



# India Meteorological Department

## FDP STORM Bulletin No. 113 (27-06-2018)

### 1. CURRENT SYNOPTIC SITUATION:

#### NWFC Inference (0300UTC of the day):

- ◆ Southwest monsoon further advanced into some more parts of Gujarat region, some parts of East Rajasthan, remaining parts of Maharashtra, Chhattisgarh, Odisha, Bihar and Jharkhand, entire Madhya Pradesh & East Uttar Pradesh; most parts of West Uttar Pradesh, Uttarakhand & Himachal Pradesh, entire Jammu & Kashmir and some parts of Punjab. The Northern Limit of Monsoon passes through Lat 21°N/ Long 60°E, Lat 21°N/ Long 65°E, Veraval, Amreli, Ahmedabad, Udaipur, Sawai Madhopur, Aligarh, Tehri, Una and Amritsar.
- ◆ Conditions are favourable for further advance of Southwest Monsoon into remaining parts of Rajasthan, West Uttar Pradesh, Uttarakhand, Himachal Pradesh and Punjab and entire Haryana, Chandigarh & Delhi during next 48 hours.
- ◆ Pre monsoon thunderstorm activity is very likely to continue over remaining parts of northwest India during next 24 hours.
- ◆ The East West trough at mean sea level from Punjab to east Assam now runs from West Rajasthan to northwest Bay of Bengal across north Madhya Pradesh, southeast Uttar Pradesh, Jharkhand & Odisha and extends upto 1.5 km above mean sea level.
- ◆ The cyclonic circulation over Bihar & adjoining Sub Himalayan West Bengal has merged with East West trough.
- ◆ The Western Disturbance as an upper air cyclonic circulation at 3.1 km above mean sea over Jammu & Kashmir and adjoining north Pakistan, now lies over Jammu & Kashmir and adjoining Himachal Pradesh between 3.1 and 5.8 km above mean sea level.
- ◆ The cyclonic circulation over south Pakistan and adjoining areas of Kutch and West Rajasthan now lies over south Pakistan & adjoining West Rajasthan and extends upto 0.9 km above mean sea level.
- ◆ The cyclonic circulation over Gujarat region and adjoining Southwest Madhya Pradesh between 2.1km and 4.5 km above mean sea level now lies over West Madhya Pradesh & adjoining southeast Rajasthan.
- ◆ A cyclonic circulation at 5.8 km above mean sea level lies over south Gujarat & neighbourhood.
- ◆ The off-shore trough at mean sea level now runs from south Gujarat coast to north Kerala coast.
- ◆ The cyclonic circulation over southern parts of Bangladesh and neighbourhood now lies over coastal Odisha and adjoining areas of northwest Bay of Bengal & West Bengal and extends upto 7.6 km above mean sea level titling south-westwards with height.

## Satellite Observations during past 24 hrs and current observation:

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

#### Clouds descriptions within India:

**North:** Broken low/medium clouds with embedded intense to very intense convection seen over East Uttar Pradesh. Scattered low/medium clouds with embedded weak to moderate convection seen over Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Punjab, Haryana, Delhi and Northwest Uttar Pradesh. Scattered low/medium clouds over rest Uttar Pradesh

**East:** Broken low/medium clouds with embedded intense to very intense convection seen over East Chhattisgarh, Odisha, West Bengal, extreme Southwest Gangetic West Bengal, Assam. Scattered low/medium clouds with embedded moderate to intense convection seen over rest Chhattisgarh, Southwest Bihar, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Jharkhand and weak to moderate convection seen over rest parts of the region & rest Bihar, rest North Gangetic West Bengal & Tripura.

**West:** Scattered low/medium clouds with embedded moderate to intense convection seen over South & Northeast Rajasthan, adjoining Northwest & South Central Madhya Pradesh, Vidarbha, South Konkan & Goa. Scattered low/medium clouds with embedded weak to moderate convection seen over Gujarat, Rajasthan, rest Madhya Pradesh and rest Maharashtra. Scattered low/medium clouds over rest Gujarat.

**South:** Scattered low/medium clouds with embedded intense to very intense convection seen over Coastal & Northeast Andhra Pradesh. Broken low/medium clouds with embedded moderate to intense convection seen over Telangana, Rayalaseema, Karnataka, North Kerala, Bay Islands and weak to moderate convection seen over South Kerala, Tamilnadu & Lakshadweep.

**Arabian Sea:** Scattered low/medium clouds with embedded moderate to intense convection seen over East Arabian Sea off South Maharashtra – Karnataka - Kerala Coast.

**Bay of Bengal & Andaman Sea:** Broken low/medium clouds with embedded intense to very intense convection seen over North Bay Central Bay & Southeast Bay Andaman Islands and moderate to intense convection seen over Andaman Sea.

### Past Observation: Not Received

#### DWR and RAPID Observations:

Light to Moderate echoes observed on DWR Agartala, Bhopal, Chennai, Delhi, Goa, Hyderabad, Jaipur, Kolkata, Kochi, Lucknow, Machilipatnam, Nagpur, Patiala, Thiruvananthapuram, Vishakhapatnam and Light echoes over Gopalpur and Patna at around 1700 IST.

RAPID RGB Satellite imagery at 1530 IST indicates significant convection over East Punjab, Haryana, East Uttar Pradesh, East Rajasthan, Central Arunachal Pradesh, West & East Assam, East Meghalaya, Nagaland, North Tripura, East Sub Himalayan West Bengal, Southwest Jharkhand, Madhya Pradesh, Chhattisgarh, Vidarbha, South Odisha, North Coastal Andhra Pradesh, Coastal Karnataka and North Kerala.

#### Environmental Condition (dust etc) and its Forecast based on 00UTC of date:

Higher Dust concentration was observed over northern Africa, Arab countries and western part of India. Dust concentration is expected to decrease for next few days over IGP and north India.

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

Delhi – SAFAR analysis & Forecast	27.06.2018	28.06.2018
PM10 (micro-g/m <sup>3</sup> )	140	154
PM2.5 (micro-g/m <sup>3</sup> )	53	58

## 2. NWP MODEL GUIDANCE:

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

#### 1. Weather Systems:

**Low level Cycirs, Troughs:** 925 to 700 hPa CYCIRs at 00&12UTC: Embedded CYCIRs in monsoon trough one over central India and another over Odisha in Day-0 to Day-1. The two are merging in Day-1 over MP and moving NW wards in Day-2-3  
CYCIR over NW India prominent at 700 hPa in Day-3 and Day-4

**Confluence & wind Discontinuity regions:** NIL

**Synoptic systems:** 500 hPa trough: Monsoon trough extends from Rajasthan-Gujarat to Odisha in Day-0 to Day-1 with strong south-easterlies over the plains.

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

#### 3. Convergence at 850 hPa:

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

Day0: Assam Meghalaya,

Day1: Assam Meghalaya,

Day2: Assam Meghalaya,

Day3:

Day4:

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

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

Day0: Assam Meghalaya, Gangetic WB, East Rajasthan, Odisha, Tamilnadu Puducherry, Kerala,

Day1: Arunachal Pradesh, East UP, West UP, West Rajasthan, East MP, Tamilnadu Puducherry,

Day2: Arunachal Pradesh, Assam Meghalaya, East UP, West UP, Haryana, Chandigarh, Delhi, Jammu Kashmir, West Rajasthan, Tamilnadu Puducherry,

Day3: Arunachal Pradesh, Assam Meghalaya, West Rajasthan, Tamilnadu Puducherry,

Day4: Arunachal Pradesh, Assam Meghalaya, Bihar, Tamilnadu Puducherry,

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

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

Day0: Arunachal Pradesh, Sub Himalayan WB, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West Rajasthan, East Rajasthan, West MP, Gujarat Region, Saurashtra Kutch,

Day1: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, West Rajasthan, Saurashtra Kutch,

Day2: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, West Rajasthan, Saurashtra Kutch,

Day3: Arunachal Pradesh, Sub Himalayan WB, Jharkhand, Uttarakhand, Himachal Pradesh, Jammu Kashmir, West Rajasthan, Chhattisgarh,

Day4: Arunachal Pradesh, Sub Himalayan WB, Jharkhand, Uttarakhand, Punjab, Himachal Pradesh, Jammu Kashmir, West Rajasthan, Odisha, Chhattisgarh,

## 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, Uttarakhand, Himachal Pradesh, Jammu Kashmir, West Rajasthan, Saurashtra Kutch,

Day1: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir,

Day2: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir,

Day3: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir,

Day4: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir,

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

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

Day0: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West Rajasthan, East Rajasthan, West MP, East MP, Marathwada, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, Tamilnadu Puducherry,

Day1: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Jharkhand, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Himachal Pradesh, Jammu Kashmir, West Rajasthan, East Rajasthan, Odisha, West MP, East MP, Gujarat Region, Saurashtra Kutch, Madhya Maharashtra, Coastal AP, Telangana, Tamilnadu Puducherry, NI Karnataka,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Jharkhand, Bihar, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West Rajasthan, Gujarat Region, Saurashtra Kutch, Chhattisgarh, Tamilnadu Puducherry,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, East UP, Uttarakhand, Punjab, Himachal Pradesh, Jammu Kashmir, West Rajasthan, Odisha, East MP, Gujarat Region, Saurashtra Kutch, Chhattisgarh,

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, East MP, Chhattisgarh,

## 8. Rainfall and thunder storm activity:

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

Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West Rajasthan, East Rajasthan, Odisha, West MP, East MP, Gujarat Region, Konkan Goa, Madhya Maharashtra, Vidarbha, Chhattisgarh, Andaman Nicobar, Coastal AP, Telangana, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Jharkhand, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West Rajasthan, East Rajasthan, Odisha, West MP, East MP, Gujarat Region, Konkan Goa, Madhya Maharashtra, Vidarbha, Chhattisgarh, Andaman Nicobar, Coastal AP, Telangana, Tamilnadu Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Bihar, East UP, West UP, Uttarakhand, Punjab, Himachal Pradesh, Jammu Kashmir, West Rajasthan, East Rajasthan, Odisha, Gujarat Region, Saurashtra Kutch, Konkan Goa, Madhya Maharashtra, Chhattisgarh, Andaman Nicobar, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Himachal Pradesh, Jammu Kashmir, West Rajasthan, East Rajasthan, Odisha, Gujarat Region, Saurashtra Kutch, Konkan Goa, Madhya Maharashtra, Chhattisgarh, Coastal Karnataka, SI Karnataka, Kerala,

Day5: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, Gujarat Region, Saurashtra Kutch, Konkan Goa, Madhya Maharashtra, Coastal Karnataka, SI Karnataka, Kerala,

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

**1. Synoptic Systems:** The analysis based on 00 UTC shows an East- West oriented Trough extends from West Rajasthan to Northwest Bay of Bengal across North Madhya Pradesh, Southeast Uttar Pradesh, Jharkhand and Orissa in lower Troposphere (850hPa). The forecast shows it will persist till day3 with slight Northward shift. The analysis shows a cyclonic circulation over South Pakistan and adjoining west Rajasthan at (925hPa). The forecast shows it will persist till day2. An off-shore Trough is seen in the analysis at mean sea level extends from South Gujarat coast to North Kerala coast and forecast shows it will persist till day3. The analysis shows a cyclonic circulation over South Bangladesh and adjoining areas at (850hPa). The forecast shows it will persist till day2 with slight westward shift.

**2. Location of Jet and Jet Core (>60kt) at 500hPa:** There is 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 around the cyclonic circulation, Sikkim, Tamil Nadu, Kerala and NE states during next 3 days; over parts of West Uttar Pradesh, Rajasthan, Madhya Pradesh, Punjab, Haryana, Eastern parts of the country GWB, Orissa, Jharkhand and Orissa from day 1 onwards.

### **4. Spatial distribution of T-storm Initiation Index, Lifted Index, Total Total Index, CAPE, CIN and Sweat Index [High potential for thunderstorm]:**

**T-Storm Initiation Index (> 3):** Over parts of Gujarat, Rajasthan, Punjab, Haryana, Uttar Pradesh, Northwest Madhya Pradesh and coastal Tamil Nadu on day 1; on day 2 over same region except it disappear over parts of Uttar Pradesh and Northwest Madhya Pradesh; on day 3 over parts of west Rajasthan, Gujarat, coastal Tamil Nadu, coastal Orissa, coastal Andhra Pradesh and GWB.

**Lifted Index (< -2):** The value of Index (< -2) lies over parts of J&K, Punjab, Haryana, Delhi, Himachal Pradesh, Uttarakhand, Gujarat, Rajasthan, Uttar Pradesh, Bihar, Jharkhand, Gangetic West Bengal, SHWB, Orissa, coastal Maharashtra, coastal Tamil Nadu, Chhattisgarh, East and west Madhya Pradesh, coastal Andhra Pradesh, along East and West coast of India, Sikkim, NE states during next 3 days.

**Total Total Index (> 50):** Higher than Threshold value of the Index is seen over parts of J&K, Himachal Pradesh, Uttarakhand, foothills of Himalaya, Sikkim and Arunachal Pradesh during all 3 days; over some parts of West Rajasthan on day 1.

**Sweat Index (> 300):** Is seen over the sub-divisions along east and west coast, areas along foothills of Himalayas, Central India, South Peninsular India, NE states and most parts of the country during next 3 days; significant zone lies over parts of J&K, Uttarakhand, Himachal Pradesh, Foothills of Himalaya, Sikkim and Arunachal Pradesh.

**CAPE (> 1000):** Mostly seen over parts of Gujarat, Rajasthan, Uttar Pradesh, South Haryana, coastal areas along West coast, GWB, SHWB, Bihar, Jharkhand, coastal Tamil Nadu, Madhya Pradesh, coastal Maharashtra including Mumbai, Sikkim and NE states on day 1.; on day 2 over parts of Gujarat, Rajasthan, Punjab, Haryana, Madhya Pradesh, Chhattisgarh, Uttar Pradesh and some parts of Tripura; on day 3 over parts of Punjab, Haryana Rajasthan, Madhya Pradesh, coastal Tamil Nadu, coastal Orissa and Andhra Pradesh; significant zone with highest value of index lies over parts of West Rajasthan, Assam and some pockets of Northwest Madhya Pradesh and adjoining areas.

**CIN (50-150):** Mostly seen over North, West and Northwest India, GWB, SHWB, Bihar, Jharkhand, Uttar Pradesh, east coast of India and parts of Gujarat, Eastern parts of India and NE states and over most of the parts of the country except J&K and central parts of the country on day 1; over most parts of the country except J&K, central parts of the country, extreme south Peninsular India and NE states on day 2 and 3.

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

Above 130 mm Isolated Rainfall: over some parts of South Chhattisgarh and adjoining East Vidarbha on day 1.

70-130 mm Rainfall: over parts of Assam, Meghalaya, South Chhattisgarh adjoining East Vidarbha, Telangana and South Orissa on day 1; over some parts of Nagaland, Arunachal Pradesh, Madhya Pradesh, Chhattisgarh adjoining Orissa and pockets of J&K on day 2.

40-70 mm Rainfall: over parts of coastal Maharashtra including Mumbai, coastal Karnataka, Konkan and Goa, coastal Kerala, Chhattisgarh, Orissa, Vidarbha, J&K and Himachal Pradesh on day 1 and 2; over parts of Jharkhand and Telangana on day 1; over central parts of Madhya Pradesh on day 2; over parts Uttarakhand, Foothills of Himalaya, Sikkim, Arunachal Pradesh, Nagaland, East Rajasthan and coastal Maharashtra including Mumbai.

10-40 mm Rainfall: over parts of J&K, Himachal Pradesh, Uttarakhand, Punjab, Haryana, Delhi and adjoining areas, coastal, Kerala, coastal Maharashtra including Mumbai, South coastal Tamil Nadu, Konkan and Goa, Vidarbha, Chhattisgarh, Jharkhand, Bihar, Orissa, Telangana, coastal Andhra Pradesh, Madhya Pradesh, Gujarat, Rajasthan, Sikkim, GWB, SHWB and NE states on day 1 and 2; on day 3 over same region except it disappear over central and southern parts of Madhya Pradesh, Gujarat, Telangana and also appear over parts of Interior Andhra Pradesh and Tamil Nadu.

Up to 10 mm rainfall: Over parts of J&K, Himachal Pradesh, Uttarakhand, Rajasthan, Uttar Pradesh, Punjab, Haryana, Delhi, Foothills of Himalaya, GWB, SHWB, Sikkim, NE states, Bihar, Jharkhand, Orissa, Chhattisgarh, Madhya Pradesh, Vidarbha, Kerala, Interior Karnataka, Konkan & Goa, coastal Maharashtra including Mumbai, Gujarat, Madhya Maharashtra, Marathwada, Tamil Nadu, Telangana and Andhra Pradesh during next 3 days.

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

**1. Model Reflectivity (Max. dBz): >25 dBZ Model Reflectivity:** On Day 1 and 2 over parts of J&K, Himachal Pradesh, Uttarakhand, Punjab< Haryana, Delhi, coastal areas along the west coast, Telangana, Konkan and Goa, North Madhya Maharashtra, Marathwada, Gujarat, Rajasthan, Orissa, Bihar, Jharkhand, Andhra Pradesh, Kerala, Coastal Maharashtra including Mumbai, Madhya Pradesh, Uttar Pradesh, Chhattisgarh, Sikkim, GWB, Sikkim and NE states; On day 3 over parts J&K, Haryana, Punjab, Rajasthan, Himachal Pradesh and Uttarakhand, South Madhya Maharashtra, Marathwada, Bihar, Jharkhand, Uttar Pradesh, Orissa, Chhattisgarh, Vidarbha, Gujarat, coastal Maharashtra including Mumbai, Konkan and Goa, coastal Karnataka and adjoining areas..

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

**Total Index (> 50):** The value of the index greater than the threshold value is seen over parts of J&K, Himachal Pradesh, Uttarakhand, Punjab, Haryana, Delhi, West Uttar Pradesh, Rajasthan, North Madhya Pradesh and some parts of Andhra Pradesh and Tamil Nadu on day 1; below threshold value of the index is seen over most of the parts of the country from day 2; prominent values are found over parts of J&K, Himachal Pradesh, Punjab, Haryana and Rajasthan.

**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 J&K, Himachal Pradesh, Uttarakhand, Rajasthan, Madhya Pradesh, Vidarbha, coastal Maharashtra including Mumbai, Madhya Maharashtra, Marathwada, Karnataka, Telangana, Chhattisgarh, Andhra Pradesh, Kerala, Tamil Nadu, Gujarat, Orissa, Bihar, Jharkhand, Uttar Pradesh, GWB, SHWB, Foothills of Himalaya, Sikkim and NE states during next 3 days over Punjab, Haryana, Delhi and adjoining areas from day 2.



**CAPE (> 1500):** Greater than threshold value over J&K, Himachal Pradesh, Uttarakhand, Punjab, Haryana, Delhi, Gangetic plains, Gujarat, Rajasthan, coastal areas of west coast, coastal Maharashtra including Mumbai, Konkan & Goa, coastal Karnataka, coastal Kerala, coastal areas along the east coast, SHWB, GWB, Orissa, Uttar Pradesh, coastal Andhra Pradesh, coastal Tamil Nadu, Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh, GWB, SHWB, Sikkim, and NE states on day 1; It remains over same region but disappears over parts of Himachal Pradesh, Uttarakhand, J&K, South Chhattisgarh, Telangana, Vidarbha, Bihar, Jharkhand and West coast except Konkan and Goa on day 2; on day 3 it is seen over Punjab, Haryana, Delhi, Rajasthan, Uttar Pradesh, Bihar, Jharkhand, coastal areas along East coast, Sikkim and NE states; Prominent value of the index is seen over parts of West Uttar Pradesh, Punjab, Haryana, Rajasthan and adjoining North Madhya Pradesh.

**CIN (50-150):** The value of the index lies in the 50-150 range over parts of North India, Northwest India, central India, Bihar Jharkhand, GWB and SHWB, NE states except extreme South Peninsular India and coastal areas along southern parts of west coast on day 1; Value of the index lies in the above range over West India, Northwest India and South East Peninsular India including southern parts East coast and its coastal areas on day 2 and 3; significant zone with maximum value of index lies over parts of Uttarakhand, Uttar Pradesh, Punjab, Haryana and Rajasthan.

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

Above 200 mm Isolated Rainfall: over parts of Southeast Rajasthan on day 1; over parts of South coastal Maharashtra on day 3.

130-200 mm Isolated Rainfall: over parts of Arunachal Pradesh, Madhya Pradesh, East Rajasthan and adjoining areas on day 1; over parts of Meghalaya, south coastal Maharashtra, Konkan and Goa on day 3.

70-130 mm Rainfall: over parts of coastal Maharashtra, coastal Karnataka, Konkan and Goa during next 3 days; over parts of Rajasthan, J&K, Uttarakhand, Chhattisgarh, Madhya Pradesh, Orissa, Vidarbha, Assam and Arunachal Pradesh on day 1; over parts of East Rajasthan, Gujarat, Chhattisgarh, GWB, Assam and Arunachal Pradesh on day 2; over parts of Assam, Arunachal Pradesh, GWB, Meghalaya and adjoining areas on day 3.

40-70 mm Rainfall: over west coast from coastal Maharashtra including Mumbai, Konkan and Goa, coastal Karnataka to Kerala adjoining South Tamil Nadu, NE states, Himachal Pradesh, Uttarakhand, Gujarat, Rajasthan and adjoining areas during next 3 days; over parts of J&K, Punjab, Haryana, Madhya Pradesh, Chhattisgarh, Vidarbha, Orissa and coastal Andhra Pradesh on day 1; over parts of J&K, North Madhya Pradesh, Jharkhand, GWB and Orissa on day 2; over parts of Punjab, West Uttar Pradesh, Bihar, Jharkhand and GWB on day 3.

10-40 mm Rainfall: over parts of J&K, Himachal Pradesh, Uttarakhand, Rajasthan, Punjab, Haryana, Delhi and adjoining areas, Uttar Pradesh, Foothills of Himalaya, Madhya Pradesh, Vidarbha, Gujarat, Kerala, Tamil Nadu, coastal and Interior Karnataka, Konkan and Goa, coastal Maharashtra including Mumbai, Sikkim, Orissa, Telangana, Madhya Maharashtra, Marathwada, Chhattisgarh, Bihar, Jharkhand, Andhra Pradesh, Sikkim, GWB, SHWB and NE states during next 3 days

Up to 10 mm Rainfall: Over parts of J&K, Himachal Pradesh, Uttarakhand, Punjab, Haryana, Delhi and adjoining areas, Foothills of Himalaya, Rajasthan, Kerala, Tamil Nadu, coastal and Interior Karnataka, Konkan and Goa, Sikkim, GWB, SHWB, Uttar Pradesh, Bihar, Jharkhand, Orissa, Telangana, Madhya Maharashtra, Marathwada, Vidarbha, coastal Maharashtra including Mumbai, Madhya Pradesh, Andhra Pradesh, Gujarat and NE states during next 3 days.

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

#### Summary and Conclusions:

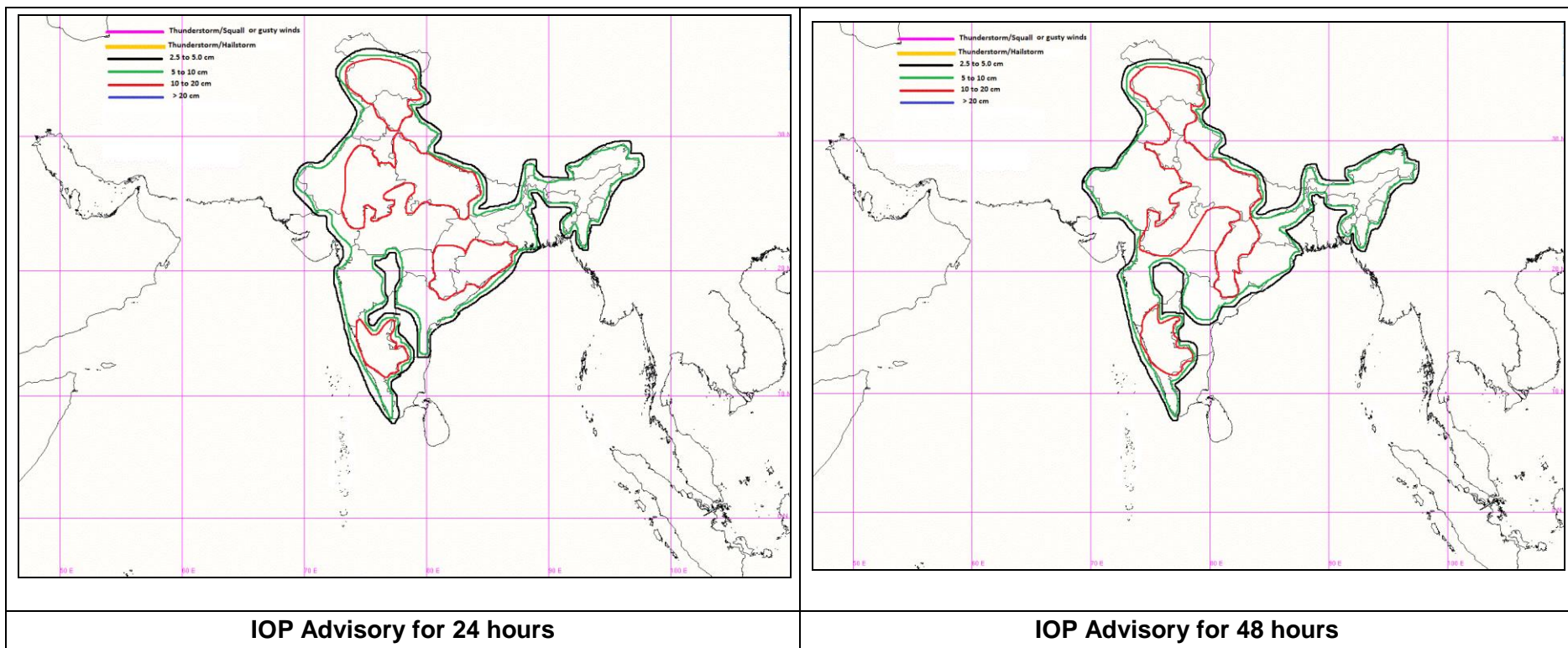
- The synoptic analysis indicates an east-west trough at mean sea level from West Rajasthan to northwest Bay of Bengal across north Madhya Pradesh, southeast Uttar Pradesh, Jharkhand & Odisha and extending upto 1.5 km above mean sea level. Also, a cyclonic circulation lies over south Pakistan & adjoining West Rajasthan and extending upto 0.9 km above mean sea level; another cyclonic circulation lies over West Madhya Pradesh & adjoining southeast Rajasthan between 2.1km and 4.5 km above mean sea level and a third cyclonic circulation lies over coastal Odisha and adjoining areas of northwest Bay of Bengal & West Bengal and extends upto 7.6 km above mean sea level tilting south-westwards with height. Together with these systems, a Western Disturbance is also present as an upper air cyclonic circulation over Jammu & Kashmir and adjoining Himachal Pradesh between 3.1 and 5.8 km above mean sea level. This scenario is favourable for causing significant rainfall amounts over entire northwest India, plains of north India, east and central India on day 1 as well as on day 2. The interaction of the westerlies with the easterlies in the lower levels also is likely cause significant rainfall over the western Himalayan region on day 1 and day 2.
- A cyclonic circulation is seen at 5.8 km above mean sea level over south Gujarat & neighbourhood. The off-shore trough at mean sea level is seen running from south Gujarat coast to north Kerala coast. The orographic lifting of the strong westerlies from Arabian sea is likely to produce heavy rainfall along the west coast on day 1 and day2.
- Most of the forecast stability indices from IMD GFS indicate that Himalayas and parts of northwest India and extreme northeast India are favourable for convective activity to develop. On the contrary, Lifted Index indicates north India and south peninsular India as the favourable areas for convective activity to occur. CAPE is favourable for moderate convection at isolated places over plains of north India.

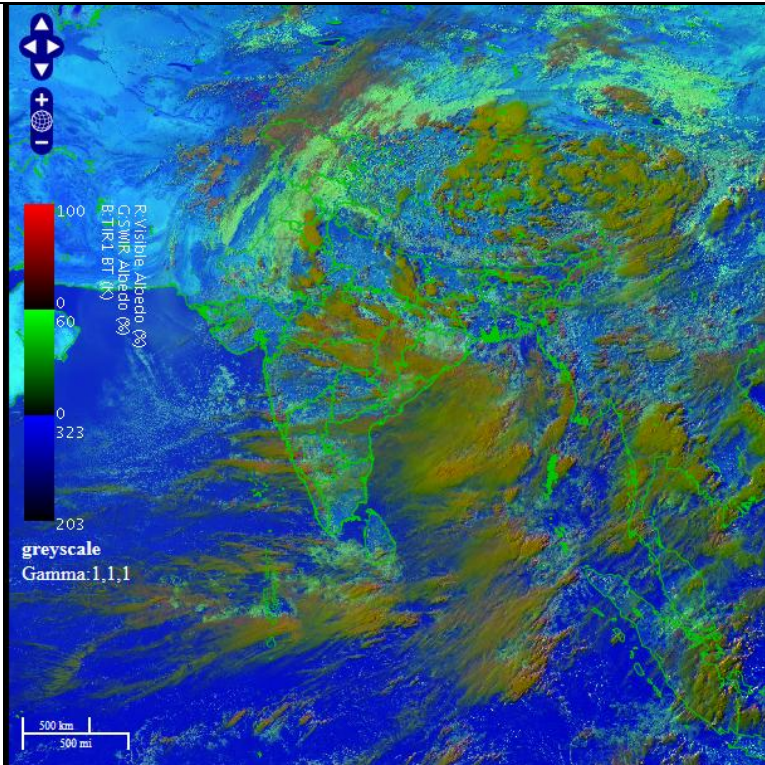


**IOP Area for Day-1 & Day-2:**

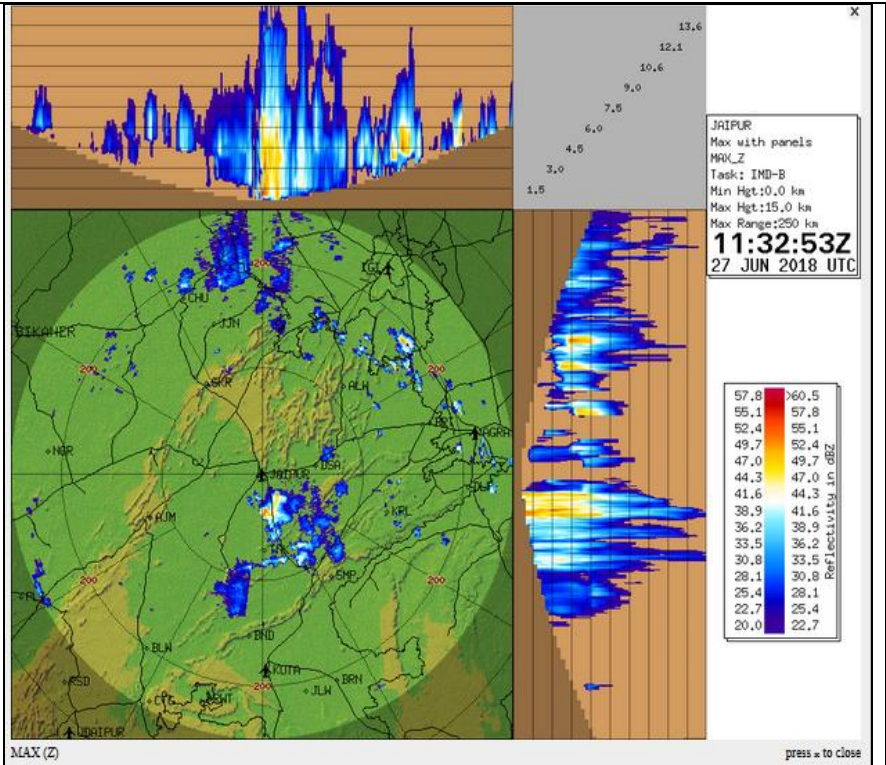
<b>24 hour Advisory for IOP:</b>	<b>48 hour Advisory for IOP:</b>
<p><b>Significant Rainfall:</b> Coastal Karnataka, South Interior Karnataka, Kerala Coastal Andhra Pradesh, Telangana Konkan &amp; Goa, Gujarat Region, Madhya Maharashtra, North Gujarat Madhya Pradesh, Chhattisgarh, Vidarbha Rajasthan,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

## Graphical Presentation of Potential Areas for Severe Weather:



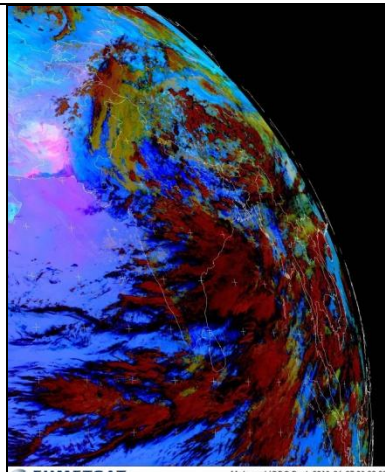


**RAPID RGB Satellite Imagery at 1530 IST**

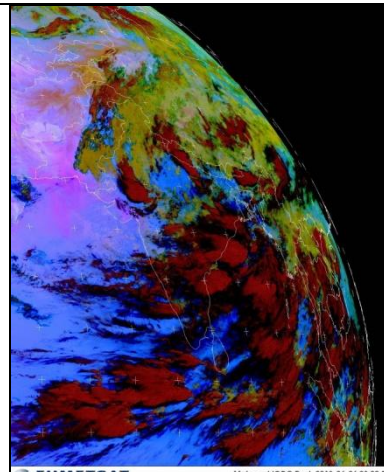


**DWR Jaipur reflectivity at 1702 IST**

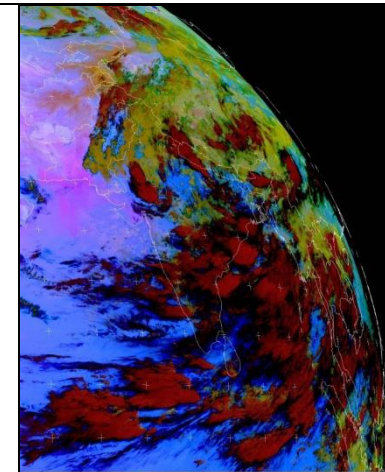




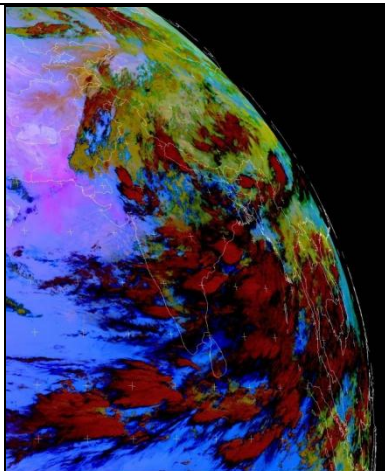
EUMETSAT Meteosat IODC Dust, 2018-06-27 08:00:00



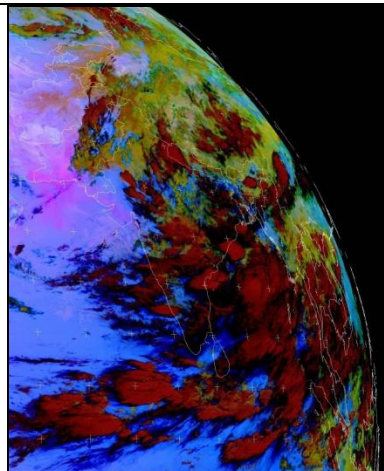
EUMETSAT Meteosat IODC Dust, 2018-06-26 23:00:00



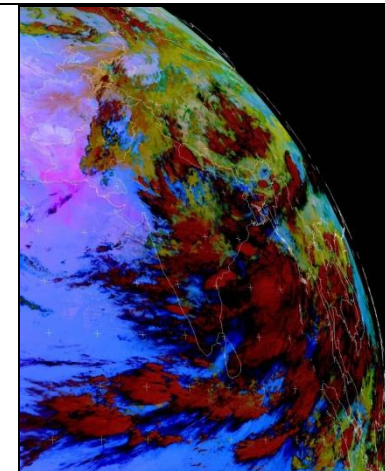
EUMETSAT Meteosat IODC Dust, 2018-06-26 22:00:00



EUMETSAT Meteosat IODC Dust, 2018-06-26 21:00:00

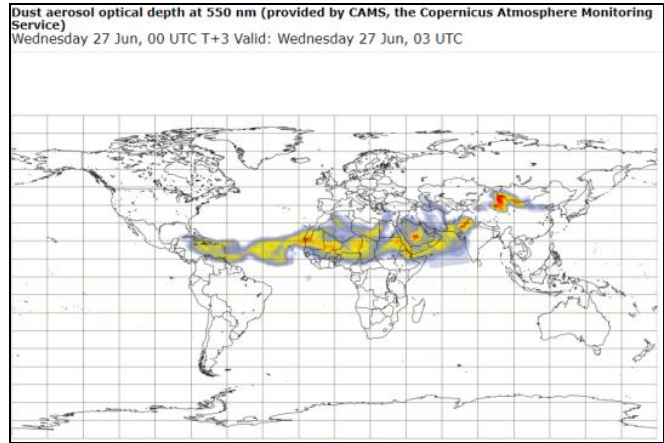


EUMETSAT Meteosat IODC Dust, 2018-06-26 20:00:00

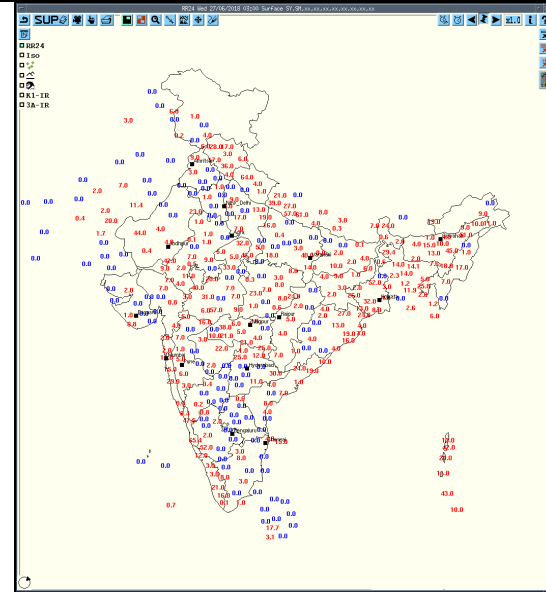


EUMETSAT Meteosat IODC Dust, 2018-06-26 19:00:00

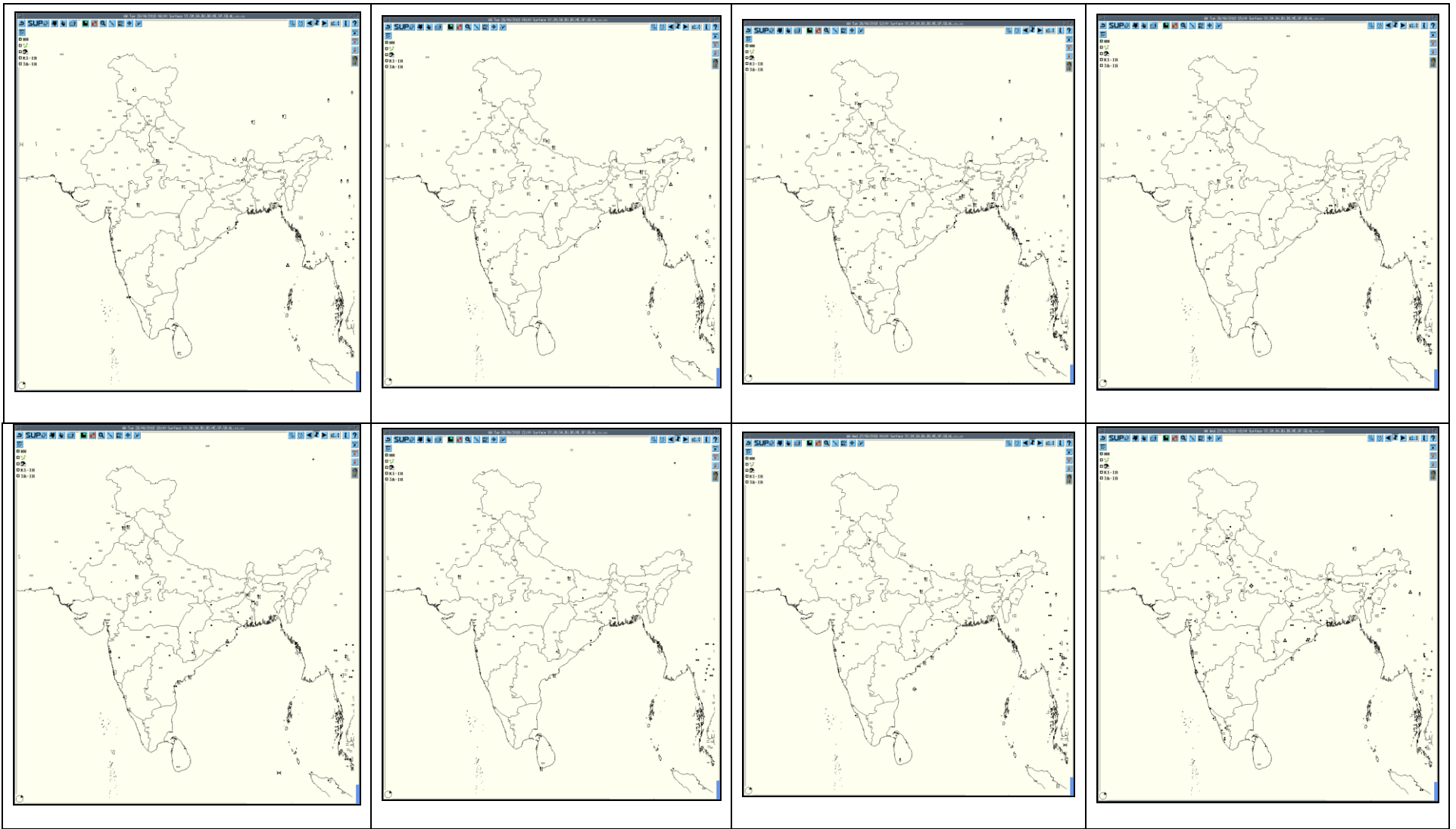
Observed Satellite Dust Images of today



**Dust Forecast**

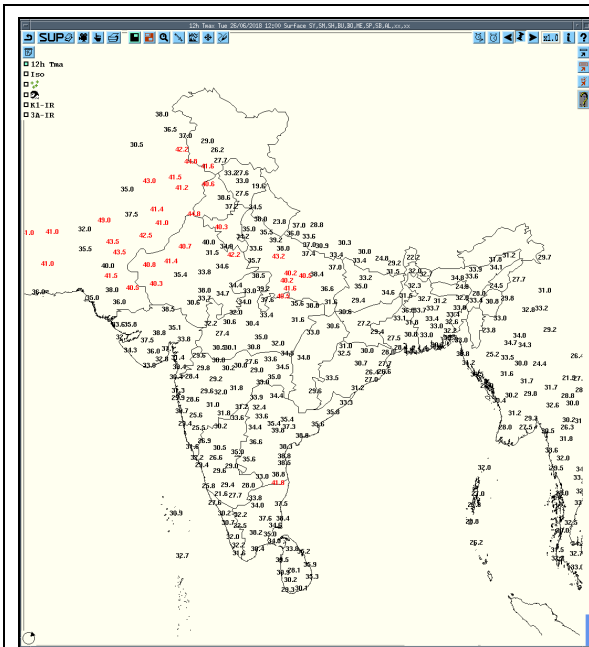


**Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today**

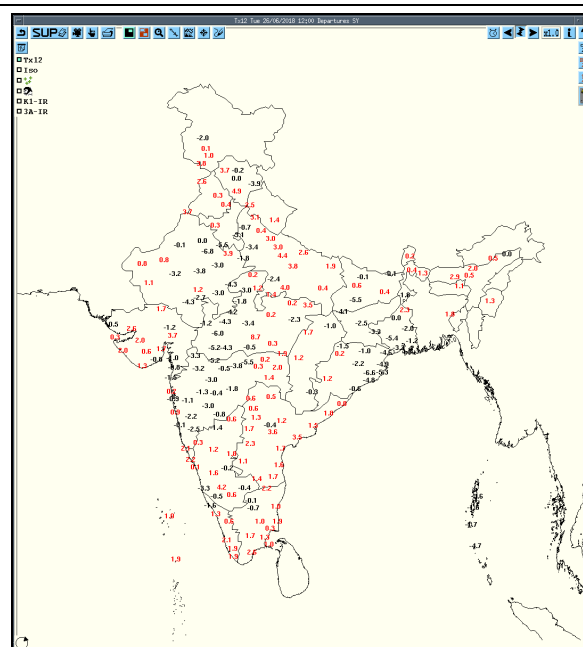


**3hourly Past weather at 06, 09, 12, 15, 18, 21 UTC of yesterday and 00 & 03 hrs UTC of today**

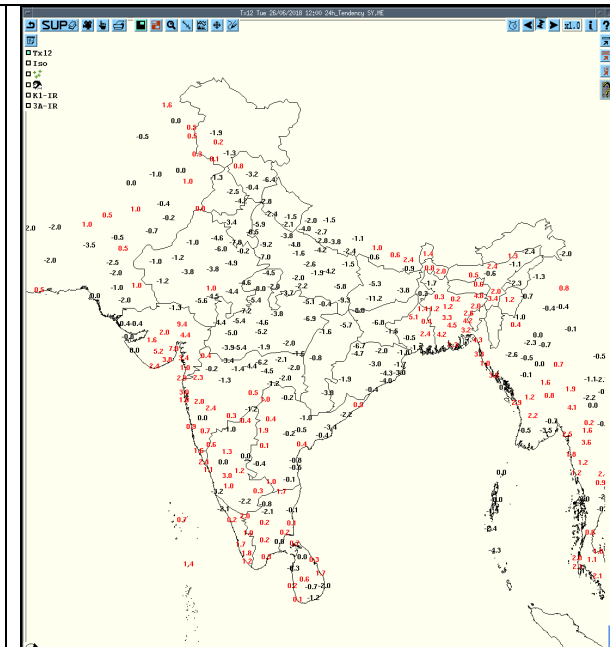




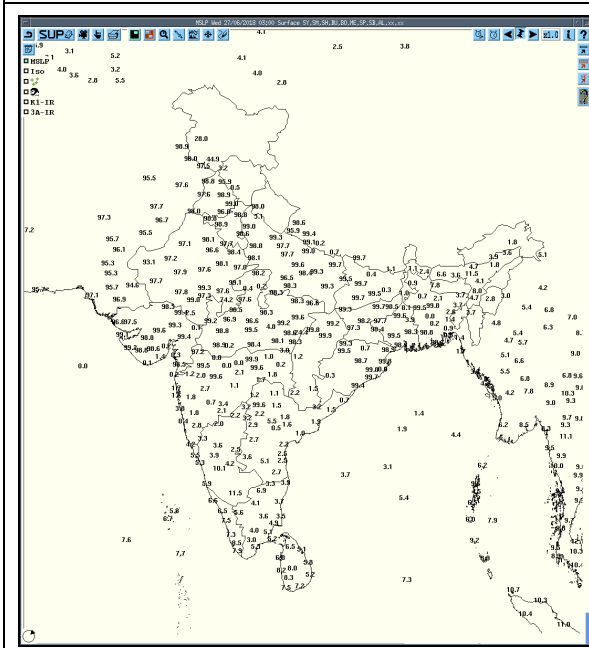
Tmax



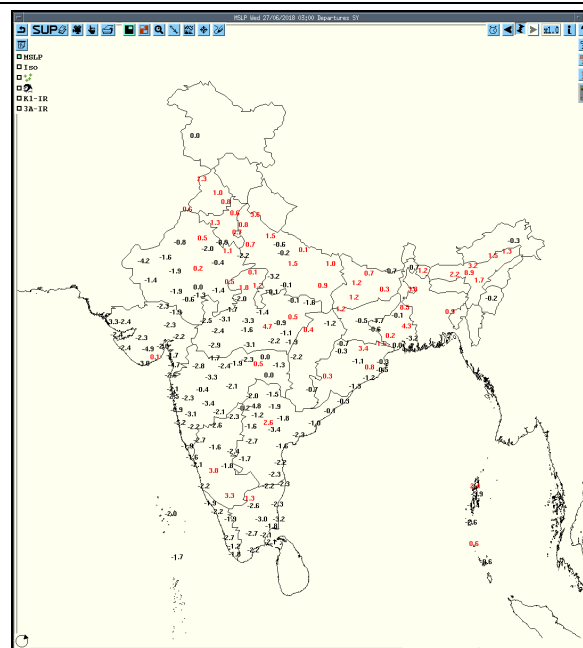
Departure Tmax



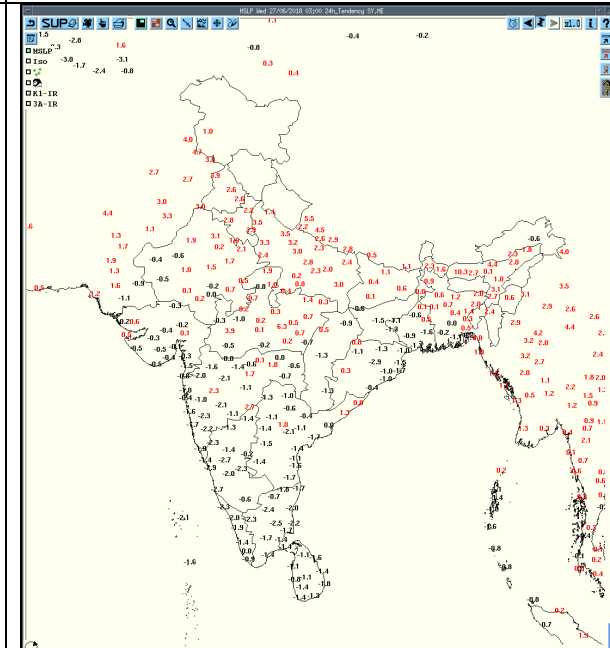
Tendency Tmax



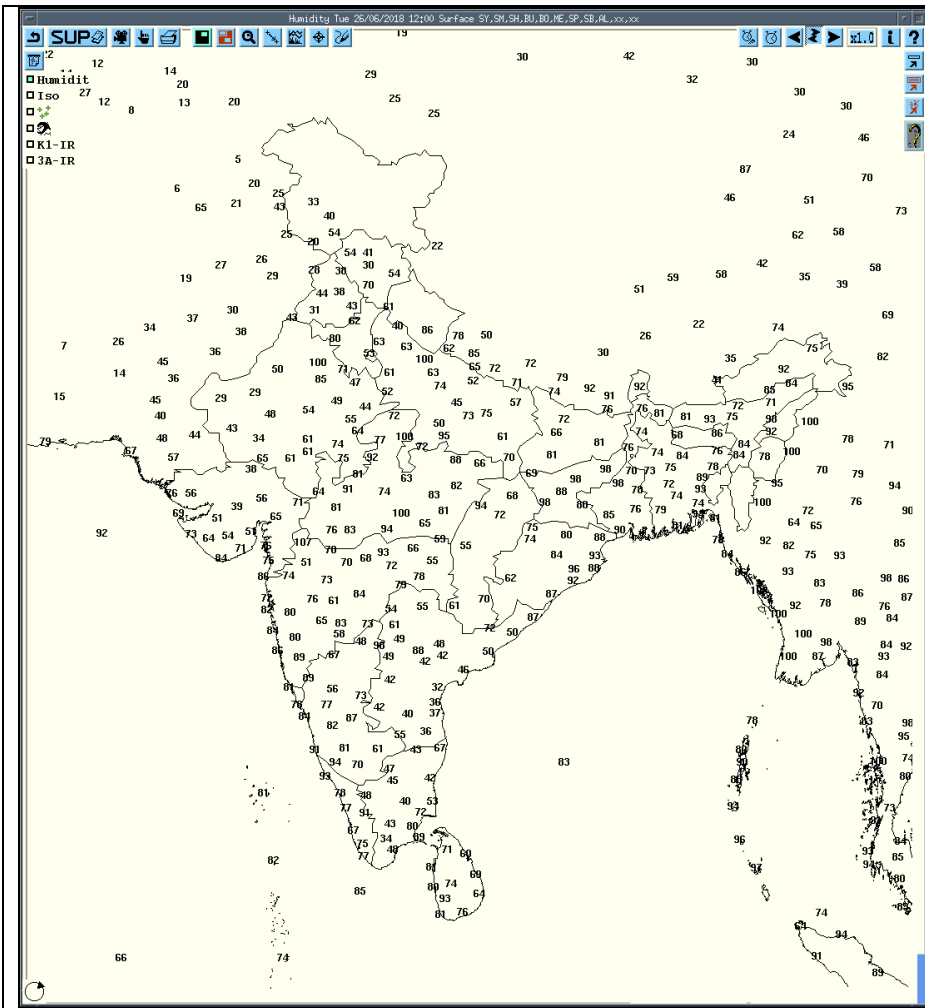
MSLP



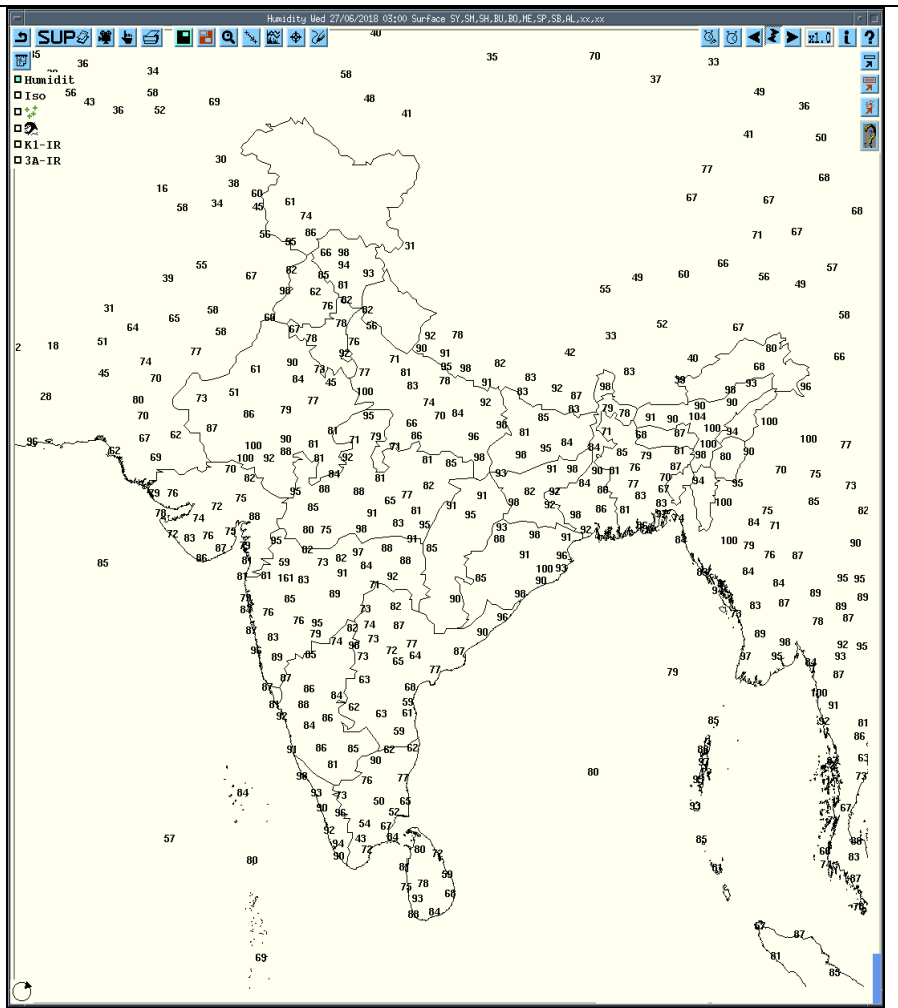
Departure MSLP



Tendency MSLP



RH at 1200UTC yesterday



RH at 0300UTC today

**Past 24 hours DWR Report:**

Radars 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	26/06/18	0600UTC	Isolated Cb cell over the sea in SE with max reflectivity 45 dBZ and height 6 kms.	227 kms(SE) 03:31UTC and moving Easterly.	Cb cell dissipated at 0411 UTC	NIL	NIL
	26/06/18	0900UTC	CB CELL with reflectivity 51 dBZ and height 6kms.	111kms(NE) 08:51 UTC and moving SE ly.	-	-	Srikakulam (AP).
	26/06/18	1200UTC	CB cell with reflectivity 53 dBZ and height 6kms.	97kms(NE) 09:01UTC and moving SE ly,	-	-	Srikakulam (AP).
	26/06/18	1800UTC	Merged Cb cells formed as region with max reflectivity 48 dBZ and height 8kms.	226kms(SW) 17:41UTC and moving Easterly.	Forming Cb cells with the less reflectivity over the land.	-	East Godavari (AP).
	27/06/18	0000UTC	SQUALLY line of Cb cells along the coast with max reflectivity 53 dBZ and height 10kms.	14kms (SW) and over the Visakhapatnam at 22:51UTC and moving SE ly.	Multiple Cb cells are being formed to move SE ly .	Moderate rain with thunderstorms.	Visakhapatnam, Vizianagaram, East Godavari (AP).
	27/06/18	0300UTC	SQUALLY line of Cb cells along the coast with max reflectivity 53 dBZ and height 9kms.	27kms (ESE) and over the Visakhapatnam at 00:01UTC and moving E ly.	Multiple Cb cells are being formed over the sea and dissipating	Moderate rain with thunderstorms.	Visakhapatnam, Vizianagaram, East Godavari (AP) and Bay of Bengal
Jaipur	27/06/18	0300UTC of 26/06/18 to 0300 UTC of 27/06/18	Multiple cell with average height of 4.5 km & maximum reflectivity 56.50 dBZ	Multiple cell develop from 0300 UTC of 26/06/18 towards W, NE, NW, S, SE, E, NW, N of Jaipur and moved to SE, NE, NW, N wards at speed 20-25 km/hr	Multiple cell develop from 0300 UTC of 26/06/18 towards W, NE, NW, S, SE, E, NW, N of Jaipur and reaches maximum reflectivity at 1002 UTC of 26/06/18and cells Continue on 0300 UTC OF 26/06/2018	Dust storm/ Thunders torm/ Light rain at Isolated places	Jaipur, Ajmer, Nagaur, Pali, Tonk, Dausa, Kota, Bundi, Bhiwara, Jhalawar, Baran, Sawai Madhopur, Karauli, Sikar, Jhunjhunu, Churu, Bikaner, Bharatpur, Dholpur, Chittorgarh, Pali, Rajsamand, Alwar Districts.

<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>
Patiala	27-06-18	26/06/2018 0300 - 0600	Multiple Echoes Z: 49.0 dBZ Ht. 6-8 KM.	NE,SE SECTORS Dir. N E-WARDS		RA/DZ	SOLAN, SHIMLA AND THEIR ADJOINING AREAS.
		26/06/2018 0600 -0900	Multiple Echoes Z: 42.0 dBZ Ht. 6-8 KM.	NE,SW SECTORS Dir. N E-WARDS		RA/DZ	SOLAN, SHIMLA, NAHAN, FATEHABAD AND THEIR ADJOINING AREAS.
		26/06/2018 0900- 1200	Multiple Echoes Z: 57.5 dBZ Ht. 9-10 KM.	N,NE,E,SW SECTORS Dir. N E-WARDS		RA/TS	ABOHAR,MALOUT,ZILKA,BHIMSANA,RAJGARH,HISSAR,DALHOUSIE,CHAMBA,SOLAN,SHIMLA AND THEIR ADJOINING AREAS.
		26/06/2018 1200 - 1500	Multiple Echoes Z: 54.5 dBZ Ht. 9-11 KM.	N,NE,E,SW SECTORS Dir. N E-WARDS		RA/TS	PATHANKOT,DALHOUSIE,CHAMBA,MALOUT,MUKTSAR,SOLAN,SHIMLA,HISSAR,NIRWANA ,PALAMPUR AND THEIR ADJOINING AREAS.
		26/06/2018 1500 -1800	Multiple Echoes Z: 57.5 dBZ Ht. 9-11 KM.	N,NW,SW SECTORS Dir. N E-WARDS		RA/TS	AMRITSAR, BATALA, GURDASPUR, PALAMPUR, DALHOUSIE, PEHWA, KAITHAL AND THEIR ADJOINING AREAS.
		26/06/2018 1800 - 2100	Multiple Echoes Z: 55.0 dBZ Ht. 8-10 KM.	N,NW SECTORS Dir. N E-WARDS		RA/TS	AMRITSAR, FEROZPUR, HOSHIARPUR, UNA, HAMIRPUR, DALHOUSIE, SOLAN AND THEIR ADJOINING AREAS.
		26/06/2018 2100- 0000	Multiple Echoes Z: 51.0 dBZ Ht. 8-9 KM.	NW,NE,SE SECTORS Dir. N E-WARDS		RA/TS	AMRITSAR,BATALA,KAPURTHALA,LUDHIANA ,FEROZPUR,PATIALA,AMBALA,YAMUNANAGAR,SOLAN,PALAMPUR,UTTARKASHI AND THEIR ADJOINING AREAS.
		27/06/2018 0000-0252	Multiple Echoes Z: 43.0 dBZ Ht. 8-9 KM.	NW,NE,SE SECTORS Dir. N E-WARDS		RA/TS	LUDHIANA,AMRITSAR,JALANDHAR,MOGA,AMBALA,CHANDIGARH,HOSHIARPUR,SOLAN, BILASPUR AND THEIR ADJOINING AREAS.
Patna	27/06/18	260300 - 270300	Isolated Multiple cell Maximum Reflectivity: 46 dBZ Echo Top: 8 KM	Range: 32.2 KM from DWR Patna in NW direction Movement: SOUTH EASTERLY	Warning Issued	Thunder storm	Patna, Chhapra, Vaishali

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

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

Station	Region	State/Sub Division	Weather Event (TS/Hail/Squall)	Date	Time of Commencement (IST)	Time of end (IST)
Pahalgam	Northwest India	Jammu & Kashmir	Thunderstorm	26-06-18	1550	1630
Batote	Northwest India	Jammu & Kashmir	Thunderstorm	26-06-18	1650	1815
Bhaderwah					1545	2030
Shimla	Northwest India	Uttrakhand	Thunderstorm	26-06-18	1535	1830
Pantnagar	Northwest India	Uttrakhand	Thunderstorm	26-06-18	1740	1900
Mukteswar	Northwest India	Uttrakhand	Thunderstorm	26-06-18	1220 1530	1305 1755
Hissar	Northwest India	Haryana	Thunderstorm	26-06-18	1526	1540
Amritsar	Northwest India	Punjab	Thunderstorm	26/27-06-18	1950	0220
<b>Amritsar</b>	<b>Northwest India</b>	<b>Punjab</b>	<b>Squall(Dir-NW, Max. speed 95 kmph)</b>	<b>26/27-06-18</b>	<b>2105</b>	<b>2115</b>
Safdarjung	Northwest India	Delhi	Thunderstorm	27-06-18	0655	0705
Gorakhpur	Northwest India	East Uttar Pradesh	Thunderstorm	26-06-18	1840 2305 0210 0700	1900 2335 0630 0725
L. Kheri	Northwest India	East Uttar Pradesh	Thunderstorm	26-06-18	2215	2230
Hardoi	Northwest India	East Uttar Pradesh	Thunderstorm	26-06-18	1525 1900	1550 2000
Lucknow AP	Northwest India	East Uttar Pradesh	Thunderstorm	26-06-18	1725	2010
Kanpur C	Northwest India	East Uttar Pradesh	Thunderstorm	26-06-18	1900	2130
Banda	Northwest India	East Uttar Pradesh	Thunderstorm	26-06-18	1600	1630
Varanasi AP	Northwest India	East Uttar Pradesh	Thunderstorm	26-06-18	1750 0415	2120 0610
Varanasi BHU	Northwest India	East Uttar Pradesh	Thunderstorm	26-06-18	1630	1735
Bareilly	Northwest India	West Uttar Pradesh	Thunderstorm	26-06-18	1650 2000	1745, 2040
Jhansi	Northwest India	West Uttar Pradesh	Thunderstorm	26-06-18	1630	1940
Sikar	Northwest India	East Rajasthan	Thunderstorm	26-06-18	1415	1445
Kota	Northwest India	East Rajasthan	Thunderstorm	26-06-18	1710	2240
Bundi	Northwest India	East Rajasthan	Thunderstorm	26-06-18	1215	1615
Jaipur	Northwest India	East Rajasthan	Thunderstorm	26-06-18	2021	2345
Bikaner	Northwest India	West Rajasthan	Thunderstorm	26-06-18	1705	1800
Churu	Northwest India	West Rajasthan	Thunderstorm	26-06-18	1230	1600
Pali	Northwest India	West Rajasthan	Thunderstorm	26-06-18	1530	1700
Jaisalmer	Northwest India	West Rajasthan	Thunderstorm	27-06-18	0100	0300
Phalodi	Northwest India	West Rajasthan	Thunderstorm	26-06-18	2100	2130
Sri Ganganagar	Northwest India	West Rajasthan	Thunderstorm	26-06-18	1635	1830

Realised TS/HS/SQ during past 24hours ending at 0300UTC of today (received from RMCs/MCs)						
Station	Region	State/Sub Division	Weather Event (TS/Hail/Squall)	Date	Time of Commencement (IST)	Time of end (IST)
Nagpur	Central India	Vidarbha	Thunderstorm	26-06-18	1525	1550
Gwalior	Central India	Madhya Pradesh	Thunderstorm	26-06-18	1435 2035	1450 2245
Indore	Central India	Madhya Pradesh	Thunderstorm	26-06-18	1055	1305
Sagar	Central India	Madhya Pradesh	Thunderstorm	26-06-18	1320 1640	1500 1830
Raipur	Central India	Chhattisgarh	Thunderstorm	26-06-18	1905	1955
Bilaspur	Central India	Chhattisgarh	Thunderstorm	26-06-18	0830 1740	0930 2000
Jorhat	Northeast India	Assam	Thunderstorm	27-06-18	27/0200	27/0530
N/Lakhimpur	Northeast India	Assam	Thunderstorm	26/27-06-18	26/1300 27/0400	26/1500 27/0640
Guwahati	Northeast India	Assam	Thunderstorm	26-06-18	26/1310	26/1520
Barapani	Northeast India	Meghalaya	Thunderstorm	26-06-18	26/1440	26/1455
Lengpui	Northeast India	Mizoram	Thunderstorm	26-06-18	26/1830	26/1930
Agartala	Northeast India	Tripura	Thunderstorm	26-06-18	26/1655	26/1900
Malda	East India	GWB	Thunderstorm	26-06-18	1650 2220 0030	1900 2245 0115
Diamond Harbour	East India	GWB	Thunderstorm	26-06-18	1850	2030
Asansol	East India	GWB	Thunderstorm	26-06-18	1810	2000
Sriniketan	East India	GWB	Thunderstorm	26-06-18	1705	1755
Bhubaneswar	East India	GWB	Thunderstorm	26-06-18	...0830	1050
Puri	East India	Bihar	Thunderstorm	26-06-18	...0830	1010
Nizamabad	South India	Telangana	Thunderstorm	26-06-18	1735	2030
Kalingapatnam	South India	Coastal Andhra Pradesh	Thunderstorm	26/27-06-18	1340 0525	1430 0830
Visakhapatnam	South India	Coastal Andhra Pradesh	Thunderstorm	27-06-18	0400	0600
Vijayawada AP	South India	Coastal Andhra Pradesh	Thunderstorm	26-06-18	1900	1940
Masulipatnam	South India	Coastal Andhra Pradesh	Thunderstorm	26-06-18	2030	2140
Narsapur	South India	Coastal Andhra Pradesh	Thunderstorm	27-06-18	0115	0300
Bapatla	South India	Coastal Andhra Pradesh	Thunderstorm	26-06-18	2215	2345
Mangalore AP	South India	Coastal Karnataka	Thunderstorm	26-06-18	1338	1615
Panambur	South India	Coastal Karnataka	Thunderstorm	26-06-18	1325 1610	1435 1625
Madikeri	South India	South Interior Karnataka	Thunderstorm	26-06-18	1400	1730
Chennai AP	South India	Coastal Tamil Nadu	Thunderstorm	26-06-18	1805 1915	1815 1930
Nungambakkam	South India	Coastal Tamil Nadu	Thunderstorm	26-06-18	1940	1945
Salem	South India	Interior Tamil Nadu	Thunderstorm	26-06-18	1735	1810



## IMPORTANT LINKS:

For NCMRWF NWP products:(<http://www.ncmrwf.gov.in/HomePage/NEPS-prod-1.php>)

For IMD NWP products:([http://nwp.imd.gov.in/diagpro\\_new.php](http://nwp.imd.gov.in/diagpro_new.php))

For Synoptic plotted data and charts

<http://amssdelhi.gov.in/>

<http://www.amsskolkata.gov.in/>

For RANDHRA PRADESHID tool:

[http://rAndhra\\_Pradeshid.imd.gov.in/](http://rAndhra_Pradeshid.imd.gov.in/)

Low Level Winds

[http://satellite.imd.gov.in/archive/INSAT-3D-IMAGER/3D-PRODUCTS/AMV/LLW/MAR\\_2017/?C=M;O=D](http://satellite.imd.gov.in/archive/INSAT-3D-IMAGER/3D-PRODUCTS/AMV/LLW/MAR_2017/?C=M;O=D)

Upper level winds

[http://satellite.imd.gov.in/archive/INSAT-3D-IMAGER/3D-PRODUCTS/AMV/HLW/MAR\\_2017/?C=M;O=D](http://satellite.imd.gov.in/archive/INSAT-3D-IMAGER/3D-PRODUCTS/AMV/HLW/MAR_2017/?C=M;O=D)

Past24hourHEMandIMRrainfall(upto03UTCoftoday)

IMR: [http://satellite.imd.gov.in/img/3Ddaily\\_imr.jpg](http://satellite.imd.gov.in/img/3Ddaily_imr.jpg)

HEM: [http://satellite.imd.gov.in/img/3Ddaily\\_he.jpg](http://satellite.imd.gov.in/img/3Ddaily_he.jpg)

ForRadarimagesofthepast24hoursincludingmosaicofimages:

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

Satellite sounder based T- Phigram

[http://satellite.imd.gov.in/mAndhra\\_Pradesh\\_skm2.html](http://satellite.imd.gov.in/mAndhra_Pradesh_skm2.html)

## WEATHER SYMBOLS:



+ thunderstorm



+ heavy thunderstorm



sandstorm or dust storm



squall



hail shower



tropical storm



+ tornado



+ lightning



+ hurricane



haze



smoke



dust or sand storm



fog



drizzle



rain



snow



showers



hail



thunderstorm

**Weather Symbols**