



**India Meteorological Department**  
**FDP STORM Bulletin No.22 (27-03-2017)**

**1. CURRENT SYNOPTIC SITUATION at 0300 UTC of 27-03-2017:**

**SYNOPTIC FEATURES:**

The western disturbance as a trough in mid-tropospheric westerlies with its axis at 5.8 km above mean sea level roughly along longitude 48.0°E and north of latitude 25.0°N persists.

The upper air cyclonic circulation over North Interior Karnataka & neighbourhood extending upto 0.9 km above mean sea level persists.

An upper air cyclonic circulation lies over south Chhattisgarh & neighbourhood and extends upto 0.9 km above mean sea level.

An upper air cyclonic circulation lies over east Bihar & neighbourhood at 1.5 km above mean sea level.

An upper air cyclonic circulation lies over Comorin area & neighbourhood and extends upto 1.5 km above mean sea level. A trough runs from this system to interior Tamilnadu and extends upto 0.9 km above mean sea level.

The trough from southeast Srilanka to south Tamilnadu across Comorin area has become less marked.

The trough from west Assam to south Chhattisgarh across Gangetic West Bengal, Jharkhand & interior Odisha has become less marked.

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

**Clouds (based on 0900UTC imagery of INSAT 3D):**

Scattered multi/layered clouds were seen over north J & K in association with western disturbance over the area.

Scattered low/medium clouds with embedded isolated to moderate convection were seen over Arunachal Pradesh & Sikkim.

Scattered medium/high clouds were seen over rest J & K, Himachal Pradesh, Uttarakhand, Sub Himalayan West Bengal, Assam, Nagaland, Manipur, Meghalaya, Kerala and Bay Islands. Isolated low/medium clouds were seen over northeast Jharkhand, Gangetic West Bengal, Odisha and south Chhattisgarh.

**Arabian Sea:**

Scattered low/medium clouds with isolated embedded moderate to intense convection were seen over southeast Arabian Sea off Kerala coast.

**Bay of Bengal & Andaman Sea:**

Scattered low/medium clouds with embedded moderate to intense convection were seen over southeast Bay and Andaman Sea.

**Convection:**

Light to moderate convection was observed over J & K and North East parts of India.

**OLR:-** Upto 340  $\text{wm}^{-2}$  was over Central and south India; Upto 310  $\text{wm}^{-2}$  was over North Rajasthan, East Uttar Pradesh Upto 300  $\text{wm}^{-2}$  was over Haryana east Punjab North West Uttar Pradesh East Bihar East West Bengal Upto 280  $\text{wm}^{-2}$  was over Assam Manipur and Up to 230  $\text{wm}^{-2}$  was over J&K Himachal Pradesh Sikkim Arunachal Pradesh Nagaland.

**Jet Stream:**

No Jet stream was observed over India .

### **Dynamic Features:**

A positive Vorticity field is seen over Uttarakhand, Uttar Pradesh, Bihar, West Bengal and Coastal Odisha. Moderate wind shear observed over North India and Low wind shear observed over South India. Negative shear tendency observed over Gujarat.

### **Precipitation:**

**IMR:** Rainfall upto 20mm was observed over Extreme North West Jammu Kashmir, East Arunachal Pradesh, North Nagaland, Rainfall upto 10mm was observed over rest North West J&K, Sikkim Central Meghalaya Extreme East Assam Rest Arunachal Pradesh, South Manipur Rest Nagaland.

**HEM:** Rainfall upto 70mm was observed over Arunachal Pradesh Nagaland Central Meghalaya upto 14mm was observed over North West J&K upto 07mm was observed over rest Meghalaya East Assam.

### **RADAR and RAPID observation:**

Isolated convective clouds were observed over West Bengal in DWR Composite at 1620hrs IST and RGB satellite imagery at 1530hrs IST.

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

No significant dust concentration observed over Arabian Peninsula and west Rajasthan. Dust concentration is expected to increase over northern India and central India for next three days.

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

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

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

12UTC Charts on all days from Day0-4 show feeble trough in MSLP over J & K; which is not seen at 00UTC

12UTC charts on all days from Day0-4 show wind discontinuity at 925 hPa: Maharashtra, MP, Chhattisgarh, Odisha.

00UTC charts on Day-1-Day-2 show weak CYCIR over eastern UP and Bihar region at 925 and 850 hPa.

850hPa anticyclonic flow lies over Arabian Sea on all Days

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

Weak in magnitude on all Days. Well defined anticyclonic flow centred near Gujarat.

Jet core >60kt on Day-3 at 12UTC over Bangladesh

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

At 12UTC on all days: Strong low level convergence in land all along the west coast and isolated regions over Odisha. Only in Day-3 over parts of Assam

At00UTC on all days: Northern part of Karnataka and Maharashtra

#### **4. Low level Vorticity:-Positive Vorticity (>15 x 10<sup>-5</sup>/s):.**

At 12UTC on Day0 and 1: Strong over northern UP. Day-2-3 strong over Assam, parts of Bihar and WB. Isolated locations over Odisha and along west coast.

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

Day-0: Isolated location over coastal Maharashtra, Goa, Odisha parts of Arunachal.

Day-1: Parts of J & K and over NE India over Tripura, Manipur and Mizoram

Day-2: over J & K in north and parts of Arunachal and coastal Kerala and Karnataka

Day-3: over mainly Meghalaya and parts of coastal Kerala and Karnataka  
Day-4: parts of J&K, some parts of NE and over parts of coastal Kerala and Karnataka

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

Day-0: Isolated location over coastal Maharashtra, Goa, Odisha parts of Arunachal.  
Day-1: Parts of J & K and over NE India over Tripura, Manipur and Mizoram  
Day-2: over J & K in north and parts of Arunachal and coastal Kerala and Karnataka  
Day-3: over mainly Meghalaya and parts of coastal Kerala and Karnataka  
Day-4: parts of J&K, some parts of NE and over parts of coastal Kerala and Karnataka

**7. Spatial distribution of TTI:**

**TTI >44 [Scattered Numerous Thunderstorms]** : Coastal Maharashtra, Telangana and adjoining Maharashtra and Odisha extending to WB and Bangladesh.

**TTI >50 [Scattered Thunderstorms few severe]** : Coastal Maharashtra and Odisha in day-0, Manipur Nagaland and J & K in Day-1, West coast of Kerala and Karnataka and J & K in Day-2. Isolated locations of J & K in Day3 and 4

**8. Rainfall and thunder storm activity:**

Day-2: (>4cm/day) J & K region, Meghalaya and Nagaland parts of Assam  
Day-3,4 and Day-5 (>4cm/day) widespread over NE India.

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

**1. Weather Systems:**

North-west trough over GWB and adjoining Bay of Bengal seen in the analysis charts. CYCIR, which persist during day 4 to 5 days over Bihar and adjoining areas.

The NE-west southwest oriented trough from GWB and passes through Odisha, south Chhattisgarh and adjoining regions is seen for next 4 to 5 days.

North-south trough from Maharashtra to Kerala passes through Karnataka on day 4 and 5

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

The Jet at 500 hPa almost does not exist over India during next 5 days except a small belt over UP and Bihar in the analysis as well as during next 2/3 days.

**3. Low level Vorticity:-Positive Vorticity 850hPa (>12 x 10<sup>-1</sup>/s):**

Mainly along foothill of Himalaya and over east UP, GWB and Odisha during next 2 to 3 days. The regions of eastern coastal states and Maharashtra region also witnessed vorticity maximum during day 3 to day 5.

The significant vorticity zones associated with the cyclonic circulations are seen over Karnataka, Konkan-Goa and west coast during next 3 to 5 days only in morning hours.

**4. Spatial distribution of T-Storm Initiation Index, Lifted Index, Total Total Index, CAPE, CINE and Sweat Index (High potential for thunderstorm):**

**T-Storm Initiation Index (> 4):** Significant zone with values exceeding 4 is noticed over north eastern coastal states including GWB, Odisha, Jharkhand and Bihar and adjoining Bangladesh during next 4/5 days. Based on today analysis the south-eastern coastal states also witnessed significant region with > 4.

**Lifted Index (< -2):** The areas with index less than -2 lies along east coast regions over GWB, Odisha, coastal AP, Bihar and adjoining areas with gradually the LI areas with less than -2 mainly extended towards south-eastern coastal regions and west coastal region of India.

**Sweat Index (> 400):** Then significant zones are confined along east coast of India over Andhra coast, GWB, Odisha, Bangladesh and adjoining regions. Some parts of western Gujarat states and Karnataka coast also indicated the value > 400 K for next 5 days and over J & during next 5 days.

**Total Total Index (> 50):** Above threshold value in some parts of central India and adjoining northern parts of India from day 1 up to day 5 particularly at 12 UTC of each day.

**CAPE (> 1000):** Mostly along east coast of India over Gangetic West Bengal, Odisha, Bihar, Jharkhand and adjoining regions during next 5 days. The CAPE values also above threshold over Kerala and parts of coastal Karnataka, Konkan-Goa during day 3-5 days.

**CINE (50-150):** Maximum CINE values are found in some areas along east coast over GWB, Odisha, coastal AP and Tamil Nadu and also over Bihar and Jharkhand from Day-1 to Day-5.

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

10-40 mm rainfall shows over isolated place of NE States, the rainfall over NE states likely to continue during subsequent 4 to 5 days.

J & K rainfall is likely during day 1 to 5 along with isolated rainfall over parts of extreme south Peninsula.

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

**1. Model reflectivity (Max. dBz): (>25 dBz)** dBZ exceeding the threshold value is seen over J & K region during many hours on 28/03/2017.

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

**Total Total Index (> 50):** Above threshold value over most parts of India during next 3 days except parts of extreme south peninsular region and north-eastern states and J & K during morning hours.

**K-Index (> 35):** Less than threshold value over most parts of India during next 3 days.

**CAPE (> 1000):** Mostly along east coast of India over Andhra Pradesh, Odisha, GWB, Bihar and Jharkhand during next 3 days. Another zone along west coast over Kerala, coastal Karnataka and Konkan & Goa.

**CINE (50-150):** CINE values are mostly small all over India during all three days of forecasts except some areas along coastal areas of India over Odisha, GWB, Bihar, Jharkhand, coastal AP, coastal Karnataka and Konkan-Goa during next 3 days.

#### **3. Rainfall activity**

Rainfall activity: (~ 10-40 mm) over NE states and J & K of day 1 and day 2.

#### **ECMWF Forecasts based on 00 UTC of the day**

##### **Mean sea level:**

No significant systems over Indian region till 1<sup>st</sup> April 2017.

##### **Lower Level Winds (925 hpa & 850 hpa)**

An upper air cyclonic circulation extending up to 0.9 km above mean sea level is seen over Comorin area and neighbourhood on 27<sup>th</sup> March and become less marked thereafter.

An upper air cyclonic circulation extending up to 0.9 km above mean sea level is seen over east Bihar and neighbourhood on 27<sup>th</sup> & 28<sup>th</sup> March and become less marked thereafter.

An upper air cyclonic circulation is seen over North interior Karnataka and neighbourhood at 1.5 km above mean sea level on 28<sup>th</sup> March and become less marked thereafter.

##### **Western Disturbances (700 hpa & 500 hpa)**

No WD is seen in Indian region till 1<sup>st</sup> April 2017.

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

#### **Summary and Conclusions:**

##### **Day 1 & Day 2:**

The upper air cyclonic circulation lying over east Bihar & neighbourhood at 1.5 km above mean sea level is likely to increase the southerly moist wind flow inland from the Bay of Bengal, resulting in increase in rainfall activity over Sub Himalayan West Bengal, Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram and Tripura. There is also likelihood of thunderstorms accompanied by squalls over the Northeast Indian region on day 1. The distribution and intensity of rainfall over North-east India is likely to increase on day 2.

##### **24 hour Advisory for IOP:**

Sub Himalayan West Bengal, Assam, Meghalaya, Arunachal Pradesh.  
Nagaland, Manipur, Mizoram and Tripura

##### **48 hour Advisory for IOP:**

Assam, Meghalaya, Arunachal Pradesh.  
Nagaland, Manipur, Mizoram and Tripura

ForNCMRWFNWPproducts:(<http://www.ncmrwf.gov.in/HomePage/NEPS-prod-1.php>)

ForIMDNWPproducts:([http://nwp.imd.gov.in/diagpro\\_new.php](http://nwp.imd.gov.in/diagpro_new.php))

ForSynopticplotteddataandcharts

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

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

ForRAPIDtool:

<http://rapid.imd.gov.in/>

LowLevelWinds

[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)

Upperlevelwinds

[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)

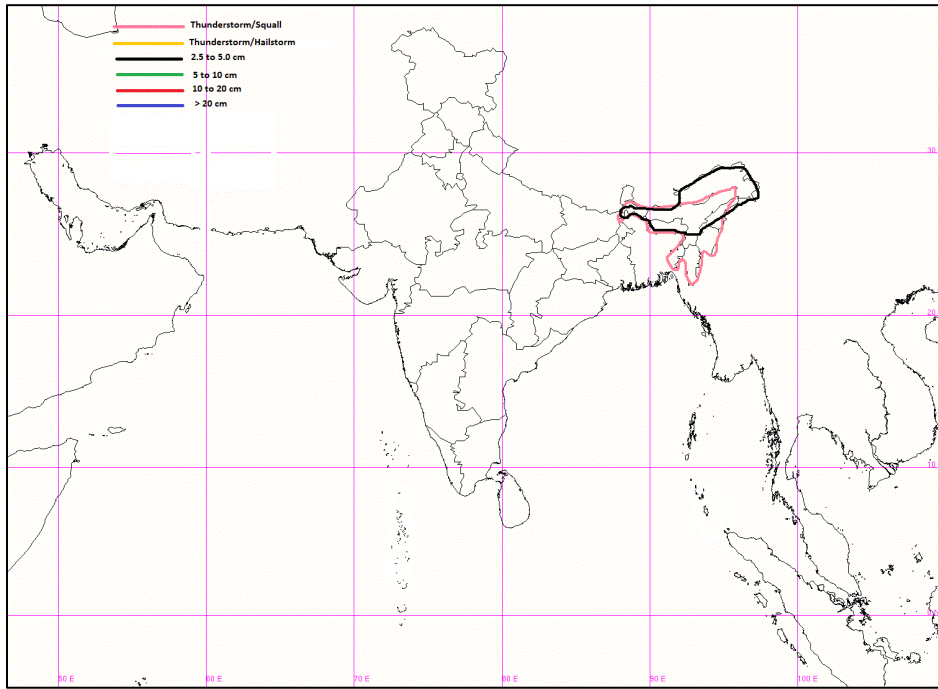
ForRadarimagesofthepast24hoursincludingmosaicofimages:

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

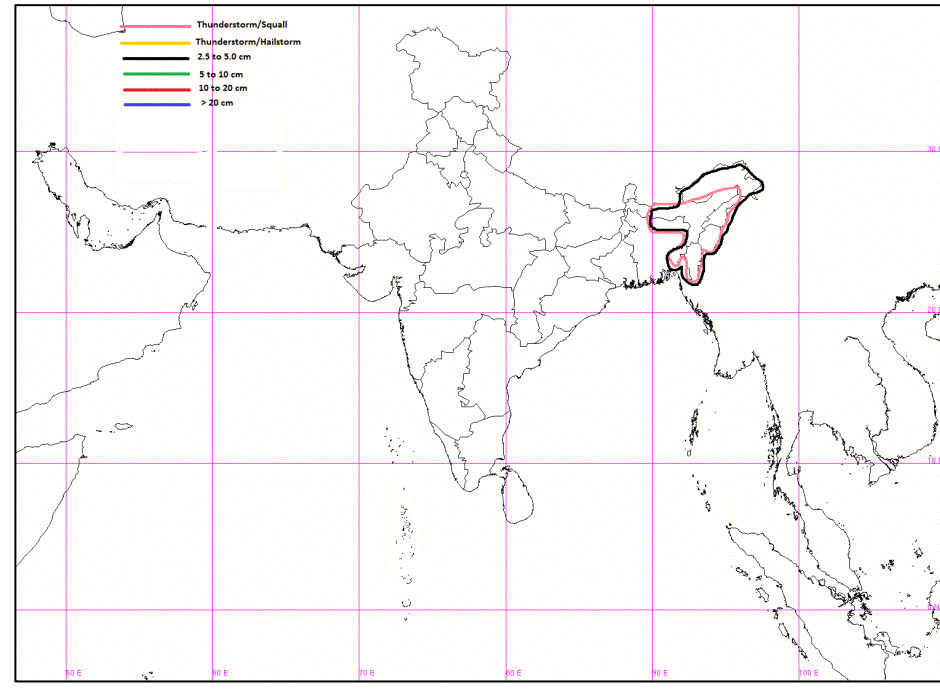
Satellite sounder based T-Phi gram

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

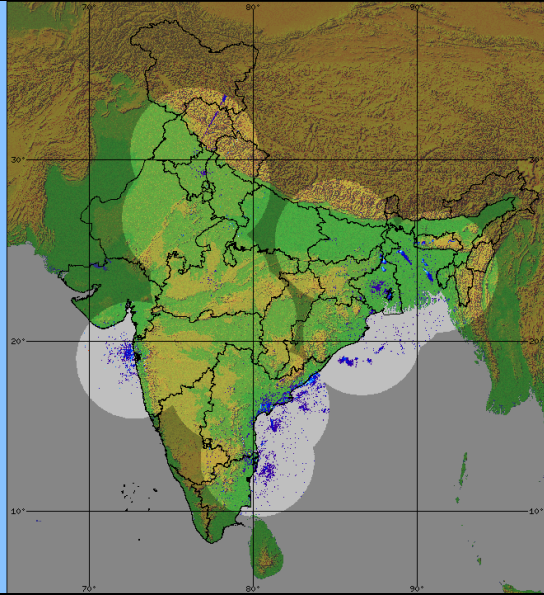




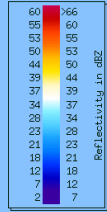
**IOP Advisory for 24 hours**



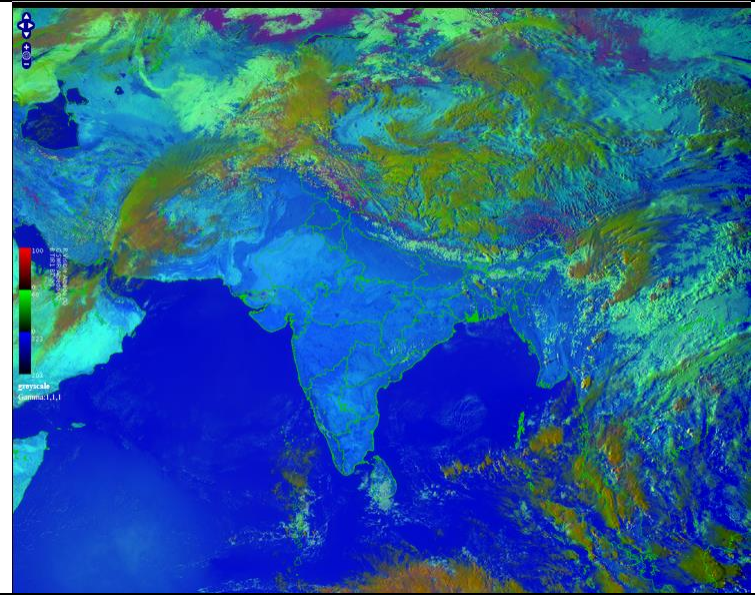
**IOP Advisory for 48 hours**



INDIA  
 PPI  
 COMP  
 Task: IMD-C  
 PRF: 250Hz  
 Elevation:0.2  
 Max Range:1695 km  
**16:20:26**  
**27 MAR 2017 IST**

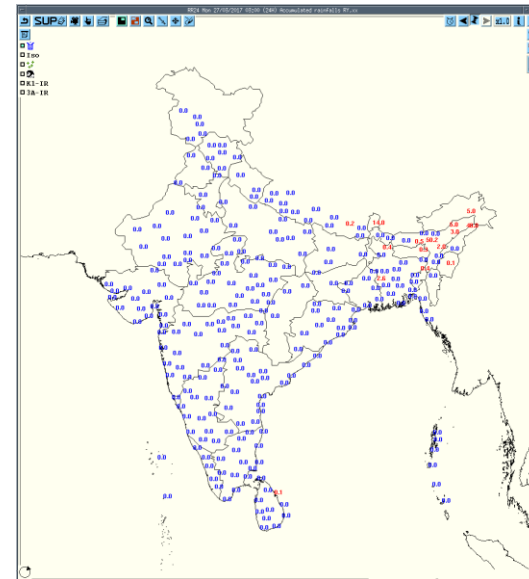
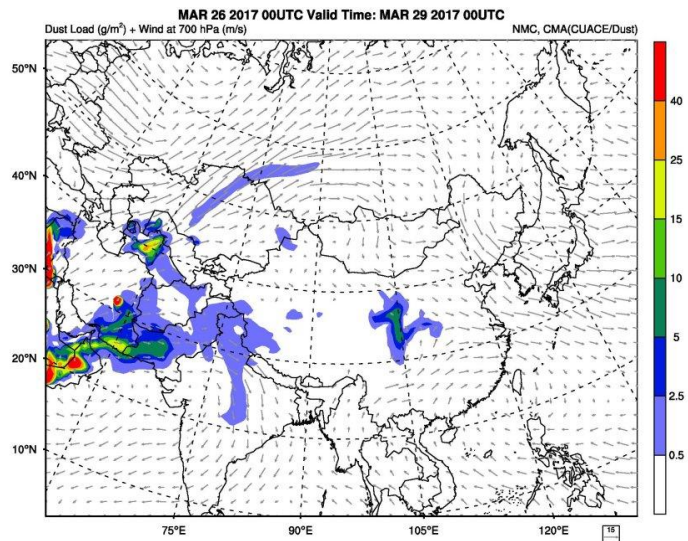


**DWR Composite at 1620 hrs IST**



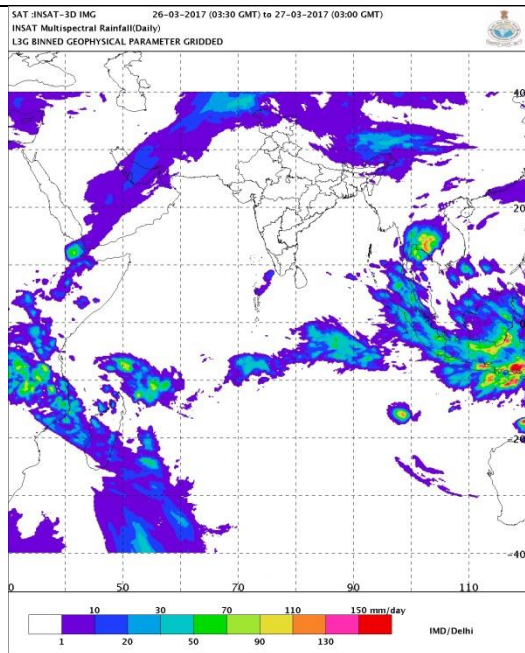
**RGB Image of INSAT 3D at 1530 hrs IST**



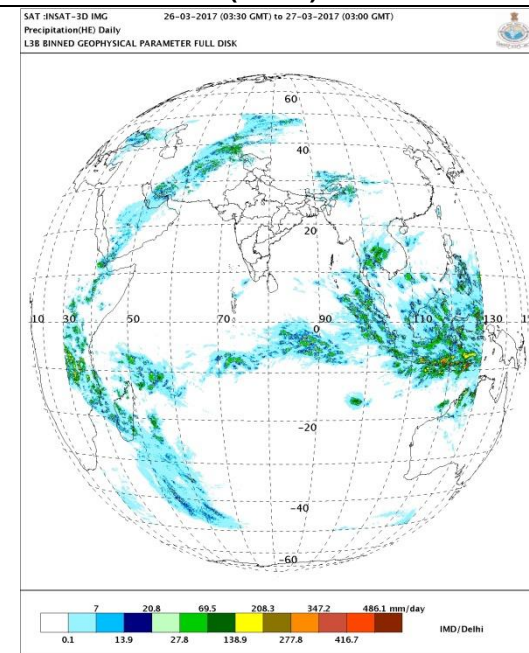


**Forecast Dust Concentration at 00 UTC of 29 March**

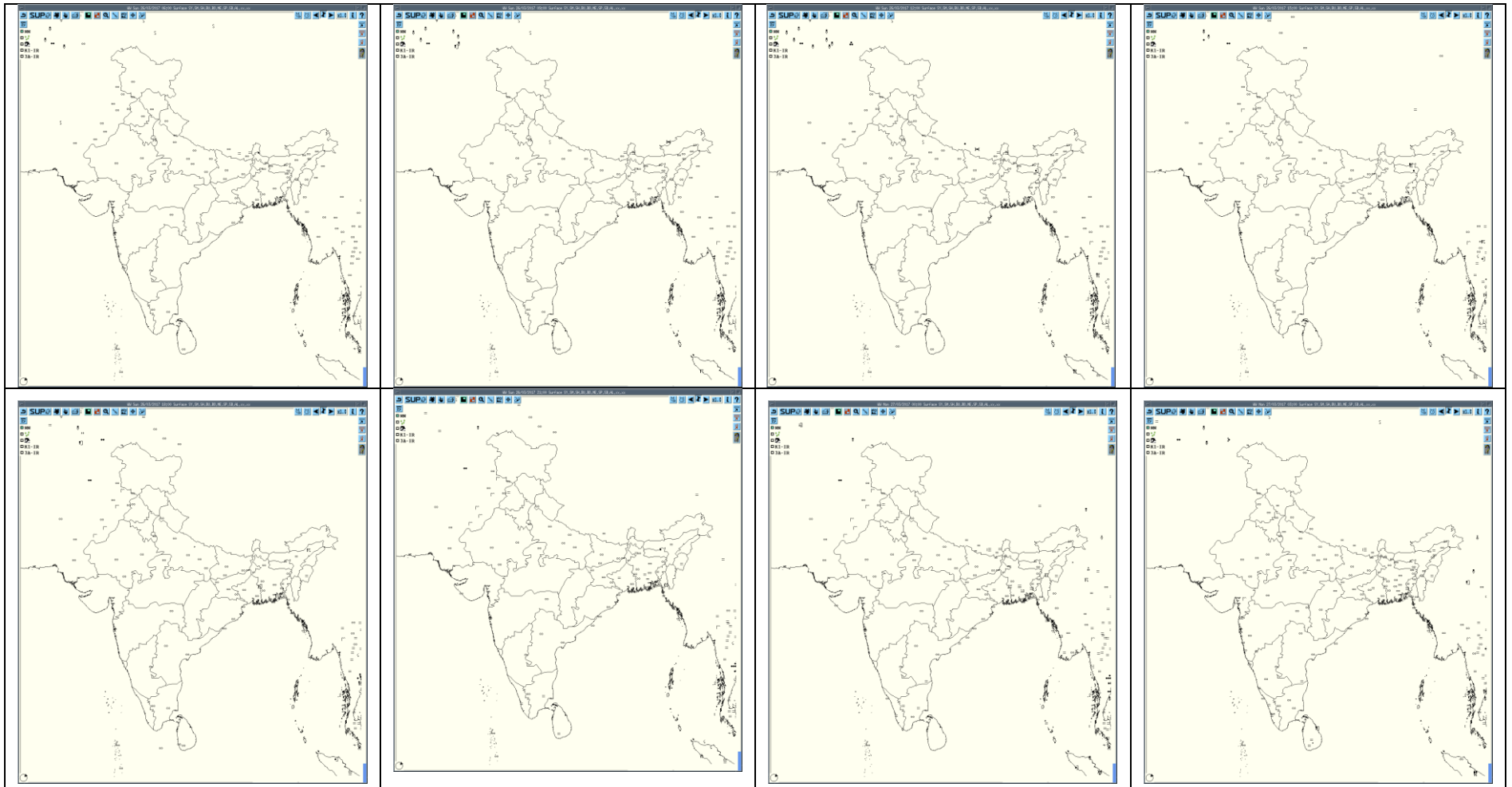
**Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today**



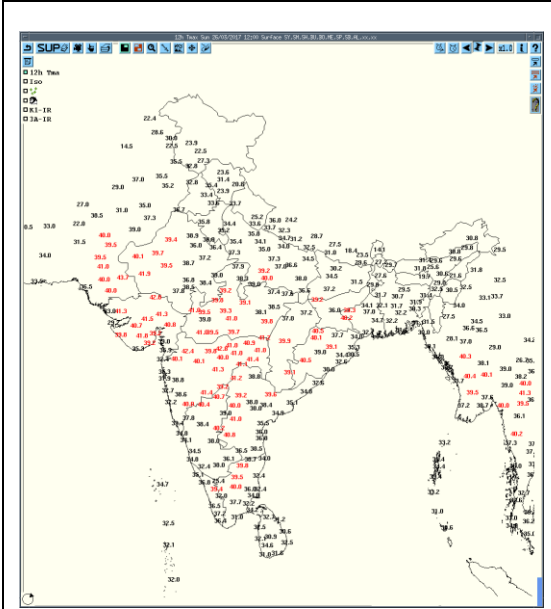
**IMR Rainfall**



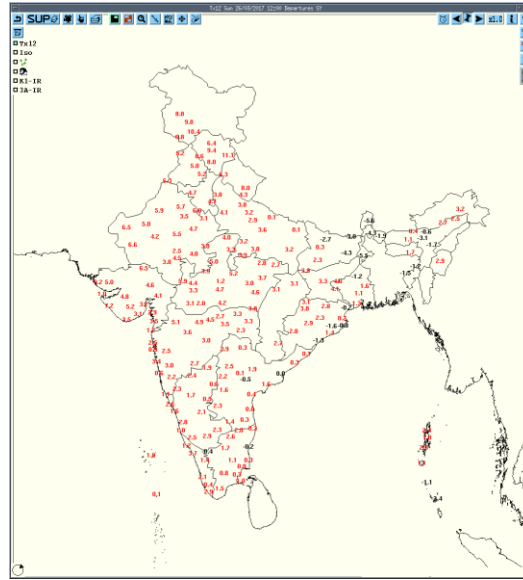
**HEM Rainfall**



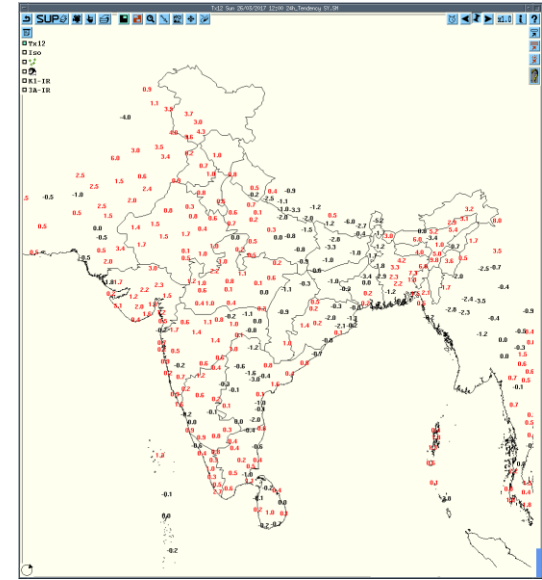
3hourly Past weather at 06, 09, 12, 15, 18, 21 UTC of yesterday and 00 & 03 hrs UTC of today



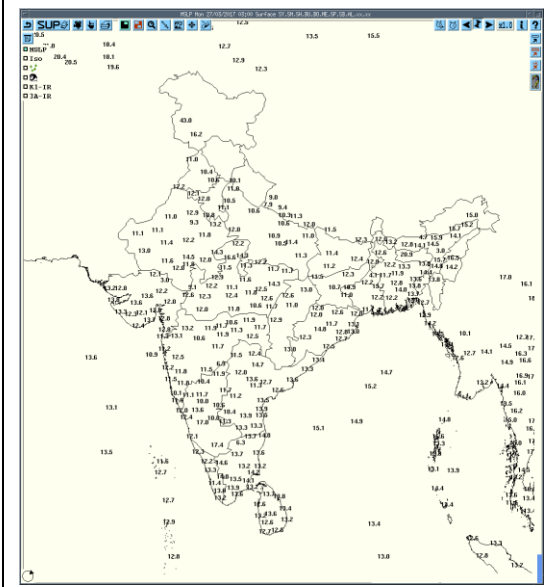
T<sub>max</sub>



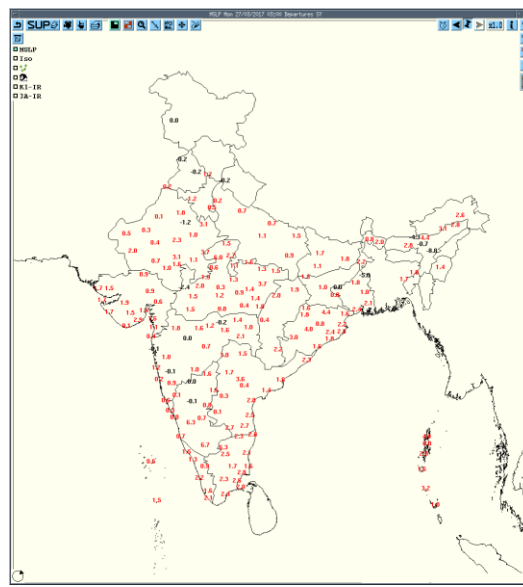
Departure T<sub>max</sub>



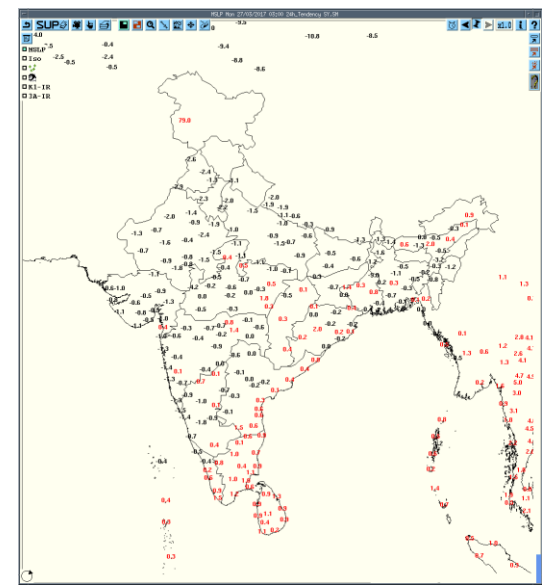
Tendency T<sub>max</sub>



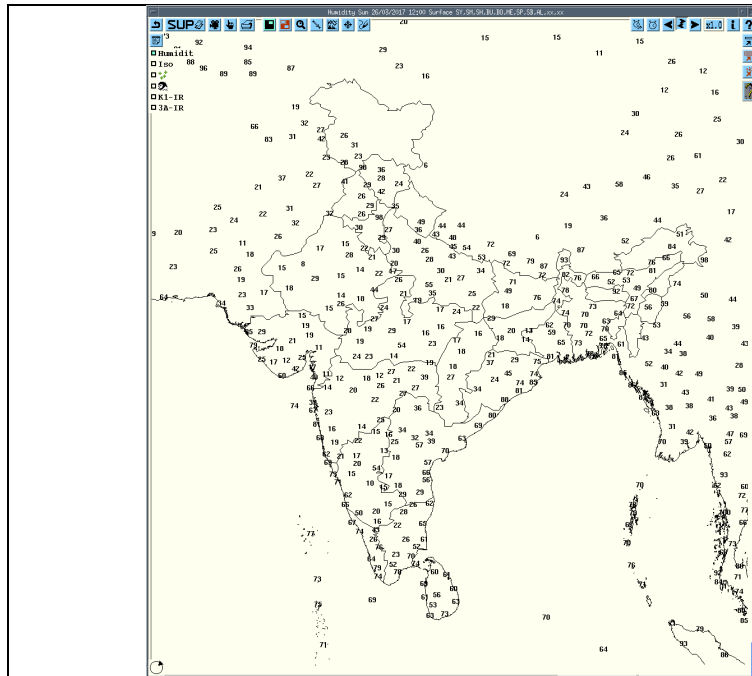
MSLP



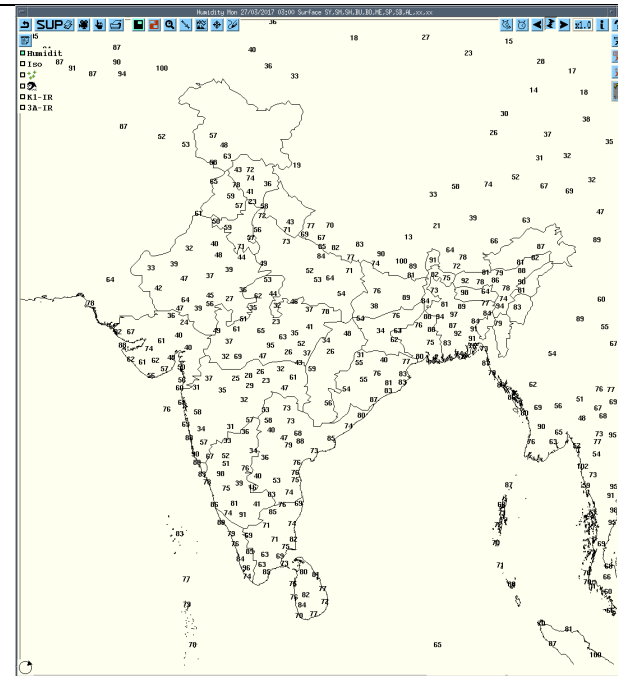
Departure MSLP



Tendency MSLP



**RH at 12UTC yesterday**



**RH at 03UTC today**

**Realized weather past 24 hours (based on SYNERGIE data)**

| Date       | Time of Reporting | Name of Station Reporting | Region          | STATE | Weather Event |
|------------|-------------------|---------------------------|-----------------|-------|---------------|
| 26-03-2017 | 0600UTC           | Nil                       | Nil             | Nil   | Nil           |
| 26-03-2017 | 0900UTC           | Nil                       | Nil             | Nil   | Nil           |
| 26-03-2017 | 1200UTC           | Nil                       | Nil             | Nil   | Nil           |
| 26-03-2017 | 1500UTC           | Guwahati                  | Northeast India | Assam | Thunderstorm  |
| 26-03-2017 | 1800UTC           | North Lakhimpur           | Northeast India | Assam | Thunderstorm  |
| 26-03-2017 | 2100UTC           | Nil                       | Nil             | Nil   | Nil           |
| 27-03-2017 | 0000UTC           | Silchar                   | Northeast India | Assam | Thunderstorm  |
| 27-03-2017 | 0300UTC           | Nil                       | Nil             | Nil   | Nil           |

| Name of Station Reporting | Region            | STATE     | Weather Event | Date     | Time of Commencement (IST) | Time of end (IST) |
|---------------------------|-------------------|-----------|---------------|----------|----------------------------|-------------------|
| Barapani                  | Assam & Meghalaya | Meghalaya | Thunderstorm  | 26-03-17 | 26/1601                    | 27/0800           |
| Dibrugarh                 | Assam & Meghalaya | Assam     | Thunderstorm  | 26-03-17 | 27/0500                    | 27/0520           |
| Guwahati                  | Assam & Meghalaya | Assam     | Thunderstorm  | 26-03-17 | 26/1905                    | 26/2035           |
| Jorhat                    | Assam & Meghalaya | Assam     | Thunderstorm  | 26-03-17 | 26/2200                    | 27/0130           |
| N/Lakhimpur               | Assam & Meghalaya | Assam     | Thunderstorm  | 26-03-17 | 26/21300                   | 26/2400           |
| Silchar                   | Assam & Meghalaya | Assam     | Thunderstorm  | 27-03-17 | 27/0500                    | 27/0535           |










### 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 |
|--------------------|----------|------------------------------------|---|---|---|----------------------------------|--------------------|
| DWR KOLKATA        | 26-03-17 | 0301-0711                          | NIL   | NIL   | NO ECHO   | NIL                              | NIL                |
|                    | 26-03-17 | 0721-1512                          | NIL   | NIL   | NO ECHO   | NIL                              | NIL                |
|                    | 26-03-17 | 1521-1612                          | Single cell with max. height of 8.6 km with max. reflectivity of 55 dbz   | N'yly (108.2 KM)<br>Moving in E'yly direction at speed of ...km/hr. | Cell started forming at 1521 UTC and moving towards E'yly and entered into Bangladesh at 1612 UTC | TS/RAIN                          | NADIA              |
|                    | 26-03-17 | 1551- 1632                         | Single cell with max. height of 7.0 km with max. reflectivity of 53 dbz   | N'yly (138.3 KM)<br>Moving in E'yly direction at speed of ..km/hr   | Cell started forming at 1551 UTC and moving towards E'yly and died at 1632 UTC                    | TS                               | N/A                |
|                    | 26-03-17 | 1641-2351                          | NIL   | NIL   | NO ECHO   | NIL                              | NIL                |
|                    | 27-03-17 | 0001-0301                          | NIL   | NIL   | NO ECHO   | NIL                              | NIL                |
| DWR Mohanbari      | 26-03-17 | 0730-1100                          | Isolated cells with average height of 09 km with maximum reflectivity of 48.5 dBZ   | ESE(130KM) and remains almost stationary                            | Nil   | No                               | NIL                |
|                    | 26-03-17 | 0830-1100                          | Isolated cells with average height of 07 km with maximum reflectivity of 35.0 dBZ   | WNW(120KM) almost stationary  | Nil   | No                               | NIL                |



| Radar Station Name | Date     | Time Interval Of Observation (UTC) | Organisation 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 | Associate d severe weather if any | Districts affected |
|--------------------|----------|------------------------------------|--|--|---------|-----------------------------------|--------------------|
| PATNA              | 27-03-17 | 260300-270300                      | Nil  | --   | --      | --                                | --                 |
| AGARTALA           | 27-03-17 | 260300-270300                      | Nil  | --   | --      | --                                | --                 |
| JAIPUR             | 27-03-17 | 260300-270300                      | Nil  | --   | --      | --                                | --                 |
| LUCKNOW            | 27-03-17 | 260300-270300                      | Nil  | --   | --      | --                                | --                 |
| NAGPUR             | 27-03-17 | 260302-270252                      | Nil  | --   | --      | --                                | --                 |
| PATIALA            | 27-03-17 | 260302-270252                      | Nil  | --   | --      | --                                | --                 |

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

|   |   |   |
|---|---|---|
|  |   |  |
| + thunderstorm  | + heavy thunderstorm  | sandstorm or dust storm   |
|  |  |  |
| squall  | hail shower   | tropical storm  |
|  |  |  |
| + tornado   | + lightning   | + hurricane   |

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