



# India Meteorological Department

## FDP STORM Bulletin No. 78 (23-05-2018)

### 1. CURRENT SYNOPTIC SITUATION:

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

- ◆ Conditions are very likely to become favourable for the advance of Southwest monsoon into South Andaman Sea & neighbourhood during next 72 hours.
- ◆ The Cyclonic storm "Mekunu" over southwest Arabian sea moved north north-westwards with a speed of 12 kmph during past 06 hours and intensified into a Severe Cyclonic Storm and lay centred at 0830 hours IST of today, the 23rd May 2018 over southwest Arabian Sea near lat 11.2°N & long 55.9°E, about 270 km southeast of Socotra islands and 670 km south southeast of Salalah (Oman). It is very likely to intensify further into a Very Severe Cyclonic Storm during next 24 hours. It is very likely to move north north-westwards and cross south Oman southeast Yemen coasts as a Very Severe Cyclonic Storm with maximum sustained surface wind 150-160 kmph gusting to 180 kmph between 53°E and 55°E close to Salalah around 26th May 2018 morning. As the system is away from the Indian coast, no adverse weather is expected along and off west coast of India.
- ◆ The Western Disturbance as an upper air cyclonic circulation over north Pakistan & neighbourhood now lies over north Pakistan and adjoining Jammu & Kashmir at 3.1 km above mean sea level with the trough aloft with its axis at 5.8 km above mean sea level running roughly along Long 72°E to the north of Lat. 30°N.
- ◆ However, the trough from northeast Madhya Pradesh to North Interior Karnataka now runs from East Madhya Pradesh to south Tamilnadu and extends upto 1.5 km above mean sea level with an embedded cyclonic circulation over north Madhya Maharashtra & neighbourhood at 0.9 km above mean sea level.
- ◆ A trough at 0.9 km above mean sea level runs from East Rajasthan to Gangetic West Bengal across north Madhya Pradesh & Jharkhand.
- ◆ The cyclonic circulation over east Bihar and adjoining Sub Himalayan West Bengal persists and now seen between 1.5 & 2.1 km above mean sea level .
- ◆ A north south trough at 3.1 km above mean sea level runs roughly along Long 88°E to the north Lat 22° N.
- ◆ The cyclonic circulation over eastern parts of Assam & neighbourhood extending upto 0.9 above mean sea level persists.
- ◆ The cyclonic circulation over Srilanka and adjoining Southwest Bay of Bengal now lies over southwest Bay of Bengal between 1.5 & 3.1 km above mean sea level.

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

### **Current Observation (based on 0600UTC imagery of INSAT 3D):**

#### **Vortex over south-west Arabian Sea:**

Vortex (**MEKUNU**) over south-west Arabian Sea now lay cantered near 11.4N/56.0E. Intensity T3.5 RPT T3.5. Associated broken low/medium clouds with embedded intense to very intense convection over area between lat 7.0N to 16.0N long 50.0E to 60.0E (**Minimum CTT Minus 93 Deg C**).

#### **Western Disturbance (WD) :**

Scattered multi/layered clouds over North Jammu & Kashmir, & neighbourhood in associated WD over the area. Scattered multi/layered clouds over Iraq W Iran & neighbourhood in another associated WD over the area

### **Clouds Descriptions within India:**

#### **NORTH:-**

Scattered low/medium clouds with embedded isolated weak convection over Jammu & Kashmir. Scattered low/medium clouds over Himachal Pradesh, Uttarakhand & Northeast Uttar Pradesh.

#### **EAST:-**

Broken low/medium clouds with embedded moderate to intense convection seen over East Odisha, South Jharkhand, Southeast Gangetic West Bengal, Northeast Bihar, Northeast Sub Himalayan West Bengal, Sikkim, Meghalaya adjoining West Assam, Arunachal Pradesh, Nagaland, Tripura. Scattered low/medium clouds with embedded isolated weak to moderate convection over rest Odisha, North Jharkhand and Manipur. Scattered low/medium clouds over rest parts of the region.

#### **WEST:-**

Scattered low/medium clouds with embedded weak to moderate convection seen over Vidarbha and isolated weak over Southeast Rajasthan, rest Madhya Pradesh and rest Maharashtra.

#### **SOUTH:-**

Scattered low/medium clouds with embedded moderate to intense convection seen over Coastal Tamilnadu, Lakshadweep & Bay Islands. Scattered low/medium clouds with embedded isolated weak to moderate convection over Telangana, North Coastal Andhra Pradesh, South Kerala and South Tamilnadu. Scattered low/medium clouds over rest parts of the region.

#### **ARABIAN SEA:**

Scattered low/medium clouds with embedded intense to very intense convection seen over Southeast Arabian Sea Maldives & Gulf of Mannar.

#### **BAY OF BENGAL & ANDAMAN SEA:**

Scattered low/medium clouds with embedded moderate to intense convection seen over South Bay and East Central Bay.

### **Past Weather:**

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

Intense to Very Intense convection was observed over Jharkhand West Bengal Odisha South Chhattisgarh West Parts of North Interior Karnataka Central Tamilnadu.

Moderate to Intense convection was observed over J&K Bihar Sikkim Arunachal Pradesh Assam Meghalaya Nagaland Manipur South-East Madhya Pradesh Vidarbha Telangana North Coastal Andhra Pradesh Kerala rest Tamilnadu Lakshadweep Andaman & Nicobar Islands.

**OLR:-**

Upto **230**  $\text{wm}^{-2}$  was observed over J&K North Himachal Pradesh North Uttarakhand South Chhattisgarh Odisha Jharkhand South-west Bihar West Bengal Sikkim Arunachal Pradesh Assam Meghalaya Nagaland Manipur Goa adjoining Karnataka South Kerala & South Tamilnadu.

**Synoptic Features:**

**Westerly Trough & Jet Stream:** Trough in Westerlies runs roughly along Longitude 66.0E & north of Latitude 28.0N. No Jet Stream is observed over India.

**Dynamic Features:**

Wind shear up to 30-60 Knots is observed over North-west India and 10-20 Knots over rest India.

Negative Shear tendency is observed over north J&K and Positive Shear tendency observed over India South J&K Himachal Pradesh Punjab North Rajasthan Haryana Delhi North-West Uttar Pradesh.

A Positive Vorticity field is observed over North-East Rajasthan East Madhya Pradesh Jharkhand North Odisha Gangetic West Bengal.

Negative low level convergence observed over J&K Himachal Pradesh Punjab Uttarakhand North Uttar Pradesh Bihar and Positive low level convergence over Odisha Chhattisgarh.

**Precipitation:****IMR:**

Rainfall Up to **150** mm was observed over East Jharkhand North-East Odisha West parts of Gangetic West Bengal.

Rainfall Up to **90** mm was observed over South Chhattisgarh West Odisha East parts of Gangetic West Bengal.

Rainfall Up to **50** mm was observed over South Bihar Sikkim North parts of Sub Himalayan West Bengal West Parts of North Interior Karnataka South Kerala Central Tamilnadu

Rainfall Up to **30** mm was observed over Central Parts of Arunachal Pradesh North Assam East Vidarbha North Telangana.

Rainfall Up to **20** mm was observed over South-East Madhya Pradesh Meghalaya Nagaland Manipur.

Rainfall Up to **10** mm was observed over North J&K North Chhattisgarh rest Arunachal Pradesh Mizoram Tripura South Telangana North Coastal Andhra Pradesh Goa rest Karnataka rest Tamilnadu Lakshadweep Andaman & Nicobar Islands.

**DWR and RAPID Observations:**

Strong multiple echoes (dBZ > 55 and height >15km) were seen on DWR Machilipatnam and Vishakhapatnam domain at around 1540IST. Isolated/multiple moderate echoes were also seen on DWR Chennai, Hyderabad, Kochi and Thiruvananthapuram (dBZ around 45 and height >10km) and light echoes observed on DWR Agartala, Delhi, Goa, Kolkata and Nagpur at around 1530IST.

RAPID RGB Satellite imagery at 1430 IST indicated significant convection over Central Assam, Meghalaya, Nagaland, Tripura, Southeast Gangetic West Bengal, South Jharkhand, Odisha, South Interior Karnataka, South Kerala, Tamilnadu and Lakshadweep.

**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 IGP and north India.

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

<b>Delhi – SAFAR analysis &amp; Forecast</b>	23.05.2018	24.05.2018
PM10 (micro-g/m <sup>3</sup> )	302	362
PM2.5 (micro-g/m <sup>3</sup> )	90	108

## 2. NWP MODEL GUIDANCE:

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

#### 1. Weather Systems:

##### Low level Cycirs, Troughs:

**00 & 12UTC of Day 1-5:** A weak CYCIR at 850 hPa over BOB off Tamil Nadu/AP coast. System gradually intensifies in Day 3-5

**00UTC of Day 1-3:** 850hPa N-S trough from MP to AP across MH, Telangana region. Associated CYCIR over MP in day 1-2

**00UTC of Day 1-5:** CS **Mekunu** over southwest AS getting further intensified and tracking towards coast of Oman

##### Confluence & Wind Discontinuity Regions:

**12 UTC of Day 0-3:** 850hPa SW-NE line of discontinuity extending from Maharashtra to WB.

##### Synoptic Systems:

**00 UTC of Day 1-4:** Western disturbance as a trough over Pakistan and adjoining J&K in Day 1

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

#### 3. Convergence at 850 hPa:

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

Day0: Jharkhand, East MP, Madhya Maharashtra, Chhattisgarh, NI Karnataka, SI Karnataka,

Day1: Himachal Pradesh, West MP, Chhattisgarh, NI Karnataka,

Day2: East MP, Vidarbha, NI Karnataka, SI Karnataka,

Day3: Jharkhand, Uttarakhand, Jammu Kashmir, West MP, East MP, Vidarbha, Chhattisgarh, NI Karnataka, SI Karnataka,

Day4: Assam Meghalaya, Jharkhand, Jammu Kashmir, West MP, East MP, Madhya Maharashtra, Vidarbha, Chhattisgarh, TN Puducherry, Coastal Karnataka, 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, Jharkhand, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Chhattisgarh,

Day1: Arunachal Pradesh, Assam Meghalaya, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, West MP, TN Puducherry, Kerala,

Day2: Assam Meghalaya, Bihar, East UP, Uttarakhand, Himachal Pradesh, East MP, TN Puducherry, Kerala,

Day3: Assam Meghalaya, Jharkhand, Bihar, Uttarakhand, Himachal Pradesh, TN Puducherry, Kerala,

Day4: Arunachal Pradesh, Assam Meghalaya, Jharkhand, Bihar, Uttarakhand, Jammu Kashmir, TN Puducherry, Coastal Karnataka, NI Karnataka, Kerala,

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

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

Day0: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Jammu Kashmir, Odisha, Konkan Goa, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day1: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, East UP, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Konkan Goa, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day2: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Konkan Goa, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day3: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Konkan Goa, Madhya Maharashtra, Vidarbha, Chhattisgarh, Telangana, Rayalseema, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day4: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Jharkhand, Bihar, East UP, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Konkan Goa, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, TN 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, East UP, West UP, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Madhya Maharashtra, Vidarbha, Chhattisgarh, Telangana, Rayalseema, NI Karnataka, SI Karnataka,

Day1: Arunachal Pradesh, Sub Himalayan WB, Bihar, East UP, West UP, Uttarakhand, Himachal Pradesh, Jammu Kashmir, East RJ, Odisha, West MP, East MP, Vidarbha, Chhattisgarh, Telangana, Rayalseema, NI Karnataka, SI Karnataka,

Day2: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, East MP, Konkan Goa, Madhya Maharashtra, Vidarbha, Chhattisgarh, Telangana, Rayalseema, Coastal Karnataka, SI Karnataka,

Day3: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, East MP, Konkan Goa, Madhya Maharashtra, Vidarbha, Chhattisgarh, Telangana, Rayalseema, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka,

Day4: Arunachal Pradesh, Sub Himalayan WB, Jharkhand, East UP, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, East MP, Konkan Goa, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal Karnataka, NI Karnataka, SI Karnataka,

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

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

Day0: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, East UP, West UP, Uttarakhand, Jammu Kashmir, Odisha, East MP, Konkan Goa, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day1: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, East UP, West UP, Jammu Kashmir, Odisha, East MP, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka,

Day2: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Uttarakhand, Jammu Kashmir, Odisha, Konkan Goa, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day3: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Konkan Goa, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka,

Day4: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Jharkhand, Uttarakhand, Jammu Kashmir, Odisha, East MP, Marathwada, Vidarbha, Chhattisgarh, Telangana, Rayalseema, TN 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, NE NMMT, Sub Himalayan WB, Gangetic WB, Andaman Nicobar, Rayalseema, SI Karnataka, Kerala,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Rayalseema, TN Puducherry, NI Karnataka, SI Karnataka, Kerala,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Andaman Nicobar, TN Puducherry, SI Karnataka, Kerala,

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Odisha, Andaman Nicobar, TN Puducherry, SI Karnataka, Kerala,

Day5: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Jammu Kashmir, Andaman Nicobar, 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 indicates a cyclonic circulation over East Rajasthan and adjoining North west Madhya Pradesh in lower Troposphere (925hPa). The forecast shows it will persist till day 2 with eastward movement. The analysis shows a North- South Trough extends from East Madhya Pradesh to South Tamil Nadu. The forecast shows the trough will persist till day2. The analysis shows an East-West Trough extending from East Rajasthan to Gangetic West Bengal across North Madhya Pradesh and Jharkhand. The forecast shows it will persist till day 2. Analysis shows another cyclonic circulation over East Assam and adjoining areas. The forecast shows it will persist till day 2. A cyclonic circulation is seen over East Bihar and adjoining SHWB in lower Troposphere (850hPa). The forecast shows it will persist for next 24 hours.

**2. Location of Jet and Jet Core (>60kt) at 500hPa:** Although the presence of strong westerlies is found over Eastern parts of the India and over North and North western parts of 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 from J&K up to Foothills of Himalaya, along the North- South and East- West Trough, around the cyclonic circulations, central parts of India during next 3 days; Low level Positive Vorticity is also seen over parts of NE states on from day 1 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):** over parts of Gujarat, Southern parts of East and west Rajasthan, East and adjoining West Uttar Pradesh, Gangetic Plains, Uttarakhand, Bihar, Jharkhand, Gangetic West Bengal, SHWB, Orissa, coastal Maharashtra, Konkan & Goa, coastal and Interior Karnataka, Kerala, Tamil Nadu, Telangana, Rayalaseema, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, East and west Madhya Pradesh, Andhra Pradesh, along east and west coast of India, Sikkim, Assam, Tripura and adjoining areas during next 3 days; over parts of Uttarakhand on day 1; Significant zone lies over Gujarat, coastal areas along the east coast and west coast, GWB, SHWB, Bihar, Jharkhand, East Uttar Pradesh, Orissa, Andhra Pradesh, Telangana, coastal Maharashtra, Vidarbha, Chhattisgarh, Interior Karnataka and South Madhya Maharashtra.

**Lifted Index (< -2):** Similar to T-storm Index lies over Gujarat, South Rajasthan, Gangetic plains and along east and west coast of India with an extension over Interior Karnataka and Telangana, East and West Uttar Pradesh Bihar, Jharkhand, Madhya Pradesh, Orissa, GWB, SHWB, Assam, Arunachal Pradesh, Meghalaya, Mizoram, Tripura and adjoining areas, Telangana, Vidarbha, Chhattisgarh, Andhra Pradesh, coastal Maharashtra, Konkan & Goa, coastal and Interior Karnataka, Kerala, Tamil Nadu, Madhya Maharashtra and Marathwada during next 3 days, it also appears over Uttarakhand from day 1 onwards; also seen over parts of Haryana Delhi and adjoining areas on day 2; Significant zone with maximum negative value is found over East and West Uttar Pradesh, coastal areas along east coast, Bihar, Jharkhand, Orissa and adjoining areas

**Total Total Index (> 50):** Higher than Threshold value of the Index is seen over parts of J&K, Himachal Pradesh, Chhattisgarh, Telangana, Vidarbha, Madhya Pradesh, Andhra Pradesh, Orissa, Interior Karnataka, Madhya Maharashtra, Marathwada, Sikkim and Arunachal Pradesh on day 1; over most of the parts of the country except west and North west India including Gujarat, West Madhya Pradesh, Punjab, Assam, Tripura, Meghalaya, Mizoram and adjoining areas, Rajasthan on day 2 and 3; Significant zone with Maximum value of the index lies over Telangana, East Madhya Pradesh, Chhattisgarh, Vidarbha, Uttar Pradesh, Uttarakhand, Orissa and adjoining areas.

**Sweat Index (> 300):** Is seen over the sub-divisions along east and west coast, areas along foothills of Himalayas, NE states, and most parts of the country except Rajasthan, central parts of Madhya Pradesh, Punjab, Haryana, Himachal Pradesh and adjoining Uttarakhand, North west India during next 3 days; significant zone lies over parts of East and West Uttar Pradesh, Bihar, Chhattisgarh, Jharkhand, Gujarat and North Madhya Maharashtra.

**CAPE (> 1000):** Mostly seen over parts of Gujarat, southern peninsular India, along west coast and east coast, GWB, Orissa, Bihar, Jharkhand, East and West Uttar Pradesh, Andhra Pradesh, Rayalaseema, Tamil Nadu, Kerala, Karnataka, Konkan and Goa, Telangana, coastal Maharashtra, south Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, east Madhya Pradesh, Sikkim, Assam, Arunachal Pradesh, Meghalaya, Tripura and adjoining areas during next 3 days; over parts of Uttarakhand on day 2; maximum value of the index is seen over parts of GWB, SHWB, Orissa, coastal Andhra Pradesh, coastal Tamil Nadu, coastal Maharashtra, coastal Karnataka, Bihar, Jharkhand, East Uttar Pradesh, some parts of Vidarbha and adjoining Chhattisgarh.

**CIN (50-150):** Over sub-divisions along east and west coast of India, extreme south over Kerala and Tamil Nadu and whole south Peninsular India the value of the index lies in the above range over most of the parts of the country except North central parts of Madhya Pradesh, J&K, West Rajasthan, Himachal Pradesh, Uttarakhand, Punjab, Haryana, North and North west India during next 3 days; significant zone with highest value of the index lies over parts of Gujarat adjoining west Madhya Pradesh, south west Rajasthan, Vidarbha, Madhya Maharashtra, North coastal Maharashtra, Andhra Pradesh, Chhattisgarh, GWB and Orissa.

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

70- 130 mm Rainfall: over parts of Arunachal Pradesh, South Chhattisgarh and Orissa and adjoining areas on day 1; over parts of Assam, Meghalaya and adjoining areas on day 3.

40-70 mm Rainfall: over parts of Sikkim, Assam, Arunachal Pradesh, Tripura, Mizoram, Nagaland and adjoining areas during next 3 days; over parts of South Chhattisgarh, Orissa and East Vidarbha on day 1; over some parts of Coastal Kerala on day 2; over parts of GWB on day 3.

10-40 mm Rainfall: over parts of Kerala, Karnataka, Tamil Nadu, Andhra Pradesh, East Bihar, Sikkim, GWB and NE states during next 3 days; over parts of Orissa, East Jharkhand, Foothills of Himalaya, South Chhattisgarh and East Vidarbha on day 1; over some parts of Telangana on day 2; over some parts of Jharkhand on day 3.

Up to 10 mm rainfall: Over parts of J&K, Himachal Pradesh, Uttarakhand, East Uttar Pradesh, Foothills of Himalaya, GWB, SHWB, Sikkim, NE states, Bihar, Jharkhand, Orissa, Chhattisgarh, Kerala, Interior Karnataka, Konkan & Goa, coastal Maharashtra, South Madhya Maharashtra, Tamil Nadu, Telangana, Rayalaseema and Andhra Pradesh during next 3 days; over parts of West Uttar Pradesh and East Madhya Pradesh on day 1 and 2; over parts of West Madhya Pradesh & Marathwada on day 1.

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

**1. Model Reflectivity (Max. dBz): >25 dBZ Model Reflectivity:** On day 1, over parts of J&K, Kerala, Karnataka, Tamil Nadu, NE states, Telangana, Orissa, GWB, SHWB, Sikkim East Bihar, Jharkhand, Andhra Pradesh and some parts of East Madhya Pradesh; On day 2 over parts of Karnataka, Kerala, Tamil Nadu, Bihar, Jharkhand, GWB, SHWB, NE states and Sikkim; On day 3 mostly over parts of Tamil Nadu adjoining Karnataka, South Haryana adjoining North West Madhya Pradesh, GWB, SHWB, adjoining Bihar, Jharkhand, Sikkim and NE states.

#### **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, parts of Karnataka, coastal Maharashtra, South Madhya Maharashtra, Marathwada, Konkan and Goa, Kerala, Andhra Pradesh, Tamil Nadu, GWB, SHWB, Bihar, Jharkhand, Chhattisgarh, East Uttar Pradesh, Orissa Sikkim and NE states during next 3 days; below threshold value of the index is also seen over parts of Telangana on day 1.

**K-Index (> 35):** Less than threshold value is observed over most of the part of the country during the next 3 days. Prominent values are found over parts of Interior Karnataka, Telangana, Chhattisgarh, Kerala, Tamil Nadu, Andhra Pradesh, Orissa, Bihar, Jharkhand, GWB, South Madhya Maharashtra, East Vidarbha, East Madhya Pradesh, Konkan and Goa, Foothills of Himalaya and NE states

**CAPE (> 1500):** Greater than threshold value over parts of Gujarat, West Uttar Pradesh, Uttarakhand, coastal areas of west coast, coastal Maharashtra, Konkan & Goa, coastal areas along the east coast, SHWB, GWB, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Bihar, Jharkhand, East Uttar Pradesh, Telangana, Rayalaseema, Madhya Maharashtra, Chhattisgarh and Vidarbha during next 3 days; over parts of East Madhya Pradesh on day 1 and 2; Maximum value of the index is seen over the parts of Orissa, GWB, coastal and Interior Andhra Pradesh, coastal Tamil Nadu, Bihar, Jharkhand, East Uttar Pradesh, Kerala and North coastal Maharashtra

**CIN (50-150):** It covers most of the parts of the country except J&K, North Gujarat and North west India on day 1; it remains over most of the parts of country; on day 2 except over J&K, North west India, North Madhya Maharashtra and Marathwada, Punjab, Haryana, West Rajasthan, Himachal Pradesh and Uttarakhand and West Madhya Pradesh; it remains over the same region on day 3 but disappears over NE states; it has significant larger values over parts of Eastern and Western parts of the country including Gujarat, Madhya Maharashtra, Marathwada, East and West Uttar Pradesh, parts of Vidarbha, Madhya Pradesh, Jharkhand, Chhattisgarh, Orissa, Telangana, North Interior Karnataka and Andhra Pradesh during next 3 days.

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

Above 130 mm Rainfall: over parts of Assam and Sikkim on day 2.

70- 130 mm Rainfall: over parts of Assam and adjoining areas during next 3 days; over parts of SHWB on day 1 and 2; over parts of Jharkhand on day 1; over parts of Sikkim and Arunachal Pradesh on day 2.

40- 70 mm Rainfall: over parts of Sikkim and NE states during next 3 days; over parts of SHWB and GWB on day 1 and 2; over parts of Bihar, Jharkhand, Kerala, Karnataka and Tamil Nadu on day 1; over parts of South Kerala on day 2.

10- 40 mm Rainfall: Over parts of Kerala, Tamil Nadu, Sikkim, GWB, SHWB, Foothills of Himalaya and NE states during next 3 days; over parts of Bihar, Jharkhand, Andhra Pradesh and Interior Karnataka on day 1 and 2; over parts of Orissa on day 1.

Up to 10 mm Rainfall: Over parts of J&K, Himachal Pradesh, Uttarakhand, Foothills of Himalaya, Kerala, Tamil Nadu, Karnataka, Chhattisgarh, Vidarbha, Sikkim, Bihar, Jharkhand, Orissa, Andhra Pradesh, Telangana and NE states during next 2 days; over parts of J&K, Bihar, Jharkhand, Orissa, Madhya Pradesh, East Rajasthan and South Peninsular India on day 3.

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

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

Synoptic analysis indicates that there is a cyclonic circulation over eastern parts of Assam & neighbourhood and another over east Bihar and adjoining Sub Himalayan West Bengal. This system may give rise to heavy rainfall activity over Sub Himalayan West Bengal and Arunachal Pradesh on Day-1. The thunderstorm with gusty winds activity may also be observed over Nagaland and Assam and Meghalaya on Day-1.

Another cyclonic circulation observed over northeast Madhya Pradesh and adjoining East Uttar Pradesh. This will give rise to the thunderstorm with gusty winds activity mainly over North MP, Chhattisgarh, Bihar, Jharkhand and GWB on Day-1.

The cyclonic circulation observed seen over north Tamilnadu & neighbourhood. These systems may give rise to the thunderstorm with gusty winds activity over Kerala coastal Karnataka, Telangana and Tamilnadu on Day-1

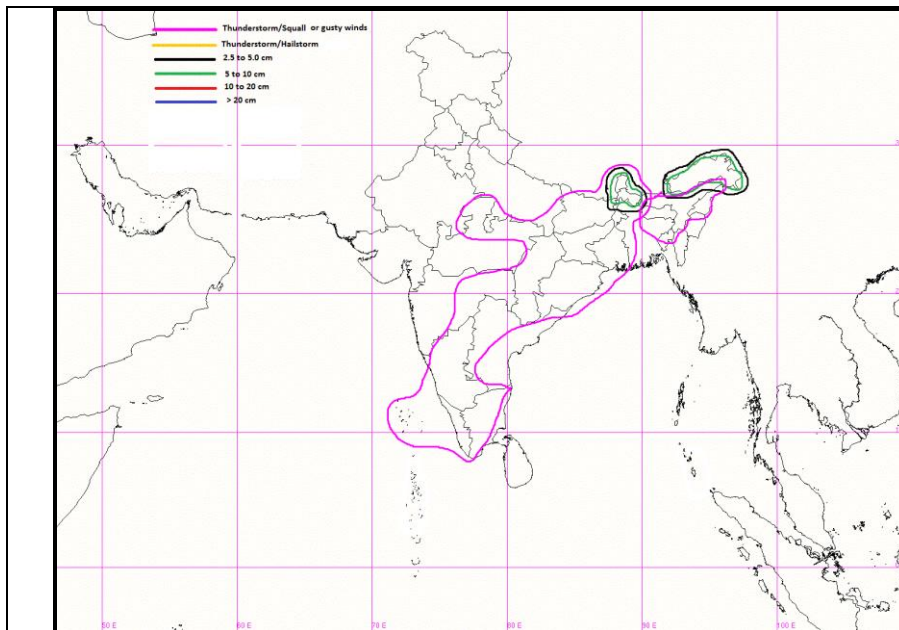
Most thermodynamic indices (K-Index, Lifted Index) from IMD GFS deterministic model indicate high probability of thunderstorm occurrence over Northeast, Eastern India on Day 1.



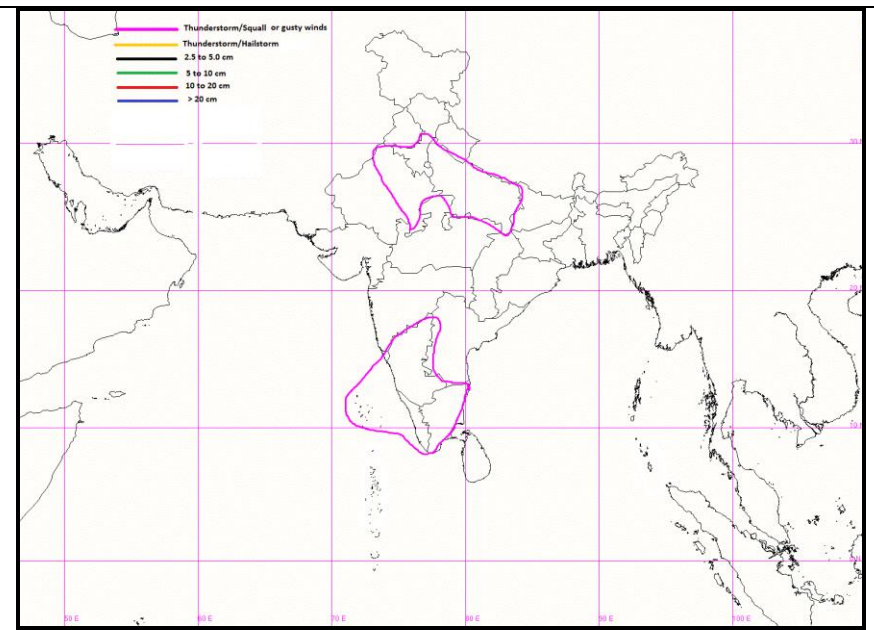
**IOP Area for Day-1 & Day-2:**

24 hour Advisory for IOP:	48 hour Advisory for IOP:
<p><b>Significant Rainfall:</b> Sub-Himalayan West Bengal, Sikkim Arunachal Pradesh</p> <p><b>Thunderstorm with squall or gusty winds:</b> Tamil Nadu, Kerala, Karnataka, Telangana, Lakshadweep Chhattisgarh, Vidarbha, North Madhya Pradesh Marathawada West Bengal, Sikkim, Odisha, Bihar, Jharkhand Assam, Meghalaya, Nagaland, Manipur, Mizoram, Tripura</p> <p><b>Thunderstorm with squall and hail</b> Nil</p> <p><b>Duststorm:</b> Nil</p>	<p><b>Significant Rainfall:</b> Nil</p> <p><b>Thunderstorm with squall or gusty winds:</b> Haryana, Chandigarh, Delhi Uttar Pradesh, East &amp; North Rajasthan Tamil Nadu, Kerala, Karnataka, Lakshadweep</p> <p><b>Thunderstorm with squall and hail</b> Nil</p> <p><b>Duststorm:</b> Nil</p>

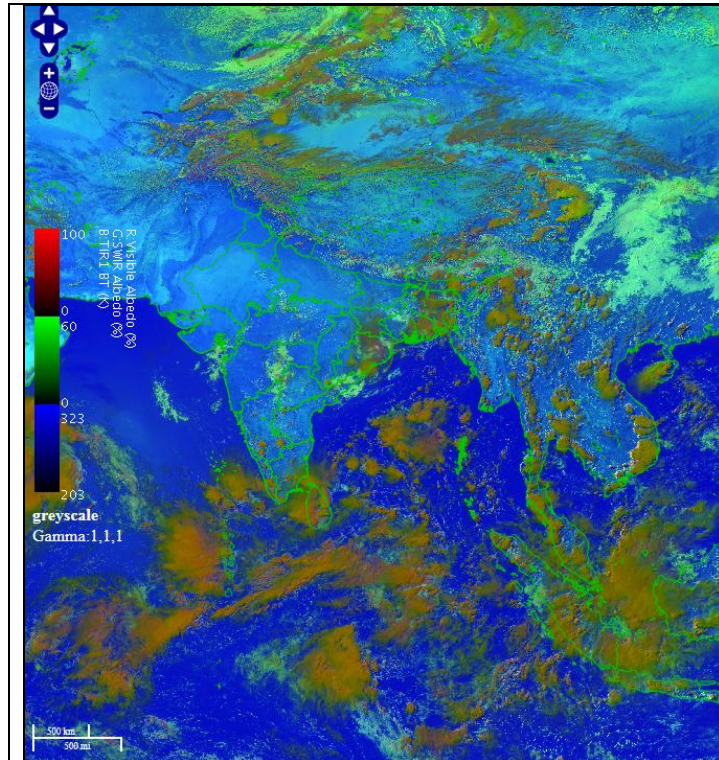
**Graphical Presentation of Potential Areas for Severe Weather:**



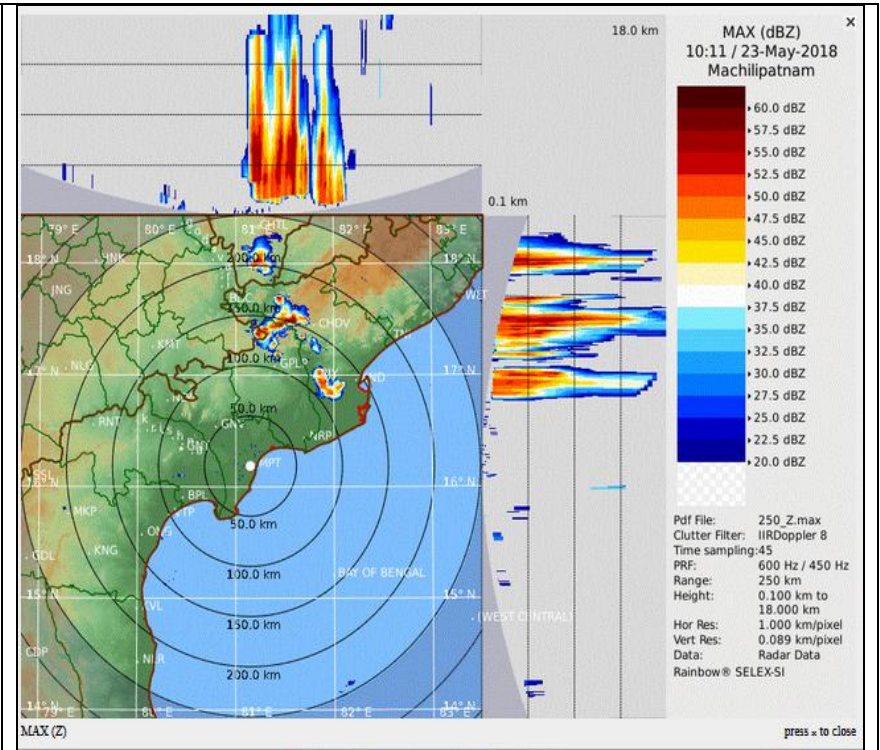
**IOP Advisory for 24 hours**



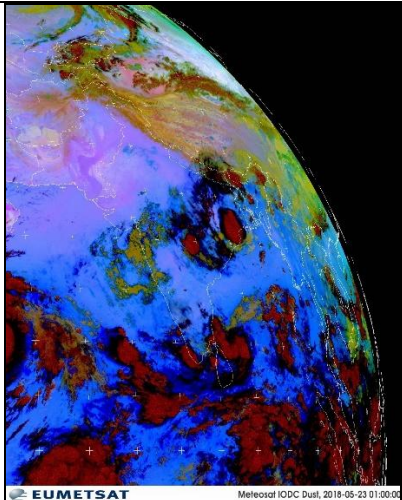
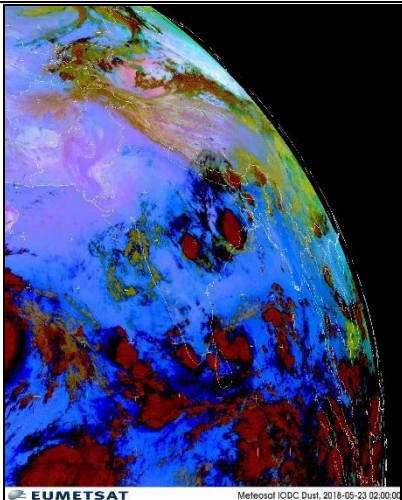
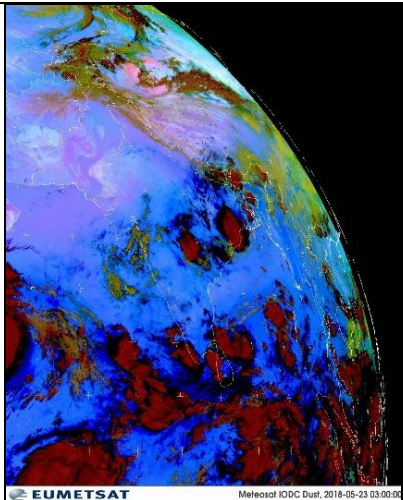
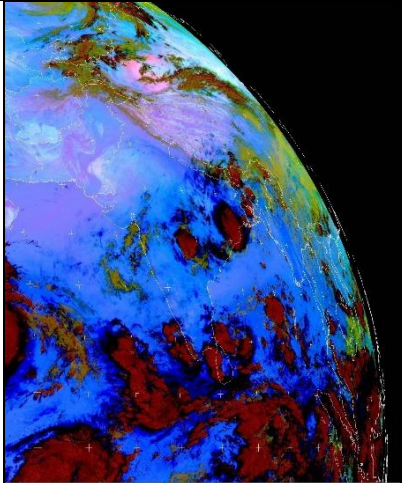
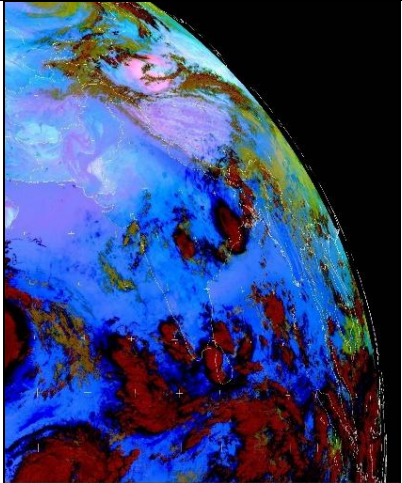
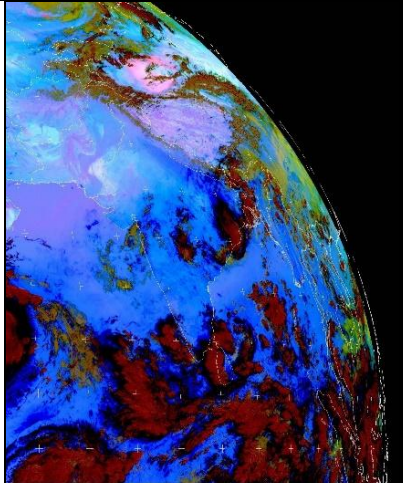
**IOP Advisory for 48 hours**



RAPID RGB Imagery at 1430 IST of the Day

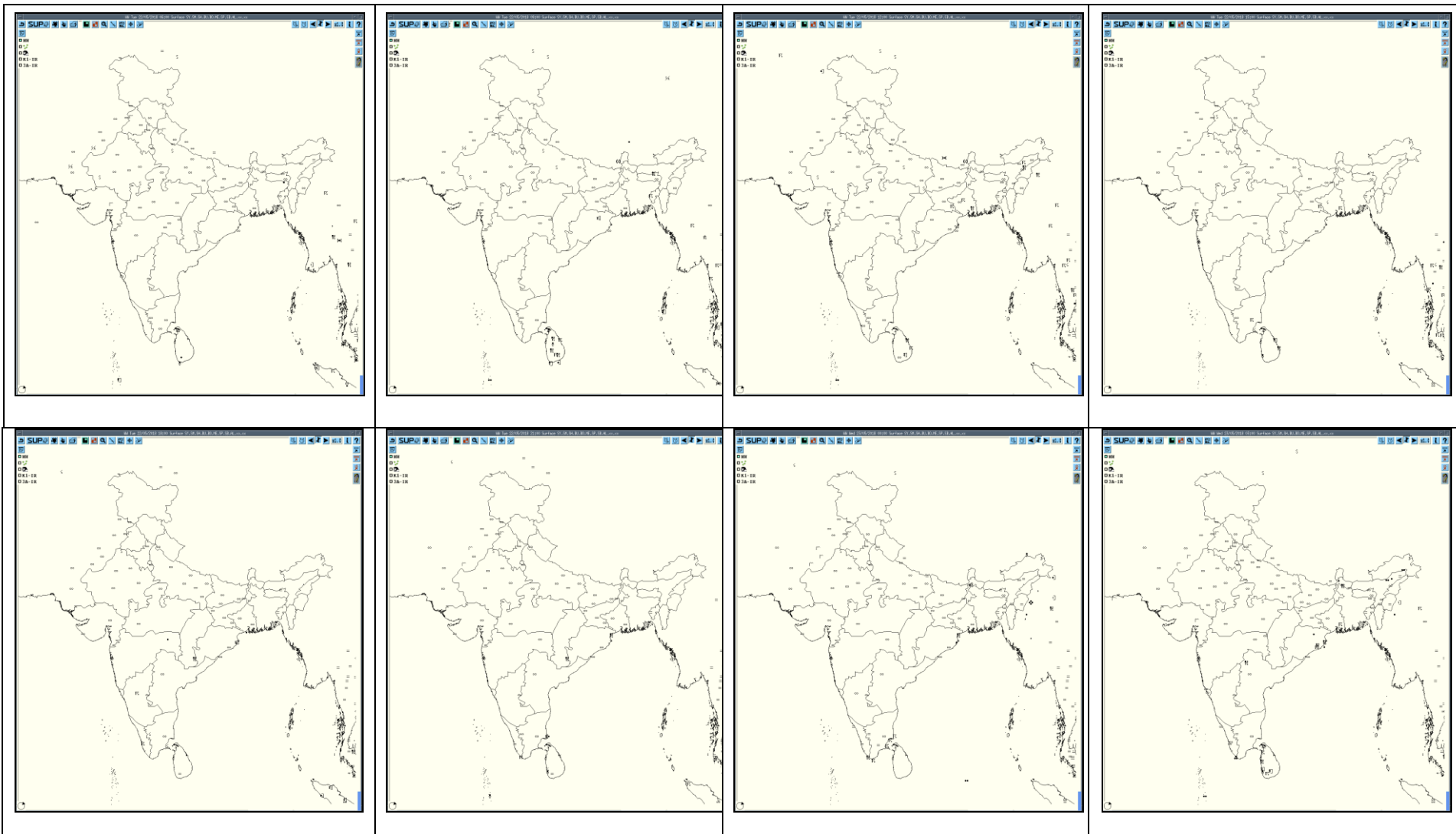


DWR Machilipatnam reflectivity image at 1541 IST

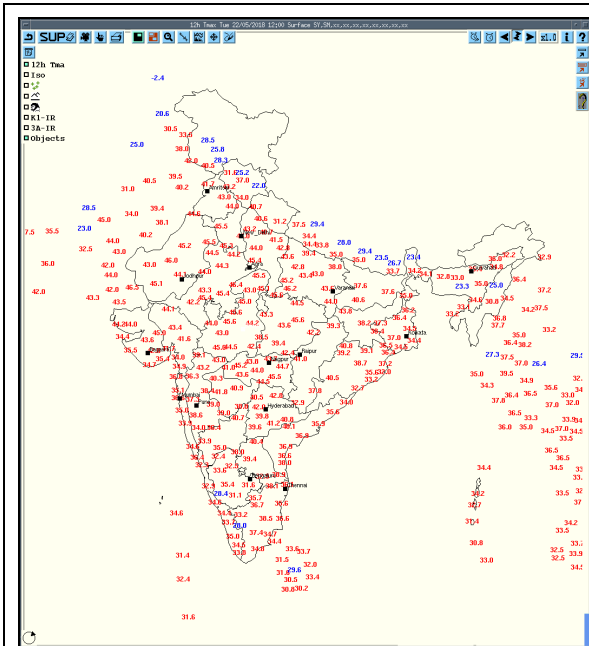


Observed Satellite Dust Images of today

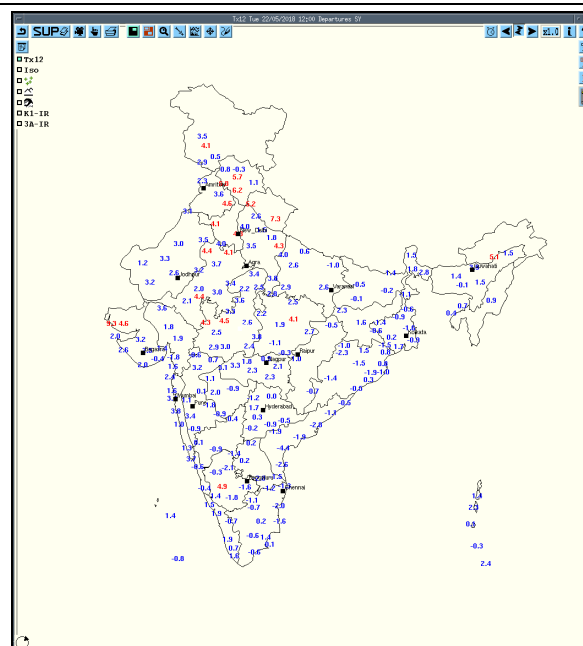




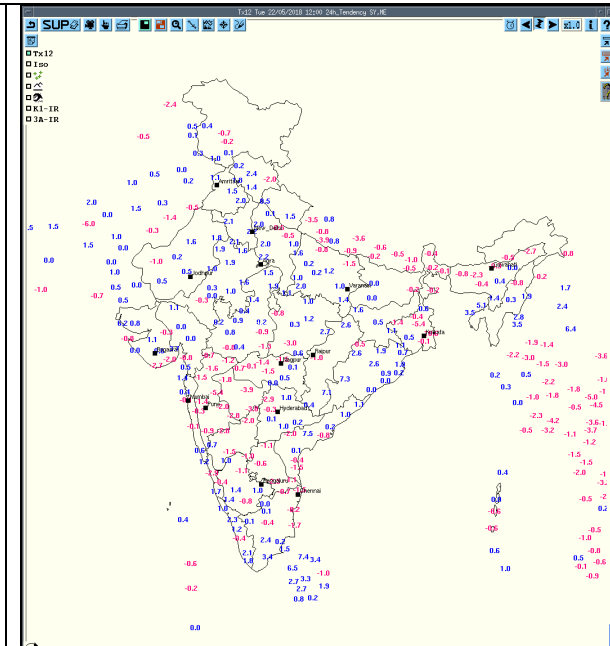
**3hourly Past weather at 06, 09, 12, 15, 18, 21 UTC of yesterday and 00 & 03 hrs UTC of today**



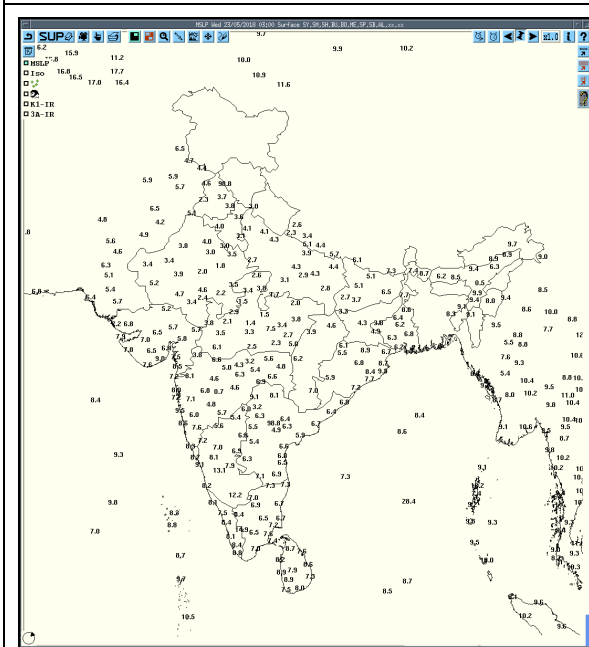
Tmax



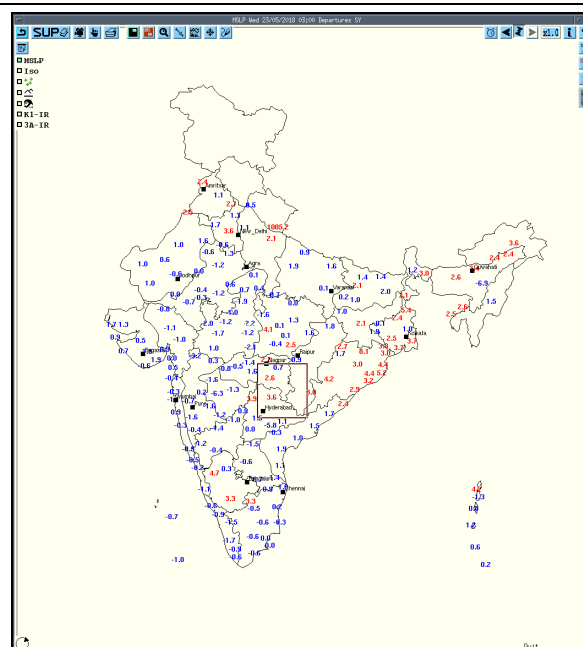
Departure Tmax



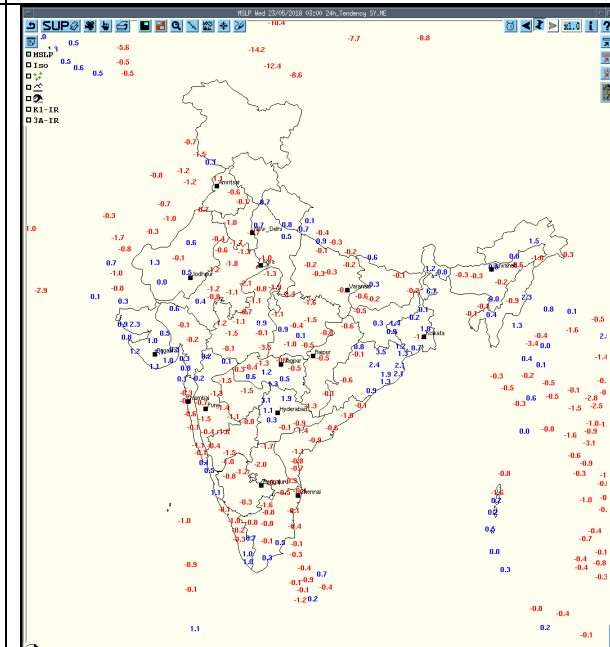
Tendency Tmax



MSLP



Departure MSLP



Tendency MSLP



<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>Associated severe weather if any</b>	<b>Districts affected</b>
Visakhapatnam	23-05-18	220900	Isolated single cells of maximum reflectivity of 55dBz with height of 13 kms	NW(107 KMS) & N(231KMS) moving Sly	Isolated single cells formed at 0831UTC and developing.		Koraput and kandamal Dist. (Orissa)
		212120	Isolated single cells of maximum reflectivity of 58dBz with height of 18 kms	NW(120 KMS) & N(232KMS) moving SWly	Since last observation CB cells are developing and matured well (58DBZ, 18 KMS) at 1101UTC .	Thunderstorm with rain	Visakhapatnam Dist. (AP) Koraput and Gajapati Dist. (Orissa)
		221500	Multiple cells of maximum reflectivity of 61dBz with height of 17 kms	W(125 KMS) N(200KMS) and NE(187 kms) moving SWly	Since last observation CB cells are developing and matured well (61 dBz)at 1401UTC and dissipating.	Thunderstorm with rain	East Godavari Dist. (AP) Koraput and Rayagada Dist. (Orissa)
		221800	Multiple cells of maximum reflectivity of 67dBz with height of 18 kms	N(223KMS) and NW(140 kms) moving Sly	Since last observation CB cells are developing and matured well (67 dBz)at 1641UTC and dissipating.	Thunderstorm with rain	Koraput Gajapati and Nabarangapur Dist. (Orissa)
		230000	Multiple cells of maximum reflectivity of 58dBz with height of 18 kms	N(190KMS) and NW(171 kms) moving Sly	CB cells are developing and matured well at 2031UTC and dissipated at 2211UTC.	Thunderstorm with rain	Vizianagaram Dist. (AP) Koraput Rayagada and Nabarangapur Dist. (Orissa)



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	22-05-18	0301—0641	NIL	NIL	NOSIG ECHO	NIL	NIL
		0651-1551	A number of cells with maximum reflectivity of 61.5 dBz at 0941 UTC and maximum height more than 18 km at 0801 UTC  Multi celled system with maximum reflectivity of 55.0 dBz at 1051 UTC and maximum height 16.93 km at 1041 UTC	Developed from east to West sector through North with min distance 13 km (E) and max distance 102 km (N). Movement initially stationery then SE-ward Developed in N(143 km) Movement stationery	A number of cells within 100 km radius developed from east to West sector through North with min distance 13 km (E) and max distance 102 km (N) from 0651 UTC. Merged and form multi celled system at 0901 UTC, dissipated at 1551 UTC, in N at a distance of 78.9 km from radar.  Multi celled system developed in N at a distance of 143 km from radar at 1021 UTC from 0651 UTC. Matured and dissipated at 1241 UTC in N 171 km from radar	Thunderstorm /Rain /Hail  Thunderstorm /Rain	N/A  N/A
	22-05-18	1031-2031  1101-2031	1)Single cell with maximum reflectivity of 59.5 dBz at 1221 UTC and maximum height not clear  2)Single cell with maximum reflectivity of 63.0 dBz at 1131 UTC and maximum height not clear	Coming from W Movement SE-ward  Coming from WNW Movement SE-ward	Single cell coming from W from 1031 UTC, matured, transformed into a big celled system, then merged with cell 1 at 1411 UTC and formed a multi celled system, dissipated at 2031 UTC in WSW at a distance of 129.3 km from radar. Single cell coming from WNW at from 1101 UTC, matured, transformed into a big celled system, then merged with cell 2 at 1411 UTC and formed a multi celled system, dissipated at 2031 UTC in WSW at a distance of 129.3 km from radar.	Thunderstorm /Rain  Thunderstorm /Rain/Hail	N/A  N/A
	22-05-18	2001- UTC	Multi isolated cells with maximum reflectivity of 61.5 dBz at 2151 UTC and maximum height 17.28 km at 2201 UTC	Developed in WSW(201.6 km) Movement stationery	Multi isolated celled system developed in WSW area at an approximate distance of 201.6 km from radar at 2001 UTC. Matured and dissipated at 0211 UTC in WSW (201 km) from radar	Thunderstorm /Rain /Hail	N/A
	23-05-18	0041-continued	Isolated cell with maximum reflectivity of 58.0 dBz at 0221 UTC and maximum height 13.88 km at 0211 UTC	Developed in SSW(69 km) Movement NNE wards	Isolated cell developed in SSW at a distance of 69 km from radar at 0041 UTC (continued next day)	Thunderstorm /Rain	N/A

**Realised past 24hrs TS/SQ/HS Data:**

**Realised TS/HS/SQ during past 24hours 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)
Jagdapur	Central India	Chhattisgarh	Thunderstorm	22/23-05-18	222300	230345
Bramhapuri	Central India	Vidarbha	Thunderstorm	23-05-18	0155	0215
Chandrapur	Central India	Vidarbha	Thunderstorm	23-05-18	0300	0430
Bilaspur	Central India	Chhattisgarh	Thunderstorm	23-05-18	1800	1840
Passighat	Northeast India	Arunachal Pradesh	Thunderstorm	23-05-18	23/0600	23/0715
Guwahati	Northeast India	Assam	Thunderstorm	22-05-18	22/1255	22/1545
Dibrugarh	Northeast India	Assam	Thunderstorm	23-05-18	23/0400	23/0700
N/Lakhimpur	Northeast India	Assam	Thunderstorm	22/23-05-18	22/1710 23/0610	22/2220, 23/0740
Jorhat	Northeast India	Assam	Thunderstorm	22-05-18	22/1440	22/1800
Dhubri	Northeast India	Assam	Thunderstorm	22/23-05-18	During night	
Kailasahar	Northeast India	Tripura	Thunderstorm	22-05-18	1450	1620
Agartala	Northeast India	Tripura	Thunderstorm	22-05-18	1345	1550
Gangtok	East India	Sikkim	Thunderstorm	23-05-18	0330	0700
Jalpaiguri	East India	Sikkim	Thunderstorm	23-05-18	0735	0830
Alipore	East India	West Bengal	Thunderstorm	22-05-18	1650	1910
				23-05-18	0755	0830
DumDum	East India	West Bengal	Thunderstorm	22-05-18	1625	2025
				23-05-18	0816	0830
Diamond Harbour	East India	West Bengal	Thunderstorm	22-05-18	1845	2215
Haldia	East India	West Bengal	Thunderstorm	22-05-18	1812	1925
				22-05-18	2140	2325
				23-05-18	0720	0745
				23-05-18	0810	0830
Digha	East India	West Bengal	Thunderstorm	22-05-18	1955	2300
Asansol	East India	West Bengal	Thunderstorm	22-05-18	1755	2040
Bankura	East India	West Bengal	Thunderstorm	22-05-18	1830	1955
Sriniketan	East India	West Bengal	Thunderstorm	22-05-18	1600	1607
Jamshedpur	East India	West Bengal	Thunderstorm	22-05-18	1710	2100
				23-05-18	0720	0800
Bhubaneswar	East India	Odisha	Thunderstorm	23-05-18	0828	0830
Balasore	East India	Odisha	Thunderstorm	23-05-18	0030	0710
Jharsuguda	East India	Odisha	Thunderstorm	22-05-18	1450	1615
Chandbali	East India	Odisha	Thunderstorm	22-05-18	2230	2300
				23-05-18	0745	0830
Paradeep	East India	Odisha	Thunderstorm	23-05-18	0800	0825
Keonjhar	East India	Odisha	Thunderstorm	22-05-18	1245	1400

**Realised TS/HS/SQ during past 24hours 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)
Kanyakumari	South India	South Coastal Tamil Nadu	Thunderstorm	23-05-18	0245 0425	0315 0655
Coimbatore	South India	North interior Tamil Nadu	Thunderstorm	23-05-18	0020	0110
Karaikal	South India	Coastal Tamil Nadu	Thunderstorm	23-05-18	0000	-0110
Thiruvananthapuram AP	South India	Kerala	Thunderstorm	23-05-18	0100 0550	0510 0900
Thiruvananthapuram City	South India	Kerala	Thunderstorm	23-05-18	0200	0640
Ramagundam	South India	Telangana	Thunderstorm	23-05-18	0600	0700
Gadag	South India	North Interior Karnataka	Thunderstorm	22-05-18	2245	2345
Madikeri	South India	South Interior Karnataka	Thunderstorm	22-05-18	1650	1650

**Media / Other Reports of Occurrence / Damage Reports (Received from RMC Kolkata):**

Date of Occurrence	Event	Report
22.05.2018	<b>Thunderstorm</b>	Severe Thunderstorms hit East Burdwan district of GWB on 22.05.2018 caused three persons killed due to thunderstorm.  <i>(Sources: (i) Aajkal, (ii) Sambad Najar dated 22.05.2018)</i>

**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



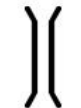
squall



hail shower



tropical storm



+ tornado



+ lightning



+ hurricane

www.visualdictionaryonline.com

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