



# India Meteorological Department

## FDP STORM Bulletin No. 72 (17-05-2018)

### 1. CURRENT SYNOPTIC SITUATION:

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

- ◆ The deep depression over Gulf of Aden moved westwards during past 6 hours with a speed of 11kmph and intensified into a cyclonic storm SAGAR and lay centred at 0830 hours IST of today, the 17th May 2018 over Gulf of Aden near latitude 13.2°N and longitude 48.7°E; about 400 km east northeast of Aden (Yemen) and 560 km west northwest of Socotra Islands. It is very likely to intensify further slightly during next 12 hours. It is very likely to move initially westwards during 12 hours and then west south-westwards during subsequent 24 hours.
- ◆ The Western Disturbance as an upper air cyclonic circulation over north Pakistan and adjoining Afghanistan now lies over Jammu & Kashmir & adjoining north Pakistan at 3.1 km above mean sea level.
- ◆ 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 60°E to the north of lat 30°N.
- ◆ The cyclonic circulation over West Uttar Pradesh & neighbourhood now lies over Central parts of South Uttar Pradesh and adjoining Madhya Pradesh and extends upto 0.9 km above mean sea level.
- ◆ An east west trough runs from the above cyclonic circulation to northeast Bay of Bengal across Bihar & Jharkhand.
- ◆ A north south trough runs from north Haryana to Marathawada with the above cyclonic circulation over South Uttar Pradesh adjoining Madhya Pradesh embedded in that and extends upto 0.9 km above mean sea level.
- ◆ A cyclonic circulation lies over Rajasthan and extends upto 1.5 km above mean sea level.
- ◆ The cyclonic circulation over east Bihar & neighbourhood persists and now seen between 1.5 km & 3.1 km above mean sea level.
- ◆ The north south trough roughly along Long. 92 °E to the north of 24° N between 5.8 km and 7.6 km above mean sea level moved away east wards.
- ◆ The north south wind discontinuity from South Interior Karnataka to North Interior Tamilnadu now runs from south Interior Karnataka to Kerala and extends upto 0.9 km above mean sea level.
- ◆ The east west trough now runs roughly along latitude 12°N at 5.8 km above mean sea level.
- ◆ The cyclonic circulation over Comorin Maldives area & neighbourhood extending upto 3.1 km above mean sea level now lies over southeast Arabian Sea & neighbourhood and extends upto 0.9 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, extreme North Pakistan, Northwest Jammu & Kashmir and over area between Lat 37.0N To 45.0N Long 66.0E to 94.5E in association with WD over the area.

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

Scattered low/medium clouds with embedded isolated intense to very intense convection seen over South Tamilnadu. Broken low/medium clouds with embedded weak to moderate convection seen over West Punjab, West Haryana, Himachal Pradesh, North Uttarakhand, South Uttar Pradesh, South Kerala, rest Tamilnadu, South Interior Karnataka, Lakshadweep and Nicobar Islands. Scattered low/medium clouds with embedded weak convection seen over Northeast states. Scattered low/medium clouds seen over North Rajasthan, Madhya Pradesh and South Maharashtra. Isolated low/medium clouds seen over Chhattisgarh, Odisha, Jharkhand, Sikkim and North West Bengal.

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

Scattered low/medium clouds with embedded moderate to intense convection seen over Southeast Arabian Sea South of Lat 10.0N Comorin & Gulf of Mannar.

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

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

#### **Past Weather:**

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

Moderate to Intense convection was observed over J & K Himachal Pradesh, Uttarakhand, Punjab, Haryana, Rajasthan, West Madhya Pradesh, North Chhattisgarh, Odisha, East Bihar, Jharkhand, Gangetic West Bengal, Sub-Himalayan West Bengal, Telangana, East Karnataka Konkan & Goa Telangana Rayalaseema South interior Karnataka Kerala Tamilnadu Lakshadweep Andaman & Nicobar Islands and weak to moderate convection observed over east Madhya Pradesh north east states north west Uttar Pradesh.

##### **OLR:**

Upto 230  $\text{wm}^{-2}$  observed over J&K North Himachal Pradesh North Uttarakhand Punjab Sub-Himalayan West Bengal 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** 30-40 knots is observed over North India, 5-20 knots over Central India, North-East India and 10-15 knots over south peninsula India.

**Positive shear tendency** is observed over east Punjab Haryana Delhi north west Rajasthan North Gujarat .

**Positive Vorticity (850 hPa)** more than 50 ( $\times 10^{-5}/\text{s}$ ) is observed over Gujarat East Maharashtra Chhattisgarh north Madhya Pradesh sub Himalayan west Bengal north Uttar Pradesh south Uttrakhand.

**Positive Low Level Convergence** is observed over Maharashtra adjoining Madhya Pradesh.

##### **Precipitation:**

Rainfall up to 27.8-139.8 mm was observed over north-west J&K Kerala South Tamilnadu Arunachal Pradesh east Meghalaya south Madhya Maharashtra south Karnataka.

Rainfall up to 0.1-13.9 mm was observed over Punjab north Haryana north west Uttar Pradesh East Bihar north Chhattisgarh Gangetic West Bengal Sub-Himalayan West Bengal Sikkim north-east States rest Kerala rest Tamilnadu Lakshadweep Andaman & Nicobar Islands.

### DWR and RAPID Observations:

Isolated/multiple moderate echoes (dBZ around 45-50 and height>10km) was observed on DWR Hyderabad, Nagpur, Goa and Thiruvananthapuram at around 1510IST and Light echoes at DWR Deli, Jaipur, Chennai, Agartala, Gopalpur, Paradeep and Vishakhapatnam.

RAPID RGB Satellite imagery at 1430 IST indicated significant convection over Jammu & Kashmir, Himachal Pradesh, Punjab, Northeast Rajasthan, Southeast Madhya Pradesh, Central Chhattisgarh, Southeast Jharkhand, Central Odisha, Telangana, North Interior Karnataka, South Kerala 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 category for next 2 days in Delhi.

<b>Delhi – SAFAR analysis &amp; Forecast</b>	17.05.2018	18.05.2018
PM10 (micro-g/m <sup>3</sup> )	244	220
PM2.5 (micro-g/m <sup>3</sup> )	70	63

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

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

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

**Low level Cycirs, Troughs: 12UTC of Day 1-2:** 850/925 hPa Deep Depression southwest Arabian Sea tracking west-northwest towards gulf of Aden likely to Cyclonic Storm subsequently

**00UTC of Day 1-4:** A CYCIR at 925/850hPa off coast Kerala over southeast AS moving towards west with intensification of the system

**00UTC of Day 1-5:** 850 hPa NE-SW trough from east U.P. to N Karnataka across M.P., Maharashtra.

**00UTC of Day 1-3:** 850 hPa trough over east UP to Nagaland across Bihar, WB and Bangladesh.

**Confluence & Wind Discontinuity Regions: 12 UTC of Day 0, 2-3:** 925 hPa N-S discontinuity over Raipur to Southern Peninsular India

**Synoptic Systems: 00 UTC of Day 1-4:** Western disturbance as a trough over J&K

#### **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, East MP,

Day1: Gangetic WB, Jharkhand, Jammu Kashmir, East Rajasthan, West MP, SI Karnataka,

Day2: Assam Meghalaya, NE NMMT, Haryana, Chandigarh, Delhi, Punjab, Jammu Kashmir, Odisha, Madhya Maharashtra, Marathwada, Chhattisgarh, Telangana,

Day3: Assam Meghalaya, NE NMMT, Jharkhand, Punjab, Madhya Maharashtra, Chhattisgarh, TN Puducherry, NI Karnataka,

Day4: Assam Meghalaya, NE NMMT, Jharkhand, Madhya Maharashtra, Marathwada, NI Karnataka,

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

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

Day0: Assam Meghalaya, Jharkhand, Bihar, Himachal Pradesh, Jammu Kashmir,

Day1: Assam Meghalaya, Gangetic WB, Uttarakhand,

Day2: Assam Meghalaya, West UP, Haryana, Chandigarh, Delhi, Punjab, TN Puducherry,

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

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Jharkhand, Bihar, Uttarakhand, TN Puducherry,

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

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

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

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

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

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

Day1: Arunachal Pradesh, Sub Himalayan WB, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, East Rajasthan, Odisha, Konkan Goa, Madhya Maharashtra, Chhattisgarh, Coastal AP, Telangana, NI Karnataka, SI Karnataka,

Day2: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, Odisha, Madhya Maharashtra, Chhattisgarh, Coastal AP, Telangana, Rayalseema, TN Puducherry, NI Karnataka, SI Karnataka,

Day3: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, SI Karnataka,

Day4: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Coastal AP, Telangana, Rayalseema, TN Puducherry, SI Karnataka,

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

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

Day0: Arunachal Pradesh, Sub Himalayan WB, Jharkhand, Uttarakhand, Himachal Pradesh, Odisha, Gujarat Region, Konkan Goa, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka,

Day1: Arunachal Pradesh, Sub Himalayan WB, West UP, Uttarakhand, Jammu Kashmir, Odisha, Konkan Goa, Madhya Maharashtra, Chhattisgarh, Coastal AP, Telangana, Rayalseema, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka,

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

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

Day4: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Gangetic WB, East UP, Uttarakhand, Jammu Kashmir, Odisha, Coastal AP, Telangana, Rayalseema, TN Puducherry, 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, Andaman Nicobar, TN Puducherry, Kerala,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Jammu Kashmir, Kerala,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Jammu Kashmir, SI Karnataka,

Day4: Assam Meghalaya, NE NMMT, Jammu Kashmir,

Day5: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Jammu Kashmir,

## 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 west 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 North East Bay of Bengal across Bihar and Jharkhand. The forecast shows it will persist till day3 with slight North Eastward shift. The analysis shows a North- South Trough extends from North Haryana to Marathwada in lower Troposphere (925hPa). Analysis shows another cyclonic circulation over North West Rajasthan and adjoining area. The forecast shows the circulation will persist till day 1. A cyclonic circulation is seen over Bihar 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 South Interior Karnataka to Kerala. The forecast shows it will become less marked 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 ( $>12 \times 10^{-1}/s$ )}**: 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, Haryana, west Uttar Pradesh from day 1; parts of Bihar, GWB, Jharkhand and Orissa 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, 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 3 days; on day 1 over parts of South West and East Rajasthan, Punjab and Uttarakhand; over some parts of Tripura and adjoining areas on day 3; Significant zone lies over south west Rajasthan, Gujarat, coastal areas along the east coast and west coast, GWB, Bihar, Jharkhand, Orissa, coastal Andhra Pradesh, Telangana, East Uttar Pradesh, coastal Maharashtra, South Madhya Maharashtra, Vidarbha, Chhattisgarh and Interior Karnataka.

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

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

**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 central parts of Madhya Pradesh and North East Rajasthan and South Haryana and adjoining areas on day 1; and is seen over south peninsular India, along east coast and west coast, eastern part of the country and NE states except over North West India and central parts of Madhya Pradesh on day 2 and 3; The significant zone lies over parts of GWB, Jharkhand, Bihar, Orissa, Andhra Pradesh, South Chhattisgarh and Telangana.

**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 during next 3 days; over parts of South West Rajasthan and Gujarat on day 1; over parts of East Uttar Pradesh and West Uttar Pradesh on day 2 and 3; maximum value of the index is seen over parts of GWB, Orissa, coastal Andhra Pradesh, coastal Tamil Nadu, coastal areas along East and northern parts of West Coast, coastal Maharashtra, Including Mumbai, coastal and Interior Karnataka, Konkan and Goa, Bihar, Jharkhand, SHWB and Telangana.

**CIN (50-150)**: Over sub-divisions along east and west coast of India, extreme south over Kerala and south 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, Haryana and East Rajasthan 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, J&K, Punjab, Haryana, Himachal Pradesh, and North West Rajasthan.



## **5. Rainfall Activity:**

40-70 mm Rainfall: over some parts of Arunachal Pradesh and adjoining areas on day 1; over parts of Meghalaya, Tripura and adjoining areas on day 3.

10-40 mm Rainfall: over parts of J&K, Foothills of Himalayas, Kerala, Karnataka, Andhra Pradesh, Tamil Nadu, Orissa, SHWB, Sikkim and NE states during next 3 days; over parts of South Coastal Maharashtra, Konkan and Goa on day 1.

Up to 10 mm rainfall: Over parts of J&K, Himachal Pradesh, Punjab, Uttar 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, Madhya Maharashtra, Marathwada, Vidarbha and Andhra Pradesh during next 3 days; on day 1 over parts of North Haryana and North West Rajasthan.

## **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, Punjab, Haryana, Himachal Pradesh, Kerala, Karnataka, Tamil Nadu, Sikkim, GWB, Jharkhand, SHWB, Orissa, NE states, South Madhya Maharashtra, Telangana, Andhra Pradesh and Vidarbha; On day 2 over parts of J&K, Himachal Pradesh, south Madhya Maharashtra, Marathwada and NE states; On day 3 mostly over parts of J&K, Himachal Pradesh, Uttarakhand, some parts of North Punjab, Assam, Meghalaya, Tripura and adjoining areas.

### **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, East Uttar Pradesh, Bihar, Jharkhand, Sikkim and NE states during next 3 days; below threshold value of the index is also seen over parts of Orissa and south Chhattisgarh 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 NE states, Interior Karnataka, Telangana, south Chhattisgarh, Kerala, Tamil Nadu, Andhra Pradesh, Orissa, Bihar, Jharkhand, GWB and Foothills of Himalaya.

**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, Vidarbha and south Chhattisgarh during next 3 days; Some parts of South West Rajasthan on day 1; over some parts Assam, Tripura and adjoining areas on day 2 and over parts of East Uttar Pradesh from day2; over most of the NE states on day 3; Maximum value of the index is seen over the parts of Bihar, Jharkhand, Orissa, GWB, coastal Andhra Pradesh, coastal Tamil Nadu, Kerala, Karnataka, Telangana, coastal Maharashtra, Gujarat, Konkan and Goa, South Madhya Maharashtra and Marathwada.

**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 Madhya Pradesh, Vidarbha and North Chhattisgarh, North Madhya Maharashtra and Marathwada, 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, East Uttar Pradesh, parts of Vidarbha and Madhya Pradesh, Bihar, Jharkhand, Chhattisgarh, Orissa, GWB, Andhra Pradesh and adjoining areas during next 3 days; maximum value of the index is also seen over parts of Punjab, J&K and North West Rajasthan on day 1.

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

Above 130 mm Rainfall: over some parts of Mizoram and adjoining Tripura on day 2.

70-130 mm Rainfall: over parts of Tripura during next 3 days; over parts of Kerala on day 1; over parts of Mizoram on day 2.

40- 70 mm Rainfall: over parts of Tripura and adjoining areas during next 3 days; over parts of Mizoram on day 1 and 2; over parts of Kerala, South Tamil Nadu North Interior Karnataka and South Madhya Maharashtra on day 1; over parts of J&K, Assam, Meghalaya, Nagaland and adjoining areas on day 3.

10- 40 mm Rainfall: over parts of J&K, Foothills of Himalaya, Kerala, Tamil Nadu, Karnataka, Sikkim, GWB, and NE states during all 3 days; over parts of Jharkhand, SHWB, Orissa, Andhra Pradesh, Konkan and Goa, South Coastal Maharashtra and South Madhya 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, North West Rajasthan, East Pradesh, coastal Maharashtra, South Madhya Maharashtra, Marathwada and Vidarbha on day 1.

### **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 almost entire Indian region with maximum probability over coastal Odisha and adjoining Gangetic West Bengal on day 1. On day 2, there is not much change, except a decrease in probability of thunderstorm initiation over North and Northwest India. 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 on day 2. The 850-200 hPa wind shear is very high over extreme North India (Jammu and Kashmir, Punjab, Himachal Pradesh) on day 1 and day 2.

o Synoptic analysis indicates presently there is a cyclonic circulation lies at 3.1 km above mean sea level over North Pakistan and adjoining west Jammu and Kashmir. A fresh Western Disturbance is approaching and is likely to affect Indian region. There is a cyclonic circulation over central parts of South Uttar Pradesh which is embedded in two troughs- (1) a north south trough from North Haryana to Marathwada and (2) east-west trough upto Northeast Bay of Bengal. There is also a cyclonic circulation over Rajasthan in the lower levels. Under the influence of these weather systems, thunderstorms accompanied with severe weather such as squall/hail is expected over Northwest India for the next three days. There is also a cyclonic circulation over Bihar in the low to mid levels. Heaviest rainfall and maximum weather throughout the country is expected over east and North east India during the next 1-3 days.

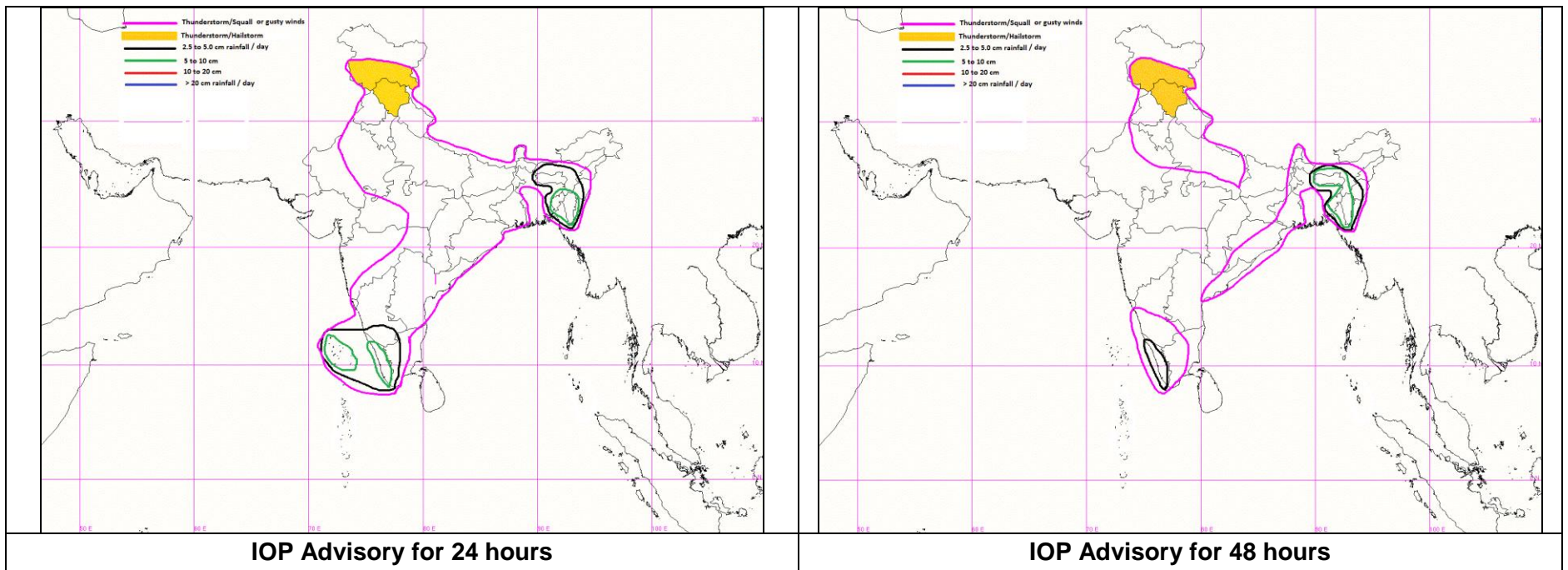
o Over South India, in association with the two cyclonic circulations over Southeast Arabian Sea and another over Southwest Bay, thunderstorm activity with isolated heavy rainfall is expected over south peninsula during next 2 days.

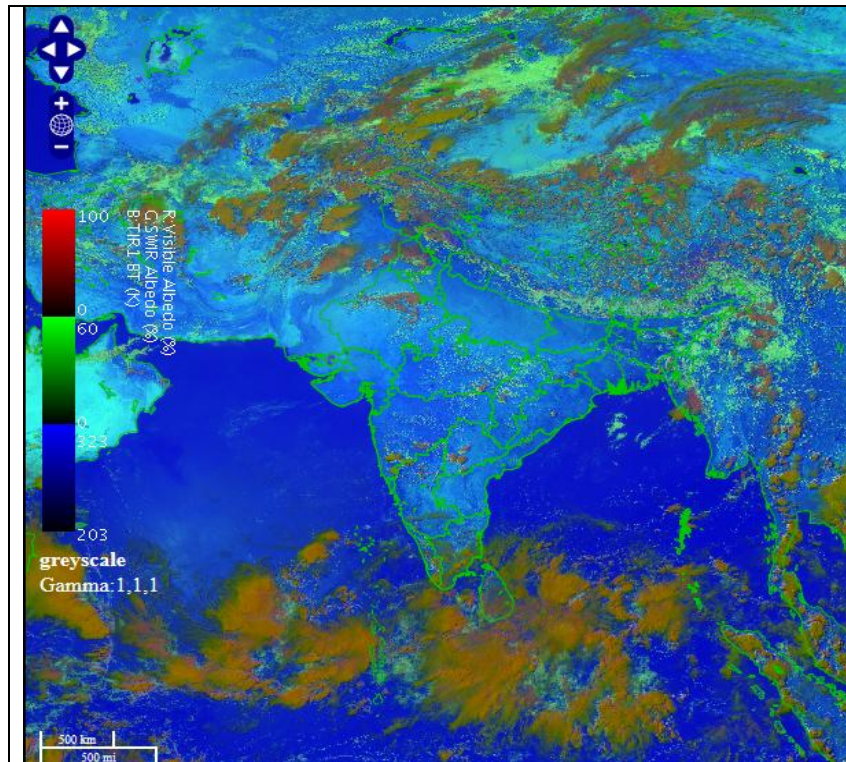


**IOP Area for Day-1 & Day-2:**

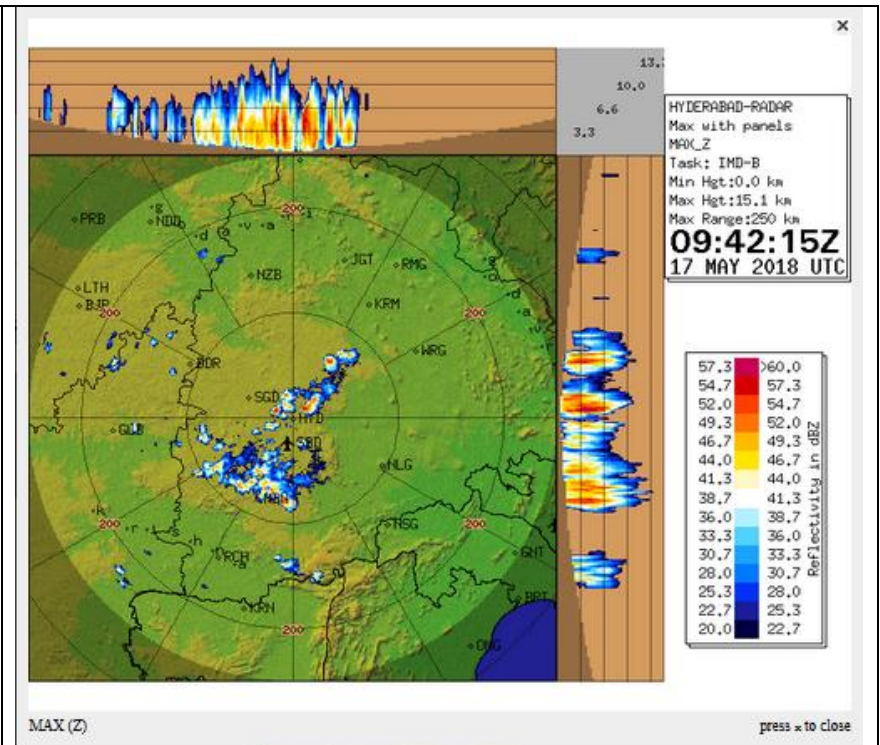
<b>24 hour Advisory for IOP:</b>	<b>48 hour Advisory for IOP:</b>
<p><b>Significant Rainfall:</b> Interior Tamil Nadu, South Interior Karnataka, Kerala, Lakshadweep West Assam and Meghalaya, Manipur, Mizoram, Tripura</p> <p><b>Thunderstorm with squall or gusty winds:</b> Tamil Nadu, Kerala, Lakshadweep,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

## Graphical Presentation of Potential Areas for Severe Weather:



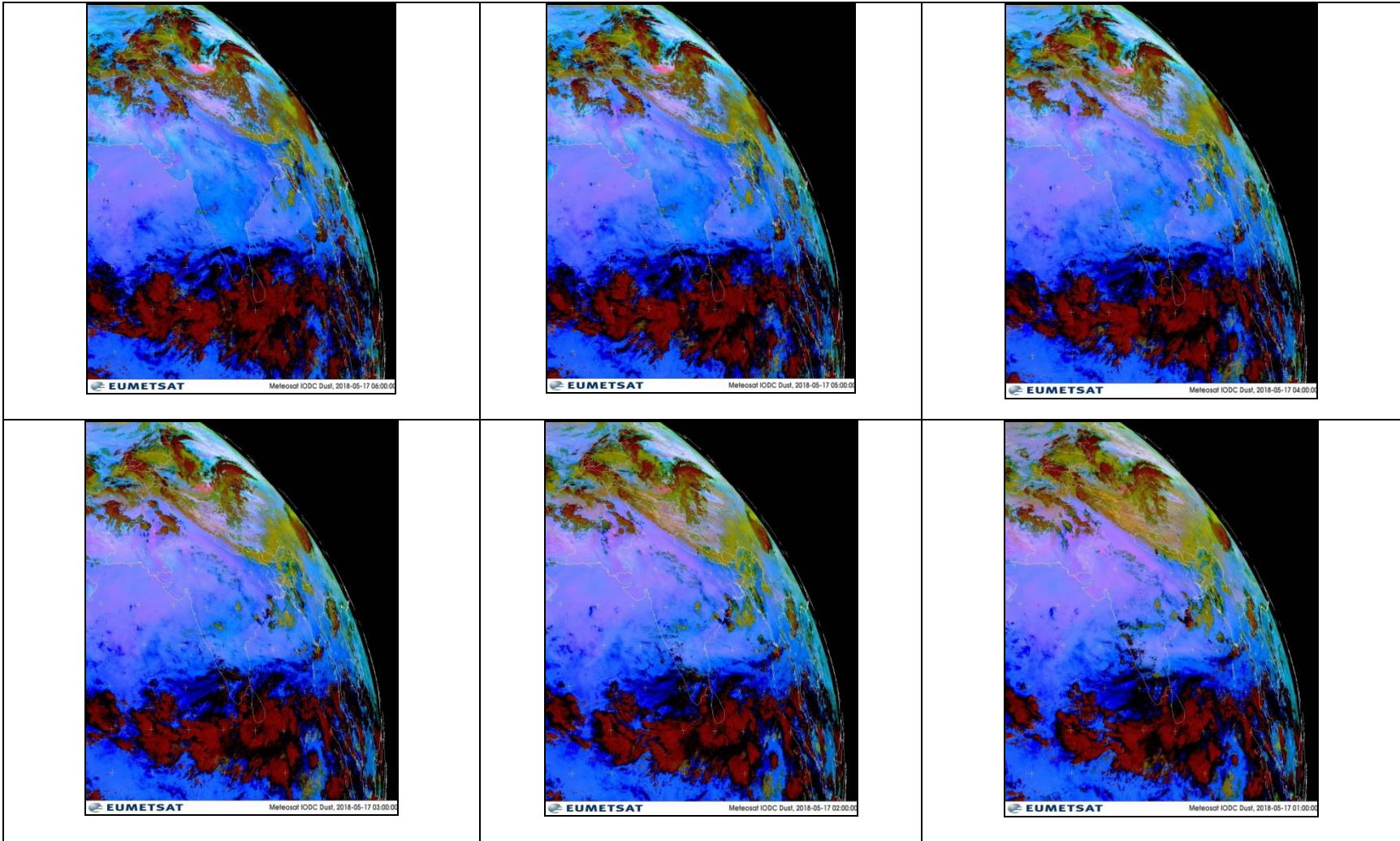


RAPID RGB Imagery at 1430 IST of the Day

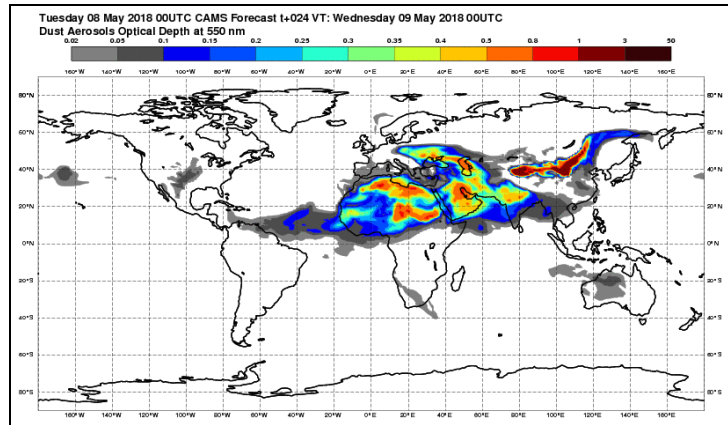


DWR Hyderabad Reflectivity Image at 1512 IST

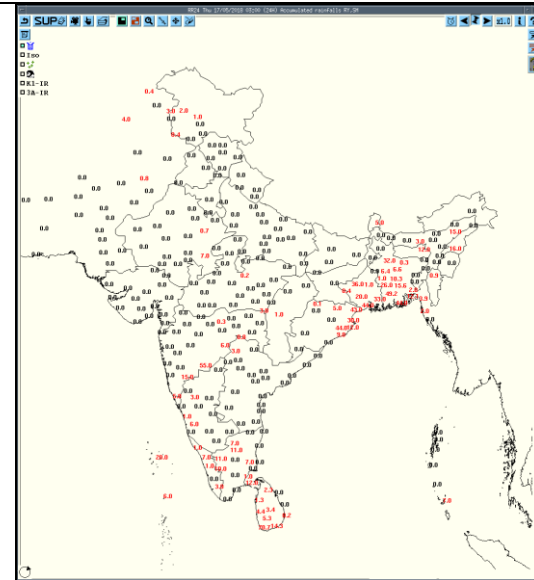




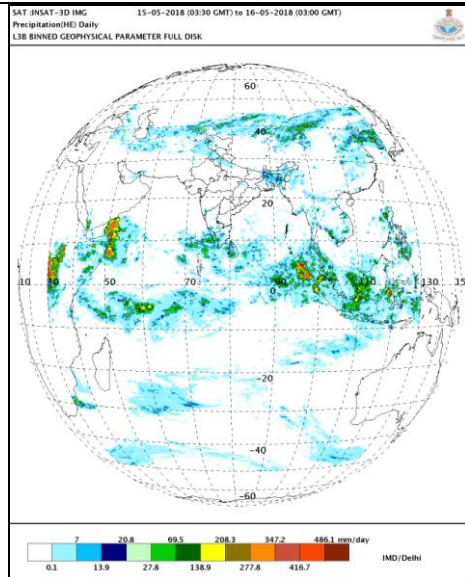
Observed Satellite Dust Images of today



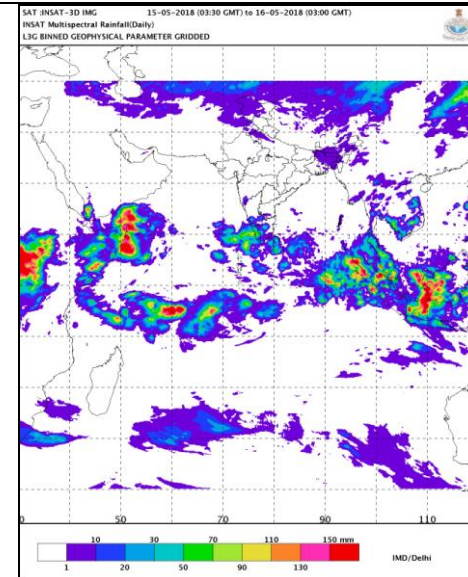
Dust Forecast



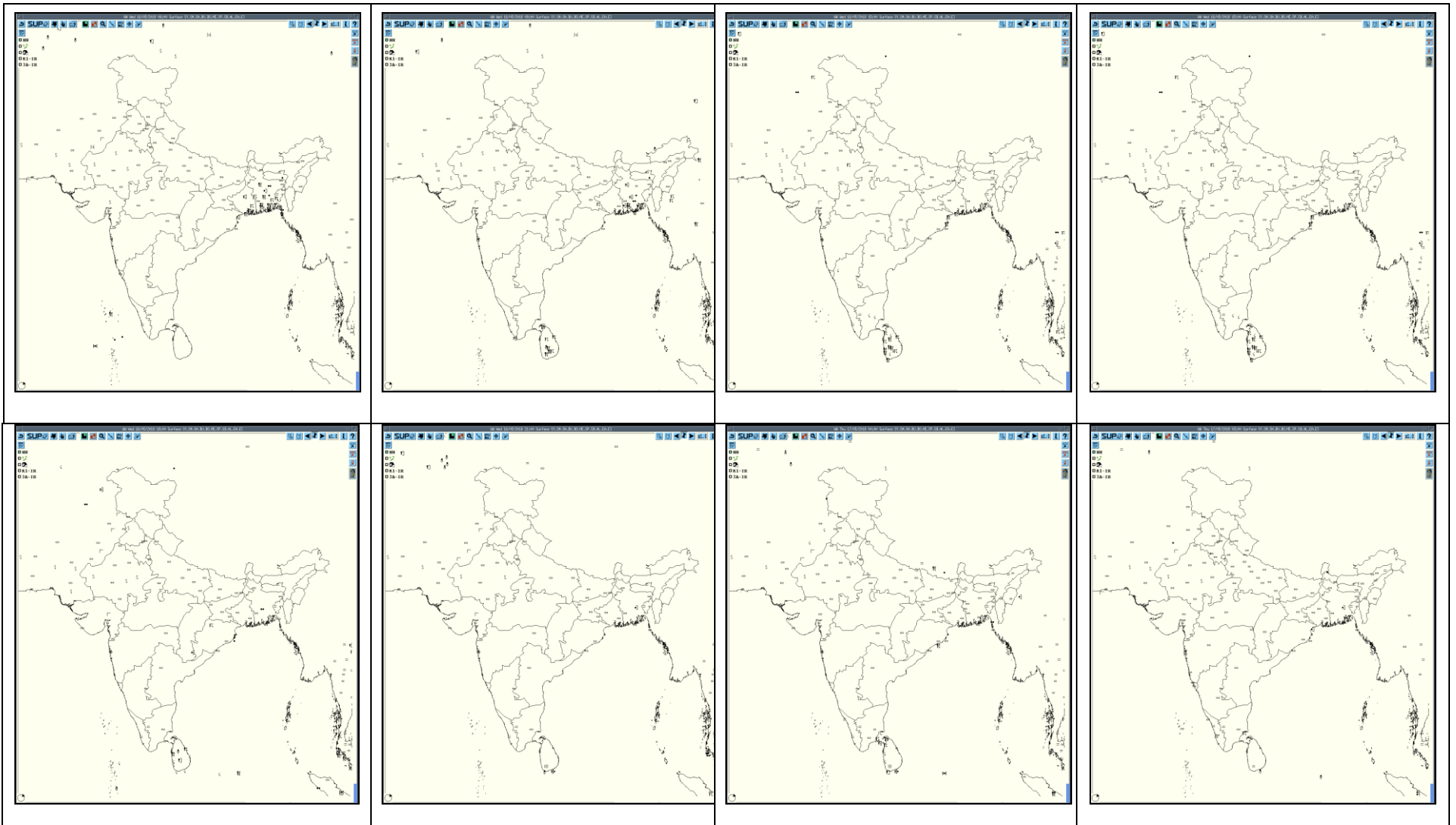
Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today



IMR

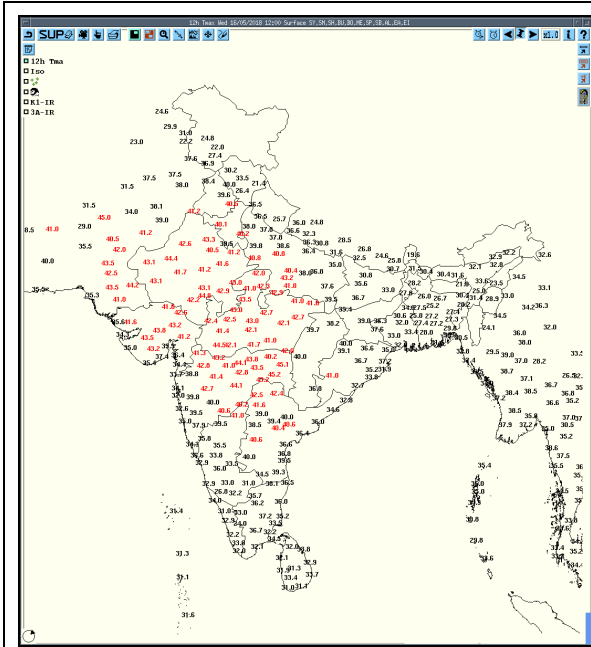


HEM

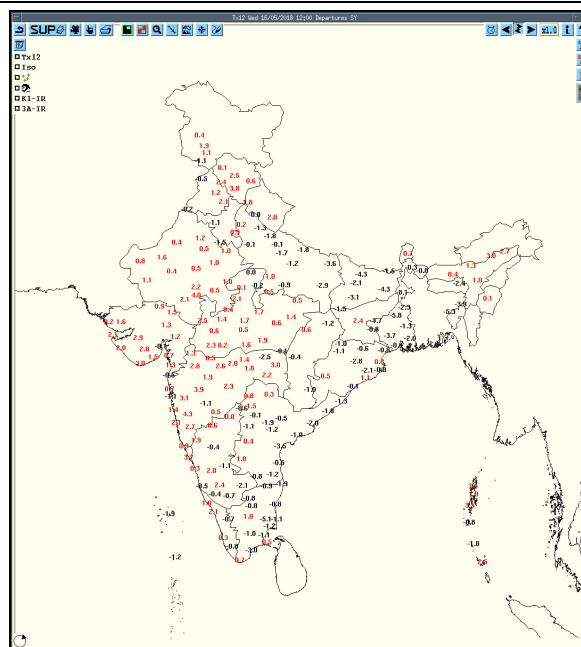


3hourly Past weather at 06, 09, 12, 15, 18, 21 UTC of yesterday and 00 & 03 hrs UTC of today

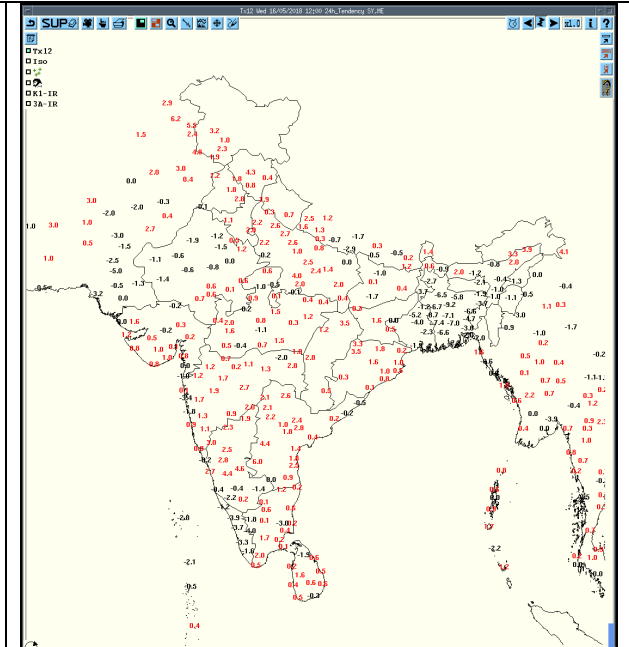




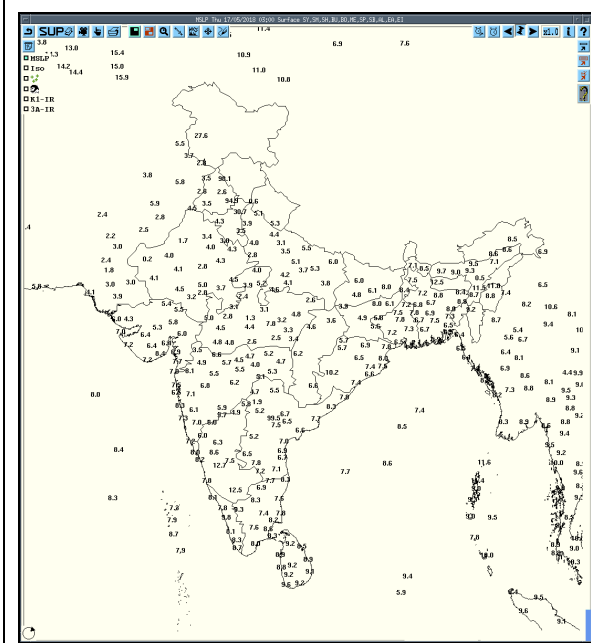
**Tmax**



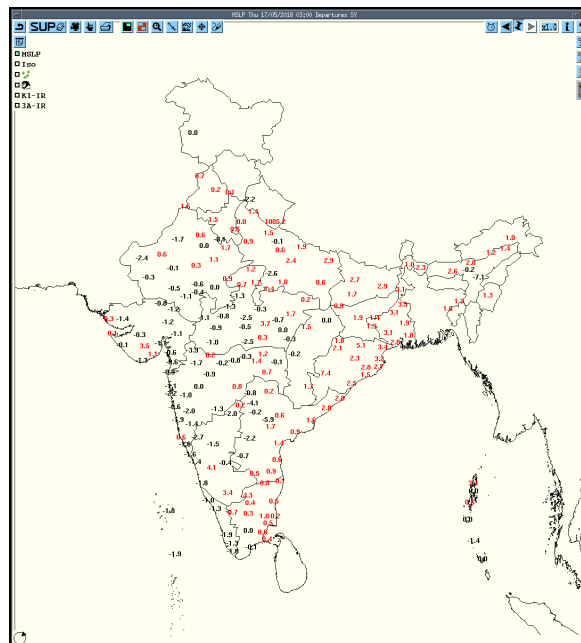
**Departure Tmax**



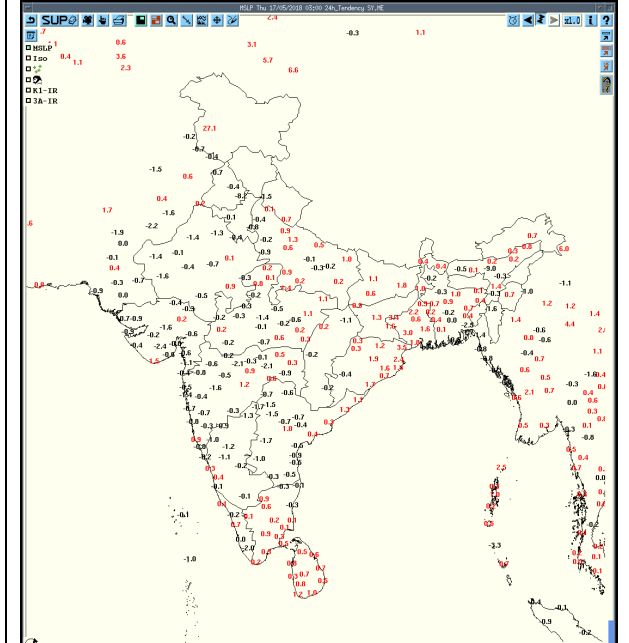
**Tendency Tmax**



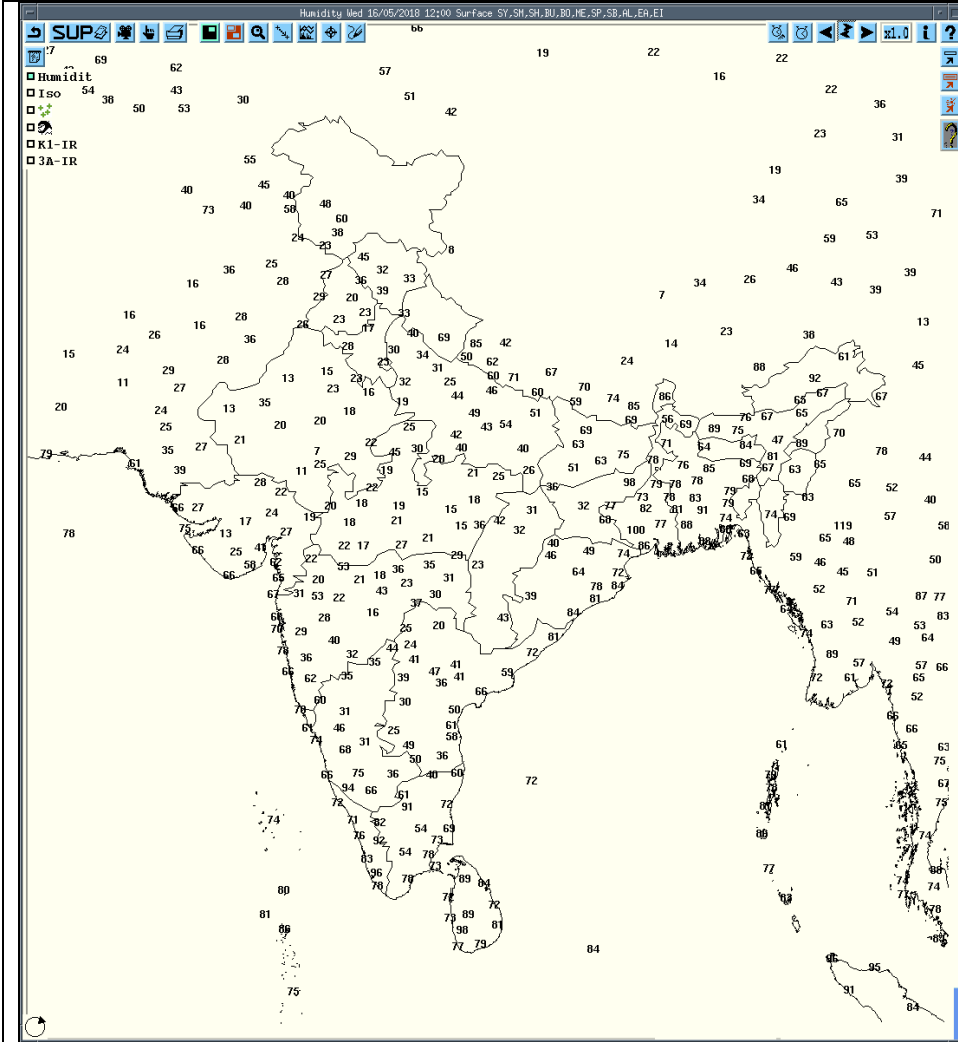
**MSLP**



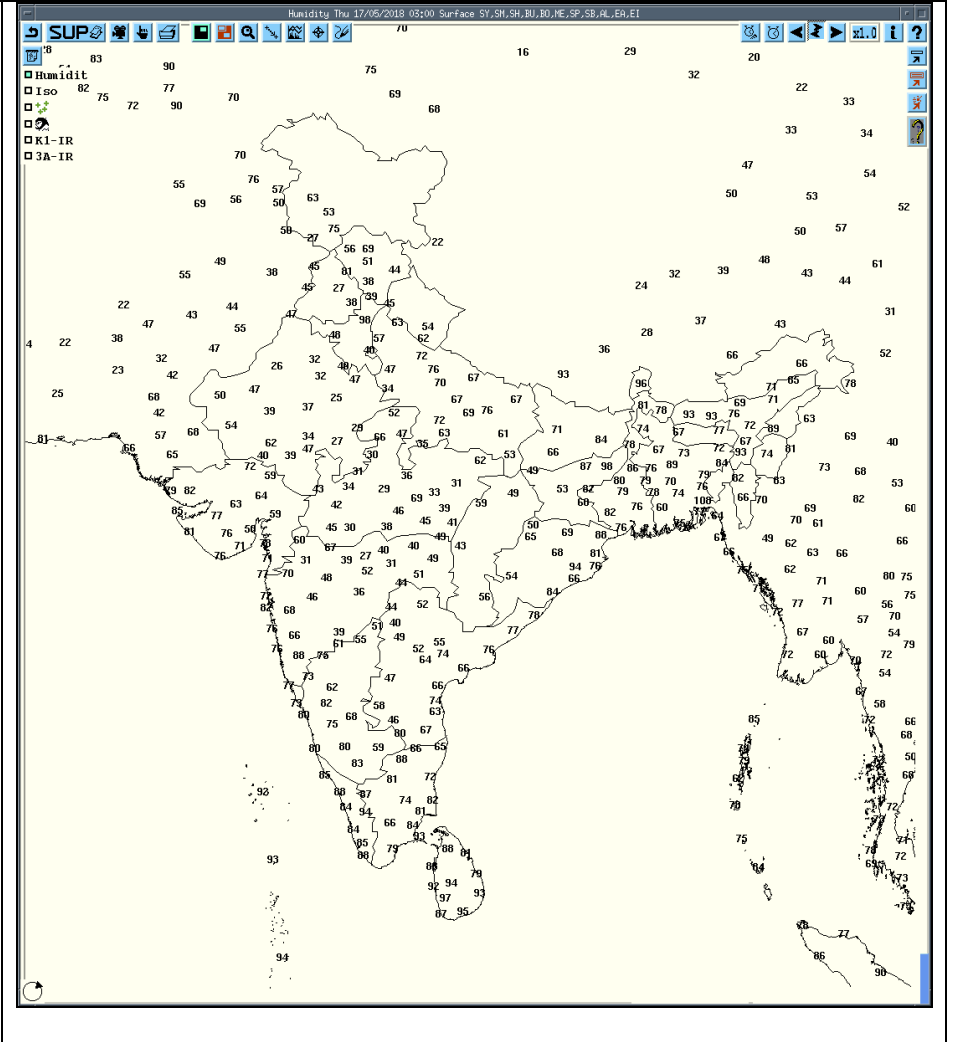
**Departure MSLP**



**Tendency MSLP**



RH at 1200UTC yesterday



RH at 0300UTC today

**Past 24 hours DWR Report:**

<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>Associate d severe weather if any</b>	<b>Districts affected</b>
Visakhapatnam	16/05/18	0900UTC	Isolated single cells formed with max. reflectivity of 60dBz and height of 17 kms	NW(93, 136 KMS) moving SEly	CB cells formed at 0741 UTC developing and matured well at 0841UTC.		Koraput(Orissa)
	16/05/18	1200UTC	Multiple cells with max. reflectivity of 62dBz and height of 18 kms	NW(114, 150, 194 KMS) moving SEly	Since last observation CB cells are developing and matured well at 1101utc	Thunderstorm with rain	Vizianagaram, Visakhapatnam Dist. (AP) Ganjam, Rayaguda, Koraput Dist. (ORISSA)
	16/05/18	1500UTC	Multiple cells with max. reflectivity of 66dBz and height of 18 kms	W(55 KMS) NW(190 to 250 KMS) moving SEly	Since last observation CB cells are matured well to 66dBz at 1221 utc and start dissipating at 1241UTC.	Thunderstorm with rain	Visakhapatnam Dist. (AP)  Ganjam, Gajapati dist. (ORISSA)
	17/05/18	0000UTC	Multiple cells with maximum reflectivity of 61dBz with height of 18 kms	NE(240 KMS) moving Sly	CB cells formed in Bay of Bengal, developed and matured well at 2151UTC and dissipating.		Bay of Bengal
	17/05/18	0300UTC	Multiple cb cells formed over bay of Bengal with max reflectivity 55dbz and height 14kms.	168kms (EAST) at 00:01UTC and moving Southerly.	Dissipated at 02:21UTC.	-	Bay of Bengal.
	Agartala	17/05/18	Nil	Nil	Nil	Nil	Nil
Lucknow	17/05/18	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	Associated severe weather if any	Districts affected
Jaipur	17/05/18	09:42 UTC TO 16:32 UTC 16/05/18	Multiple cell with average height of 6.5 km & maximum reflectivity 60.0 dBZ	Multiple cell develop from 09:42 UTC of 16/05/2018 towards W,SW,NW of Jaipur and moved to SE,E Wards at speed 20-24 km/hr	Multiple cell develop from 09:42 UTC on 16/05/2018 towards W,SW,NW of Jaipur and reaches maximum reflectivity during 10:12 to 14:32 UTC and die 16:32 UTC of 16/05/2018	Dust storm/GUSTY WINDS/Thunderstorm with Light rain at Isolated places	Ajmer, Bhilwara, Jaipur, Nagaur, Kota, Bharatpur, Dausa, Tonk, Sawai madhopur, Sikar, Bundi, Baran, Jhalawar Districts.
Patiala	17/05/18	16/05/2018 0300 - 0600	No Significant Echo.	_____	_____		-----
		16/05/2018 0600 -0900	No Significant Echo.		-----		-----
		16/05/2018 0900- 1200	Multiple Z: 38.5 dBZ Ht. 08 TO 10 Kms	N AND SE Sectors. MOVEMENT... E-wards.	_____	RA/DZ	MANALI AND ITS ADJOINING AREAS.
		16/05/2018 1200 - 2400	No Significant Echo.		_____		-----
Patna	16/05/18	0300-2120	NIL	N/A	N/A	N/A	N/A
		2122-2222	<b>Isolated Single Cell</b> Maximum Reflectivity: 40 dBZ Echo Top: 7.5 KM	Range: 92 KM from DWR Patna in WSW direction Movement: towards SOUTH-EASTERLY	N/A	N/A	BUXAR, BHOJPUR, ROHTAS, AURANGABAD
	17/05/18	2222-0300	<b>NIL</b>	N/A	N/A	N/A	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)
Srinagar	Northwest India	Jammu & Kashmir	Thunderstorm	16/17-05-18	1850 0615	2010 0630
Pahalgam	Northwest India	Jammu & Kashmir	Thunderstorm	16/17-05-18	1525	1840
Kupwara	Northwest India	Jammu & Kashmir	Thunderstorm	17-05-18	0405	0430
Bhaderwah	Northwest India	Jammu & Kashmir	Thunderstorm	16-05-18	1630	1700
Jaipur AP	Northwest India	East Rajasthan	Thunderstorm	16-05-18	1910	2120
Jaipur AP	Northwest India	East Rajasthan	Duststorm ((Dir-NNW, Max. Speed-55kmph)	16-05-18	1920	2051
Kota AP	Northwest India	East Rajasthan	Thunderstorm	16-05-18	1630	1715
Kota AP	Northwest India	East Rajasthan	Duststorm((Dir-NW, Max. Speed-40kmph)	16-05-18	1630	1715
Alipore	East India	GWB	Thunderstorm	16-05-18	1015 1900	11255 12125
DumDum	East India	GWB	Thunderstorm	16-05-18	1020	1205
Canning	East India	GWB	Thunderstorm	16-05-18	1140	1230
Diamond Harbour	East India	GWB	Thunderstorm	16-05-18	1030 1738	1240 2215
Haldia	East India	GWB	Thunderstorm	16-05-18	1035 1400 1740	1210 1436 2140
Digha	East India	GWB	Thunderstorm	16-05-18	1115 2130	1145 2130
Asansol	East India	GWB	Thunderstorm	16-05-18	1500	1640
Bankura	East India	GWB	Thunderstorm	16-05-18	1519	1735
Sriniketan	East India	GWB	Thunderstorm	16-05-18	1025	1035
Jamshedpur	East India	Jharkhand	Thunderstorm	16-05-18	1420	1650
Bhubaneswar	East India	Odisha	Thunderstorm	16/17-05-18	2115 0300	2230 0530
Balasore	East India	Odisha	Thunderstorm	16-05-18	1745 0335	2115 0400
Jharsuguda	East India	Odisha	Thunderstorm	16-05-18	0937 2240	0940 2340
Chandbali	East India	Odisha	Thunderstorm	16-05-18	1935	2110
Paradeep	East India	Odisha	Thunderstorm	16-05-18	2100	2335
Puri	East India	Odisha	Thunderstorm	16-05-18	0435	0540
Keonjhar	East India	Odisha	Thunderstorm	16-05-18	0845 1835	0900 2110
Port Blair	A and N Islands	A and N Islands	Thunderstorm	16-05-18	1435	1435
Gondia	Central India	Vidarbha	Thunderstorm	16-05-18	1830	1900
Sagar	Central India	Madhya Pradesh	Thunderstorm	16-05-18	1800	1830
Raipur	Central India	Chhattisgarh	Thunderstorm	16-05-18	1700	1800
Bilaspur	Central India	Chhattisgarh	Thunderstorm	16-05-18	1540	1650

**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>
Sholapur	West India	Madhya Maharashtra	Thunderstorm	16-05-18	1500	1620
Panaji	West India	Goa	Thunderstorm	16-05-18	1830	1845
Jorhat	Northeast India	Assam	Thunderstorm	16-05-18	16/1900	16/2015
Barapani	Northeast India	Meghalaya	Thunderstorm	16-05-18	16/1235	16/1410
Ramgundam	South India	Telangana	Thunderstorm	16-05-18	1740	1800
Shirali	South India	Coastal Karnataka	Thunderstorm	16-05-18	1300	1330
Hannover	South India	Coastal Karnataka	Thunderstorm	16-05-18	1800	1815
Kalaburgi	South India	North Interior Karnataka	Thunderstorm	16-05-18	1630	1730
Belgravia AP	South India	North Interior Karnataka	Thunderstorm	16-05-18	1500	1920
Gadag	South India	North Interior Karnataka	Thunderstorm	16-05-18	1645	1845
Chamarajanagara	South India	North Interior Karnataka	Thunderstorm	16-05-18	1440 1610	1530 1640
Madikeri	South India	South Interior Karnataka	Thunderstorm	16-05-18	1300	1330
Salem	South India	North interior Tamil Nadu	Thunderstorm	16-05-18	1550	1615
Pamban	South India	Coastal Tamil Nadu	Thunderstorm	16-05-18	1415	1615
Karaikal	South India	Coastal Tamil Nadu	Thunderstorm	17-05-18	0745	0830
Kannur	South India	Kerala	Thunderstorm	16-05-18	1800	1840
Karipur AP	South India	Kerala	Thunderstorm	16-05-18	1430	1520
Thiruvananthapuram AP	South India	Kerala	Thunderstorm	16-05-18	1400	1530
Thiruvananthapuram C	South India	Kerala	Thunderstorm	16-05-18	0420 1350	1000 1400



## 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)

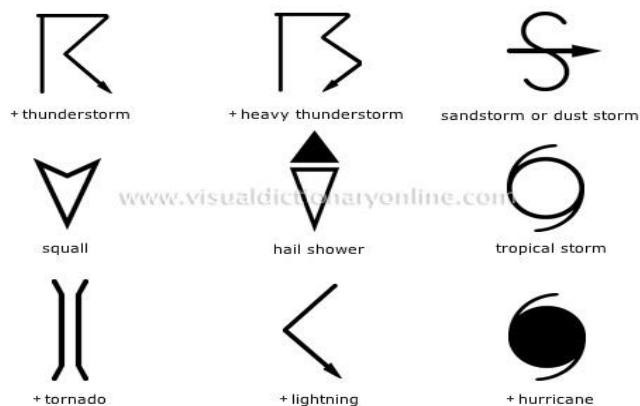
For Radar images of the past 24 hours including mosaic of images:

[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>	