorological Department

### FDP STORM Bulletin No. 4 (10-03-2018)

#### 1. CURRENT SYNOPTIC SITUATION:

##### NWFC INFERENCE (Mid- Day):

- ◆ The trough of low at mean sea level over Equatorial Indian Ocean and adjoining central parts of south Bay of Bengal now lies as a low pressure area over southwest Bay of Bengal off Sri Lanka - South Tamilnadu coasts. Associated Cyclonic Circulation extends upto mid-Tropospheric levels. It is likely to become more marked and move westwards during next 48 hrs.
- ◆ The other trough of low at mean sea level from Lakshadweep area to Konkan along the west coast persists.
- ◆ The Western Disturbance as an upper air cyclonic circulation at 3.1 km above mean sea level over north Pakistan & neighbourhood and the trough aloft in mid & upper tropospheric westerlies with its axis at 5.8 Km above mean sea level roughly along Long. 72°E to the north of Lat. 30°N has moved away northeast wards.
- ◆ A fresh western Disturbance as an upper air cyclonic circulation at 3.1 km above mean sea level lies over eastern parts of Afghanistan and neighbourhood.
- ◆ The cyclonic circulation over south Pakistan & adjoining west Rajasthan persists and now extends upto 1.5 km above mean sea level.
- ◆ A north-south trough in the westerlies runs roughly along Long. 88°E to the north of Lat. 25°N between 2.1 and 3.1 km above mean sea level.
- ◆ The cyclonic circulation over south Konkan & adjoining Madhya Maharashtra persists at 0.9 km above mean sea level.

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

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

##### Low Level Circulation (LLC) :

Broken low/medium clouds with embedded intense to very intense convection over extreme Southwest Bay adjoining India Ocean between lat 1.0N to 7.0N long 80.0E to 85.5E in association with LLC over the area.

##### Clouds descriptions within India:

Scattered low/medium clouds with embedded isolated weak to moderate convection seen over Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh, Kerala, Tamilnadu and Bay Islands. Scattered low/medium clouds with embedded isolated weak convection seen over central parts of South Madhya Pradesh. Scattered low/medium clouds seen over East Punjab, extreme Southwest Uttar Pradesh, extreme North-western parts of East Uttar Pradesh, Southeast Rajasthan, Southeast Gujarat, rest Madhya Pradesh, Maharashtra, South Chhattisgarh, South Odisha, , North sub-Himalayan west Bengal, Assam, Meghalaya, Nagaland, Telangana, North Coastal Andhra Pradesh.

##### Arabian Sea:

Scattered low/medium clouds with embedded moderate to intense convection over Gulf of Mannar, Comorin, adjoining Indian Ocean between Equator to 7.0N long 74.0E to 80.0E.

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

Broken low/medium clouds with embedded moderate to intense convection over Srilanka. Broken low/medium clouds with embedded weak to moderate convection over Southeast Bay and Andaman Sea.

##### Past Weather:

**Convection (during last 24 hrs):** Weak to Moderate convection was observed over J&K Punjab Himachal Pradesh Uttarakhand Kerala and Tamilnadu.

**OLR:** Upto 230  $wm^{-2}$  was observed over J&K North Himachal Pradesh North Uttarakhand South north Sikkim Arunachal Pradesh Kerala Tamilnadu

**Westerly Trough & Jet-Stream:** Trough in westerlies roughly along longitude 72.0°E & north of latitude 30.0°N.

**Dynamic Features:** Negative shear tendency is observed over J&K Himachal Pradesh Uttarakhand & Punjab and Positive shear tendency over rest parts of India.

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

**Precipitation:**

**HEM:**

Rainfall upto 1-7 mm was observed over SW J & K & S Tamilnadu.

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

Isolated/multiple light to moderate convection is seen on DWR Nagpur (DBZ around 35 and height 8km) domain at around 1600 IST.

Convective clouds are seen over Sikkim, Arunachal Pradesh, Southeast Madhya Pradesh and Andaman & Nicobar Islands in RAPID RGB Satellite imagery at 1530 IST.

### **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.

| <b>Delhi – SAFAR analysis &amp; Forecast</b> | 10.03.2018 | 11.03.2018 |
|--|------------|------------|
| PM10 (micro-g/m <sup>3</sup> )               | 144        | 159        |
| PM2.5 (micro-g/m <sup>3</sup> )              | 80         | 88         |

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

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

**1. Synoptic Systems:** The analysis and forecasts based on 00 UTC shows a north-south oriented trough over north Madhya Maharashtra persists up to day4. Another quasi-stationary cyclonic circulation over south Pakistan and adjoining west Gujarat persists up to day2. Forecasts also show the feeble cyclonic circulation over NMMT becomes less marked on day3 and a north-west to south-east trough from Bihar to Bangladesh persists during next 5 days. Contour at 500 hPa shows a feeble Western Disturbance would affect northwest parts of India during day4 to day5.

**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 x 10<sup>-1</sup>/s)}:** Mostly along the west coast, along the foot hill of Himalaya and parts of west Gujarat, Rajasthan and central India 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 day3. 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 but it is less than threshold value -2 along west coast and east coast during day2 to day3.

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

**Sweat Index (> 300):** Mostly along east coast, west coast and over parts of Gujarat during next 72 hours and very high value of greater than 700 over the Gangetic West Bengal on day3.

**CAPE (> 1000):** Mostly along southern parts of west coast and east coast and Gangetic West Bengal on day3.

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

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

Up to 10 mm rainfall over parts of north eastern states during next 5 days.

Up to 10 mm rainfall over parts of Tamilnadu and Kerala during day2 to day3.

Up to 10-40 mm rainfall over parts of Tamilnadu and Kerala during day4 to day5.

Up to 10 mm rainfall over J&K during day1 to day2 and 10-40 mm during day3 to day5.

Up to 10 mm rainfall over Himachal Pradesh, Uttarakhand during next 4 days and 10-40 mm over Himachal Pradesh on day5.

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

**1. Model Reflectivity (Max.dBz):** 5-20 dBZ Model reflectivity over parts of J & K and over parts of Arunachal Pradesh on day2 and day3.

#### **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):** Less than threshold value is observed over the country during the next 72 hour.

**CIN (50-150):** Mostly over Panjab, Delhi & Haryana and Uttar Pradesh during next 3 days.

#### **3. Rainfall and thunderstorm activity:**

Rainfall up to 10 mm over parts of J&K on day2 and 10-20 mm on day3.

Rainfall activity (10-20 mm) over Arunachal Pradesh during next 72 hours.

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

**Not Received**

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

#### Summary and Conclusions:

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

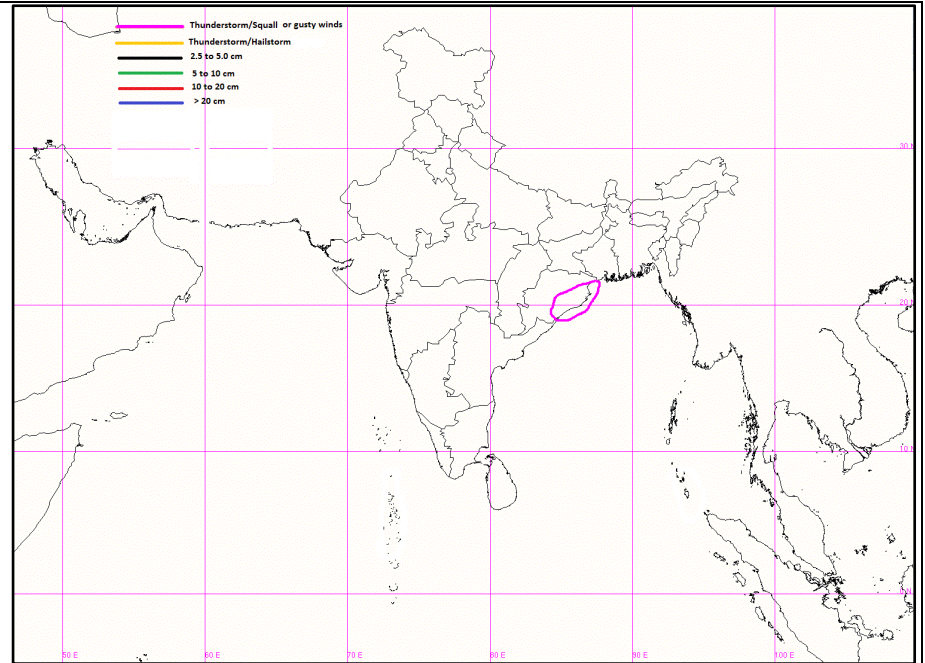
In association with the movement of the anticyclone over the Bay of Bengal, moisture feeding is likely into coastal Odisha on day 2. This will be aided by wind convergence between the moist south-westerlies and the dry westerlies over the same region on day 2. Based on these synoptic situations, thunderstorms with gusty winds are likely over coastal Odisha on day 2, which is likely to extend northwards on day 3.

|  |   |
|--|---|
| <b>24 hour Advisory for IOP:</b><br><br><b>Rainfall:</b><br>Nil<br><br><b>Thunderstorm with associated phenomena:</b><br>Nil | <b>48 hour Advisory for IOP:</b><br><br><b>Rainfall:</b><br>Nil<br><br><b>Thunderstorm with associated phenomena:</b><br>Coastal Odisha |
|--|---|

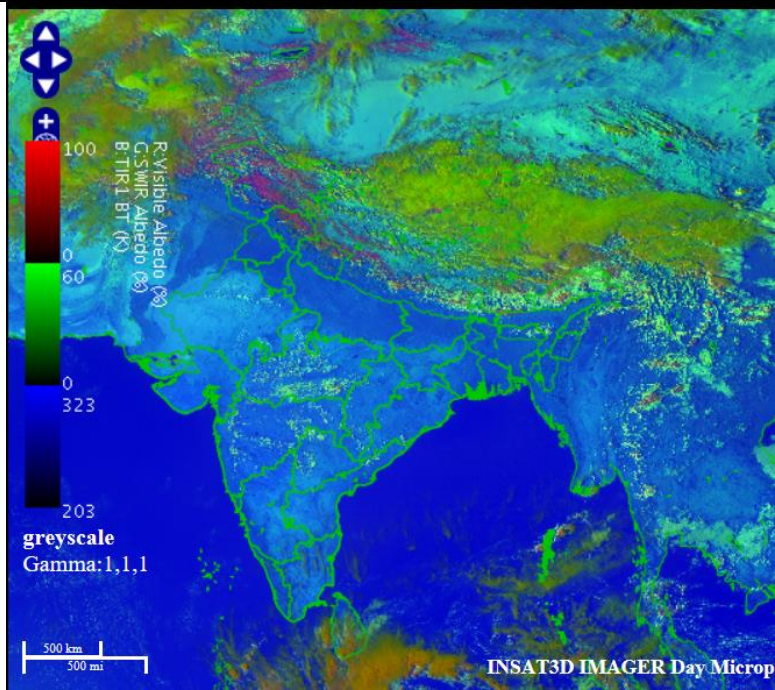
**Graphical Presentation of Potential Areas for Severe Weather:**

**No Warning for Severe Weather**

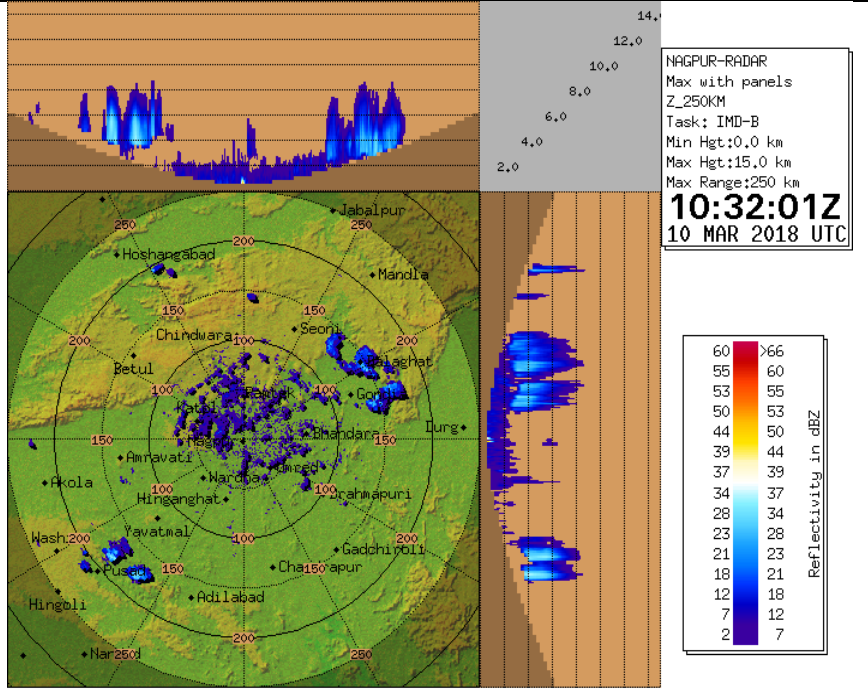
**IOP Advisory for 24 hours**



**IOP Advisory for 48 hours**

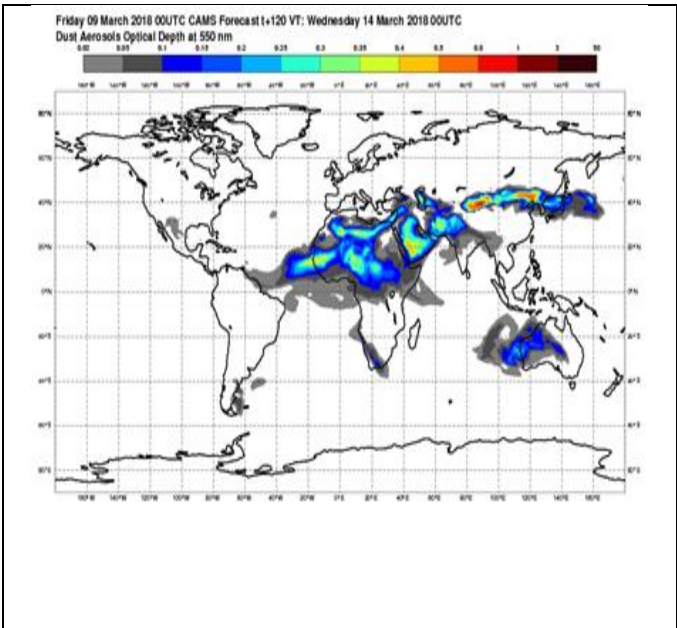


RAPID RGB Imagery at 1530IST of the Day

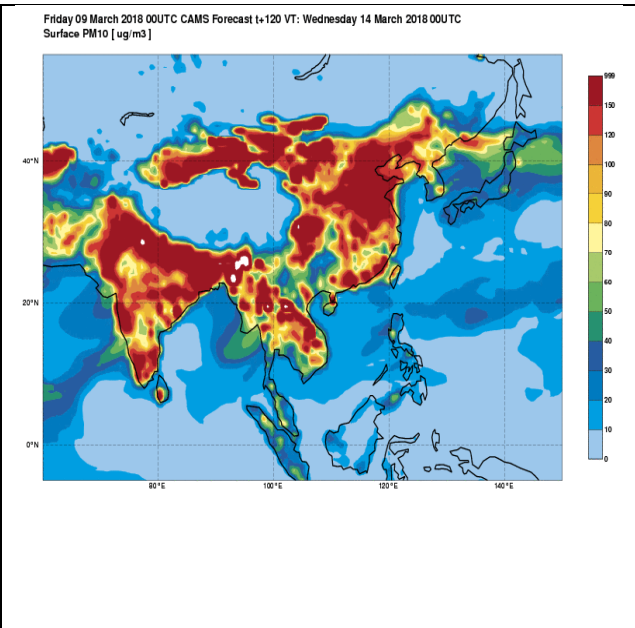


DWR Nagpur at 1602 IST of the Day

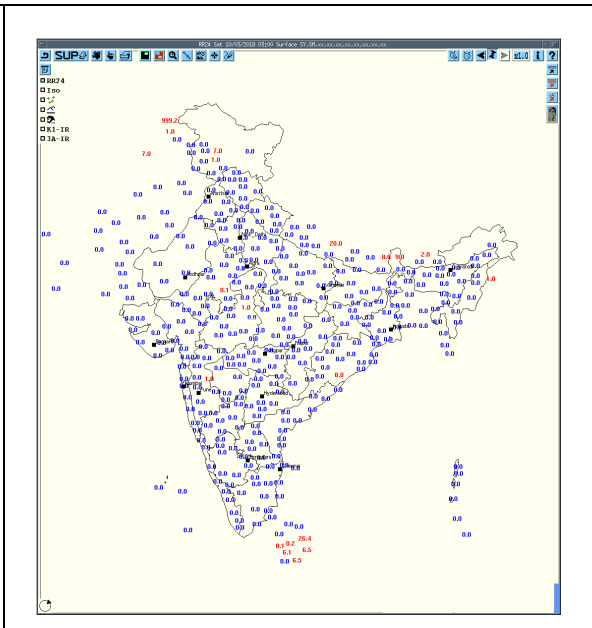




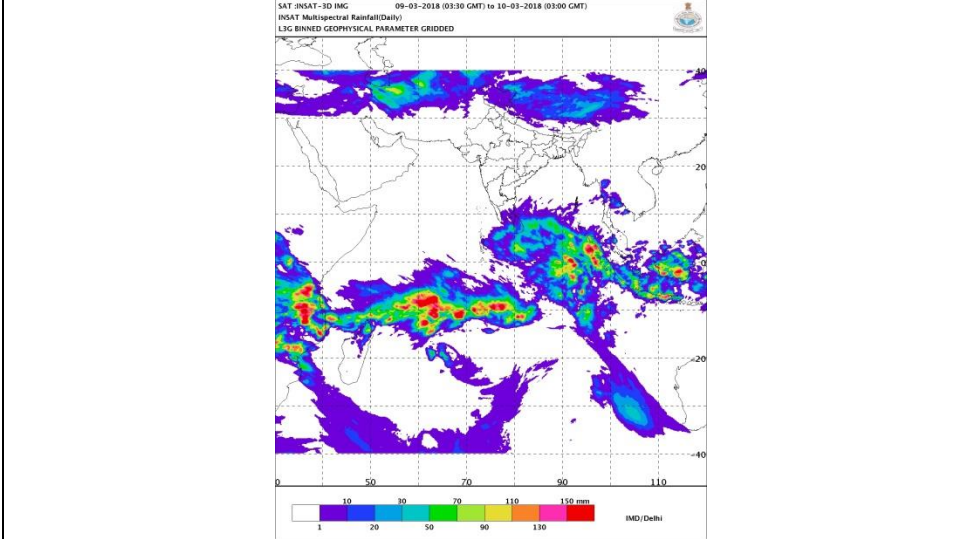
Forecast Dust Concentration for 14<sup>th</sup> March, 2018



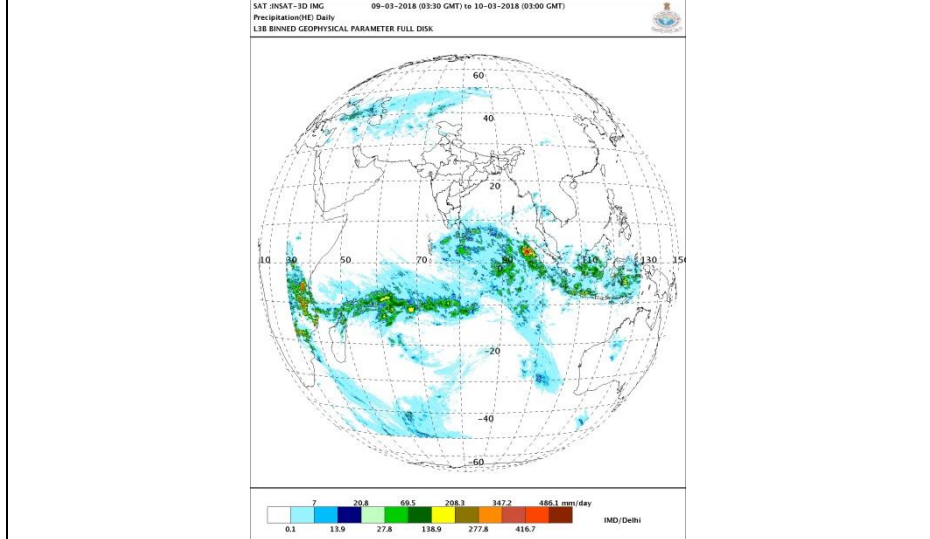
PM10 Forecast for 14<sup>th</sup> March, 2018



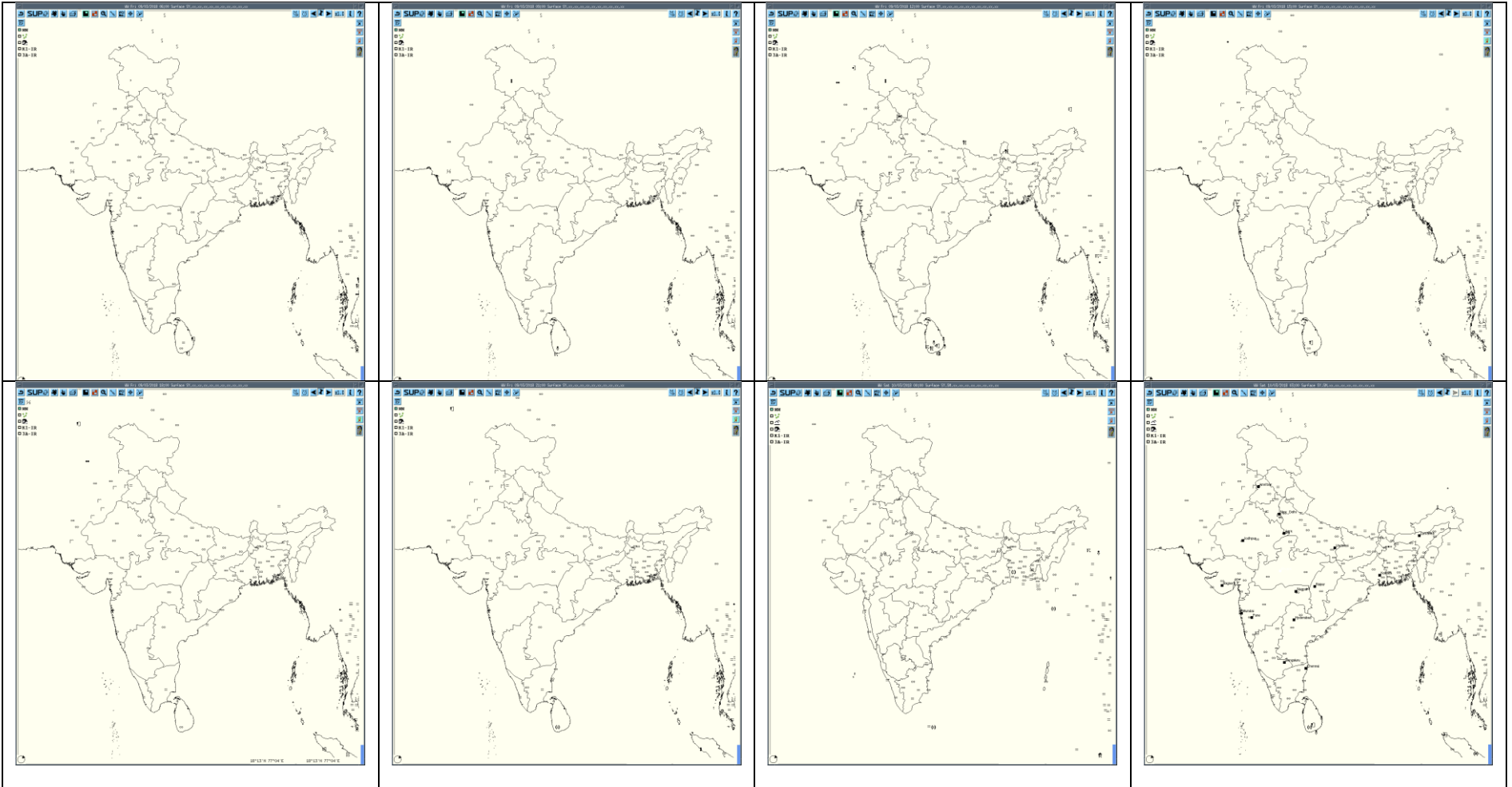
Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today



IMR Rainfall

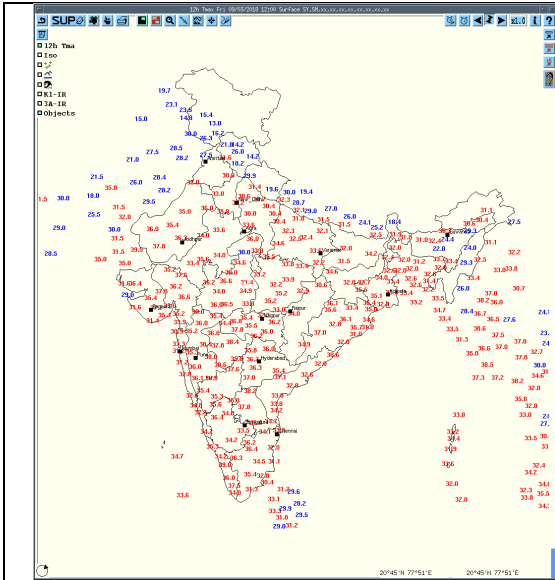


HEM Rainfall

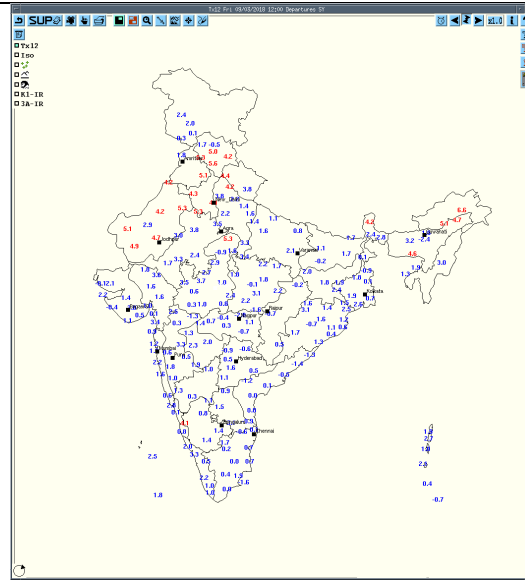


**3hourly Past weather at 06, 09, 12, 15, 18, 21UTC of yesterday and 00 & 03 hrs UTC of today**

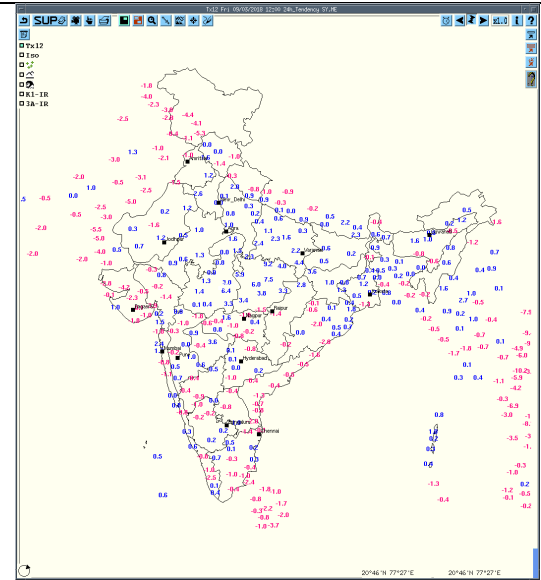




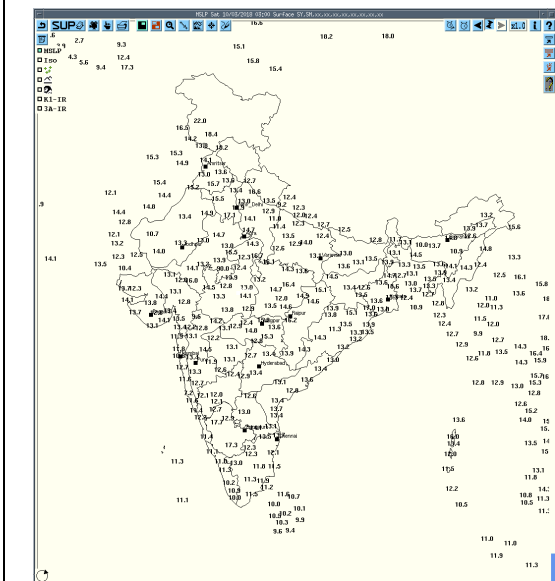
Tmax



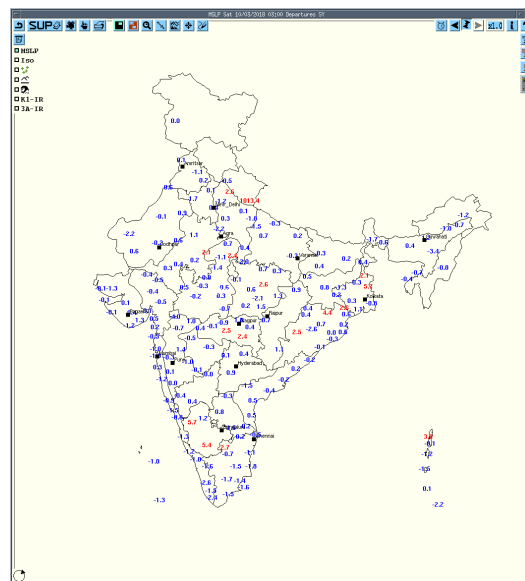
Departure Tmax



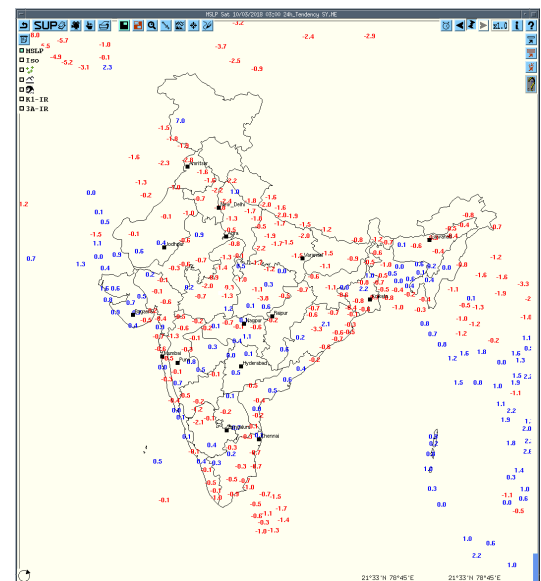
Tendency Tmax



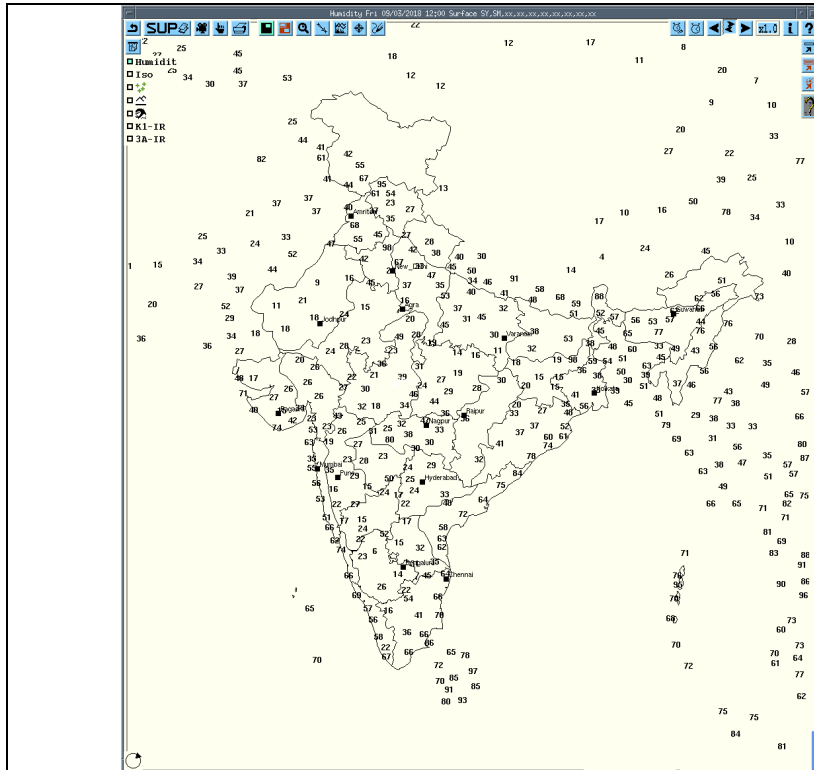
MSLP



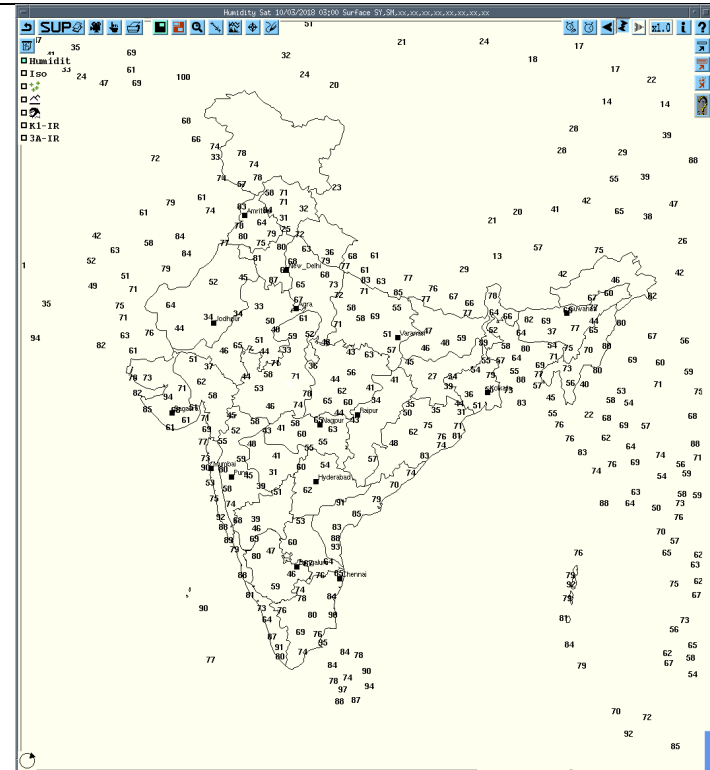
Departure MSLP



Tendency MSLP



**RH at 12UTC yesterday**



**RH at 03UTC today**

**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) |
|---------------------------|-----------------|--------------------|--------------------------------|----------|----------------------------|-------------------|
| Kota                      | Northwest India | East Rajasthan     | Thunderstorm                   | 09-03-18 | 1715                       | 1800              |
| Jaipur                    | Northwest India | East Rajasthan     | Thunderstorm                   | 09-03-18 | 2010                       | 2100              |
| Gangtok                   | East India      | Sikkim             | Thunderstorm                   | 09-03-18 | 1530                       | 2050              |
| Tadong                    | East India      | Sikkim             | Thunderstorm                   | 09-03-08 | 1557                       | 1820              |

**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.r.t. radar station and Direction of movement  | Remarks   | Associated Severe Weather if any            | Districts affected                               |
|------------------|----------------|------------------------------------|---|---|---|---|--|
| Agartala         | 10-03-18       | 090300-100300                      | Nil   | Nil   | Nil   | Nil   | Nil  |
| Jaipur           | 10-03-18       | 1118-1512                          | Multiple cell with average height of 4.5 km & maximum reflectivity 56.0 dBZ   | Multiple cell continue from previous day 1118 UTC of 09/03/2018 towards SW of Jaipur and moved to NE Wards at speed 10-12 km/hr | Multiple cell develop from 1118 UTC 09/03/2018 towards ,SW of Jaipur and reaches maximum reflectivity during 1332 UTC and died down at 1512 UTC of 09/03/2018 | Thunder storm with light rain at few places | AJMER,BHILWAR A,JAIPUR,KOTA,J HALAWAR DISTRICTS. |
| Patiala          | 10-03-18       | 090300-100252                      | No Echo   | --  | --  | --  | --   |
| Visakhapatnam    | 10-03-18       | 0900 UTC-1200 UTC                  | Convective cell is organized with height 8Km and max reflectivity 54 dbz towards NE at a distance of 210 Km.  | Moving towards SE   | Likely to be dissipated   | -   | -  |
|                  |                | 1200 UTC-1500 UTC                  | Isolated single Convective cell is formed in NW with height of 10Km and max reflectivity of 58 dBz.   | NW(78 KM) and NE(194 KM)Moving towards SE   | Likely to be dissipated   | -   | -  |

|         |          |                   |   |                            |                         |     |     |
|---------|----------|-------------------|---|----------------------------|-------------------------|-----|-----|
|         |          |                   | Another isolated cell is formed IN NE with height of 10 km and max reflectivity of 54dBz.           |                            |                         |     |     |
|         |          | 1500 UTC-1800 UTC | Isolated single Convective cell is formed in SW with height of 6 Km and max reflectivity of 56 dBz. | SW(56 KM)Moving towards SE | Likely to be dissipated | -   | -   |
| Patna   | 10-03-18 | 090300-100300     | Nil   | Nil                        | Nil                     | Nil | Nil |
| Kolkata | 10-03-18 | 090301-100300     | Nil   | Nil                        | No Echo                 | 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](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/map\\_skm2.html](http://satellite.imd.gov.in/map_skm2.html)



## WEATHER SYMBOLS:



+ thunderstorm



+ heavy thunderstorm



sandstorm or dust storm



squall



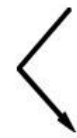
hail shower



tropical storm



+ tornado



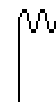
+ lightning



+ hurricane



haze



smoke



dust or sand storm



fog



drizzle



rain



snow



showers



hail



thunderstorm

**Weather Symbols**