



**India Meteorological Department**  
**FDP STORM Bulletin No. 12(17-03-2017)**

**1. CURRENT SYNOPTIC SITUATION at 0300 UTC of 17-03-2017:**

**SYNOPTIC FEATURES:**

The Western Disturbance as an upper air cyclonic circulation over north Pakistan and adjoining Jammu & Kashmir now lies over Jammu & Kashmir and neighbourhood and extends upto 3.1 km above mean sea level.

The trough from northeast Rajasthan to Gujarat region now runs from northeast Madhya Pradesh to North Interior Karnataka between 0.9 km & 1.5 km above mean sea level.

The upper air cyclonic circulation over North Interior Karnataka and adjoining south Madhya Maharashtra & Marathwada has merged with the above trough.

The wind discontinuity from Lakshadweep area to West Vidarbha across Interior Karnataka and Marathwada has become less marked.

The trough from Sub-Himalayan West Bengal to south Odisha across Gangetic West Bengal now runs from Sub Himalayan West Bengal to Gangetic West Bengal and extends upto 0.9 km above mean sea level.

A fresh Western Disturbance very likely to affect northwest India from 19th March onwards.

**SATELLITE OBSERVATIONS during past 24hrs and current observation (Based on 0900 UTC Imagery of INSAT-3D):**

**Clouds (based on 0900 UTC imagery):**

Scattered low/medium clouds with embedded isolated weak to moderate convection over J & K, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh. Scattered low/medium clouds over west Rajasthan, east Madhya Pradesh, Chhattisgarh, Bihar and north Nagaland. Isolated low/medium clouds over coastal Karnataka, Andhra Pradesh, Kerala and south Tamilnadu.

**Arabian Sea:-**

Scattered low/medium clouds over southeast Arabian Sea.

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

No significant clouds over the region.

**Convection:**

Weak convection (CTT above 240° K in some places) was observed over Sikkim and Arunachal Pradesh.

OLR upto 300-340  $\text{wm}^{-2}$  was over central parts, and upto 200  $\text{wm}^{-2}$  was over extreme north & extreme south parts of country.

**Jet Stream:**

No Jet stream and a feeble trough is observed over north Rajasthan.

**Precipitation:**

**IMR:** Rainfall upto 70 mm was observed over S Kerala J & k, H P.

**RADAR and RAPID Observation:**

Convection appears to be in progress over Coastal Andhra Pradesh and Western Himalayas in DWR composite at 1620 IST.

In RAPID convection appears to be in progress over Chhattisgarh also.

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

No significant dust concentration observed over Arabian Peninsula and west Rajasthan. No significant change in dust concentration expected over northern India for next three days.

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

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

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

Feeble trough at 12UTC in forecasts Day-0 to Day-2 at MSLP over J&K. Wind discontinuity only in Day-0-4: at 925 and 850 hPa extends over parts of AP, Maharashtra, Odisha, Chhattisgarh and parts of Bihar. Anticyclonic flow at 850 hPa over in up to Day-3 over Bay of Bengal off AP coast and Arabian Sea.

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

Weaker magnitude during Day-0 to Day-3. Jet core prominent in 84 to 96h forecasts over Bihar, Odisha, WB and Bay of Bengal.

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

Weak noisy low level convergence at several places over India

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

Weak noisy scattered in 12UTC on all days

Day-2 to Day-3 at 18 and 00UTC: NS orientation over peninsula near 77E along the NS trough at 850 hPa shifting eastwards.

Day-2- 3: 00 to 12UTC high values over NW India Rajasthan-MP and shifting eastwards to over eastern India.

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

Day-2-3: Parts of AP and Karnataka. NS orientation: covering Maharashtra and MP.

Day-1-2: Between 36-48h over Rajasthan moving eastwards

Day-2: TN and mainly NE India covering Manipur, Tripura, Mizoram, Meghalaya and Assam

Day-3-4: NS Odisha region extending NE wards (on day4)

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

Day-2-3: Parts of AP and Karnataka. NS orientation: covering Maharashtra and MP.

Day-1-2: Between 36-48h over Rajasthan moving eastwards

Day-2: TN and mainly NE India covering Manipur, Tripura, Mizoram, Meghalaya and Assam

Day-3-4: NS Odisha region extending NE wards (on day4)

#### **7. Spatial distribution of TTI: TTI >44 [Scattered Numerous Thunderstorms]:**

Day1-2: high values of TTI over NW India moving eastwards between 42h-60h forecasts. Day-2-3: over Odisha and WB and large parts of NE.

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

Day-1-2 and 4: (>2cm/day) Parts of Arunachal Pradesh.

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

- 1. Weather Systems:** A north-south oriented trough extending from east Uttar Pradesh up to interior Karnataka over Madhya Pradesh and adjoining Vidarbha, Marathwada and Telengana establishes in the analysis orients in north-east and southwest direction extending from Assam to interior Karnataka in day 1. Again, the north-south trough extends from Delhi to Interior Karnataka over Madhya Pradesh, Vidarbha, Marathawada and adjoining areas in day 2. The same trough again changes orientation in north-east and southwest direction with embedded cyclonic circulations over interior Karnataka and Jharkhand. Day 4 onwards, an anti-cyclone flow remains over central India, no trough is seen. Only a north-south trough is seen extending from Assam up to Bay of Bengal which persists from day 3 - 5.
- 2. Location of jet and jet core at 500 hPa:-500 hPa Jet core(>60kt):** The Jet at 500 hPa does not exist over India during next 5 days but strong westerly wind persists around 25 deg. N latitude except on day 4 an area of Jet is seen over GWB.
- 3. Low level Vorticity:-Positive Vorticity (>15x10<sup>-5</sup>/s):** Mainly along foothill of Himalaya during next 5 days during morning hours. The significant vorticity zones associated with the troughs and embedded cyclonic circulations are seen over the regions during next 5 days
- 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):** Less than the threshold value all over the country during next 5 days. Some pockets of significant values lies over coastal Andhra Pradesh and adjoining areas during day 3.
  - Lifted Index (< -2):** The areas with index less than threshold lies along east coast regions over GWB, Orissa, coastal Andhra Pradesh and Tamilnadu for next 5 days. During the same period, the index also crosses threshold along the west coast over Kerala, parts of coastal Karnataka and Konkan-Goa. It reaches maximum negative value over Gangetic West Bengal and adjoining Orissa on day 3 and 4. A significant zone is also seen over Rajasthan in day 2 which advances eastward with time over Madhya Pradesh and adjoining Delhi and Uttar Pradesh in day 3.
  - Sweat Index ( > 300):** Then significant zones are confined along east coast of India over GWB, Orissa and coastal AP with maximum values over GWB and Orissa in day 1 and 3. Another zone appears over Rajasthan in day 2 with moves eastward and merges with the zone along east coast in day 3.
  - Total Total Index (> 50):** Above threshold value in some parts of central India over Madhya Pradesh Maharashtra and adjoining areas in day 1. Day 3 onwards, the index crosses threshold over whole NW India reaching up to southern peninsular region in day 5.
  - CAPE (> 1000):** Mostly along east coast of India over Gangetic West Bengal, Orissa, coastal Andhra Pradesh and Tamilnadu coast during next 5 days. The CAPE values also crosses threshold over Kerala and parts of coastal Karnataka, Konkan-Goa during the same period.
  - CINE (50-150):** Maximum CIN values are found in pockets along east coast over GWB, Odisha, coastal AP and Tamilnadu from Day-1 to Day-5. The zone sometime extends inland over interior Karnataka to west coast region over coastal Karnataka and Konkan-Goa. CIN values are higher over west Rajasthan adjoining Gujarat in day 2.
- 5. Rainfall and thunderstorm activity:** 10-20 mm rainfall over Kerala and adjoining Konkan & Goa and adjoining areas during next 3 days. In day 2, over Rajasthan and over some parts of GWB and Orissa from day 2 -3. 10-40 mm rainfall is likely over some areas over north-eastern states from day 1 to day 4.

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

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

A north-south trough extending over east UP, to Marathwada is seen in the analysis which orients in north-east and south-west direction along east coast extending from Assam to interior Karnataka over GWB, Jharkhand, Chhattisgarh, Telangana and adjoining Vidarbha during day 1. A cyclonic circulation develops over east Rajasthan and adjoining areas in day 2 only. The cyclonic circulations over north Marathwada and adjoining areas persists during day 2 and 3. A wind discontinuity is seen inland along east coast in day 3. A feeble north-south trough persists over north-eastern states in day 2 and 3.

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

The Jet at 500 hPa does not exist over India during next 3 days but strong westerly wind persists around 25 deg. N latitude over northern parts of India in next 2 days which weakens thereafter in day 3.

### **3. Low level Vorticity :-Positive Vorticity (>15x10<sup>-5</sup>/s):**

Mostly along foothills of Himalaya during morning hours in next 3 days. The significant vorticity zones are seen associated with the troughs and cyclonic circulation in the lower tropospheric level.

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

(>25 dBz) over some parts of Uttarakhand and adjoining Himachal Pradesh before the evening of day 1. Some parts of GWB, SHWB and north sector of north-eastern states on day 1 and day 2. During day 2 mornings over east Rajasthan and adjoining areas advances eastward gradually and reaches over Bihar crossing over Uttar Pradesh and north MP in day 3.

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

**Total Total Index (> 50):** Above threshold value mostly over most parts of India during next 3 days except parts of extreme south peninsular region and northeastern states.

**K-Index (> 35):** Less than threshold value over most parts of India during next 3 days but significant values are seen over peninsular India and mostly over Marathwada, interior Karnataka and adjoining regions.

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

**CINE (50-150):** CIN values are small all over India during all three days of forecasts except some places along coastal areas of India over Orissa, coastal AP, coastal Karnataka and Konkan-Goa. During day 2, over Rajasthan and adjoining areas.

**6. Rainfall activity:** (~ 10-40 mm) over north-eastern states in extreme south peninsular region over Kerala and adjoining Tamilnadu and interior Karnataka during next 3 days.

10-40 mm over parts of GWB in day 2.

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

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

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

The Western Disturbance as an upper air cyclonic circulation over north Pakistan and adjoining Jammu & Kashmir now lies over Jammu & Kashmir and neighbourhood and extends upto 3.1 km above mean sea level. The jet core speed in the upper levels over Rajasthan has increased with respect to yesterday. This is likely to give thunderstorm activity over Rajasthan on day 2. The trough from northeast Rajasthan to Gujarat region has shifted eastward and now runs from northeast Madhya Pradesh to North Interior Karnataka. In association with the trough, thunderstorm with squally winds is expected over North Coastal Andhra Pradesh on day 1. In association with the trough from Sub Himalayan West Bengal to south Odisha, rainfall with thundersquall is expected over entire North East Indian region and Sub Himalayan West Bengal on day 1. With the eastward shift of this trough on day 2, the rainfall belt is likely to continue over North East India, and increase over Gangetic West Bengal and adjoining Orissa.

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

Arunachal Pradesh,  
Sikkim, Meghalaya, Assam.  
Sub Himalayan West Bengal, Mizoram and Tripura.  
Kerala, North Coastal Andhra Pradesh

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

Arunachal Pradesh, Meghalaya, Assam,  
Sub Himalayan West Bengal,  
Mizoram, Tripura.  
Kerala, Coastal Orissa, Gangetic West Bengal, North Rajasthan

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)

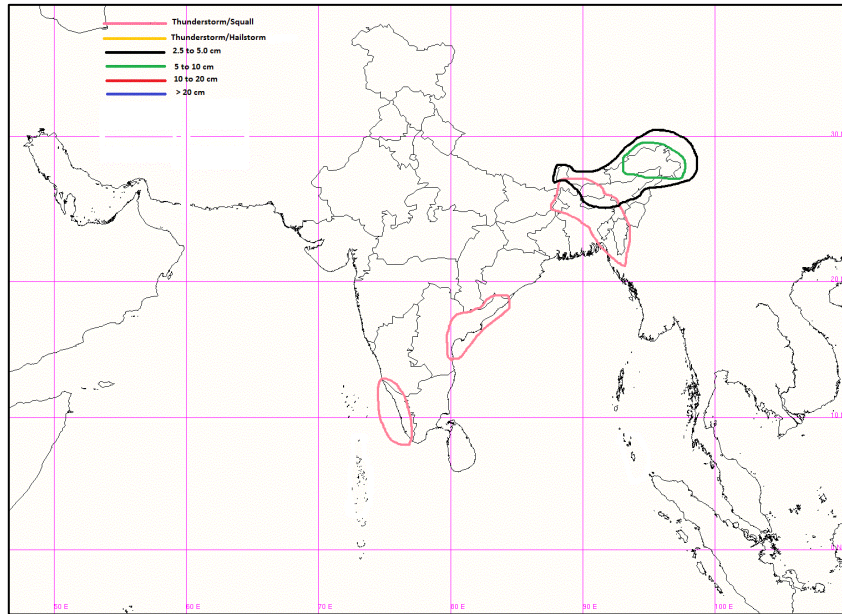
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ForRadarimagesofthepast24hoursincludingmosaicofimages:

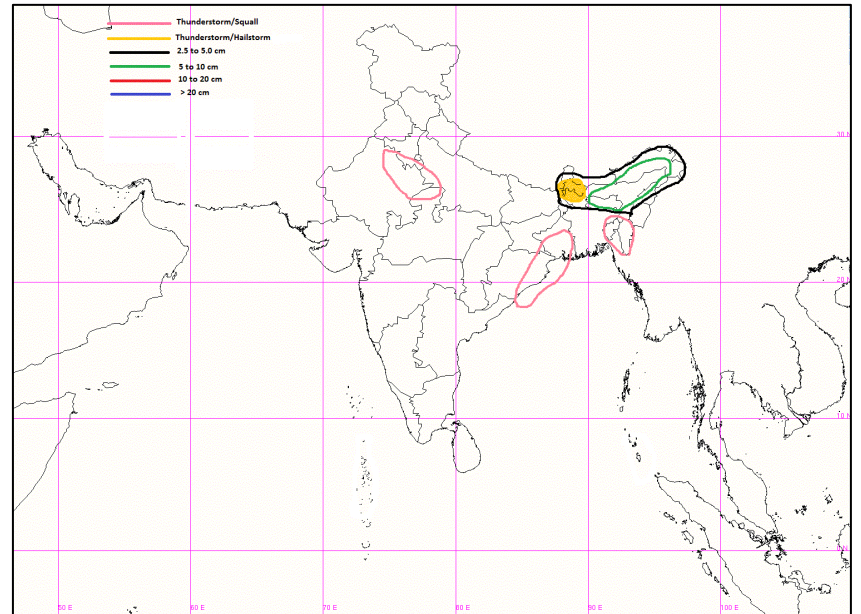
[http://ddgmui.imd.gov.in/dwr\\_img/](http://ddgmui.imd.gov.in/dwr_img/)

Satellite sounder based T-Phi gram

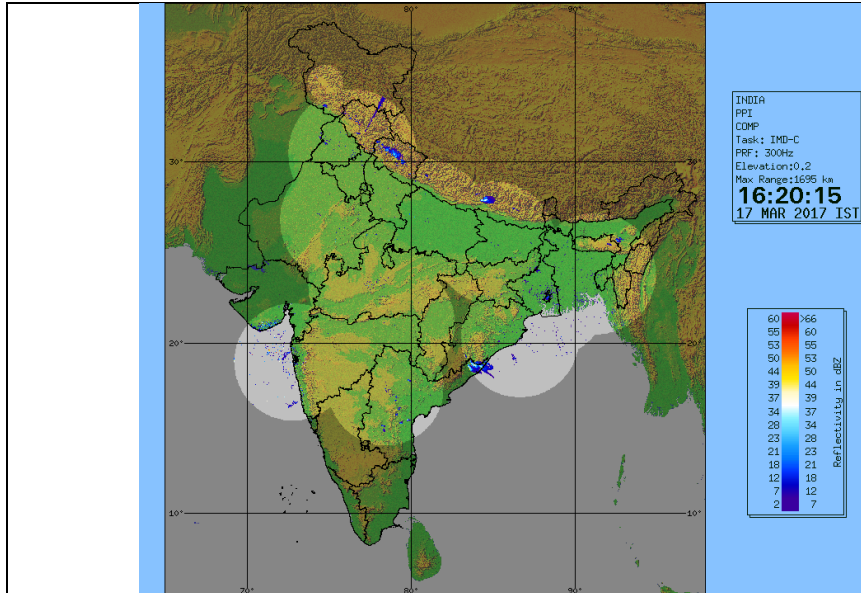
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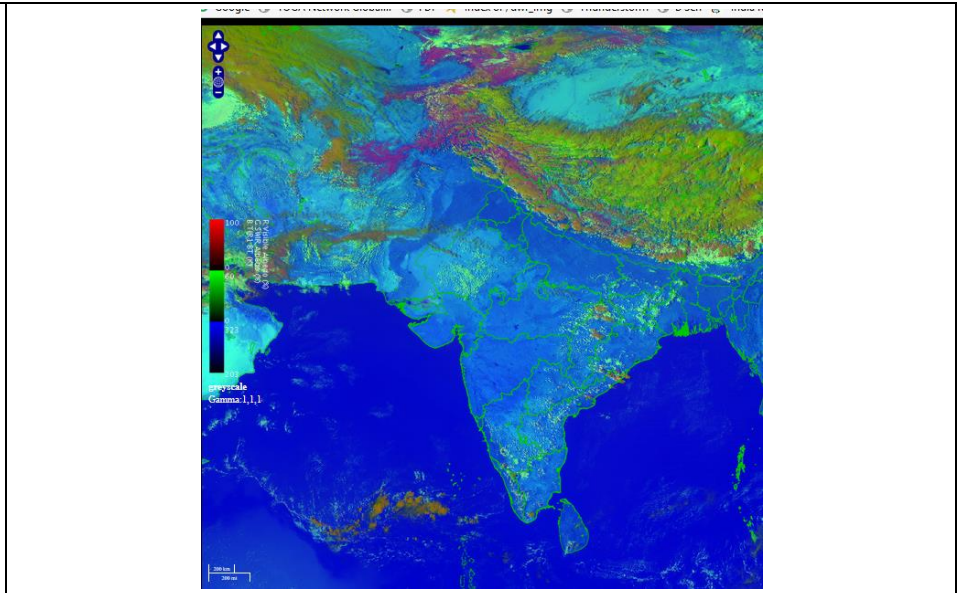
**IOP Advisory for 24hours**



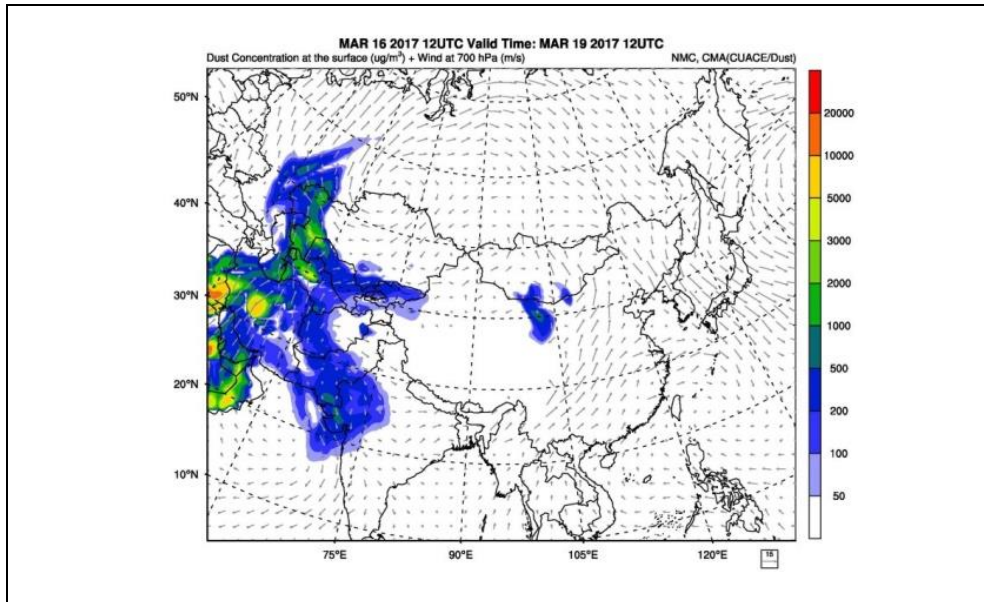
**IOP Advisory for 48hours**



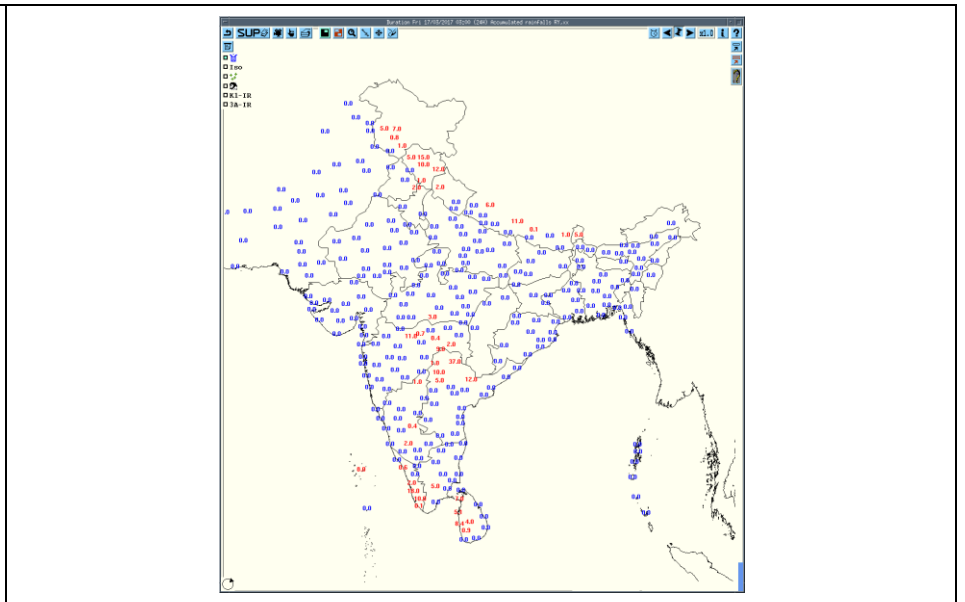
DWR Composite at 1620 IST of today



RGB Image of INSAT3D at 1530 IST of today



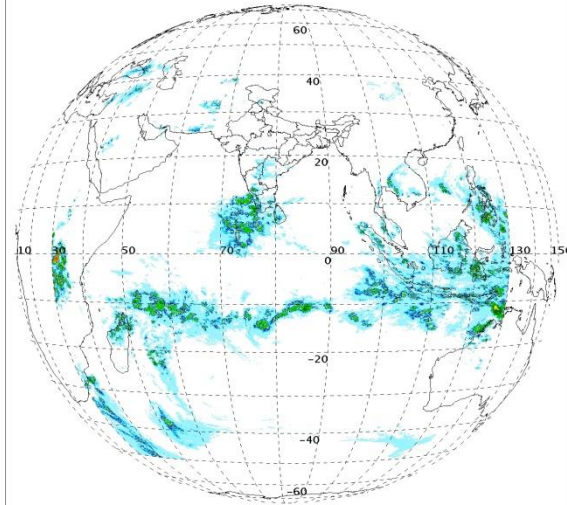
Forecast Dust Concentration at 00UTC of 19<sup>th</sup> March



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

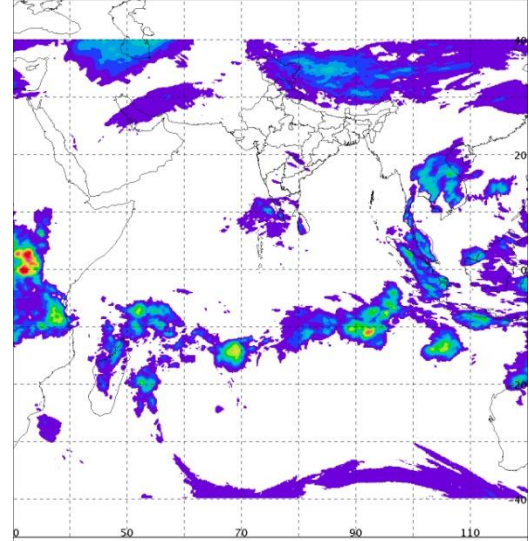


SAT INSAT-3D IMG  
Precipitation(HI) Daily  
L3B BINNED GEOPHYSICAL PARAMETER FULL DISK

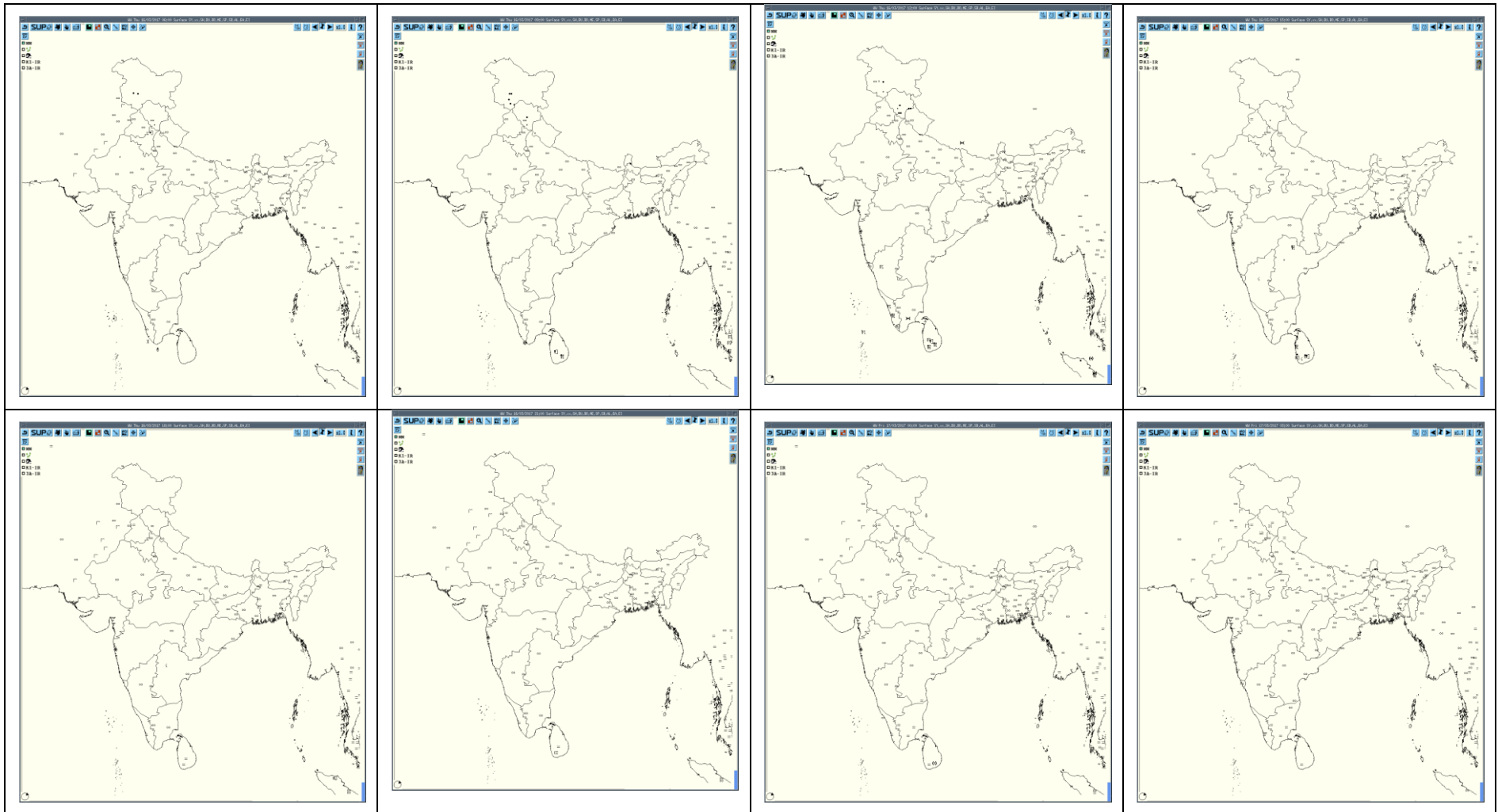


**HEM Rainfall**

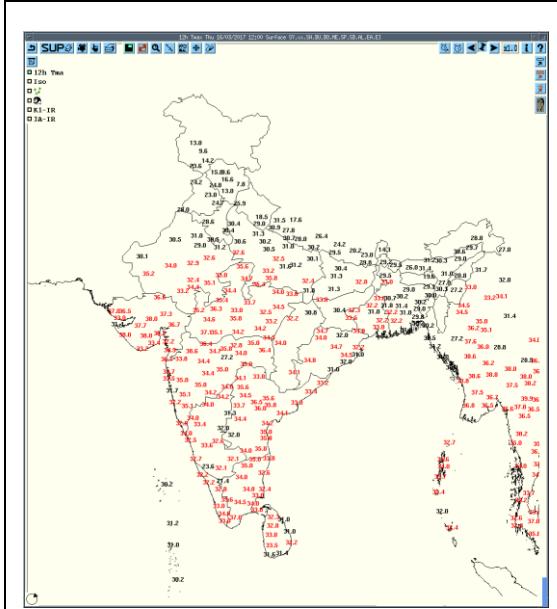
SAT INSAT-3D IMG  
INSAT Multispectral Rainfall(Daily)  
L3G BINNED GEOPHYSICAL PARAMETER GRIDDED



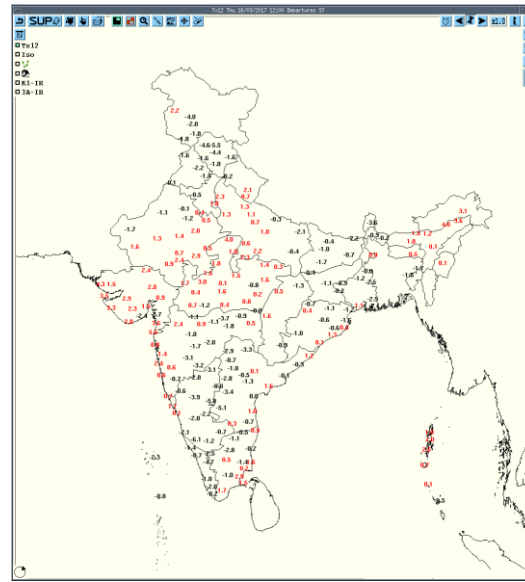
**IMR Rainfall**



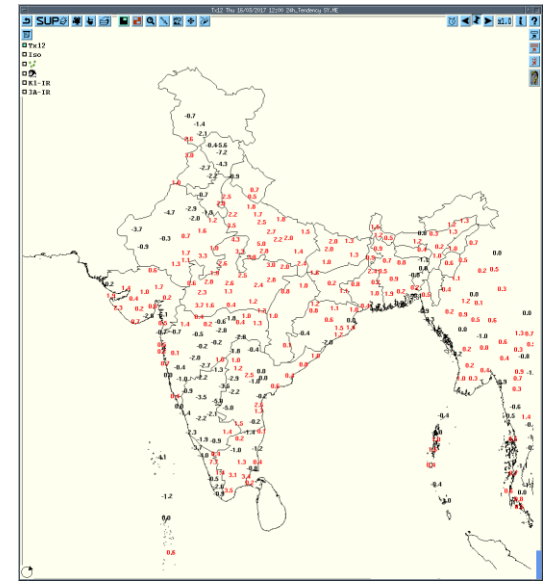
**3 hourly Past weather at 06, 09, 12, 15, 18, 21 UTC of yesterday and 00 & 03 hrs UTC of today**



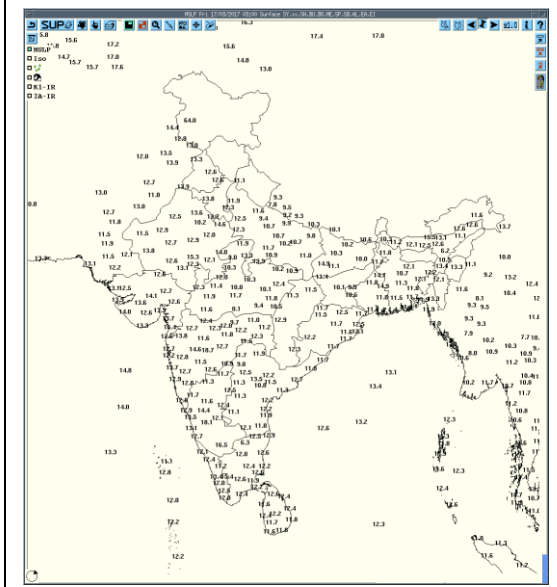
T<sub>max</sub>



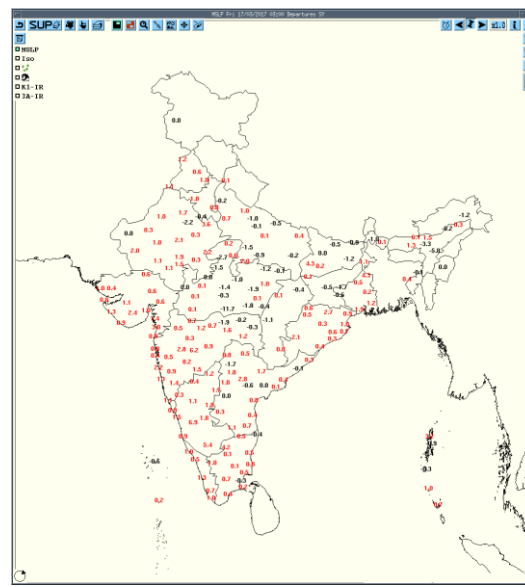
Departure T<sub>max</sub>



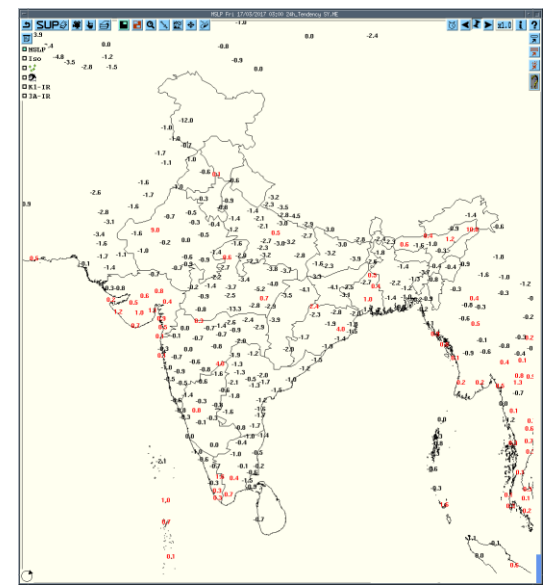
Tendency T<sub>max</sub>



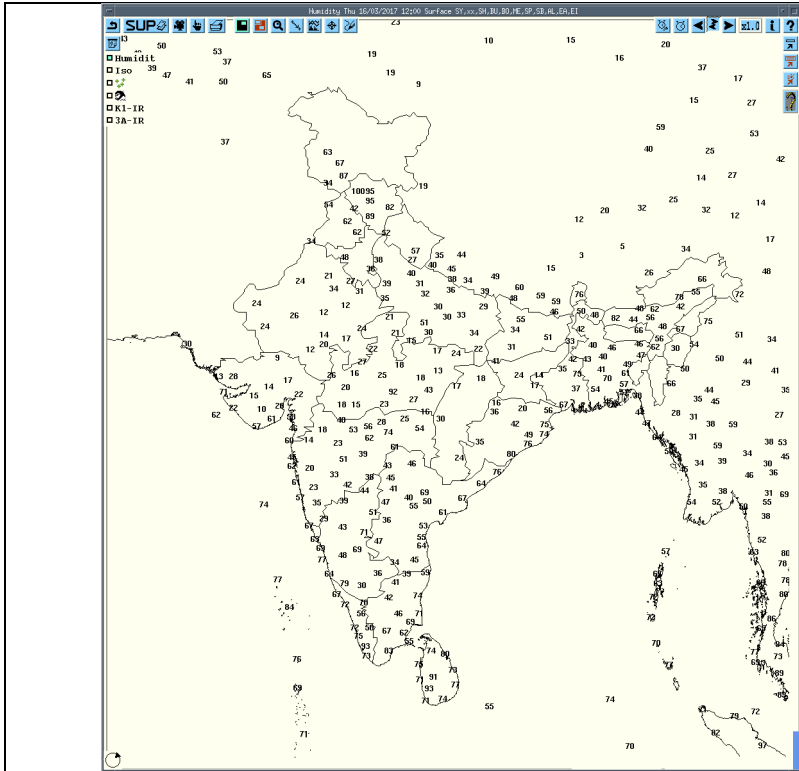
MSLP



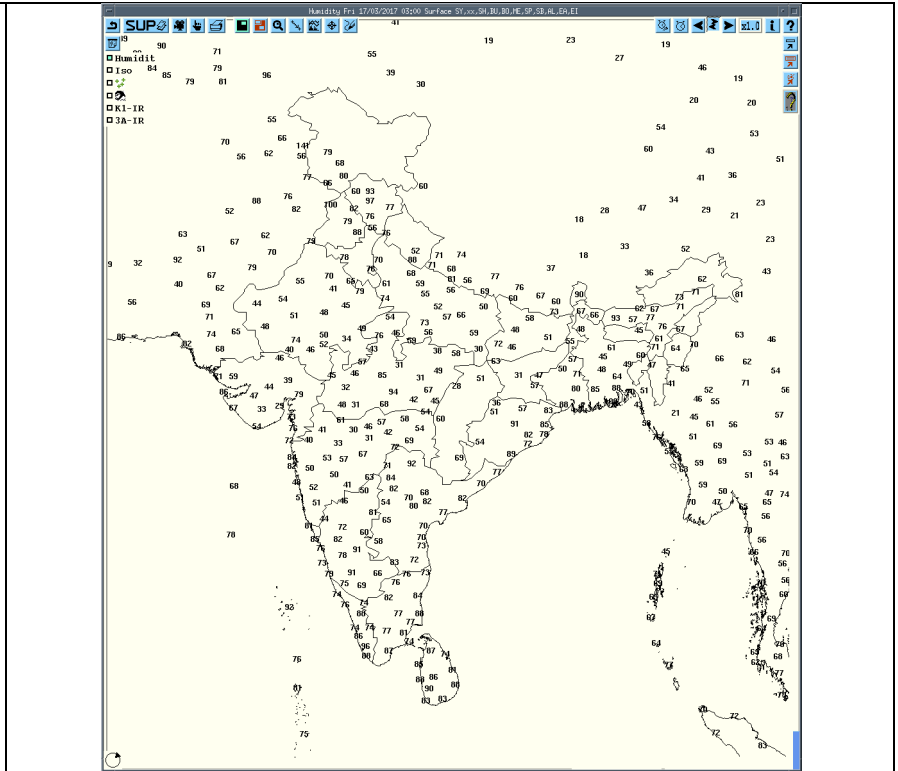
Departure MSLP



Tendency MSLP



RH 12 UTC yesterday



RH 03 UTC today

Realized weather past 24 hours					
Date	Time of Reporting	Name of Station Reporting	Region	STATE	Weather Event
16-03-2017	0600UTC	Nil	Nil	Nil	Nil
16-03-2017	0900UTC	Nil	Nil	Nil	Nil
16-03-2017	1200UTC	Dharwad	South India	Karnataka	Thunderstorm
		MO Karipur	South India	Kerala	Thunderstorm
		Cochin	South India	Kerala	Thunderstorm
		Thiruvananthapuram	South India	Kerala	Thunderstorm
		Minicoy	South India	Lakshadweep	Thunderstorm
16-03-2017	1500UTC	Ramgundam	South India	Andhra Pradesh	Thunderstorm
		Gadag	South India	Karnataka	Lighting
16-03-2017	1800UTC	Hyderabad AP	South India	Andhra Pradesh	Lighting
16-03-2017	2100UTC	Nil	Nil	Nil	Nil
17-03-2017	0000UTC	Nil	Nil	Nil	Nil
17-03-2017	0300UTC	Nil	Nil	Nil	Nil

Name of Station Reporting	Region	STATE	Weather Event	Date	Time of Commencement (IST)	Time of end (IST)
MO Tehri	Northwest India	Uttarakhand	TSRA	16-03-17	1310	1320
Buldana	Central India	Maharashtra	TSRA	16-03-17	1415	1435
Chandrapur	Central India	Maharashtra	TSRA	16-03-17	1500	1700
Yeotmal	Central India	Maharashtra	TSRA	16-03-17	1515	1700
Chhindwada	Central India	Madhya Pradesh	TSRA	16-03-17	1626	1635
Ramagundam	South India	Andhra Pradesh	TSRA	16-03-17	2000	2200
Hyderabad	South India	Andhra Pradesh	TSRA	16-03-17	1930	2000
Alappuzha	South India	Kerala	TSRA	16-03-17	1710	1745
Thiruvananthapuram City	South India	Kerala	TSRA	16-03-17	1305	1355

TS: Thunderstorm,  
TSRA: Thunderstorm with Rain

<b>Severe Weather warning based on DWR observation</b>	
<b>Name of issuing Radar station</b>	<b>DWR Lucknow</b>
Geo-coordinates of issuing Station(Lat, Long,Alt)	26 0 46'39; 078'39; N , 80 0 53'39; 078'39; E , 127.71 M
Date and time of issue in UTC (yyyyMMddhhmm)	201703170600
Nature of severe weather expected	Nil
<b>Name of issuing Radar station</b>	<b>DWR KARAİKAL</b>
Geo-coordinates of issuing Station(Lat, Long,Alt)	Lat:10.91381N,Long:79.84141E/Alt:25masl
Date and time of issue in UTC (yyyyMMddhhmm)	201703170700
Nature of severe weather expected	DWR U/S
<b>Name of issuing Radar station</b>	<b>DWR NAGPUR</b>
Geo-coordinates of issuing Station(Lat, Long,Alt)	Lat:21.1458°N,Long:79.0882°E
Date and time of issue in UTC (yyyyMMddhhmm)	-
Nature of severe weather expected	-
<b>Name of issuing Radar station</b>	<b>DWR MUMBAI</b>
Geo-coordinates of issuing Station(Lat, Long,Alt)	Lat-18°54'04", Long-72°48'32"/HeightAMSL-3.22meters.
Date and time of issue in UTC (yyyyMMddhhmm)	20170317
Nature of severe weather expected	Nil
<b>Name of issuing Radar station</b>	<b>DWR HYDERABAD</b>
Geo-coordinates of issuing Station(Lat, Long,Alt)	Lat-17.2562°NLong-78.7656°E
Date and time of issue in UTC (yyyyMMddhhmm)	201703170700
Nature of severe weather expected	Nil
<b>Name of issuing Radar station</b>	<b>DWR AGARTALA</b>
Geo-coordinates of issuing Station(Lat, Long,Alt)	23.89°N,91.25°E,16mabovemsl
Date and time of issue in UTC (yyyyMMddhhmm)	201703170610
Nature of severe weather expected	Nil
<b>Name of issuing Radar station</b>	<b>DWR KOLKATA</b>
Geo-coordinates of issuing Station(Lat, Long,Alt)	22.5705° N / 88.353° E, 7m above msl
Date and time of issue in UTC (yyyyMMddhhmm)	201703170611 UTC
Nature of severe weather expected	Nil
<b>Name of issuing Radar station</b>	<b>DWR Machilipatnam</b>
Geo-coordinates of issuing Station(Lat, Long,Alt)	LAT: 16.12' LONG: 81.09' ALT: 3.05m.
Date and time of issue in UTC (yyyyMMddhhmm)	201703170601
Nature of severe weather expected	Nil


**Past 24 hrs RADAR Report**

Radar Station name	Date	Time interval of observation (UTC)	Organization of the cells (Isolated single cells/multiple cells/ convective regions/ squall lines) with height of 20 dBZ echo top and maximum reflectivity	Formation w.r.t radar station and Direction of movement	Remarks	Associated severe weather if any	Districts affected
NAGPUR	16/03/17	0302-0352 UTC	ISOLATED CELL WITH HEIGHT 9.0 KM WITH MAX. REFLECTIVITY 38.0 DBZ	Convection cloud formation started at 0322 UTC south of DWR at range of 200 Kms moving ESE`ly and disorganized at 0342 UTC	No signature of thunderstorm & hail warning in QLW	RA/SHRA	ADILABAD IN TELANGANA
	16/3/2017	0832-2100 UTC	ISOLATED CELL WITH HEIGHT 12.0 KM WITH MAX. REFLECTIVITY 51.5 DBZ	Convection cloud formation started at 0902 UTC WSW of DWR at range of 160 Kms moving ESE`ly and disorganized at 2042 UTC	Thunderstorm warning signature & No signature of hail warning in QLW	RA/SHRA/TSRA	Akola, Washim, Yavatmal, Chandrapur MAHARASTRA & ADILABAD IN TELANGANA

∞	haze
☁	smoke
☼	dust or sand storm
☁	fog
☂	drizzle
•	rain
❄	snow
☁	showers
☁	hail
☁	thunderstorm

**Weather Symbols**

  
+ thunderstorm

  
+ heavy thunderstorm

  
sandstorm or dust storm

  
squall

  
hail shower

  
tropical storm

  
+ tornado

  
+ lightning

  
+ hurricane

[www.visualdictionaryonline.com](http://www.visualdictionaryonline.com)