



## India Meteorological Department

### FDP STORM Bulletin No. 73 (18-05-2018)

#### 1. CURRENT SYNOPTIC SITUATION:

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

- ♦ The cyclonic storm "SAGAR" over Gulf of Aden moved further west -south westwards with a speed of 18 kmph during past 6 hours, and lay centered at 0830 hrs IST of 18th May 2018 over Gulf of Aden near latitude 12.2 °N and longitude 46.3 °E; about 140 km east southeast of Aden (Yemen) and 820 km west southwest of Socotra Islands. It is very likely to move west - south westwards and weaken gradually after 12 hrs and cross Somalia coast near about Long 44 °E around noon of 19th May 2018 as a cyclonic storm with wind speed 65-75 kmph gusting to 85 kmph.
- ♦ The Western Disturbance as an upper air cyclonic circulation over Jammu & Kashmir & adjoining north Pakistan at 3.1 km above mean sea level has moved away eastwards.
- ♦ Another Western Disturbance as a trough in mid tropospheric westerlies with its axis at 5.8 km above mean sea level now runs roughly along Long 72°E to the north of lat 32°N.
- ♦ A fresh Western Disturbance as a trough in mid tropospheric westerlies with its axis at 5.8 km above mean sea level runs roughly along Long 55°E to the north of lat 30°N.
- ♦ The cyclonic circulation over central parts of South Uttar Pradesh and adjoining Madhya Pradesh extending upto 0.9 km above mean sea level persists. The east west trough from this cyclonic circulation to northeast Bay of Bengal now runs upto Manipur across south Bihar & northern parts of West Bengal and extends upto 0.9 km above mean sea level.
- ♦ The north south trough from north Haryana to Marathwada now runs from Uttarakhand to west Vidarbha with the embedded cyclonic circulation over south Uttar Pradesh and adjoining Madhya Pradesh and extends upto 0.9 km above mean sea level.
- ♦ The cyclonic circulation over Rajasthan now lies over East Rajasthan & neighbourhood and extends upto 1.5 km above mean sea level.
- ♦ A north south trough runs from east Bihar to eastern parts of Gangetic West Bengal between 1.5 km & 3.1 km above mean sea level.
- ♦ A cyclonic circulation lies over Lakshadweep & neighbourhood and extends upto 3.1 km above mean sea level.
- ♦ A cyclonic circulation lies over south Konkan & 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):

##### Western Disturbance (WD):

Scattered multi-layered clouds with embedded weak convection were seen over North Afghanistan, North Pakistan, Jammu & Kashmir, Himachal Pradesh, Punjab, North Haryana and over area between Lat 37.0N To 43.0N Long 68.0E to 83.05E in association with WD over the area.

### **Clouds descriptions within India:**

Broken low/medium clouds with embedded weak to moderate convection seen over Coastal Karnataka, South Interior Karnataka, South Kerala, North & South Tamilnadu adjoining South Andhra Pradesh. Scattered low/medium clouds with embedded weak to moderate convection seen over Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Punjab, West & East Haryana, Delhi, Northwest & Central Uttar Pradesh, Nagaland, Manipur, Mizoram, Meghalaya, South Assam, Arunachal Pradesh, Sikkim, West Bengal, South Coastal Andhra Pradesh, North Interior Karnataka, Telangana, Rayalaseema, rest Tamilnadu, Lakshadweep and Bay Islands. Scattered low/medium clouds with embedded weak convection seen over South Maharashtra, Konkan & Goa and Isolated weak over North Rajasthan, East Madhya Pradesh and Marathwada. Scattered low/medium clouds with embedded moderate to intense convection seen over west Tripura. Scattered low/medium clouds seen over Central Chhattisgarh, South Odisha, Central Jharkhand rest Madhya Pradesh, rest Maharashtra.

### **Arabian Sea:-**

Broken low/medium clouds with embedded intense to very intense convection seen over Lakshadweep Islands, Karnataka-Kerala Coasts, and moderate to intense over South Arabian Sea & Comorin.

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

Scattered low/medium clouds with embedded intense to very intense convective seen over South Bay South of Lat 12.0N and moderate to intense over Andaman sea.

### **Past Weather:**

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

Moderate to Intense convection was observed over South Orissa north Andhra Pradesh Telangana Karnataka Kerala Tamilnadu Goa south Maharashtra Bangladesh adjoining Tripura Lakshadweep Andaman & Nicobar Islands weak to moderate convection observed over J&K Himachal Pradesh Uttarakhand Punjab Haryana Rajasthan Madhya Pradesh north Chhattisgarh west Bihar north east states north west Uttar Pradesh .

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

Upto 230  $\text{wm}^{-2}$  observed over J & K North Himachal Pradesh North Uttarakhand Punjab Haryana South Orissa south Maharashtra Sikkim north-east States Konkan & Goa Andhra Pradesh Telangana Rayalaseema Karnataka Kerala Tamilnadu Lakshadweep Andaman & Nicobar.

**Westerly Trough & Jet Stream:** Westerly Trough & Jet Stream are not observed over Indian Region.

### **Dynamic Features:**

**Wind Shear** 30-60 knots is observed over North India, 5-20 knots over Central India, North-East India and 05-10 knots over south peninsula India.

**Positive shear tendency** is observed over India

**Positive Vorticity (850 hPa)** more than 50 ( $\times 10^{-5}/\text{s}$ ) is observed over north Rajasthan south Haryana Delhi north west Uttar Pradesh Konkan Goa north Madhya Pradesh sub Himalayan west Bengal .

**Negative Low Level Convergence** is observed over J&K Vidarbha Uttarakhand Himachal Pradesh Madhya Pradesh.

### **Precipitation:**

Rainfall up to 27.8-208.3 mm was observed over north-west J&K Kerala central Tamilnadu East Arunachal Pradesh, Konkan adjoining Goa north interior & costal Karnataka.

Rainfall up to 0.1-13.9 mm was observed over west Punjab north east Andhra Pradesh north Orissa West Bengal north Meghalaya Tripura Mizoram rest Tamilnadu Lakshadweep Andaman & Nicobar Island.

## DWR and RAPID Observations:

Isolated/multiple moderate echoes (dBZ >50 and height >10km) was observed on DWR Kolkata and Chennai at around 1530IST and Light to moderate echoes at DWR Agartala, Delhi, Kochi, Lucknow, Srinagar and Thiruvananthapuram.

RAPID RGB Satellite imagery at 1400 IST indicated significant convection over Jammu & Kashmir, North Himachal Pradesh, North Uttarakhand, Southeast Punjab, Southeast Gangetic West Bengal, Northeast Chhattisgarh adjoining Madhya Pradesh, Rayalaseema, South Kerala Central Tamilnadu and Nicobar Islands.

## 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 to poor category for next 2 days in Delhi.

Delhi – SAFAR analysis & Forecast	18.05.2018	19.05.2018
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:**

**12UTC of Day 1-4:** 850/925 hPa Deep Depression over southwest Arabian Sea moving west towards gulf of Aden likely to become Cyclonic Storm subsequently in Day2-Day4

**00UTC of Day1-4:**A CYCIR at 925/850hPa off coast Kerala over southeast AS moving towards west

**00UTC of Day 2-5:** A CYCIR at 850 hpa over BOB moving towards west with intensification.

**00UTC of Day1-5:** 850 hPa NE-SW trough from east U.P. to N Karnataka across M.P., Maharashtra.

**00UTC of Day1-3:** 850 hPa trough over east UP to Nagaland across Bihar, WB and Bangladesh.

**Confluence & Wind Discontinuity Regions: 12 UTC of Day 0, 1-3:** 925 hPa N-S discontinuity over Southern Peninsular India

**Synoptic Systems: 00 UTC of Day 1-4:** Western disturbance as a CYCIR over J&K and adjoining Pakistan regions

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

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

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

Day0: Odisha, West MP, East MP, Chhattisgarh,

Day1: West Rajasthan, East Rajasthan, West MP, East MP, Chhattisgarh, SI Karnataka,

Day2: Jharkhand, East MP, Madhya Maharashtra, Vidarbha, Chhattisgarh, Telangana,

Day3: Assam Meghalaya, Jharkhand, Madhya Maharashtra, Chhattisgarh, Telangana,

Day4: Jharkhand, Uttarakhand, Jammu Kashmir, Madhya Maharashtra, Chhattisgarh, TN Puducherry, NI Karnataka,

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

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

Day0: Gangetic WB, Jharkhand, West Rajasthan,

Day1: TN Puducherry,

Day2: Gangetic WB, Jharkhand, TN Puducherry,

Day3: Assam Meghalaya, Gangetic WB, Jharkhand, Uttarakhand, Punjab, Telangana, TN Puducherry, Kerala,

Day4: Gangetic WB, Jharkhand, Bihar, Uttarakhand, Chhattisgarh, TN 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, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Konkan Goa, Madhya Maharashtra, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

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

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

Day3: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Madhya Maharashtra, Coastal AP, Rayalaseema, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day4: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Jharkhand, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, TN Puducherry, Coastal 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, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West Rajasthan, East Rajasthan, Odisha, Chhattisgarh, Coastal AP, NI Karnataka,

Day1: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, East Rajasthan, Odisha, Chhattisgarh, Telangana,

Day2: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Coastal AP, Telangana, Rayalaseema, TN Puducherry, SI Karnataka,

Day3: Arunachal Pradesh, Sub Himalayan WB, Himachal Pradesh, Jammu Kashmir, Odisha, Coastal AP, Rayalaseema, TN Puducherry, SI Karnataka,

Day4: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, TN Puducherry

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

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

Day0: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Jharkhand, West UP, Uttarakhand, Jammu Kashmir, Odisha, Konkan Goa, Madhya Maharashtra, Marathwada, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, TN Puducherry, NI Karnataka, SI Karnataka, Kerala,

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

Day2: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, 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, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, TN Puducherry, Coastal Karnataka, SI Karnataka,

Day4: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, TN Puducherry, SI Karnataka,

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

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

Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Andaman Nicobar, SI Karnataka,

Day2: Assam Meghalaya, NE NMMT, SI Karnataka,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Andaman Nicobar,

Day4: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Jammu Kashmir, Odisha, Andaman Nicobar, SI Karnataka,

Day5: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, TN Puducherry, Kerala,

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

### **1. Synoptic Systems:**

The analysis based on 00 UTC indicates a cyclonic circulation over south Uttar Pradesh and adjoining Madhya Pradesh. The forecast shows it will persist till day3 with Eastward shift. The analysis shows an East- West Trough extends from this cyclonic circulation up to Manipur across South Bihar and Northern parts of West Bengal. The forecast shows it will persist till day3. The analysis shows a North- South Trough extends from Uttarakhand to West Vidarbha in lower Troposphere (925hPa). The forecast shows it will persist till day2. Analysis shows another cyclonic circulation over East Rajasthan and adjoining area. The forecast shows the circulation will become less marked in next 48 hours. A cyclonic circulation is seen over South Konkan and adjoining areas in lower Troposphere (850hPa). The forecast shows it will become less marked in next 24 hours. A North South Oriented Trough is seen in the analysis extending from East Bihar to Eastern parts of Gangetic West Bengal in lower Troposphere (850hPa). The forecast shows it will become less marked in next 48 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 ( $>12 \times 10^{-1}/s$ ):}** Low level Positive Vorticity is seen mostly along the Foothills of Himalaya, North-South and East- West Trough, around the cyclonic circulations, eastern parts of India during next 3 days; Low level Positive Vorticity is also seen over parts of Punjab, North West Rajasthan, J&K from day 2 onwards; parts of Bihar, GWB, Jharkhand, Orissa, Himachal Pradesh, Uttarakhand have Positive Vorticity from day 1.

#### **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, South East Rajasthan East and 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, Madhya Pradesh, Andhra Pradesh, along east and west coast of India during next 2 days; on day 3 it remains over the same region but disappear over Madhya Pradesh, Vidarbha, West Uttar Pradesh, Uttarakhand, Madhya Maharashtra and Marathwada and appears over Tripura and adjoining areas; Significant zone lies over Gujarat, coastal areas along the east coast and west coast, GWB, Bihar, Jharkhand, Orissa, coastal Andhra Pradesh, coastal Tamil Nadu, Telangana, East Uttar Pradesh, coastal Maharashtra, Chhattisgarh and Interior Karnataka.

**Lifted Index (< -2):** Similar to T-storm Index in day 1 and 2 it lies over J&K, Punjab, Gujarat, Rajasthan, Gangetic plains and along east and west coast of India with an extension over Interior Karnataka and Telangana, Bihar, Jharkhand, Uttar Pradesh, Uttarakhand, Orissa, GWB, Assam, Arunachal Pradesh, Meghalaya, Tripura and adjoining areas, Telangana, Vidarbha, Chhattisgarh, Andhra Pradesh, coastal Maharashtra, Konkan & Goa, coastal and Interior Karnataka, Kerala, Tamil Nadu, Madhya Maharashtra and Marathwada, In day 3 it remains on the same region but disappears over Northwest India including J&K and Punjab; Significant zone with maximum negative value is found over coastal Orissa and coastal and Interior Andhra Pradesh, GWB, Telangana and South Chhattisgarh.

**Total Total Index (> 50):** Higher than Threshold value of the Index is seen over most of the parts of the country except Gujarat, West Madhya Pradesh, Assam, Tripura, Meghalaya, Mizoram and adjoining areas and Extreme south Peninsular India on day 1 and 2; on day 3 it is seen over same region but disappear over central parts of India, North west India and Assam, Tripura, Meghalaya, Mizoram and adjoining areas; Significant zone with Maximum value of the index lies over Telangana, J&K, Himachal Pradesh, Orissa, Andhra Pradesh, GWB, Telangana, Chhattisgarh, Jharkhand and Vidarbha.

**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 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, Punjab, Haryana, Delhi and adjoining areas; The significant zone lies over parts of GWB, Jharkhand, East Uttar Pradesh, Orissa, Andhra Pradesh, Chhattisgarh, Telangana and North Interior Karnataka.

**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 and Gujarat during next 3 days; over parts of East Uttar Pradesh on day 2 and 3; over parts of West Uttar Pradesh and adjoining areas on day 3; maximum value of the index is seen over parts of GWB, Orissa, coastal and Interior Andhra Pradesh, coastal Tamil Nadu, coastal areas along East and West Coast, coastal Maharashtra, Including Mumbai, coastal and Interior Karnataka, Konkan and Goa, SHWB and Telangana.

**CIN (50-150):** Over sub-divisions along east and west coast of India, extreme south over Kerala and Tamil Nadu and the value of the index lies in the above range over most of the parts of the country except central parts of Madhya Pradesh and J&K on day 1; on day 2 and 3 it is seen over most of the parts of the country except Central Parts of Madhya Pradesh, West Vidarbha, J&K, Punjab, Haryana, Delhi, Himachal Pradesh, Uttarakhand, Rajasthan; significant zone with highest value of the index lies over parts of GWB, Chhattisgarh and East Madhya Pradesh.

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

40-70 mm Rainfall: over parts of Orissa on day 1 and 2; over parts of GWB on day 2 and 3; over parts of South Interior Karnataka on day 3; over parts of Meghalaya, Tripura and adjoining areas on day 3.

10-40 mm Rainfall: over parts of Kerala, Karnataka, Tamil Nadu, Foothills of Himalayas, Orissa, SHWB, Sikkim and NE states during next 3 days; over parts J&K on day 1 and 2; over parts of Himachal Pradesh on day 2; over parts of Jharkhand on day 3.

Up to 10 mm rainfall: Over parts of J&K, Himachal Pradesh, Uttarakhand, Foothills of Himalaya, GWB, SHWB & Sikkim and NE states, Bihar, Jharkhand, Orissa, Chhattisgarh, Kerala, Interior Karnataka, Konkan & Goa, coastal Maharashtra, Tamil Nadu, Telangana, Rayalaseema and Andhra Pradesh during next 3 days; over parts of Punjab on day 1 and 2; over parts of South Madhya Maharashtra, Marathwada and some parts of North west Rajasthan and Haryana 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, Himachal Pradesh, Uttarakhand, Punjab, Haryana, Delhi, Rajasthan, Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Kerala, Karnataka, Tamil Nadu, Sikkim, GWB, Bihar, Jharkhand, SHWB, Orissa, NE states, South Madhya Maharashtra, Marathwada, South Coastal Maharashtra, Telangana and Andhra Pradesh; On day 2 over parts of J&K, Himachal Pradesh, Punjab, adjoining North West Rajasthan, Haryana, SHWB, Bihar, Sikkim and NE states; On day 3 mostly over parts of J&K, some parts of Assam, Meghalaya, Tripura and adjoining areas, Karnataka, Andhra Pradesh, Tamil Nadu and adjoining Kerala.

### **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, Sikkim and NE states during next 3 days; below threshold value of the index is also seen over parts of Orissa and Marathwada on day 1; over parts of East Uttar Pradesh on day 2 and 3; over parts of Gujarat, North coastal Maharashtra and west Rajasthan on day 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, south Chhattisgarh, Kerala, Tamil Nadu, Andhra Pradesh, Orissa, Bihar, Jharkhand, GWB, Madhya Maharashtra, Marathwada, 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 and south Chhattisgarh during next 3 days; Some parts of J&K and West Uttar Pradesh on day 1; over parts of East Uttar Pradesh on day 3; Maximum value of the index is seen over the parts of Orissa, GWB, coastal Andhra Pradesh, coastal Tamil Nadu, Kerala, Interior and coastal Karnataka, coastal Maharashtra, Gujarat, Konkan and Goa, South Madhya Maharashtra.

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

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

**40- 70 mm Rainfall:** over parts of Bihar, Jharkhand, GWB, some parts of North Interior Karnataka and adjoining South Coastal Maharashtra, Assam, Meghalaya, Manipur, Mizoram, Tripura, Arunachal Pradesh and adjoining areas on day 1; over parts of Assam, Meghalaya, Tripura and adjoining areas on day 2; over parts of South Interior Karnataka on day 3.

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

**Up to 10 mm Rainfall:** Over parts of J&K, Himachal Pradesh, Uttarakhand, Foothills of Himalaya, Kerala, Tamil Nadu, Karnataka, Chhattisgarh, Sikkim, Bihar, Jharkhand, Orissa, Andhra Pradesh, Telangana, Sikkim and NE states during next 3 days; over parts of Punjab, Haryana, Uttar Pradesh, East Madhya Pradesh, south coastal Maharashtra, South Madhya Maharashtra, Marathwada, East Vidarbha, Konkan and Goa on day 1; over some parts of South Coastal Maharashtra on day 2.

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

#### Summary and Conclusions:

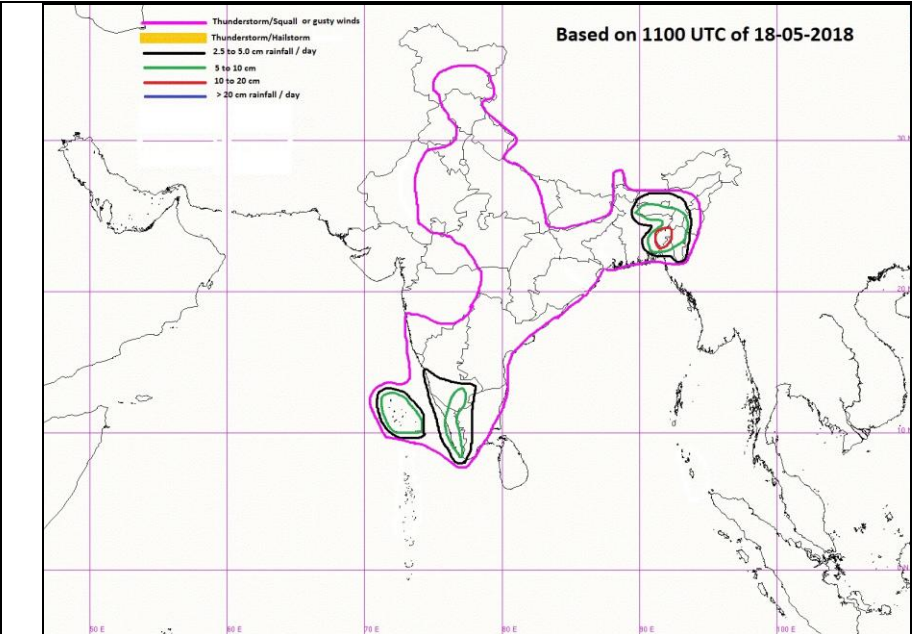
- o Most thermodynamic indices (T-STORM Initiation Index, K-Index, Lifted Index) from IMD GFS deterministic model indicate high probability of thunderstorm occurrence over east and peninsular Indian region with highest probability over Odisha. On day 2, probability of convection decreases further over northwest and central India and increases over Odisha and Gangetic West Bengal and east peninsular coast on day 2. SWEAT index, which accounts for the wind shear between 850 and 500 hPa levels in addition to thermodynamic parameters, also indicates a similar pattern on day 1 and increasing over east peninsular coast and Bengal on day 2. The 850-200 hPa wind shear is very high over Northwest India on day 1 and day 2. A small patch of high wind maxima is expected to develop over Chhattisgarh on day 2.
- o Synoptic analysis indicates that presently, there is a cyclonic circulation over south central Uttar Pradesh. An east west trough extends from this cyclonic circulation to Manipur. Another north south trough runs from Uttarakhand to west Vidarbha through the same circulation. There is also a cyclonic circulation over East Rajasthan. Under the effect of these weather systems, thunderstorm activity is expected over entire North, east, northeast and north central India on day 1. However, the most severe thunderstorms are expected over northwest India while the heaviest rainfall is expected over Northeast India on day 1. On day 2, a cyclonic circulation, currently over north Pakistan, is likely to move to over the Indian region and weather will be confined mostly to northwest and east Indian region.
- o A cyclonic circulation lies over south Konkan & neighbourhood in the lower levels, and associated thunderstorm activity is expected over Konkan and Goa and south Madhya Maharashtra. It is not likely to produce any weather on day 2.
- o Over South India, in association with the cyclonic circulation over Lakshadweep, weather is expected over the southwest peninsular coast on day 1. On day 2, as the circulation moves westward, weather is likely to decrease over the region



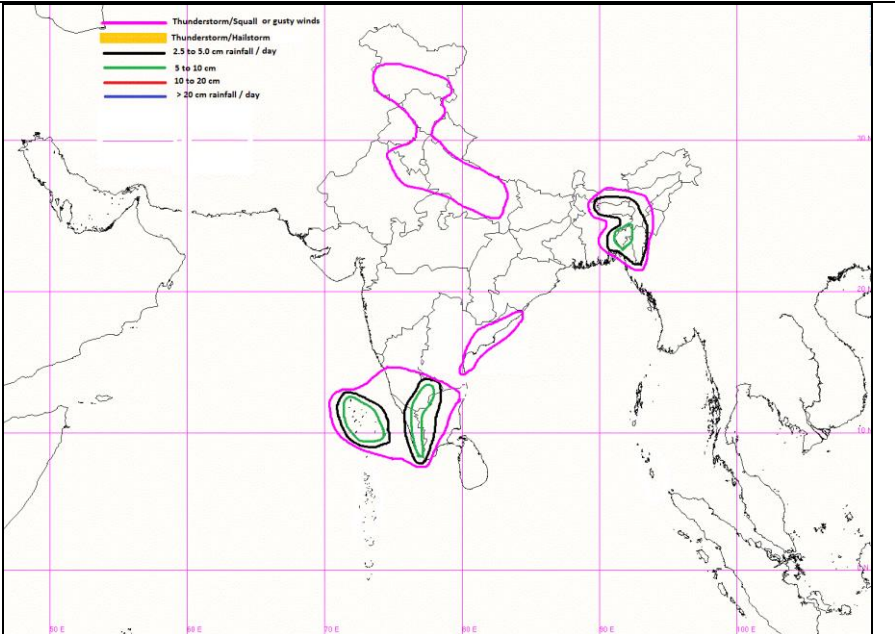
## IOP Area for Day-1 & Day-2:

24 hour Advisory for IOP:	48 hour Advisory for IOP:
<p><b>Significant Rainfall:</b> Interior Tamil Nadu, South Interior and coastal Karnataka, Kerala, Lakshadweep South and West Assam and Meghalaya, Mizoram, Tripura</p> <p><b>Thunderstorm with squall or gusty winds:</b> Tamilnadu, Kerala, Lakshadweep, Karnataka, Rayalaseema, Coastal Andhra Pradesh, Jharkhand South Madhya Maharashtra, Konkan and Goa, Vidarbha, Chhattisgarh, Madhya Pradesh Haryana, Chandigarh, Delhi, Uttar Pradesh, East Rajasthan Jammu and Kashmir, Himachal Pradesh, Uttarakhand, West Bengal and Sikkim, Odisha Manipur, Mizoram, Tripura, Assam and Meghalaya</p> <p><b>Thunderstorm with squall and hail</b> Nil</p> <p><b>Thunderstorm with Duststorm:</b> West Rajasthan</p>	<p><b>Significant Rainfall:</b> Interior Tamilnadu, South Interior Karnataka, Kerala, Lakshadweep South and West Assam and Meghalaya, Mizoram, Tripura</p> <p><b>Thunderstorm with squall or gusty winds:</b> Tamil Nadu, Kerala, Lakshadweep, South Interior and coastal Karnataka, Coastal Andhra Pradesh, Haryana, Chandigarh, Delhi, Uttar Pradesh, East Rajasthan Jammu and Kashmir, Himachal Pradesh Manipur, Mizoram, Tripura, Assam and Meghalaya</p> <p><b>Thunderstorm with squall and hail</b> Nil</p> <p><b>Thunderstorm with Duststorm:</b> West Rajasthan</p>

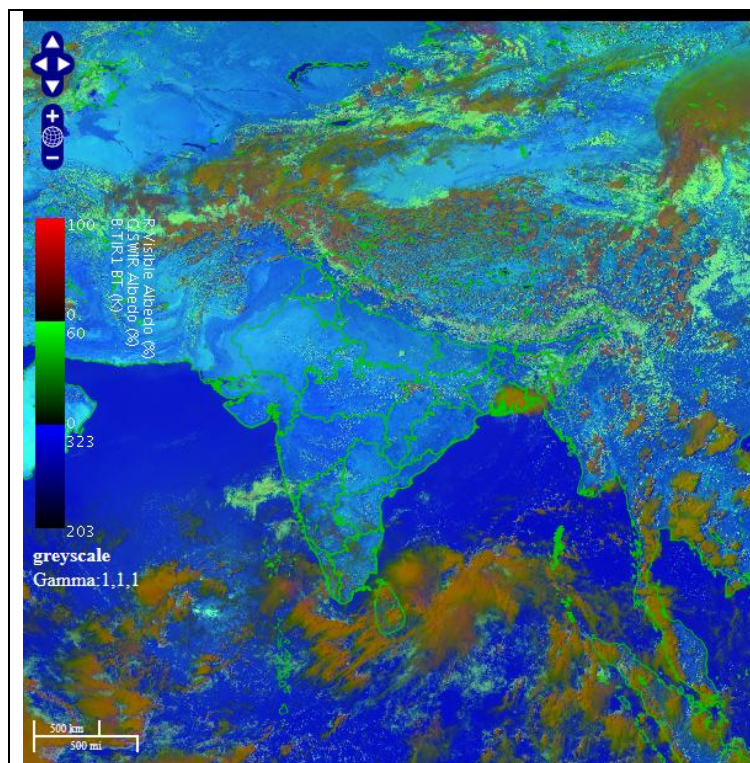
Graphical Presentation of Potential Areas for Severe Weather:



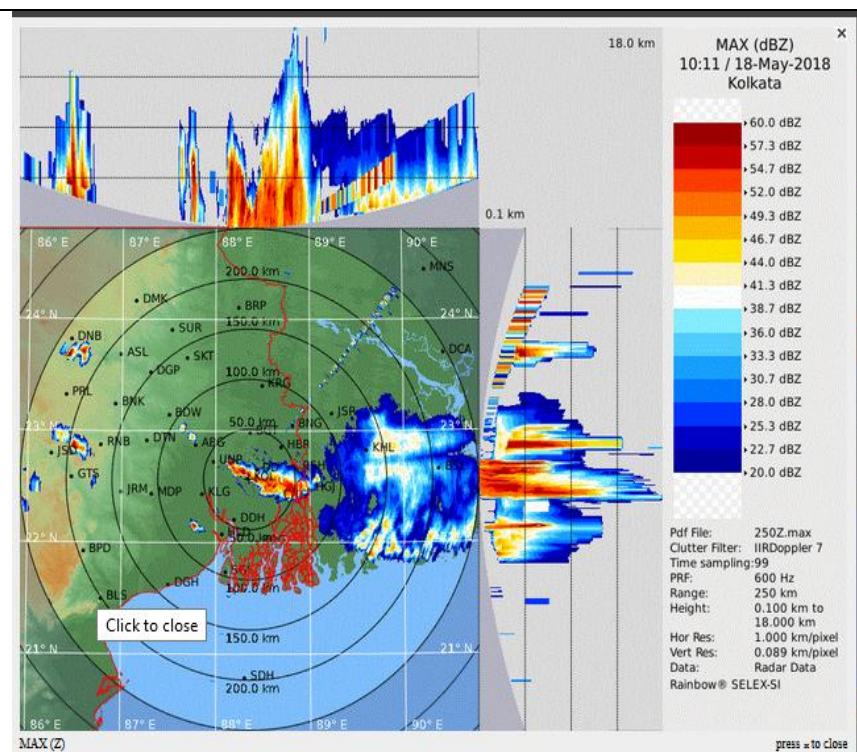
IOP Advisory for 24 hours



IOP Advisory for 48 hours

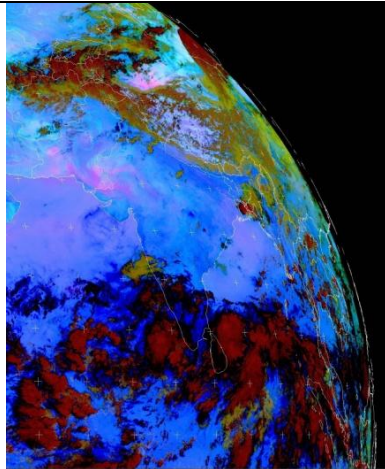


**RAPID RGB Imagery at 1400 IST of the Day**

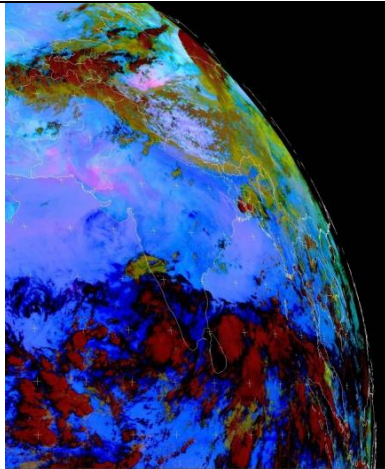


**DWR Kolkata Reflectivity Image at 1541 IST**

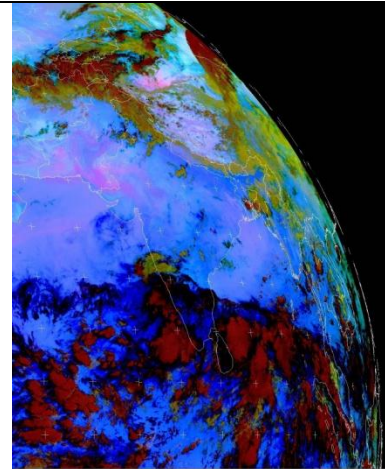




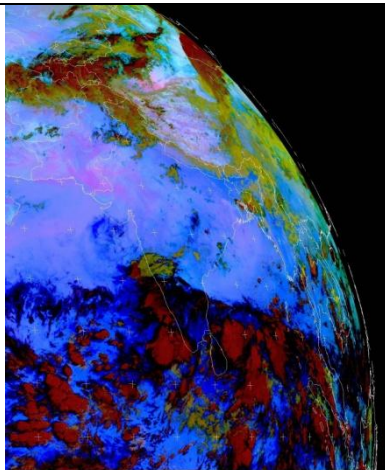
EUMETSAT  
Meteosat IODC Dust, 2018-05-18 06:00:00



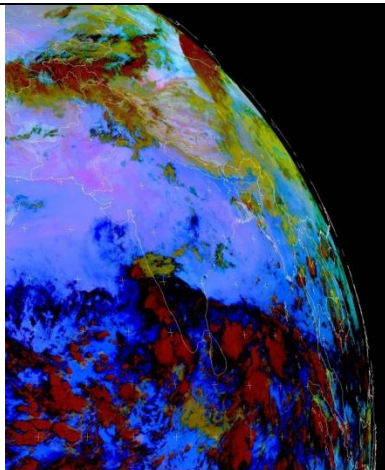
EUMETSAT  
Meteosat IODC Dust, 2018-05-18 05:00:00



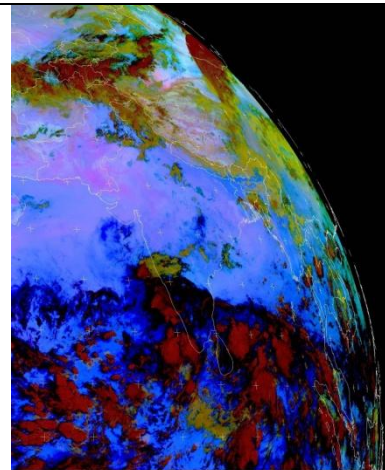
EUMETSAT  
Meteosat IODC Dust, 2018-05-18 04:00:00



EUMETSAT  
Meteosat IODC Dust, 2018-05-18 03:00:00

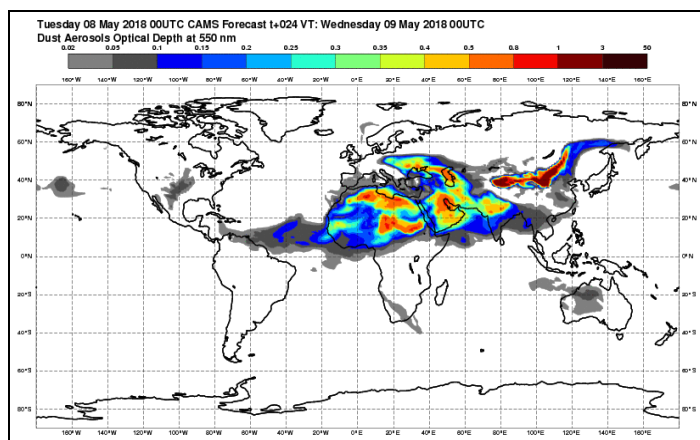


EUMETSAT  
Meteosat IODC Dust, 2018-05-18 02:00:00

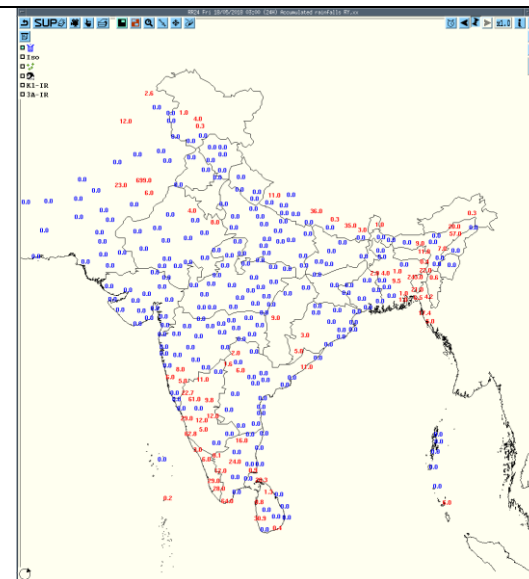


EUMETSAT  
Meteosat IODC Dust, 2018-05-18 02:00:00

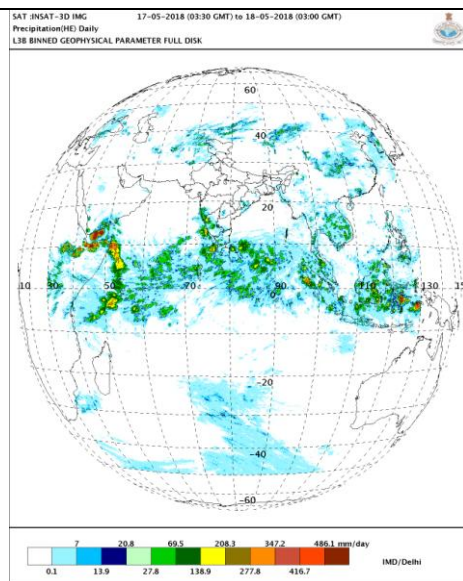
Observed Satellite Dust Images of today



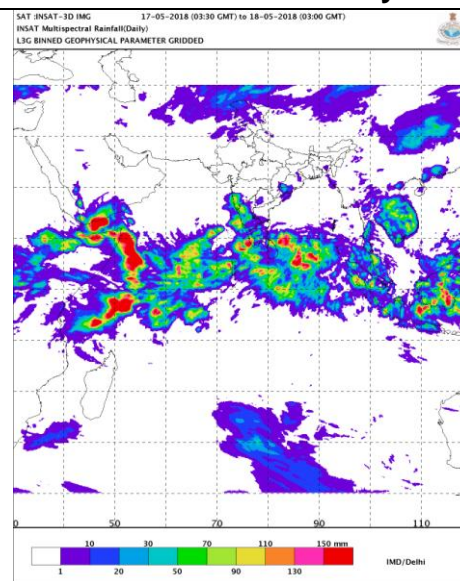
## Dust Forecast



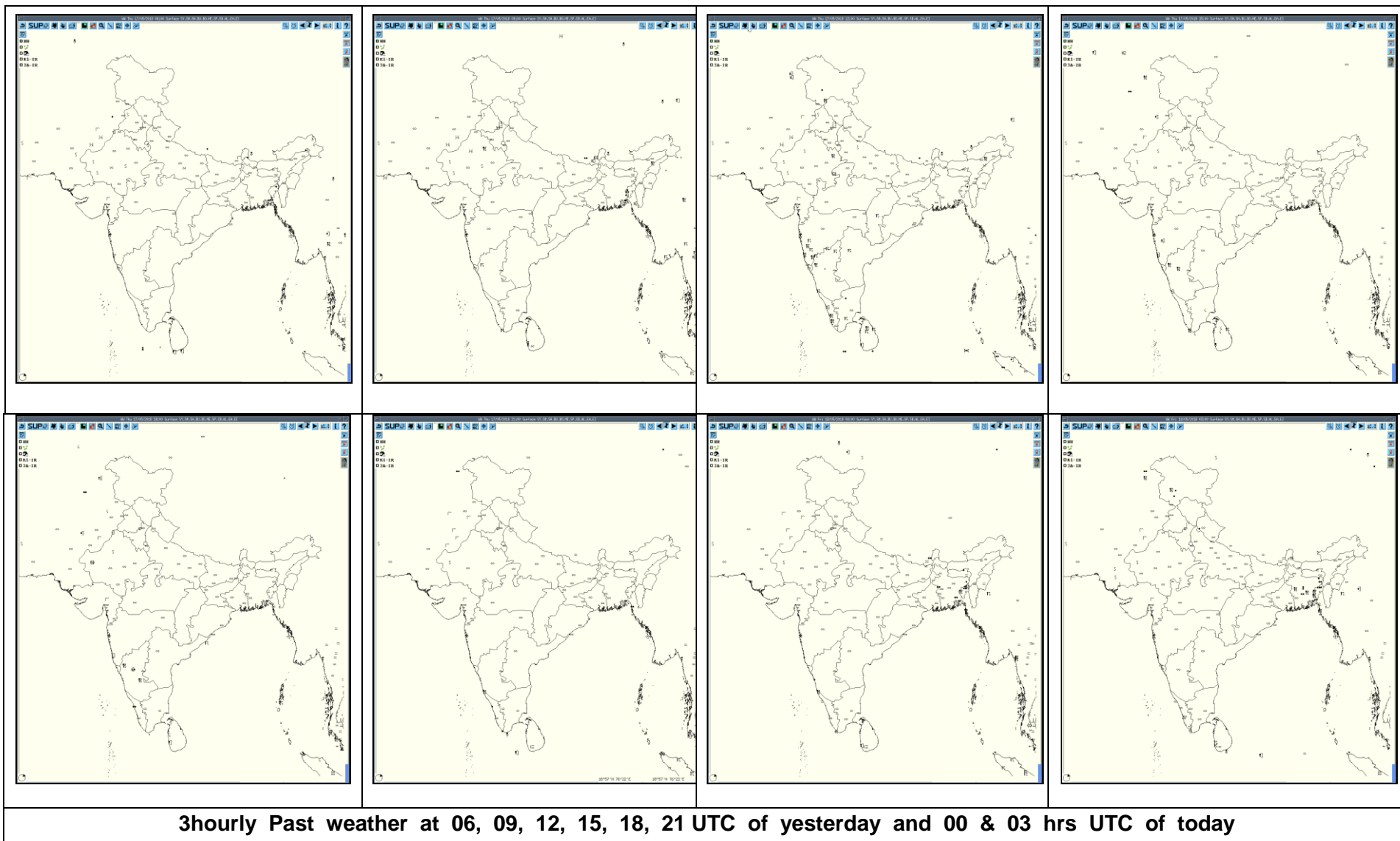
**Accumulated 24 Hour rainfall (in red) recorded  
at 0300UTC of today**



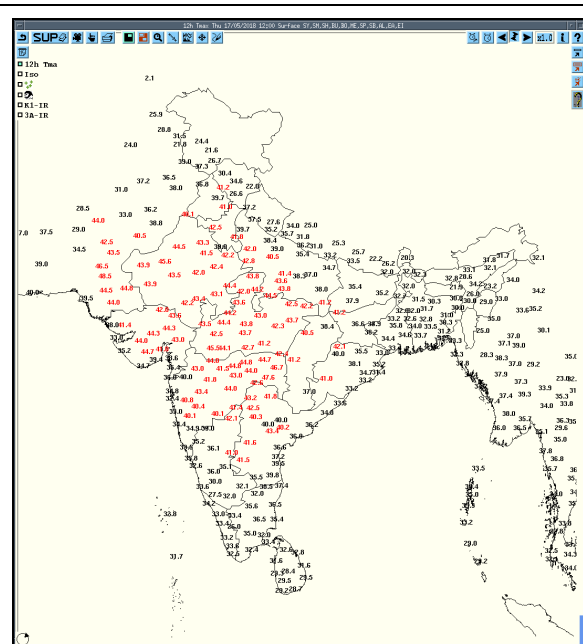
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**IMR**

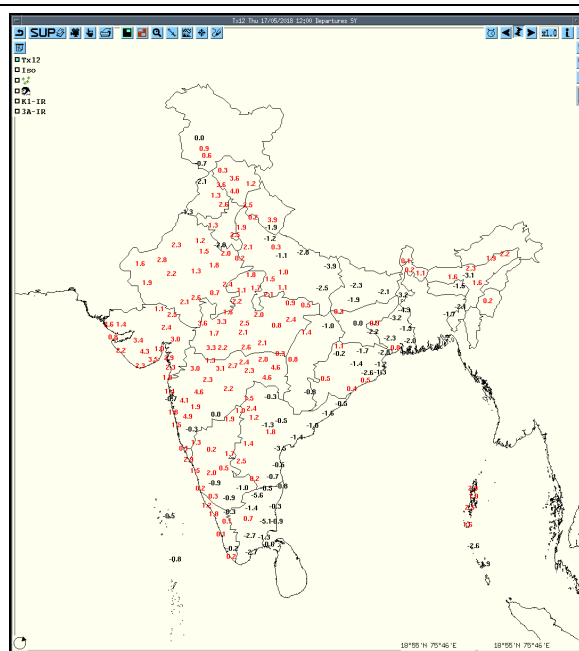
**HEM**



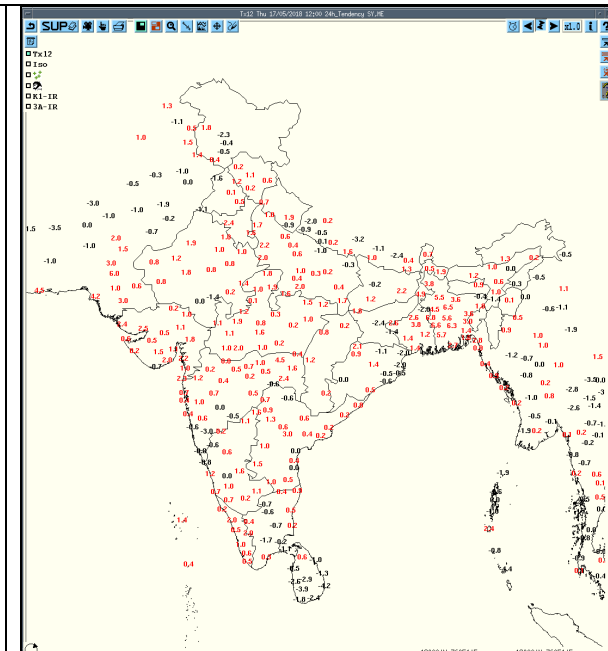




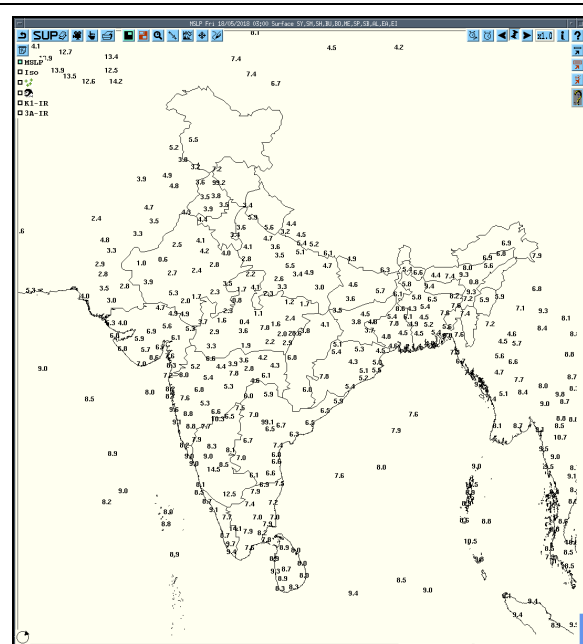
**Tmax**



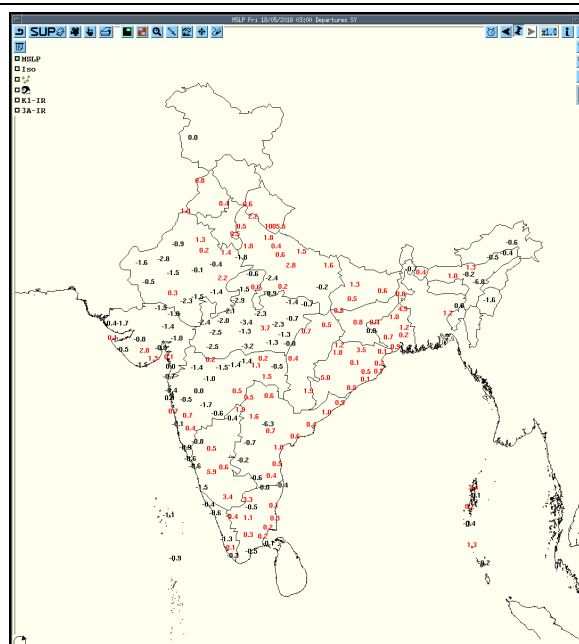
Departure Tmax



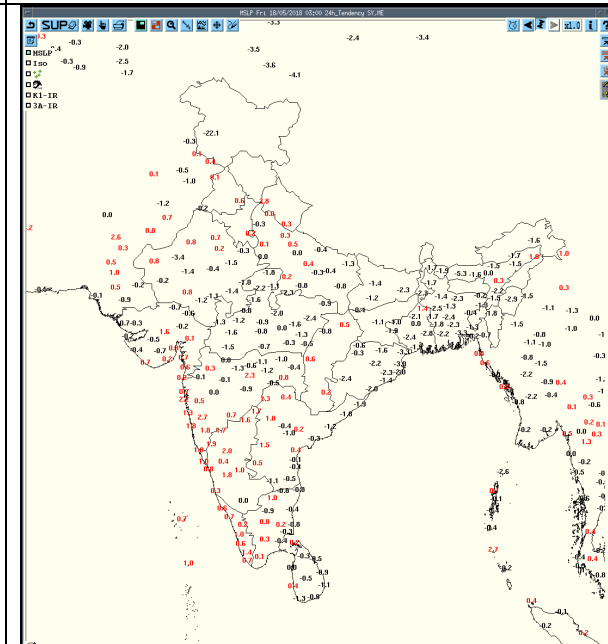
### Tendency Tmax



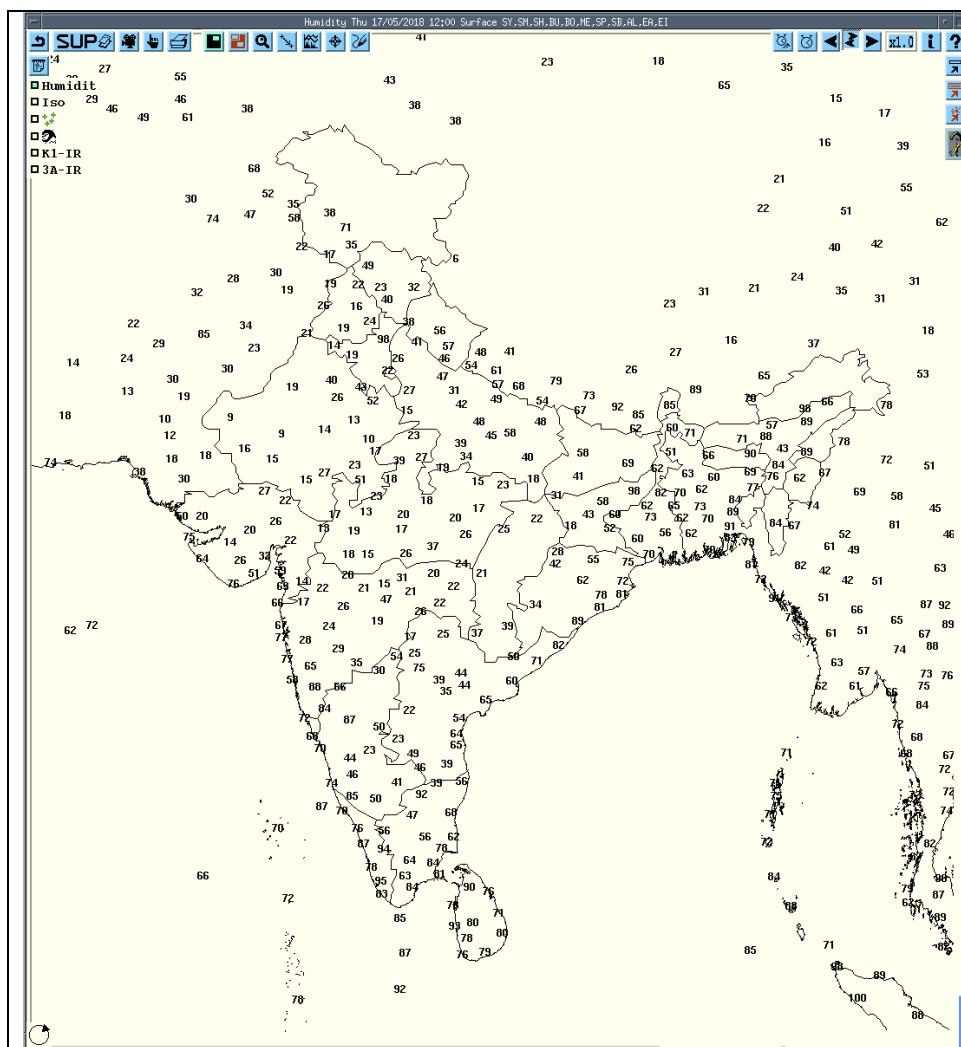
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**MSLP**

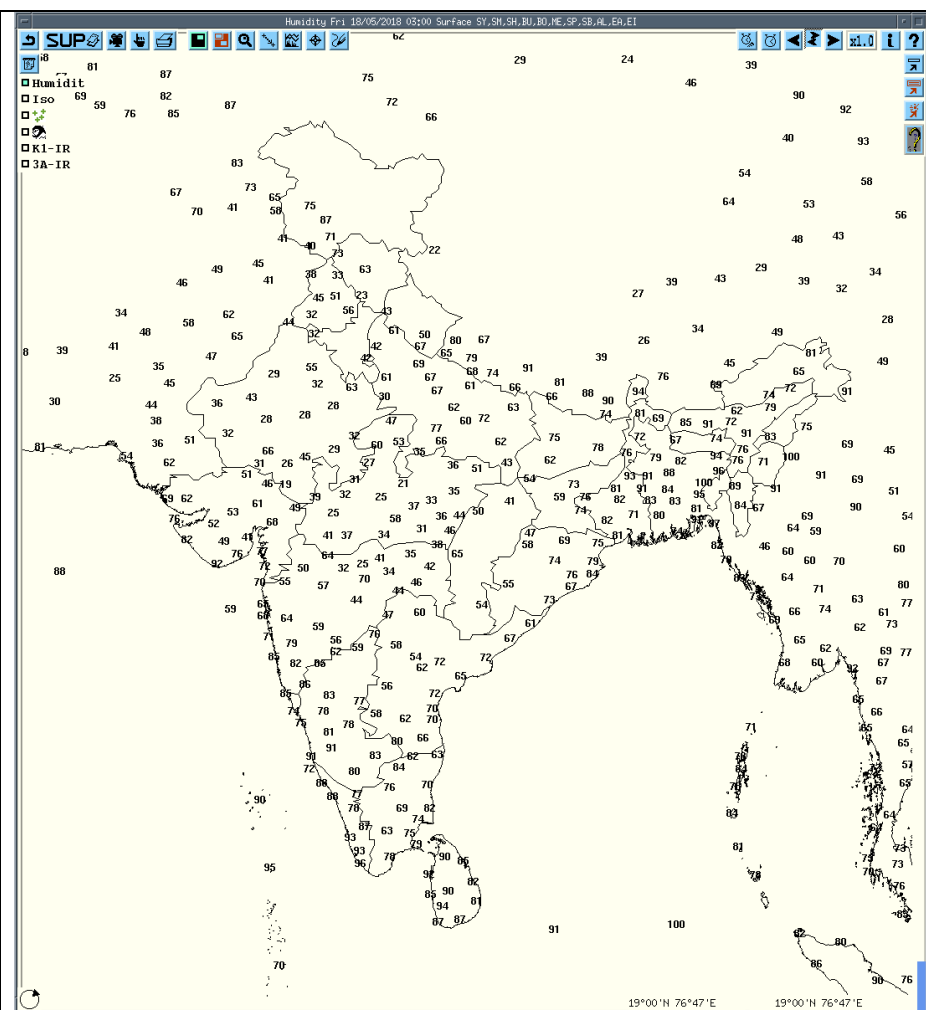
Departure MSLP



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
Visakhapatnam	17/05/18	0900UTC	Isolated CB cells formed with max. reflectivity of 58dBz and height of 13 kms	NW(95 KMS) moving SEly	CB cells formed at 0831 UTC developing	-	Visakhapatnam(AP)
		1200UTC	Multiple CB cells formed with max. reflectivity of 59dBz and height of 14 kms	NW(87 KM to 95 KM) moving SEly	CB cells formed since last observation and developed	Thunderstorm with rain	Visakhapatnam(AP) and Ganjam (Odissa)
		1500UTC	Multiple CB cells formed with max. reflectivity of 54dBz and height of 12 kms	NE (121KM) moving SEly	CB cells formed since last observation and developed	Thunderstorm with rain	Visakhapatnam(AP) and Koraput and Rayagad (Odissa)
		1800UTC	Multiple CB cells formed with max. reflectivity of 54dBz and height of 12 kms	N to NNW (23KM) moving SEly	CB cells formed since last observation and developed	Thunderstorm with rain	Visakhapatnam, Vizianagaram (AP) Koraput Rayagad (Odissa)
	18/05/18	0000UTC	Multiple CB cells formed with max. reflectivity of 61dBz and height of 9 kms	Cb cells are enclosed the radar upto 15 kms and NW (70 to 150 KMS) moving SEly	Since last observation CB cells are developing and matured wellto 61 dBz and dissipated at 2301UTC	Thunderstorm with rain	Visakhapatnam, Vizianagaram, Srikakulam (AP) Rayagad (Odissa)
	17-05-18	0300-2201	NIL	NIL	NOSIG ECHO	NIL	NIL
Kolkata	18-05-18	2201-0300	Multi cell system with maximum reflectivity of 57.5 dBz at 0051 UTC and maximum height of 7.42 Km at 0241 UTC	NNW (232.2km) Moving first in SE-ward and then Eastward direction.	Multi Single cell coming from NNW at 2201 UTC at a distance 232.2 Km from radar. Matured, later transformed into a multi cell system and continuing after 0300 UTC of 18.05.2018	Thunderstorm /Rain	N/A
Patna	18-05-18	Nil	Nil	Nil	Nil	Nil	Nil
Lucknow	18-05-18	Nil	Nil	Nil	Nil	Nil	Nil

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	Associate d severe weather if any	Districts affected
Patiala	18-05-2018	17/05/2018 0300 - 0600	No Significant Echo.	_____	_____		-----
		17/05/2018 0600 -0900	Multiple Cells Dbz = 45.0 Ht. 06 TO 09 kms	NW,NE Sectors. MOVEMENT... ESE -wards.	_____	RA/DZ	Tarantarn, Faridkot, Ludhiana, Patiala, Mansa, Kalsi,Nahan And Its Adjoining Areas.
		17/05/2018 0900- 1200	Multiple Cells 42.5 dbz Ht. 09 TO 11 kms	S, SW Sectors. MOVEMENT... E-wards.	_____	TS/RA/DZ	Moga, Ludhiana,Patiala, Sangrur, Ambala, Pehowa, Fridkot, Bhiwani, Jajhar, And Its Adjoining Areas.
		17/05/2018 1200 - 1500	Multiple Cells 44.0 dbz Ht. 08 TO 10 kms	S, NE Sectors. MOVEMENT... E-wards.	_____	TS/RA/DZ	Bhiwani, Rohtak, Sonapat, Fridkot, Hisar, Uttarkashi, And Its Adjoining Areas.
		17/05/2018 1500 -1800	Multiple Cells 46.0 dbz Ht. 06 TO 07 kms	SW,SE Sectors. MOVEMENT... E-wards.	_____		Bhiwani, Saharanpur, Mussorie, Rohtak, Dehradun, And Its Adjoining Areas.
		17/05/2018 1800 - 2100	Multiple Cells 43.0 dbz Ht. 05 TO 06 kms	SW, SE Sectors. MOVEMENT... E/NE wards.	_____		Fatehabad, Panipat, Nahan, Kathial, Patiala, Moga, And Its Adjoining Areas.
		17/05/2018 2100- 0000	Multiple Cells 45.0 dbz Ht. 05 TO 06 kms	NW, SW, SE Sectors. MOVEMENT.. E/NE-wards.	_____		Sirsa, Ferozpur, Fathebad, Rohtak, Shamli, Ludhiana, And Its Adjoining Areas.
		18/05/2018 0000-0252	Multiple Cells 38.0 dbz Ht. 05 TO 06 kms	NW, SW, SE Sectors. MOVEMENT.. E/NE wards.	_____		Ludhiana, Hoishpur, Kaithal,Fathebad And Its Adjoining Areas.
Agartala	18-05-18	170300 to 180300	SQUALL LINE FORMATION @170500Z OVER South-B'DESH;11kms;40 dBZ	150-200 Kms SSE;25Kmph;NE'ly	Recurved and affected almost all dists of Tripura	+TSRA	All dists of Tripura
			SQUALL LINE FORMATION @180300Z	Over Head	Recurving and Thus affected All Dists of Tripura.	+TSRA	All dists of Tripura .

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
Jaipur	18-05-18	0702 UTC - 0300 UTC	Multiple cell with average height of 6.0 km & maximum reflectivity 59.0 dBZ	Multiple cell develop from 11:12 UTC of 17/05/2018 towards NW,SW,NE,W,N of Jaipur and moved to NE,E Wards at speed 15-20 km/hr	Multiple cell develop from 07:02 UTC on 17/05/2018 towards NW,SW,NE,W,N of Jaipur and reaches maximum reflectivity during 08:42 to 11:12 UTC and continue till 03:00 UTC of 18/05/2018	Dust storm/GUSTY WINDS/Thunderstorm/Hail with Light rain at Isolated places	Ajmer,Bhilwara,Jaipur,Nagar,Bharatpur,Dausa,Tonk,,Sikar,Bikaner,Churu,Jhunjhunu,Alwar Districts.

### 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)
Srinagar	Northwest India	Jammu & Kashmir	Thunderstorm	18-05-18	0745 0755	0750 0800
Pahalgam	Northwest India	Jammu & Kashmir	Thunderstorm	17-05-18	1505	1600
Kupwara	Northwest India	Jammu & Kashmir	Thunderstorm	18-05-18	0720	0740
Banihal	Northwest India	Jammu & Kashmir	Thunderstorm	18-05-18	0650	0710
Bhaderwah	Northwest India	Jammu & Kashmir	Thunderstorm	17-05-18	1630	1745
Alwar	Northwest India	East Rajasthan	Thunderstorm	17-05-18	1700	1735
Pilani	Northwest India	East Rajasthan	Thunderstorm	17/18-05-18	1630 0730	1700 0800
Churu	Northwest India	West Rajasthan	Thunderstorm	17/18-05-18	1345 0605	1520 0640
Ganganagar	Northwest India	West Rajasthan	Thunderstorm	18-05-18	0540	0555
Raipur	Central India	Chhattisgarh	Thunderstorm	17-05-18	1540	1740

**Realised TS/HS/SQ during past 24hours ending at 0300UTC of today (received from RMCs/MCs)**

<b>Name of Station Reporting</b>	<b>Region</b>	<b>State/Sub Division</b>	<b>Weather Event (TS/Hail/Squall)</b>	<b>Date</b>	<b>Time of Commencement (IST)</b>	<b>Time of end (IST)</b>
Jorhat	Northeast India	Assam	Thunderstorm	17-05-18	17/1400	17/1500
N/Lakhimpur	Northeast India	Assam	Thunderstorm	17-05-18	17/1705 17/1730	17/1730 17/1745
Kailasahar	Northeast India	Tripura	Thunderstorm	17-05-18	18/0500	18/0730
Agartala	Northeast India	Tripura	Thunderstorm	17-05-18	18/0400	18/0530
Nizamabad	South India	Telangana	Thunderstorm	17-05-18	1835	1850
Kalingapatnam	South India	Coastal Andhra Pradesh	Thunderstorm	17-05-18	2100	2330
Hyderabad	South India	Telangana	Thunderstorm	17-05-18	1520	1830
Visakhapatnam	South India	Coastal Andhra Pradesh	Thunderstorm	17/18-05-18	2343	0130
Mahabubnagar	South India	Telangana	Thunderstorm	17-05-18	1615	1715
Mangaluru AP	South India	Coastal Karnataka	Thunderstorm	17/18-05-18	1544 1725 2225 0005	1625 1825 2400 0555
Panambur	South India	Coastal Karnataka	Thunderstorm	17/18-05-18	1640 2350	1725 0420
Kalaburgi	South India	North Interior Karnataka	Thunderstorm	17-05-18	1630	1750
Belagavi AP	South India	North Interior Karnataka	Thunderstorm	17-05-18	1350	0030
Gadag		North Interior Karnataka		17/18-05-18	1450 1815	1710 2240
Chitradurga		South Interior Karnataka		17/18-05-18	2120 0000	2400 0020
Chamarajanagar		South Interior Karnataka		17-05-18	1640 1820	1745 1830
Dharmapuri	South India	North interior Tamil Nadu	Thunderstorm	17-05-18	1650	1730
Karaikal	South India	Coastal Tamil Nadu	Thunderstorm	17-05-18	0830	1000
CIAL Kochi	South India	Kerala	Thunderstorm	17-05-18	1545	1920
Karipur A P	South India	Kerala	Thunderstorm	17-05-18	1530 2050	1710 2250
Thiruvananthapuram AP	South India	Kerala	Thunderstorm	17/18-05-18	1840 2030 0020	1940 2215 0620
Thiruvananthapuram C	South India	Kerala	Thunderstorm	17/18-05-18	1340 1610 1900 0145 0425	1450 1625 2025 0315 0720
Minicoy	Lakshadweep	Lakshadweep	Thunderstorm	18-05-18	0350	0420



## 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(upto03UTCof today)

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)

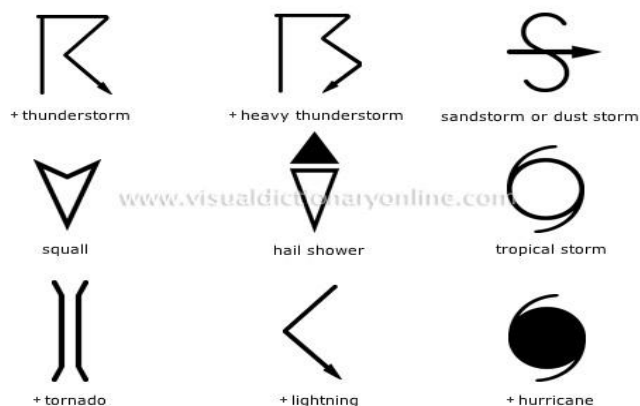
For Radar images of the past 24 hours including mosaic of images:

[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
<b>Weather Symbols</b>	