



# India Meteorological Department

## FDP STORM Bulletin No. 76 (21-05-2018)

### 1. CURRENT SYNOPTIC SITUATION:

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

- ◆ Conditions are becoming favourable for the advance of Southwest monsoon into South Andaman Sea & neighbourhood during next 34 days.
- ◆ The well marked low pressure area over southwest and adjoining southeast Arabian Sea now lies over southwest Arabian Sea with the associated upper air cyclonic circulation extending upto mid tropospheric levels. It is very likely to concentrate into a depression during next 24 hours and further into a cyclonic storm during subsequent 48 hours. It is very likely to move north westwards towards south Oman southeast Yemen coasts during next 5 days.
- ◆ The Western Disturbance as a cyclonic circulation over Afghanistan and adjoining Pakistan at 3.1 km above mean sea level persists where as the trough aloft with its axis at 5.8 km above mean sea level now runs roughly along Long 65°E to the north of lat. 28°N.
- ◆ The cyclonic circulation over north Madhya Pradesh & neighbourhood now lies over northeast Madhya Pradesh & neighbourhood and extends upto 0.9 km above mean sea level.
- ◆ The trough from Southwest Rajasthan to Manipur now runs from Southwest Rajasthan to the above cyclonic circulation and extends upto 0.9 km above mean sea level.
- ◆ The cyclonic circulation over east Bihar persists and now seen between 1.5 & 3.1km above mean sea level.
- ◆ The cyclonic circulation over eastern parts of Assam & neighbourhood at 3.1 km above mean sea level persists.
- ◆ The cyclonic circulation over south Sri Lanka & neighbourhood now lies over Sri Lanka and adjoining Southwest Bay of Bengal between 1.5 & 5.8 km above mean sea level.
- ◆ The cyclonic circulation over north interior Tamilnadu & neighbourhood now lies over north Tamilnadu & neighbourhood at 1.5 km above mean sea level.

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

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

#### Clouds descriptions within India:

Scattered low/medium clouds with embedded intense to very intense convection seen over extreme South Tamilnadu adjoining East Comorin. Scattered low/medium clouds with embedded moderate to intense convective seen over South Kerala. Scattered to Broken low/medium clouds with embedded isolated moderate to intense convective seen over Tripura and Southwest Odisha. Scattered low/medium clouds with embedded isolated weak to moderate convection seen over South Chhattisgarh, South Odisha, Southeast Gangetic West Bengal, Telangana, rest Kerala, North Coastal

Andhra Pradesh, Lakshadweep and Bay Islands. Scattered low/medium clouds with embedded weak seen over Himachal Pradesh. Isolated low/medium clouds seen over Jammu & Kashmir, North Uttarakhand, extreme East Uttar Pradesh, East Madhya Pradesh and East Vidarbha.

#### **Arabian Sea:-**

Scattered low/medium clouds with embedded moderate to intense convection seen over Arabian Sea, of Lat 13.5N.

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

Broken low/medium clouds with embedded moderate to intense convective seen over South Bay South of 13.0N.

#### **Past Weather:**

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

Moderate to Intense convection was observed over Bihar Jharkhand Odisha Chhattisgarh Gangetic West Bengal north coastal Andhra Pradesh south Interior Karnataka south Kerala south Tamilnadu Lakshadweep Andaman & Nicobar Islands and weak to moderate convection observed over J&K east Madhya Pradesh Telangana north Rayalaseema Tripura Mizoram Vidarbha south Konkan & Goa coastal & north Interior Karnataka rest Kerala & rest Tamilnadu.

##### **OLR: - .**

Upto 230  $\text{wm}^{-2}$  observed over J&K North Himachal Pradesh North Uttarakhand Bihar Jharkhand Odisha Chhattisgarh Gangetic West Bengal Sikkim Tripura Mizoram south Telangana north Rayalaseema south Maharashtra south Konkan & Goa Karnataka Kerala Tamilnadu Lakshadweep Andaman & Nicobar islands.

#### **Synoptic Features:**

**Westerly Trough & Jet Stream:** Westerly Trough roughly along Longitude  $65^{\circ}\text{E}$  & north of Latitude  $30^{\circ}\text{N}$ .

#### **Dynamic Features:**

**Wind Shear** 30-60 knots is observed over North India, 10-20 knots over Central India, North-East India and 5-20 knots over south peninsula India.

**Positive shear tendency** 40-70 knots is observed over North-West India

**Positive Vorticity (850 hPa)** more than 50 ( $\times 10^{-5}/\text{s}$ ) is observed over Himachal Pradesh Uttarakhand North-west Uttar Pradesh North Rajasthan Punjab.

**Negative Low Level Convergence** is observed over J&K Himachal Pradesh Uttarakhand adjoining West Uttar Pradesh Punjab Haryana.

#### **Precipitation:**

##### **IMR:-**

Rainfall up to 70-150 mm was observed over Odisha adjoining Jharkhand adjoining Chhattisgarh South Interior Karnataka south Kerala.

Rainfall up to 20-50 mm was observed over Jharkhand south Gangetic West Bengal south Tamilnadu Lakshadweep & Nicobar Islands.

Rainfall up to 01-20 mm was observed over north J&K south Bihar Chhattisgarh Tripura Mizoram north coastal Andhra Pradesh south Konkan Goa coastal Karnataka Andaman Islands..

#### **DWR and RAPID Observations:**

Isolated/multiple moderate echoes (dBZ  $>50$  and height  $>10\text{km}$ ) was observed on DWR Nagpur, Chennai, Hyderabad and Machilipatnam and Light echoes at DWR Agartala 1640IST.

RAPID RGB Satellite imagery at 1600 IST indicated significant convection over East Meghalaya, Jharkhand, East Madhya Pradesh, Vidarbha, Chhattisgarh, Telangana, Rayalaseema and South Interior Karnataka, Kerala and Tamilnadu.

## 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 increase for next few days over IGP and north India.

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

<b>Delhi – SAFAR analysis &amp; Forecast</b>	21.05.2018	22.05.2018
PM10 (micro-g/m <sup>3</sup> )	252	227
PM2.5 (micro-g/m <sup>3</sup> )	80	72

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

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

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

**Low level Cycirs, Troughs: 00 & 12UTC of Day 1-4:** A weak CYCIR at 850 hpa over BOB off Tamil Nadu/AP coast.

**00UTC of Day 1-4:** 850hPa N-S trough from MP to AP across MH, Telangana region.

**00UTC of Day1-4:** 850hPa/500hPa CYCIR over south-central AS getting intensified and tracking towards coast of Oman/Yemen.

**Confluence & Wind Discontinuity Regions: 12 UTC of Day 0, 2-3:** 850hPa SW-NE line of discontinuity extending from Maharashtra to WB.

**Synoptic Systems: 00 UTC of Day 1-4:** Western disturbance as a CYCIR over Afghanistan approaching J&K in Day 2

**2. Location of jet and jet core (>60kt) at 500hPa:** Strong westerly over south of Afghanistan in Day 0-1 following the WD.

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

**Day/Index: Subdivisions with Lower Level Convergence > 15 x 10<sup>-5</sup> /s**

Day0: Jharkhand, Uttarakhand, East Rajasthan, West MP, Madhya Maharashtra, Vidarbha,

Day1: Jharkhand, East Rajasthan, West MP, East MP, Madhya Maharashtra, Chhattisgarh, Tamilnadu Puducherry,

Day2: Jharkhand, West UP, West MP, East MP, Chhattisgarh, Tamilnadu Puducherry,

Day3: Jharkhand, Jammu Kashmir, West MP, East MP, Chhattisgarh, Rayalseema, Tamilnadu Puducherry, SI Karnataka,

Day4: Assam Meghalaya, Jharkhand, East MP, Madhya Maharashtra, Marathwada, Chhattisgarh,

#### **4. Low level Vorticity:-Positive Vorticity:**

**Day/Index: Subdivisions with Lower Level Vortex > 15 x 10<sup>-5</sup> /s**

Day0: Jharkhand, East UP, Uttarakhand, Himachal Pradesh,

Day1: Assam Meghalaya, Jharkhand, East UP, Uttarakhand, Himachal Pradesh, Odisha, Tamilnadu Puducherry,

Day2: Arunachal Pradesh, Assam Meghalaya, Jharkhand, Uttarakhand, Himachal Pradesh, Tamilnadu Puducherry, Kerala,

Day3: Arunachal Pradesh, Assam Meghalaya, Jharkhand, Bihar, Uttarakhand, East MP, Tamilnadu Puducherry, Kerala,

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Jharkhand, East UP, Uttarakhand, Himachal Pradesh, Tamilnadu Puducherry, Kerala

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

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

Day0: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, East MP, Konkan Goa, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day1: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Gangetic WB, Uttarakhand, Jammu Kashmir, Odisha, Konkan Goa, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

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

Day3: Arunachal Pradesh, Sub Himalayan WB, Jharkhand, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Konkan Goa, Madhya Maharashtra, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu Puducherry, NI Karnataka, SI Karnataka, Kerala,

Day4: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Jammu Kashmir, Odisha, Saurashtra Kutch, Konkan Goa, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu 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, Himachal Pradesh, Jammu Kashmir, East MP, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu Puducherry, NI Karnataka, SI Karnataka,

Day1: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Jammu Kashmir, West MP, Vidarbha, Telangana, Rayalseema, NI Karnataka, SI Karnataka,

Day2: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Marathwada, Vidarbha, Chhattisgarh, Telangana, Tamilnadu Puducherry, NI Karnataka, SI Karnataka,

Day3: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, East MP, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, SI Karnataka,

Day4: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, East MP, Saurashtra Kutch, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka,

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

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

Day0: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Jharkhand, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, East MP, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu Puducherry, NI Karnataka, SI Karnataka, Kerala,

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

Day2: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Jharkhand, Uttarakhand, Jammu Kashmir, Odisha, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu Puducherry, NI Karnataka, SI Karnataka,

Day3: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Gangetic WB, Uttarakhand, Jammu Kashmir, Odisha, Gujarat Region, Saurashtra Kutch, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu Puducherry, NI Karnataka, SI Karnataka,  
Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Uttarakhand, Jammu Kashmir, Odisha, Gujarat Region, Saurashtra Kutch, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka,

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

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

Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Gangetic WB, SI Karnataka,

Day2: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Gangetic WB, Tamilnadu Puducherry, SI Karnataka,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Jharkhand, Bihar, Rayalseema, Tamilnadu Puducherry, Kerala,

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Rayalseema, Tamilnadu Puducherry, NI Karnataka, SI Karnataka, Kerala,

Day5: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Coastal AP, Tamilnadu 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 North East Madhya Pradesh and adjoining area. The forecast shows it will persist till day2. The analysis shows a Trough extends from South west Rajasthan to this cyclonic circulation. The forecast shows the trough will persist till day2 with North Eastward shift. Analysis shows another cyclonic circulation over North Tamil Nadu and adjoining area in lower Troposphere (850hPa). The forecast shows the circulation will persist for next 48 hours and become less marked thereafter. A cyclonic circulation is seen over East Bihar and adjoining areas in lower Troposphere (850hPa). The forecast shows it will merge with the Trough in 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 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 Trough, around the cyclonic circulations, central parts of India; Low level Positive Vorticity is also seen over parts of NE states on day 3.

#### **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, East Uttar Pradesh, Gangetic Plains, Uttarakhand, Bihar, Jharkhand, Gangetic West Bengal, GWB, SHWB, Orissa, coastal Maharashtra, Konkan & Goa, coastal and Interior Karnataka, Kerala, Tamil Nadu, Telangana, Rayalaseema, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Madhya Pradesh, Andhra Pradesh, along east and west coast of India, Tripura and adjoining areas during next 3 days; over parts of West Uttar Pradesh and Madhya Pradesh on day 2 and 3; over parts of Uttarakhand and South East Rajasthan on day 3; Significant zone lies over Gujarat, coastal areas along the east coast and west coast, GWB, Bihar, Jharkhand, Orissa, Andhra Pradesh, coastal Tamil Nadu, Telangana, East and West Uttar Pradesh, coastal Maharashtra, Vidarbha, Chhattisgarh, Interior Karnataka, South Madhya Maharashtra and Marathwada.

**Lifted Index (< -2):** Similar to T-storm Index lies over Gujarat, Rajasthan, Gangetic plains and along east and west coast of India with an extension over Interior Karnataka and Telangana, Bihar, Jharkhand, East and West Uttar Pradesh, Uttarakhand, Orissa, GWB, 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, it also appears over South East Rajasthan and Madhya Pradesh on day from day 2 onwards; Significant zone with maximum negative value is found over East Uttar Pradesh on day 3.

**Total Total Index (> 50):** Higher than Threshold value of the Index is seen over parts of Orissa, Chhattisgarh, Telangana, Vidarbha, Andhra Pradesh, Interior Karnataka, Tamil Nadu, coastal Maharashtra, South Madhya Maharashtra, Marathwada, Konkan and Goa, J&K and Arunachal Pradesh on day 1; over most of the parts of the country except Gujarat, West Madhya Pradesh, Punjab, Haryana and adjoining areas, 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, West Uttar Pradesh, East Uttar Pradesh and Uttarakhand.

**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 west Rajasthan, central parts of Madhya Pradesh, Punjab, Haryana, West Uttar Pradesh, Himachal Pradesh and adjoining Uttarakhand on day 1; on day 2 and 3 it remain over most of the parts of the country except central parts of Madhya Pradesh and North west India; significant zone lies over parts of Gujarat, North Coastal Maharashtra, East Uttar Pradesh and West Madhya Pradesh.

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

**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 and Punjab 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, Vidarbha, Madhya Maharashtra and North coastal Maharashtra.

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

70- 130 mm Rainfall: over parts of Sikkim and Assam on day 3.

40-70 mm Rainfall: over parts of Orissa on day 1 and 2; over parts of South Chhattisgarh, Sikkim and Arunachal Pradesh on day 2; over parts of Andhra Pradesh, Rayalaseema, South Interior Karnataka, Sikkim, Assam, Arunachal Pradesh, Tripura, Mizoram, Nagaland and adjoining areas on day 3.

10-40 mm Rainfall: over parts of Kerala, Karnataka, Tamil Nadu, Orissa, Andhra Pradesh, Sikkim and NE states during next 3 days; over parts of Bihar, SHWB and South Chhattisgarh on day 2 and 3.

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



### 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, South Madhya Maharashtra adjoining Marathwada and Orissa; On day 2 over parts of J&K, Karnataka adjoining Andhra Pradesh and Tamil Nadu, NE states, Sikkim, Vidarbha adjoining Marathwada and Madhya Pradesh; On day 3 mostly over parts of J&K, parts of Karnataka, Andhra Pradesh, Tamil Nadu, Kerala, 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, Konkan and Goa, Kerala, Andhra Pradesh, Tamil Nadu, GWB, SHWB, Bihar, Jharkhand, East Uttar Pradesh, Orissa Sikkim and NE states during next 3 days; below threshold value of the index is also seen over parts of Chhattisgarh and Telangana on day 1 and 3.

**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 and East Madhya Pradesh, Konkan and Goa, Foothills of Himalaya and NE states

**CAPE (> 1500):** Greater than threshold value over parts of Gujarat, 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, Telangana, Rayalaseema, Madhya Maharashtra, coastal Maharashtra, south Chhattisgarh and Vidarbha during next 3 days; over parts of East Uttar Pradesh from day 1 onwards; over parts of East Madhya Pradesh on day 2 and 3; over parts of West Madhya Pradesh on day 3; Maximum value of the index is seen over the parts of Orissa, GWB, coastal and Interior Andhra Pradesh, Telangana, coastal Tamil Nadu, Kerala, Interior and coastal Karnataka, coastal Maharashtra, coastal Gujarat, Konkan and Goa, South Madhya Maharashtra, Bihar, Jharkhand and East Uttar Pradesh.

**CIN (50-150):** It covers most of the parts of the country except central parts of the Madhya Pradesh West Vidarbha, J&K and North west India on day 1; it remains over most of the parts of country on day 2 and 3 except over, North west India, Madhya Maharashtra and Marathwada, J&K, Punjab, Haryana, Himachal Pradesh and Uttarakhand and West Madhya Pradesh, Only it has significant larger values over parts of west India and Eastern parts of the country including Gujarat, Madhya Maharashtra, Marathwada, East and West Uttar Pradesh, parts of Vidarbha, East Madhya Pradesh, Bihar, Jharkhand, Chhattisgarh, Orissa, GWB, East Madhya Pradesh Telangana and adjoining areas during next 3 days.

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

Above 130 mm Rainfall: over parts of SHWB and adjoining areas on day 3.

70- 130 mm Rainfall: over parts of South Interior Karnataka, Tamil Nadu, Tripura and adjoining areas on day 1; over parts of Assam on day 2 and 3; over parts of Assam, Sikkim and SHWB on day 3.

40- 70 mm Rainfall: over parts of Assam, Arunachal Pradesh, Tripura and adjoining areas, Orissa, Karnataka and Tamil Nadu on day 1; over parts of Sikkim and most of the NE states on day 2 and 3; over parts of South Kerala on day 2 and 3; over parts of SHWB on day 3.

10- 40 mm Rainfall: over parts of Kerala, Tamil Nadu, Karnataka, GWB, SHWB, Orissa, Sikkim and NE states during all 3 days; over parts of Bihar and Jharkhand on day 1 and 3; over parts of Telangana on day 2; over parts of J&K and Foothills of Himalaya on day 2 and 3.

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

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

#### Summary and Conclusions:

o Most thermodynamic indices (T-STORM Initiation Index, K-Index, Lifted Index, CAPE) from IMD GFS deterministic model indicate high probability of thunderstorm occurrence over east and east peninsular Indian region as well as west peninsular region with highest probability over Odisha and coastal Andhra Pradesh. On day 2, pattern of probability of convection remains nearly the same, with increases in probability over east peninsular coast. SWEAT index, which accounts for the wind shear between 850 and 500 hPa levels in addition to thermodynamic parameters, indicates along north peninsular Indian region, with probability increasing over the same region on day 2. The 850-200 hPa wind shear is very high over Northwest India on day 1 and decreasing slightly on day 2.

o Synoptic analysis indicates that the cyclonic circulation over north Madhya Pradesh has weakened. A trough runs from Southwest Rajasthan to the above cyclonic circulation in the lower levels. There are also two cyclonic circulations in the middle levels, one over east Bihar and another over eastern parts of Assam & neighbourhood. The combined effect of these weather systems indicates that easterlies are no longer penetrating into northwest India and weather is likely to be confined to east and northeast India on day 1 and 2.

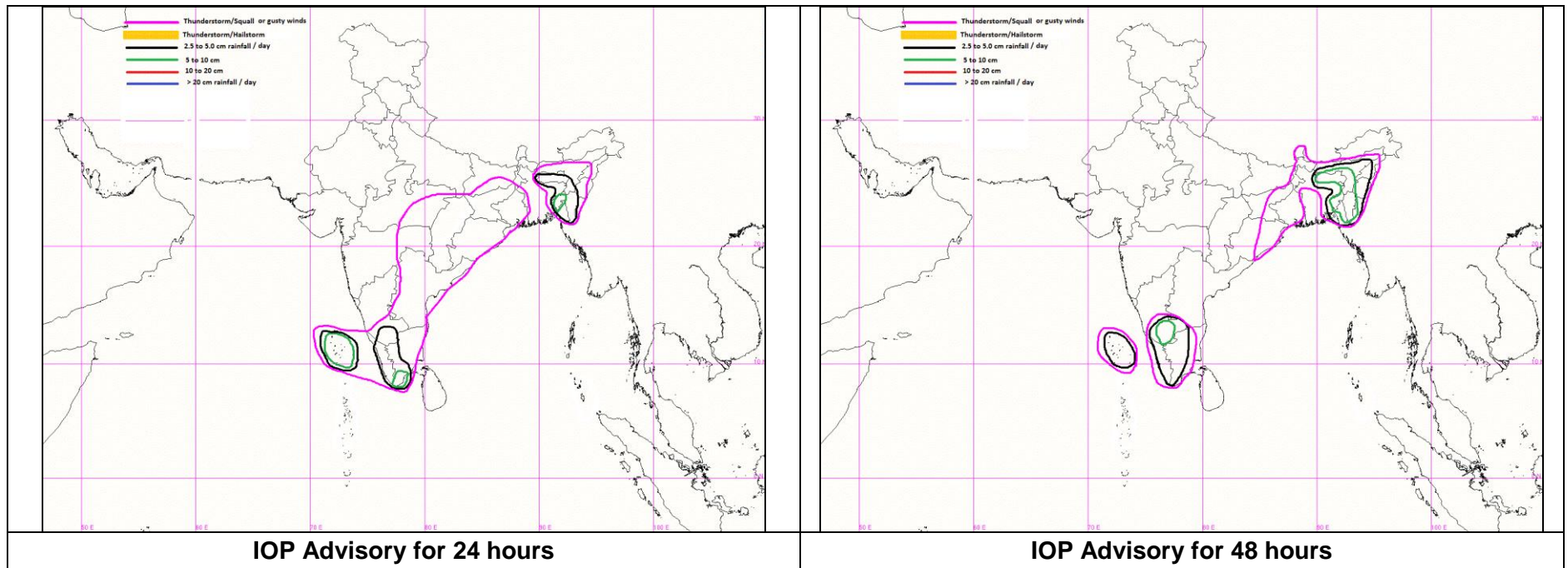
o Over South India, there are two cyclonic circulations in the low to mid levels (a) over Srilanka and adjoining Southwest Bay of Bengal and (b) over north Tamilnadu & neighbourhood, South easterlies, on the periphery of the cyclonic circulations is likely to penetrate into south peninsular India and there is likelihood of thunderstorm activity over the peninsular Indian region on day 1 and 2.

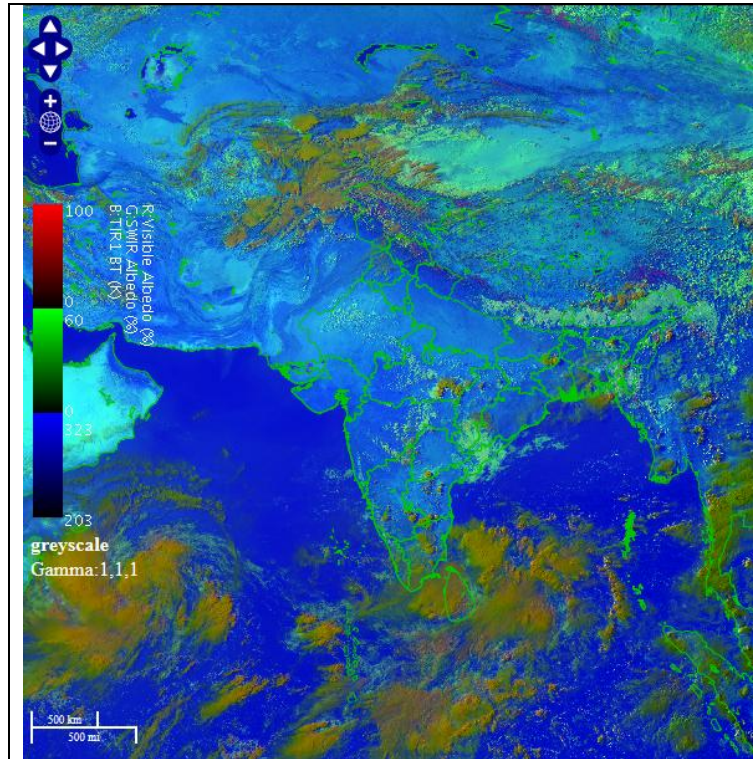


**IOP Area for Day-1 & Day-2:**

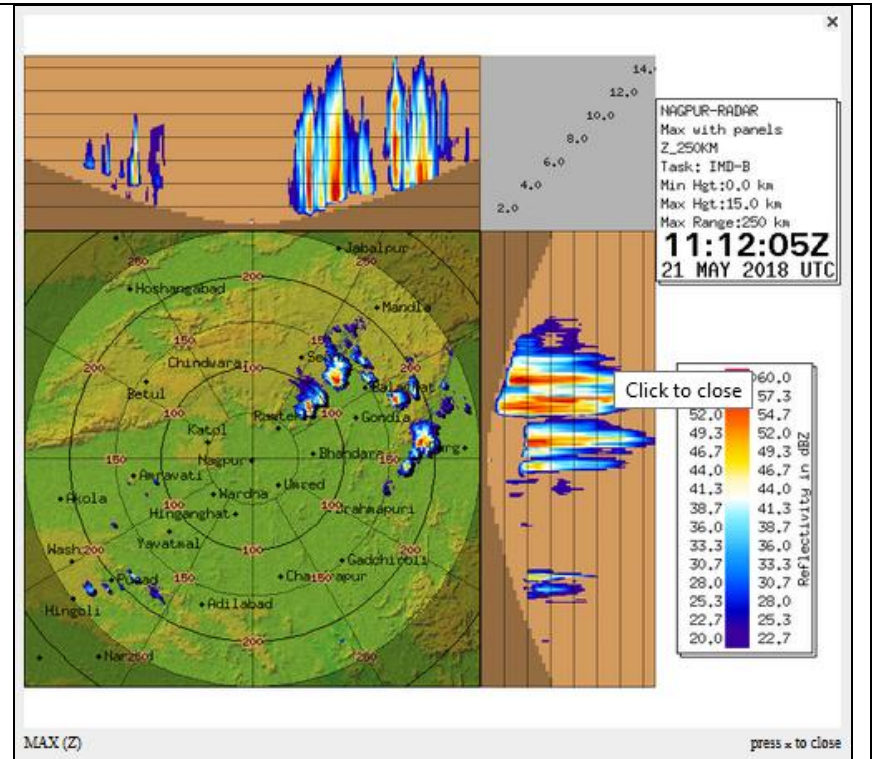
24 hour Advisory for IOP:	48 hour Advisory for IOP:
<p><b>Significant Rainfall:</b> Interior Tamil Nadu, South Interior Karnataka, Kerala, Lakshadweep Mizoram, Tripura, South Assam and Meghalaya</p> <p><b>Thunderstorm with squall or gusty winds:</b> Tamil Nadu, Kerala, Lakshadweep, South Interior Karnataka, Rayalaseema, Telangana, Coastal Andhra Pradesh, Chhattisgarh, East Madhya Pradesh, Vidarbha Gangetic West Bengal, Odisha, Bihar, Jharkhand Nagaland, Manipur, Mizoram, Tripura, Assam and Meghalaya</p> <p><b>Thunderstorm with squall and hail</b> Nil</p> <p><b>Duststorm:</b> Rajasthan</p>	<p><b>Significant Rainfall:</b> Interior Tamil Nadu, South Interior Karnataka, Kerala, Lakshadweep Manipur, Mizoram, Tripura, South Assam and Meghalaya,</p> <p><b>Thunderstorm with squall or gusty winds:</b> Tamil Nadu, Kerala, Lakshadweep, South Interior Karnataka, West Bengal and Sikkim, Odisha, Jharkhand Nagaland, Manipur, Mizoram, Tripura, Assam and Meghalaya</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:**

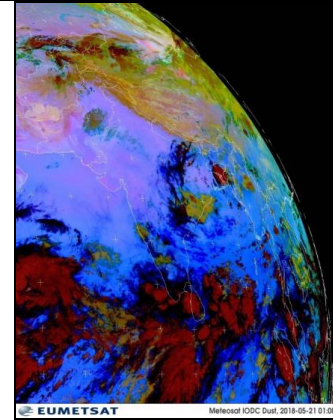
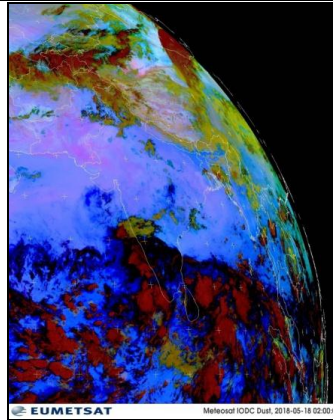
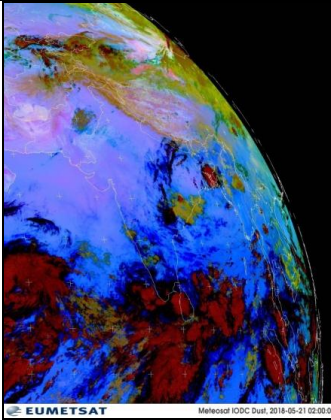
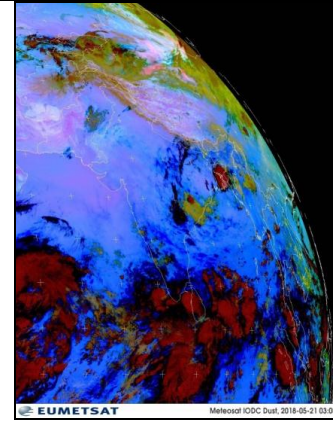
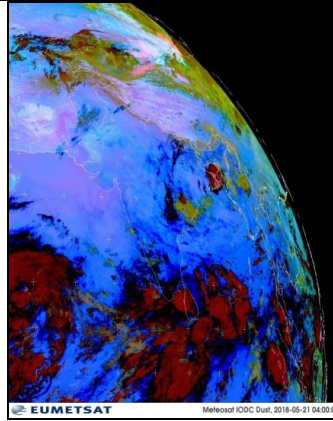
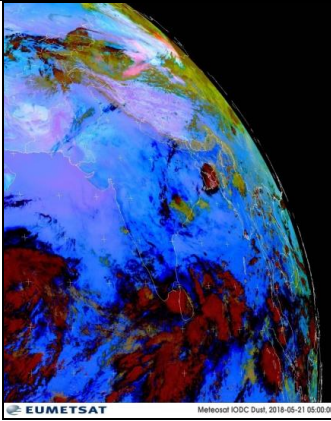




RAPID RGB Imagery at 1600 IST of the Day

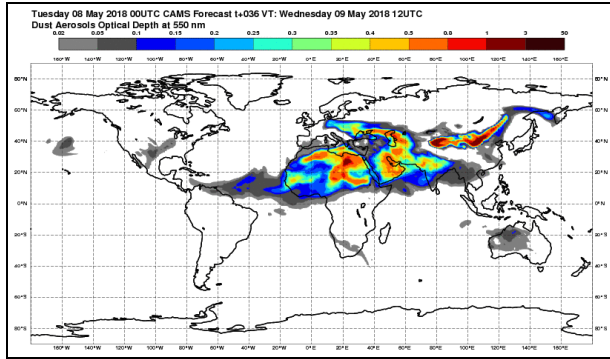


DWR Nagpur Reflectivity Image at 1642 IST

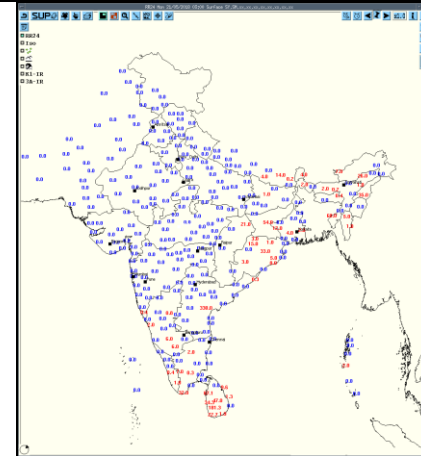


**Observed Satellite Dust Images of today**

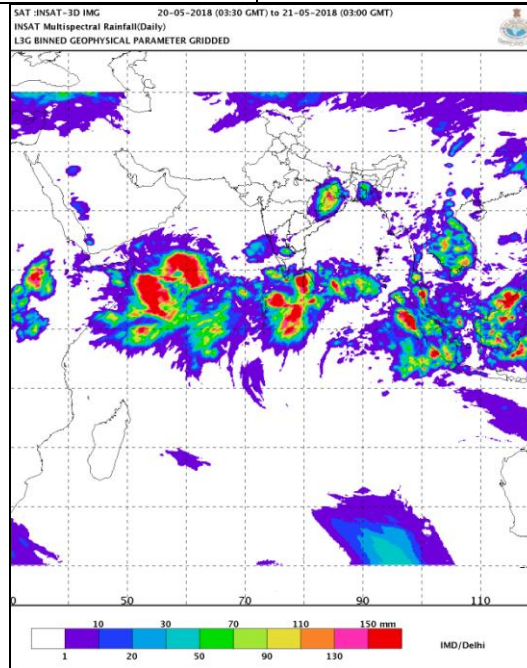




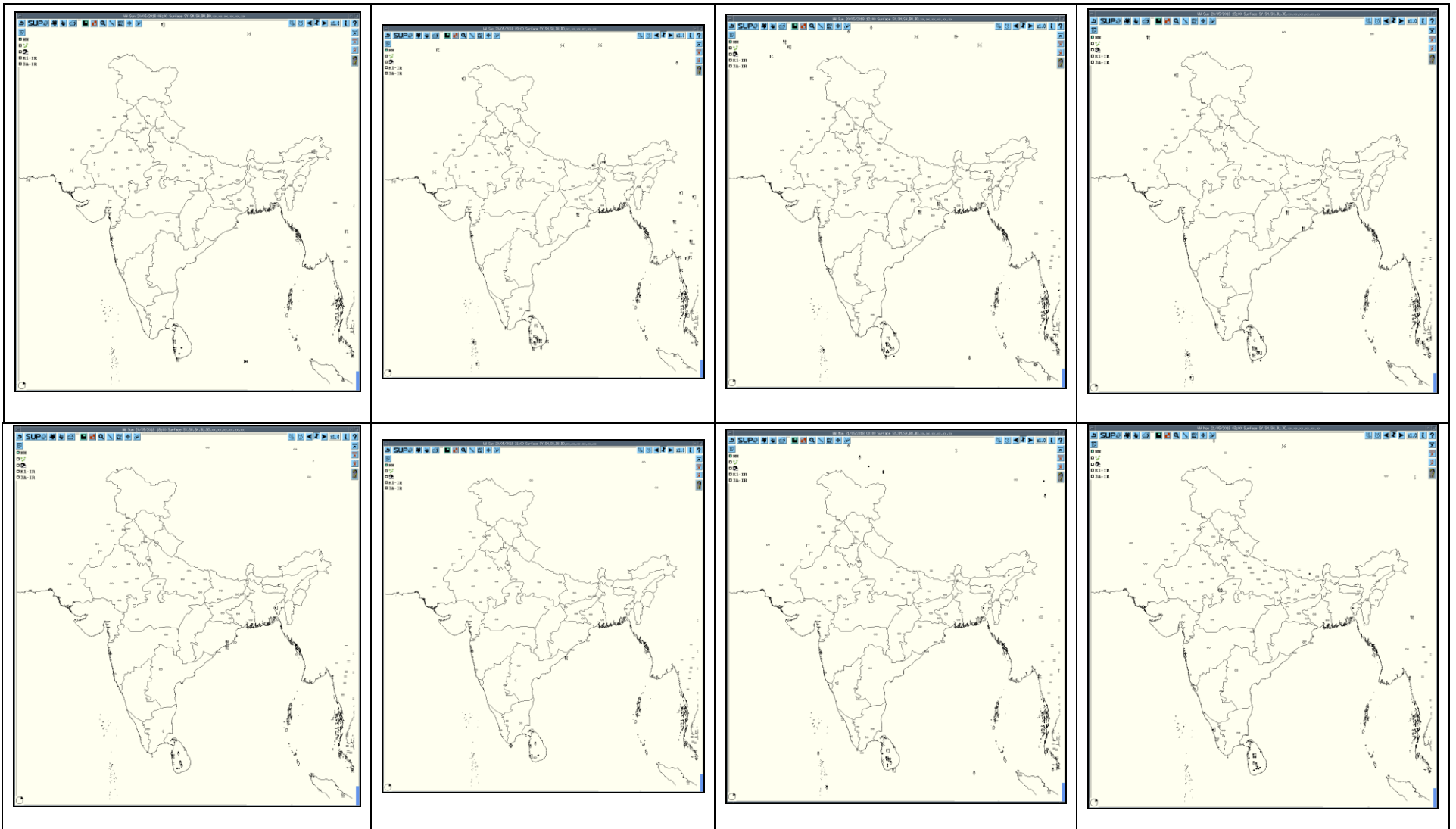
Dust Forecast



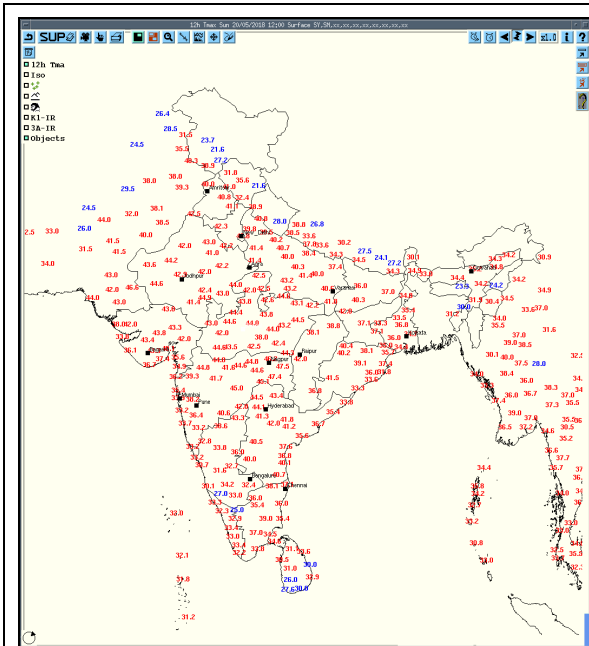
Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today



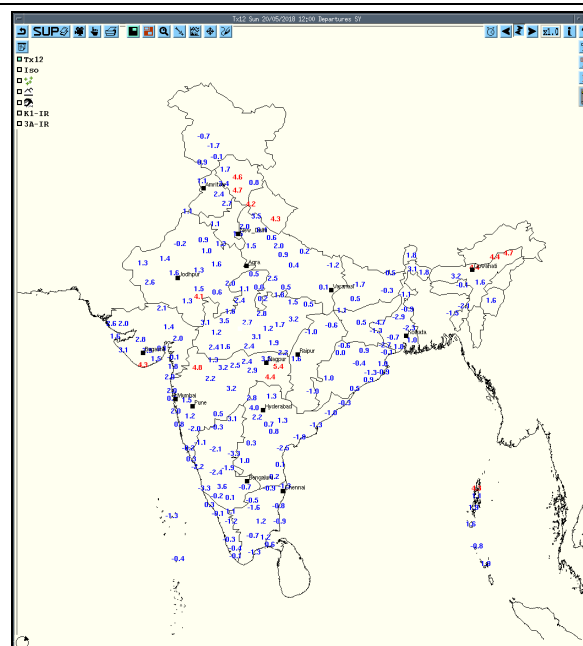
IMR



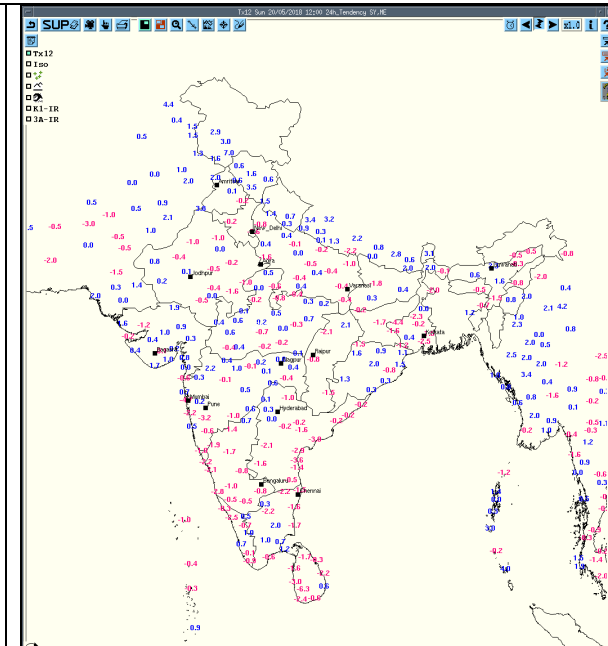
**3hourly Past weather at 06, 09, 12, 15, 18, 21 UTC of yesterday and 00 & 03 hrs UTC of today**



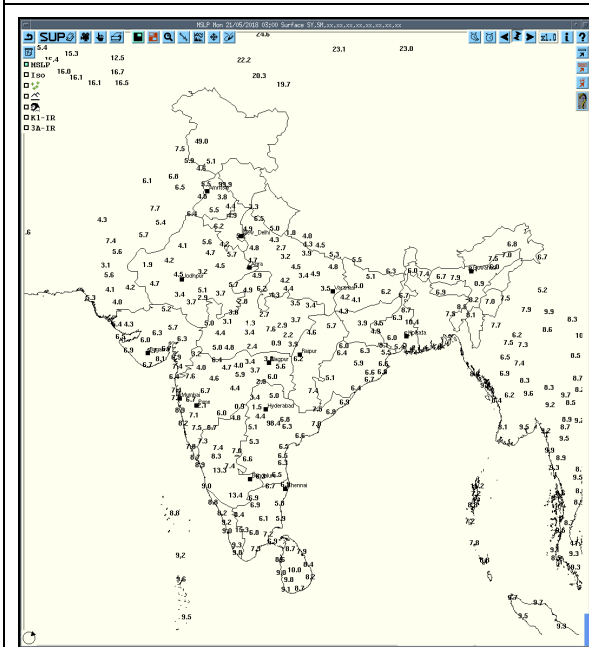
Tmax



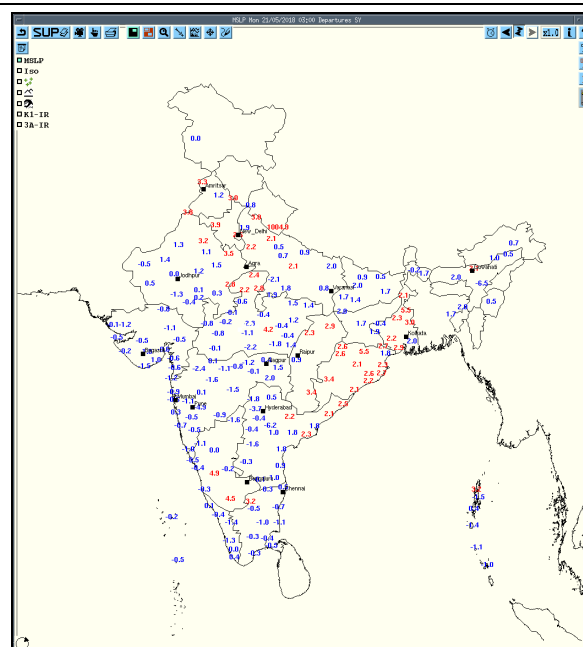
Departure Tmax



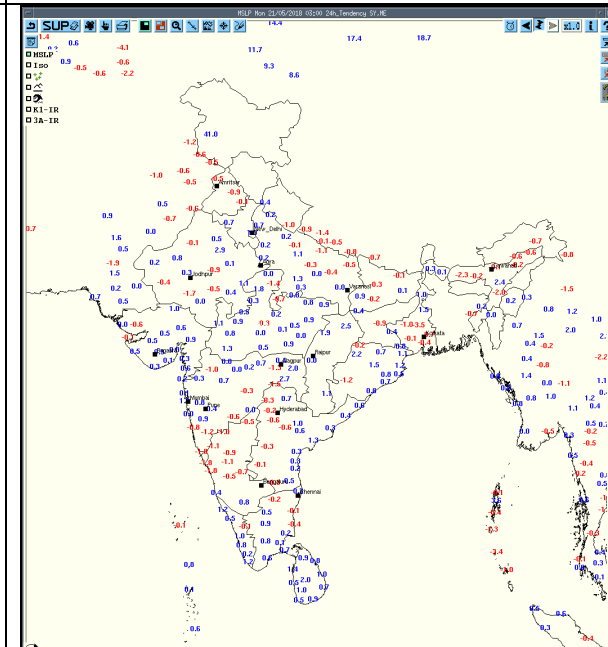
Tendency Tmp



MSLP

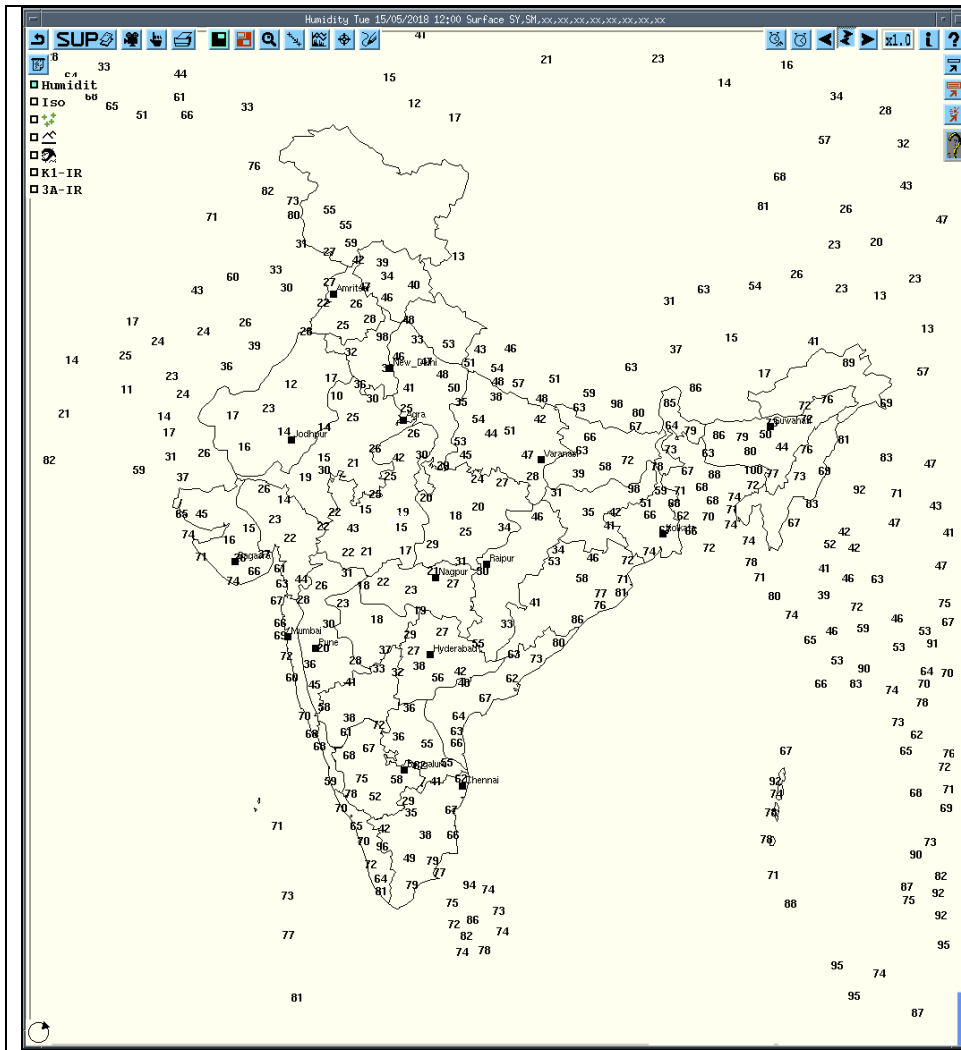


Departure MSLP

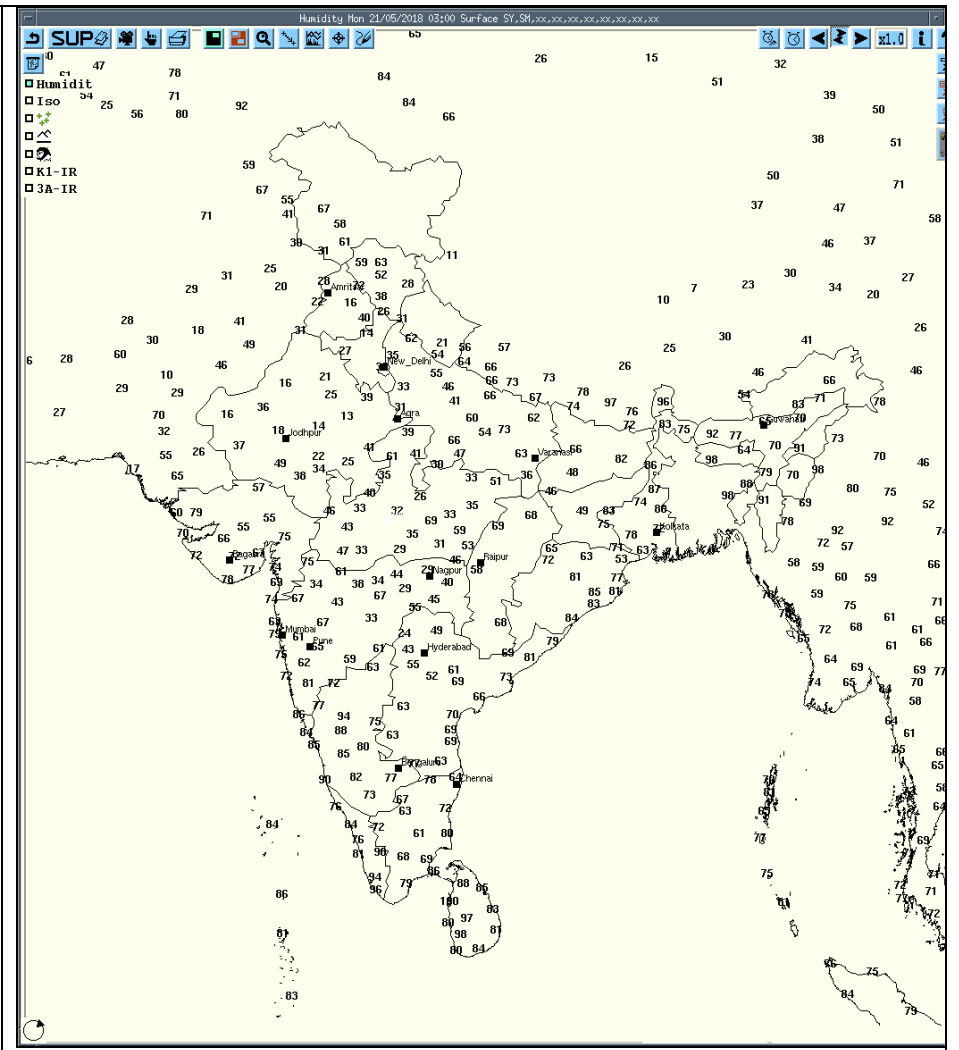


Tendency MSLP





RH at 1200UTC yesterday



RH at 0300UTC today

## Past 24 hours DWR 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
Agartala	21-05-18	200300 to 210300	Multiple cell formed over South of Tripura & adj Bangladesh at 200600Z; 11KMS;45dBZ	100 to 200 Kms SE/SW;30Kmph;E'ly	Cell dissipated over hills of Mizoram at 200820Z	TSRA	All south dists. of Tripura=
Jaipur	21-05-18	200300-210300	Nil	Nil	Nil	Nil	Nil
Patiala	21-05-18	200300-210300	No Significant Echo	--	--	--	--
Lucknow	21-05-18	200300-210300	Nil	Nil	Nil	Nil	Nil
Patna	21-05-18	200300-201932	NIL	N/A	N/A	N/A	
		201932-202132	<b>Isolated Single Cell</b> Maximum Reflectivity: 39.5 dBZ Echo Top: 9.0 KM	Range: 143 KM from DWR Patna in NNE direction Movement: towards Southerly	Warning issued	N/A	SHEOHAR, SITAMARHI, MADHUBANI, MUZAFFRPUR
		202142-202312	<b>Isolated Single Cell</b> Maximum Reflectivity: 38.5 dBZ Echo Top: 10.6 KM	Range: 195 KM from DWR Patna in NNW direction Movement: towards Southerly	Warning issued	N/A	EAST CHAMPARAN, WEST CHAMPARAN, SHEOHAR,
		202312-210300	NIL	N/A	N/A	N/A	

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	20-05-18	Contd. from 192251-200531	Multi cells system developed with maximum reflectivity of 56.0 dBz at 2351 UTC of 19-05-2018 and maximum height more than 10.03 km at 0001 UTC of 20-05-2018	Coming from NW. Moving in ESE-ward direction	Multi Isolated cells coming from NW (241.6 km) at 2251 UTC and later developed into big cell system. Matured and one part of it dissipated at 0301 UTC in NW at a distance of 158.5 km and another part of it entered into Bangladesh at 0301 UTC in NE at a distance 90.2 km and residual part of it entered into Bangladesh at 0531 UTC in ENE at a distance 59.7 km .	Thunderstorm /Rain	N/A
		0541- 0751	NIL	NIL	NOSIG ECHO	NIL	NIL
		0801-1621	Multi-celled system with maximum reflectivity of 58.0 dBz at 0851 UTC and maximum height 17.19 km at 0851 UTC Multi-celled system with maximum reflectivity of 58.5 dBz at 0941 UTC and maximum height 16.30 km at 0931 UTC	Coming from SW. Moving in E-ward thereafter SE-ward direction Developed in WSW (214 km). Moving in ENE ward direction	1. Multi-celled system coming from SW from 0801 UTC. Matured. dissipated at 1041 in SW at a distance 208 km from radar.  2. Multi-celled system developed in WSW at 0911 UTC at a distance 214 km from radar. Not matured. Dissipated at 1041 in WSW at a distance 186 km from radar.	Thunderstorm /Rain  Thunderstorm /Rain	N/A  N/A
		0801-1621	Single cell with maximum reflectivity of 59.0 dBz at 1051 UTC and maximum height 17.64 km at 1051 UTC  Multi-celled system with maximum reflectivity of 62.0 dBz at 1131 UTC and maximum height more than 18 km at 1111 UTC  A number of cells with maximum reflectivity of 60.5 dBz at 1311 UTC and maximum height 17.46 km at 1251 UTC	Developed in SW(185 km) Moving in NNE-ward direction  Coming from W. Moving in SE ward direction  Developed between NNE to W Almost stationery.	3. Isolated single cell developed at 1011 UTC in SW at a distance of 185 km from radar. Matured dissipated in SW at a distance 148 km from radar.  4. Multi-celled system coming from W at 1101 UTC . Matured, dissipated in WSW at 1621 UTC at a distance 71 km from radar.  5. A number of cells developed between NNE to West sector from 1211 UTC. All dissipated by 1401 between NE to W.	Thunderstorm /Rain  Thunderstorm /Rain/Hail  Thunderstorm /Rain/Hail	N/A  N/A  N/A
	1631-2351	NIL	NIL	NOSIG ECHO	NIL	NIL	
	21-05-18	0001-0301	NIL	NIL	NOSIG ECHO	NIL	NIL

<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	21-05-18	200900	Isolated single cells with maximum reflectivity of 60 dBz and height of 18 kms	NW(88KMS) & N(165 KMS) moving Sly	CB cells are formed at 0801UTC and developed and matured well to 60dBz at 0841UTC.		Visakhapatnam Dist(AP) Rayagada & Koraput Dist.(Orissa)
		201200	Multiple cells with maximum reflectivity of 62 dBz and height of 17 kms	NW(70 KMS) & N(120 to 250 KMS) moving Sly	Since last observation CB cells are developing and matured well to 62dBz at 1001UTC start dissipating.		Visakhapatnam Dist(AP)  Koraput Dist.(Orissa)
		201500	Isolated cb cells with maximum reflectivity of 53 dBz and height of 13 kms	NE(233 KMS) and moving SEly	CB cells developed and dissipating started from 1341 UTC.		Ganjam Dist.(Odisha)
		201800	Isolated CB cells formed with maximum reflectivity of 55 dBz and height of 15 kms	N(195 KMS) and moving SEly	CB cells formed since last observation and developing	Thunderstorm with rain	Rayagada Dist.(Odisha)
		210000	Isolated CB cells formed with maximum reflectivity of 56 dBz and height of 14 kms	N(105 KMS) and moving SEly	CB cells formed since last observation and well developed and dissipating started from 2041 UTC	Thunderstorm with rain	Srikakulam Dist. (AP) and Rayagada Dist.(Odisha)
		210300	Convective region of max. reflectivity of 38dBz with height of 8 kms	N(208 kms) moving Sly	Convective region of max. reflectivity of 38dBz observed at 0101UTC and start dissipating.		Kandhamal Dist.(Odisha)

**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)
Agartala	Northeast India	Tripura	Thunderstorm	21-05-18	0531	0725
Pendra Road	Central India	Chhattisgarh	Thunderstorm	21-05-18	1157	1352
Bilaspur	Central India	Chhattisgarh	Thunderstorm	21-05-18	2200	0030
Passighat	Northeast India	Arunachal Pradesh	Thunderstorm	20-05-18	0945	1035
Dhubri	Northeast India	Assam	Thunderstorm	20/21-05-18	202010 202340	202110 210010
Barapani	Northeast India	Meghalaya	Thunderstorm	20-05-18	201340	201400
Agartala	Northeast India	Tripura	Thunderstorm	21-05-18	210530	210725
Mangalore AP	South India	Coastal Karnataka	Thunderstorm	21-05-18	0530	0540
AMS HAL Bengaluru	South India	South Interior Karnataka	Thunderstorm	20-05-18	1730	2320
Bengaluru City	South India	South Interior Karnataka	Thunderstorm	20-05-18	1835	2350
Yelahanka IAF	South India	South Interior Karnataka	Thunderstorm	20-05-18	1730	2000
Kalingapatnam	South India	Andhra Pradesh (CAP)	Thunderstorm	21-05-18	0130	0250
Kanyakumari	South India	South Tamil Nadu	Thunderstorm	20/21-05-18	2115 0410	2245 0510
Anantapur	South India	Rayalaseema	Thunderstorm	21-05-18	0400	0445
Alappuzha	South India	Kerala	Thunderstorm	20-05-18	1615	1745
Thiruvananthapuram C	South India	Kerala	Thunderstorm	20-05-18	1420 1710 2140 0230	1440 1750 2155 0405

## 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)

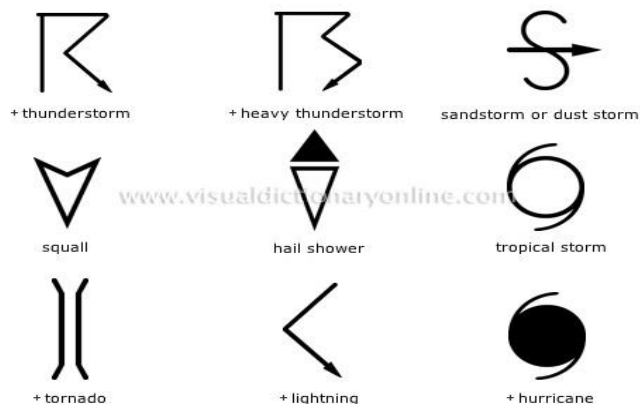
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









[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:



	haze
	smoke
	dust or sand storm
	fog
	drizzle
	rain
	snow
	showers
	hail
	thunderstorm

**Weather Symbols**