



# India Meteorological Department

## FDP STORM Bulletin No. 99 (13-06-2018)

### 1. CURRENT SYNOPTIC SITUATION:

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

- ♦ The Northern Limit of Monsoon (NLM) continues to pass through Lat 19°N/ Long 60°E, Lat 19°N/Long 70°E, Thane (including Mumbai), Ahmednagar, Buldhana, Amraoti, Gondia, Titlagarh, Cuttack, Midnapore, Lat. 24°N/ Long 89°E, Goalpara, Bagdogra and Lat 27°N/ Long 87°E. No further advance likely during the next one week due to weakening of monsoon flow.
- ♦ The cyclonic circulation over south Assam & Meghalaya & neighbourhood persists and now extends upto 4.5 km above mean sea level.
- ♦ The trough at 7.6 km above mean sea level from the above cyclonic circulation to north Coastal Andhra Pradesh has become less marked.
- ♦ A trough in westerlies runs from south Odisha to north Coastal Karnataka across south Chhattisgarh, Telangana and North Interior Karnataka between 3.6 km & 5.8 km above mean sea level.
- ♦ A cyclonic circulation extending upto 0.9 km above mean sea level lies over Sub Himalayan West Bengal & neighbourhood.
- ♦ A trough at 0.9 km above mean sea level runs from the above cyclonic circulation to Nagaland across Assam & Meghalaya.
- ♦ The Western disturbance as an upper air cyclonic circulation over Jammu & Kashmir & neighbourhood between 5.8 km & 7.6 km above mean sea level has moved away northeastwards.

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

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

**Low Level Circulation (LLC):** Broken low/medium clouds with embedded intense to very intense convection seen over East Assam, Meghalaya In association with LLC over the area.

#### Clouds descriptions within India:

**NORTH:** Scattered low/medium clouds with embedded weak convection seen over East Uttar Pradesh. Scattered low/medium clouds over Jammu & Kashmir, Himachal Pradesh and Uttarakhand.

**EAST:** Broken low/medium clouds with embedded intense to very intense convection seen over West Meghalaya, East Assam East Arunachal Pradesh. Scattered low/medium clouds with embedded moderate to intense convection seen over Northeast Jharkhand and isolated weak to moderate convection seen over rest parts of the region.

**WEST:** Scattered low/medium clouds with embedded isolated weak convection seen over Maharashtra. Scattered low/medium clouds over Madhya Pradesh.

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

**Arabian Sea:**

Scattered low/medium clouds with embedded moderate convection seen over Southeast Arabian Sea off Kerala Coast and South of Lat 10.0N.

**Bay of Bengal & Andaman Sea:**

Broken low/medium clouds with embedded intense to very intense convection seen over Central Bay adjoining North Bay off South Andhra Pradesh Coast and moderate convection over rest Bay Arakan Coast adjoining Myanmar.

**Past Weather:****Convection (during last 24 hrs):**

Moderate to Intense convection was observed over east Uttar Pradesh Bihar Jharkhand Odisha Chhattisgarh Gangetic West Bengal Sub-Himalayan West Bengal North-East States East Madhya Pradesh Vidarbha Andhra Pradesh Telangana Rayalaseema Karnataka Kerala Tamilnadu Lakshadweep Bay islands(.)

**OLR:-**

Up to **150**  $\text{wm}^{-2}$  was observed over Nagaland Manipuri Mizoram Tripura,

Up to **230**  $\text{wm}^{-2}$  was observed over east Bihar east Madhya Pradesh Jharkhand Odisha Chhattisgarh Gangetic West Bengal Sub-Himalayan West Bengal rest North-East States Vidarbha Telangana North Interior Karnataka Andhra Pradesh south Karnataka Kerala Tamilnadu Lakshadweep Bay islands

**Dynamic Features: Wind Shear, Vorticity & Convergence-**

Wind shear up to 05-15 Knots is observed over North and NE India, 30-40 Knots observed over Central & Peninsula India.

Positive Shear tendency is observed over the country.

Vorticity (850 hPa) up to 250 is observed over East Uttar Pradesh Bihar Gangetic West Bengal east Assam Tripura Mizoram Manipur Nagaland Extreme South Tamilnadu.

Positive low level convergence (5 Knots) observed over most parts of India.

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

Rainfall >150 mm was observed over central Chhattisgarh South Jharkhand extreme north Odisha Gangetic West Bengal Meghalaya Tripura,

Rainfall up-to 50-110 mm observed over Bihar east Madhya Pradesh Rest north Odisha east Assam Nagaland Manipur Mizoram Telangana Coastal Andhra Pradesh (.) Rainfall up-to 20-50 mm observed over Orissa Bihar East Assam Manipur (.) Rainfall up-to 10-20 mm observed over SHWB Sikkim west Assam Arunachal Pradesh rest Odisha south Chhattisgarh south Andhra Pradesh adjoining Rayalaseema coastal Karnataka Kerala Tamilnadu.

**DWR and RAPID Observations:**

Light to moderate echoes observed over DWR Agartala and Thiruvananthapuram, Light echoes over Delhi, Lucknow, Patiala and Patna at around 1630 IST.

RAPID RGB Satellite imagery at 1530 IST indicates significant convection over Arunachal Pradesh, East Assam, Nagaland, Northeast Manipur, South Mizoram, Northeast Madhya Pradesh adjoining Uttar Pradesh, South Coastal Karnataka and 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 remain high for next few days over IGP and north India.

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

Delhi – SAFAR analysis & Forecast	13.06.2018	14.06.2018
PM10 (micro-g/m <sup>3</sup> )	613	429
PM2.5 (micro-g/m <sup>3</sup> )	197	138

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

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

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

**Low level Cycirs, Troughs: 00&12UTC of Day 1-4:** CYCIR Punjab & adjoining Pakistan day 3-5. A trough over Bangladesh and NE states in Day 1-3

**Confluence & wind Discontinuity regions: 00 & 12 UTC of Day0-1:** Gangetic plains of UP and Bihar

**Synoptic systems: 00 & 12 UTC of Day0-2:** Lower level trough extending from central Arabian sea to head Bay of Bengal

**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, NE NMMT, Jammu Kashmir,

Day1: Assam Meghalaya, Uttarakhand, Jammu Kashmir,

Day2: Arunachal Pradesh, Assam Meghalaya, Uttarakhand, Jammu Kashmir,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Chhattisgarh, TN Puducherry,

Day4: Arunachal Pradesh, Assam Meghalaya,

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

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

Day0: Arunachal Pradesh, Assam Meghalaya, NE NMMT, West UP, Uttarakhand, Himachal Pradesh, Jammu Kashmir, TN Puducherry, Kerala,

Day1: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Bihar, East UP, Uttarakhand, Himachal Pradesh, TN Puducherry, Kerala,

Day2: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, East UP, Uttarakhand, TN Puducherry, Kerala,

Day3: Arunachal Pradesh, Assam Meghalaya, Bihar, East UP, TN Puducherry, Kerala,

Day4: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, East UP, Uttarakhand, TN Puducherry, Kerala,

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

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

Day0: 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 RJ, East RJ, Odisha, West MP, East MP, Gujarat

Region, Konkan Goa, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, Coastal Karnataka, NI Karnataka, SI Karnataka,

Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, East UP, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, East MP, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, NI Karnataka, SI Karnataka,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West RJ, Odisha, Madhya Maharashtra, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, NI Karnataka, SI Karnataka,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West RJ, East RJ, Odisha, West MP, Gujarat Region, Saurashtra Kutch, Madhya Maharashtra, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, TN Puducherry, NI Karnataka, SI Karnataka,

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West RJ, East RJ, Odisha, East MP, Gujarat Region, Saurashtra Kutch, Madhya Maharashtra, Chhattisgarh, TN Puducherry,

## **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, Gangetic WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West RJ, East RJ, Odisha, West MP, East MP, Gujarat Region, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Telangana, NI Karnataka,

Day1: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, East UP, Uttarakhand, Punjab, Himachal Pradesh, Jammu Kashmir, West RJ, Odisha, East MP, Vidarbha, Chhattisgarh, Telangana,

Day2: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Jharkhand, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, Odisha, Chhattisgarh, Telangana,

Day3: Arunachal Pradesh, Sub Himalayan WB, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West RJ, East RJ, West MP,

Day4: Arunachal Pradesh, Sub Himalayan WB, Jharkhand, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West RJ, Odisha, East MP, Saurashtra Kutch, Chhattisgarh,

## **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, Gangetic WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West RJ, East RJ, Odisha, West MP, East MP, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, TN Puducherry, NI Karnataka, SI Karnataka,

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, Odisha, West MP, East MP, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal AP, Rayalaseema, NI Karnataka, SI Karnataka,

Day2: 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, Odisha, West MP, Marathwada, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, TN Puducherry, NI Karnataka,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, Odisha, East MP, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal AP, Telangana, TN Puducherry, NI Karnataka,

Day4: 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, East RJ, Odisha, West MP, East MP, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalaseema, TN Puducherry, NI Karnataka,

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

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

Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Bihar, Konkan Goa, Telangana, TN Puducherry, Coastal Karnataka, SI Karnataka, Kerala,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Uttarakhand, Konkan Goa, Madhya Maharashtra, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Uttarakhand, Jammu Kashmir, Konkan Goa, Madhya Maharashtra, Andaman Nicobar, TN Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day4: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Uttarakhand, Konkan Goa, Madhya Maharashtra, Andaman Nicobar, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day5: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Uttarakhand, Punjab, Himachal Pradesh, Jammu Kashmir, Konkan Goa, Madhya Maharashtra, Andaman Nicobar, Coastal Karnataka, NI Karnataka, Kerala,

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

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

The analysis based on 00 UTC indicates a cyclonic circulation over SHWB and adjoining area in lower Troposphere (925hPa). The forecast shows it will persist till day3. Analysis shows a Trough extends from this cyclonic circulation to Nagaland across Assam and Meghalaya. The forecast shows it will persist till day3. The analysis shows a cyclonic circulation over South Assam, Meghalaya and adjoining areas. The forecast show it will persist till day2.

**2. Location of Jet and Jet Core (>60kt) at 500hPa:** Although the presence of strong westerlies is found over South Peninsular and Northwest India but no jet core over the Indian region for the next 3 days.

**3. Low Level Vorticity {850hPa Positive Vorticity (>12 x 10<sup>-1</sup>/s)}:** Low level Positive Vorticity is seen mostly around the cyclonic circulations, J&K, Foothills of Himalaya to Bihar, Jharkhand, GWB, SHWB, over South Peninsular India including Kerala, Tamil Nadu and NE states and adjoining areas during next 3 days.

#### **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 Punjab, Haryana, Gujarat, Rajasthan, Uttar Pradesh, Bihar, Jharkhand, Gangetic West Bengal, SHWB, Orissa, coastal Maharashtra, North Interior Karnataka, Telangana, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, East and west Madhya Pradesh, along Northern parts of east and west coast of India, coastal Andhra Pradesh, coastal Tamil Nadu, Sikkim, Assam, Tripura, Mizoram and adjoining areas on day 1; it remains over same region on day 2 but disappear over parts of west Uttar Pradesh and adjoining areas; on day 3 it is seen over Northwest India including Rajasthan, Punjab, Haryana, Madhya Pradesh, Gujarat, Bihar, GWB, NE states and along the east coast.

**Lifted Index (< -2):** Similar to T-storm Index lies over parts of Punjab, Haryana, Delhi, Gujarat, Rajasthan, Uttar Pradesh, Bihar, Jharkhand, Gangetic West Bengal, SHWB, Orissa, coastal Maharashtra, Konkan & Goa, coastal and North Interior Karnataka, coastal Tamil Nadu, Telangana, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, East and west Madhya Pradesh, coastal Andhra Pradesh, along east

and west coast of India, Sikkim, NE states and extreme south coastal parts of the country during next 2 days; on day 3 it is seen over Northwest India including Rajasthan, Punjab, Haryana, Madhya Pradesh, Gujarat, Bihar, GWB, NE states and along the east coast; significant zone with highest value of the index lies over parts of Bihar, GWB, 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 extreme south peninsular India, Assam, Meghalaya, Mizoram, Tripura, Manipur, Nagaland and adjoining areas on day 1; over most of the parts of the country on day 2 except extreme south peninsular India, Gujarat, Rajasthan, Assam, Meghalaya, Mizoram, Tripura, Manipur, Nagaland and adjoining areas on day; over most of the parts of the country on day 3 except Madhya Pradesh, coastal areas along the west coast, South Peninsular India, Assam, Meghalaya, Mizoram, Tripura, Manipur, Nagaland and adjoining; significant zone with highest value of the index lies over parts of J&K, Punjab, Himachal Pradesh, Haryana, Rajasthan, Uttar Pradesh, Madhya Pradesh, Vidarbha, Marathwada, Bihar, Orissa, Jharkhand, GWB and Chhattisgarh.

**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 Himachal Pradesh, Uttarakhand, Foothills of Himalaya, Sikkim, Arunachal Pradesh, Assam, Tripura, Gujarat, Rajasthan, East Uttar Pradesh, Bihar, Jharkhand, GWB, SHWB, coastal Orissa, Madhya Pradesh, coastal Andhra Pradesh.

**CAPE (> 1000):** Mostly seen over parts of Gujarat, Rajasthan, along west coast and east coast, GWB, SHWB, Orissa, Bihar, Jharkhand, coastal Andhra Pradesh, North coastal Maharashtra including Mumbai, North Madhya Maharashtra, Vidarbha, Chhattisgarh, Telangana, coastal Karnataka, Konkan and Goa, East and West Madhya Pradesh and Sikkim and NE states during next 3 days; significant zone with highest value of the index lies over parts of GWB, SHWB, Bihar, coastal Orissa, coastal Andhra Pradesh, Assam, Tripura and adjoining areas.

**CIN (50-150):** Over sub-divisions along east and west coast of India, extreme south over Kerala, Tamil Nadu and south Peninsular India, central, North and Northwest India mainly the value of index lies in above range over most of the parts of the country except J&K during next 3 days; significant zone with highest value of the index lies over parts of Rajasthan, Northwest Madhya Pradesh and adjoining Punjab.

## **5. Rainfall Activity:**

70-130 mm Rainfall: over parts of Assam, Meghalaya, Arunachal Pradesh, Tripura, Nagaland, Manipur, coastal Karnataka, coastal Kerala, Orissa and Chhattisgarh on day 1; over parts of Assam and Arunachal Pradesh on day 2; over some parts of Sikkim and Assam on day 3.

40-70 mm Rainfall: over parts of Sikkim and NE states during next 3 days; over parts of south coastal Maharashtra, coastal Karnataka, coastal Kerala, Konkan and Goa on day 1 and 2;; over parts Chhattisgarh and Orissa on day 1; over some parts of J&K on day 3.

10-40 mm Rainfall: over Foothills of Himalaya, parts of East Bihar, Sikkim, NE, coastal Karnataka, coastal Kerala, coastal Tamil Nadu, coastal Maharashtra including Mumbai, Konkan and Goa during next 3 days; over parts of Chhattisgarh, Orissa, GWB, SHWB, Andhra Pradesh and Telangana on day 1; over parts of J&K, Himachal Pradesh, Uttarakhand, and some parts of Punjab on day 1.

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

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

**1. Model Reflectivity (Max. dBz): >25 dBZ Model Reflectivity:** On day 1, over parts of J&K, Kerala, Tamil Nadu, South Karnataka, NE states, Orissa, Jharkhand, GWB, SHWB, Sikkim, Telangana, Rayalaseema, Andhra Pradesh, Chhattisgarh, Vidarbha, south coastal Maharashtra, Konkan and Goa and some parts of Gujarat; On day 2 over parts of Kerala, Tamil Nadu, Karnataka, Konkan and Goa, Sikkim, SHWB, East

Bihar and NE states; On day 3 over parts of Kerala, coastal Karnataka, Konkan and Goa, Sikkim, East Bihar, J&K, Himachal Pradesh, Uttarakhand and NE states

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

**Total Index (> 50):** Below threshold value is observed over parts of Gujarat, Rajasthan, East and West Uttar Pradesh, Uttarakhand, coastal areas of west coast, coastal Maharashtra, Konkan & Goa, coastal areas along the east coast, SHWB, GWB, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Bihar, Jharkhand, Telangana, Rayalaseema, Madhya Maharashtra, Marathwada, Chhattisgarh, Telangana, Madhya Pradesh, Vidarbha and NE states during next 3 days; below threshold value is also seen over parts of Punjab, Haryana and adjoining area on day 2 and 3; over parts of J&K and Himachal Pradesh 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 J&K, Himachal Pradesh, Uttarakhand, Punjab, some parts of Haryana, East Madhya Pradesh, Vidarbha, Telangana, Chhattisgarh, Andhra Pradesh, Orissa, Bihar, Jharkhand, Uttar Pradesh, GWB, SHWB, Foothills of Himalaya, Sikkim and NE states.

**CAPE (> 1500):** Greater than threshold value over parts of Gujarat, East Uttar Pradesh, coastal areas of west coast, coastal Maharashtra, including Mumbai, Konkan & Goa, coastal areas along the east coast, SHWB, GWB, Orissa, Andhra Pradesh, coastal Tamil Nadu, Kerala, Karnataka and Andhra Pradesh, Bihar, Jharkhand, Telangana, Chhattisgarh, Vidarbha and NE states during next 3 days; on day 1 over central parts of India including Madhya Pradesh, Chhattisgarh, Vidarbha, Madhya Maharashtra, Marathwada, Karnataka and adjoining areas; Maximum value of the index is seen over the parts of East Bihar, Jharkhand, GWB, SHWB, Orissa, coastal Andhra Pradesh, Assam, Tripura, Sikkim and adjoining area.

**CIN (50-150):** The value of the index lies in above range over most of the parts of the country except J&K, Himachal Pradesh and Uttarakhand on day 1; over most of the parts of the country except South Peninsular India, J&K and NE states on day 2; over most of the parts of the country except South Peninsular India on day 3; Maximum value of the index is seen over the parts of Punjab, Haryana, Gujarat, Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar, Jharkhand, GWB, Orissa, North Chhattisgarh and Vidarbha.

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

Above 200 mm Rainfall: over parts of Assam and Meghalaya on day 1 and 2.

130-200 mm Rainfall: over parts of Assam, Meghalaya and adjoining area on day 1 and 2; over parts of Arunachal Pradesh and adjoining areas on day 2 and 3; over parts of North Kerala, Mizoram and Arunachal Pradesh on day 2.

70-130 mm Rainfall: over parts of coastal Sikkim, NE states, Konkan and Goa on during next 3 days; over parts of coastal Karnataka, Kerala and south Coastal Maharashtra on day 1; over some parts of south coastal Maharashtra on day 2; over parts of J&K on day 3.

40-70 mm Rainfall: over parts of Kerala adjoining Tamil Nadu, coastal Karnataka and coastal Maharashtra, Konkan & Goa, Sikkim and NE states during next 3 days; over parts of SHWB and East Bihar on day 2; over parts of J&K adjoining Himachal Pradesh and Punjab on day 3.

10-40 mm Rainfall: Over parts of Kerala, Tamil Nadu, coastal and Interior Karnataka, Konkan and Goa, coastal Maharashtra including Mumbai, Andhra Pradesh, Foothills of Himalaya during next 3 days; South Madhya Maharashtra, , Tamil Nadu, East Bihar and NE states during next 3 days; over parts of Jharkhand, Chhattisgarh, Orissa, Vidarbha, Telangana and South Interior Karnataka on day 1; over parts of J&K, Himachal Pradesh adjoining Punjab and Haryana on day 3.

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

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

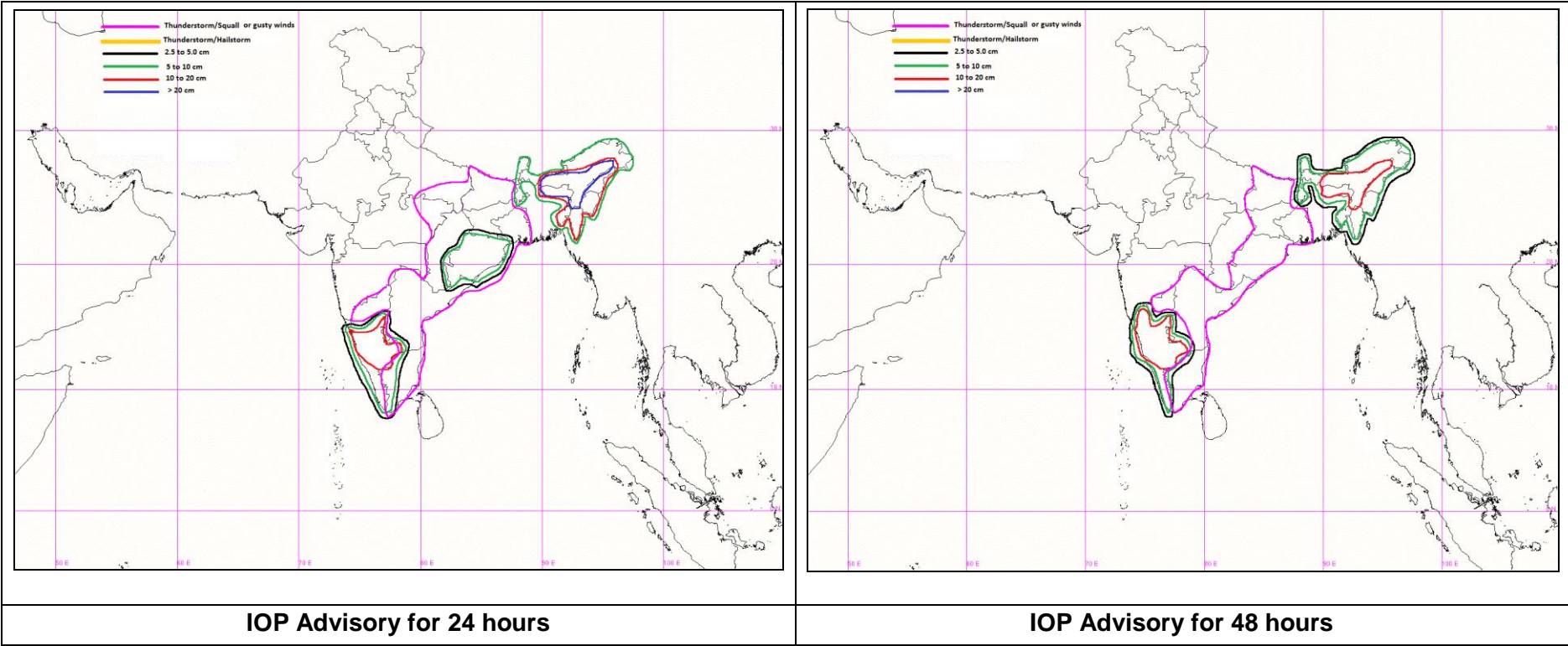
#### Summary and Conclusions:

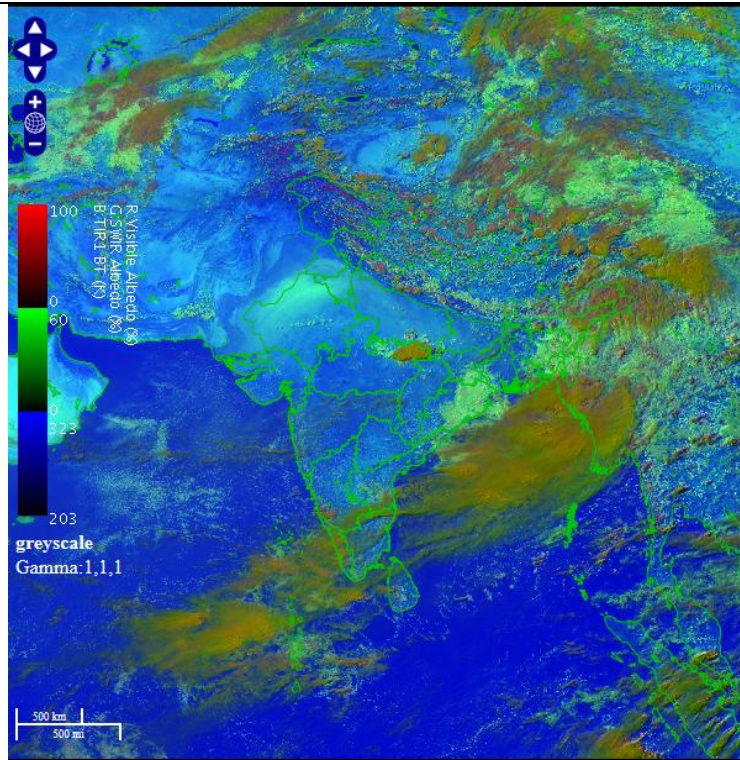
- The synoptic analysis indicates a cyclonic circulation over south Assam & Meghalaya and neighbourhood extending upto 4.5 km above mean sea level. This circulation is very likely to cause heavy to very heavy rainfall over northeastern states on day 1 and day 2 with likelihood of extreme heavy rainfall at isolated places over Assam & Meghalaya on day1.
- A trough in westerlies is seen running from south Odisha to north Coastal Karnataka across south Chhattisgarh, Telangana and North Interior Karnataka between 3.6 km & 5.8 km above mean sea level. Further a cyclonic circulation extending upto 0.9 km above mean sea level lies over Sub-Himalayan West Bengal & neighbourhood. A trough at 0.9 km above mean sea level runs from the above cyclonic circulation to Nagaland across Assam & Meghalaya. These systems together are expected to cause isolated thunderstorm development over Gangetic West Bengal, Odisha, Bihar and Jharkhand on day 1 and day 2. Odisha and Sub Himalayan west Bengal is likely to get isolated heavy rainfall also on day 1
- The Orographic lifting of the strong westerlies over the western coast of peninsular India is likely to cause heavy to very heavy rain on day and day 2 along the western coastal regions of the peninsula.
- Amongst the stability indices, CAPE and K index are indicating favourable conditions over parts of east India and over foothills of Himalayas. The lifted index is favourable over most parts of the country except extreme north, south and north eastern states; whereas TT Index indicates Madhya Pradesh and adjoining east Rajasthan to be the favourable areas for convective clouds to form.

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

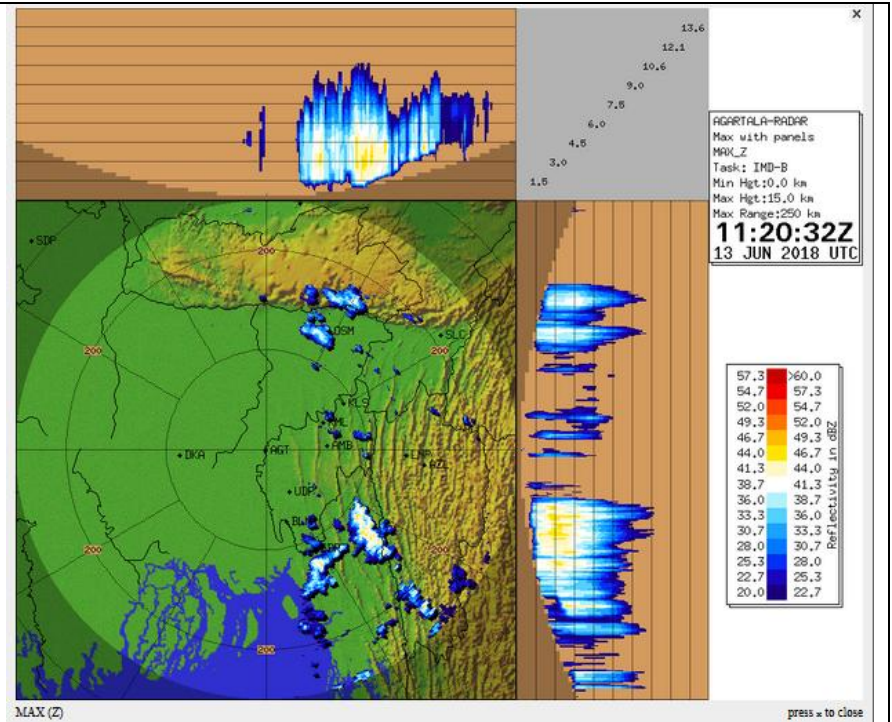
24 hour Advisory for IOP:	48 hour Advisory for IOP:
<p><b>Significant Rainfall:</b> Interior Tamilnadu, Kerala, Coastal &amp; South Interior Karnataka Sub-Himalayan West Bengal &amp; Sikkim, Odisha Arunachal Pradesh, Assam &amp; Meghalaya Nagaland, Manipur, Mizoram, Tripura</p> <p><b>Thunderstorm with squall or gusty winds:</b> Tamilnadu, North Interior Karnataka, North Coastal Andhra Pradesh, Telangana, Rayalaseema Chhattisgarh, Northeast Madhya Pradesh Southeast Uttar Pradesh Gangetic West Bengal, Odisha, Bihar, Jharkhand</p> <p><b>Thunderstorm with squall and hail</b> Nil</p> <p><b>Duststorm:</b> Nil</p>	<p><b>Significant Rainfall:</b> Kerala, Coastal &amp; South Interior Karnataka Sub-Himalayan West Bengal &amp; Sikkim, Arunachal Pradesh, Assam &amp; Meghalaya, Nagaland, Manipur, Mizoram, Tripura,</p> <p><b>Thunderstorm with squall or gusty winds:</b> Tamilnadu, North Interior Karnataka, North Coastal Andhra Pradesh, Telangana, Rayalaseema Gangetic West Bengal, Odisha, Bihar, Jharkhand</p> <p><b>Thunderstorm with squall and hail</b> Nil</p> <p><b>Duststorm:</b> Nil</p>

Graphical Presentation of Potential Areas for Severe Weather:

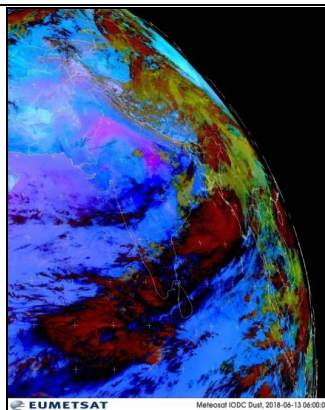




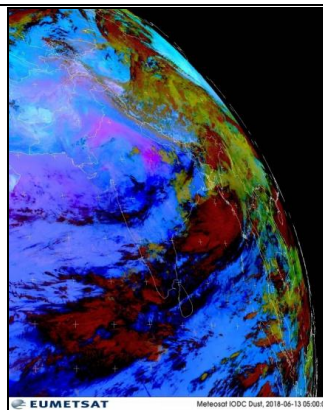
**RAPID RGB Imagery at 1530 IST of the Day**



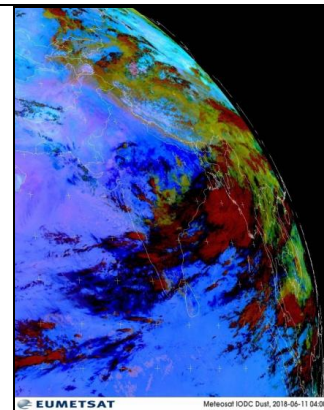
**DWR Agartala reflectivity at 1650 IST**



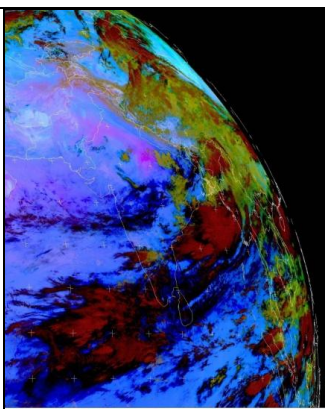
Meteosat KDC Dust, 2018-06-13 00:00:00



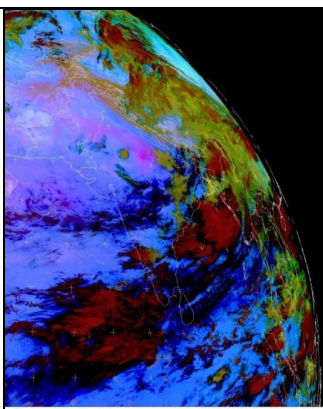
Meteosat KDC Dust, 2018-06-13 05:00:00



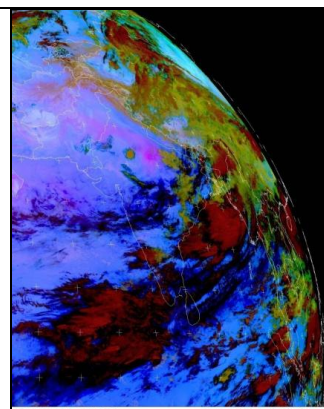
Meteosat KDC Dust, 2018-06-13 09:00:00



Meteosat KDC Dust, 2018-06-13 03:00:00

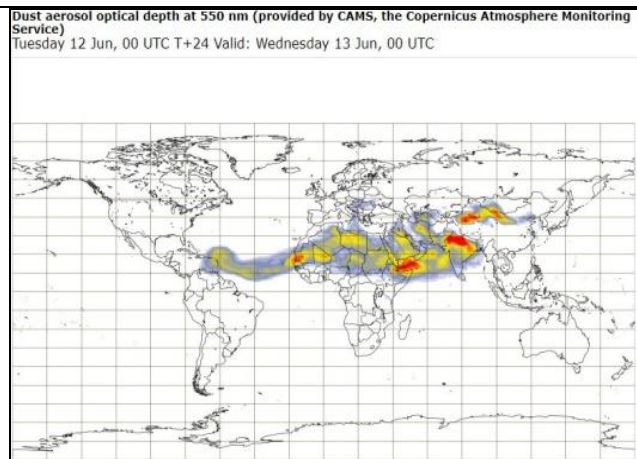


Meteosat KDC Dust, 2018-06-13 02:00:00

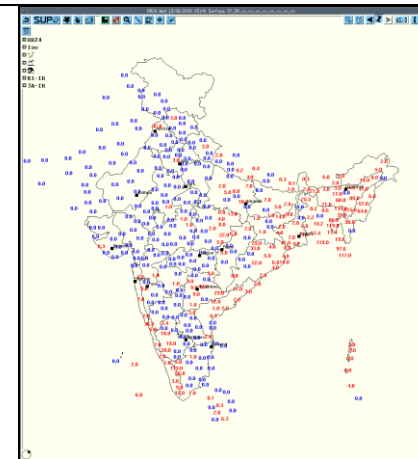


Meteosat KDC Dust, 2018-06-13 02:00:00

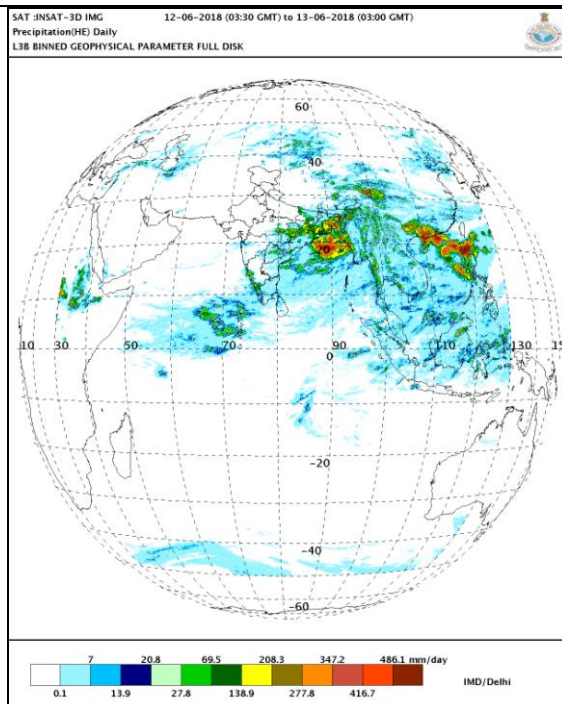
Observed Satellite Dust Images of today



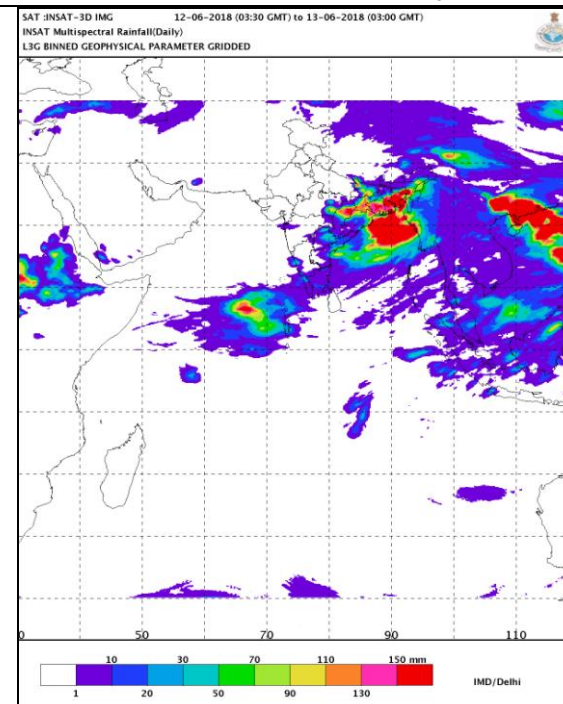
**Dust Forecast**



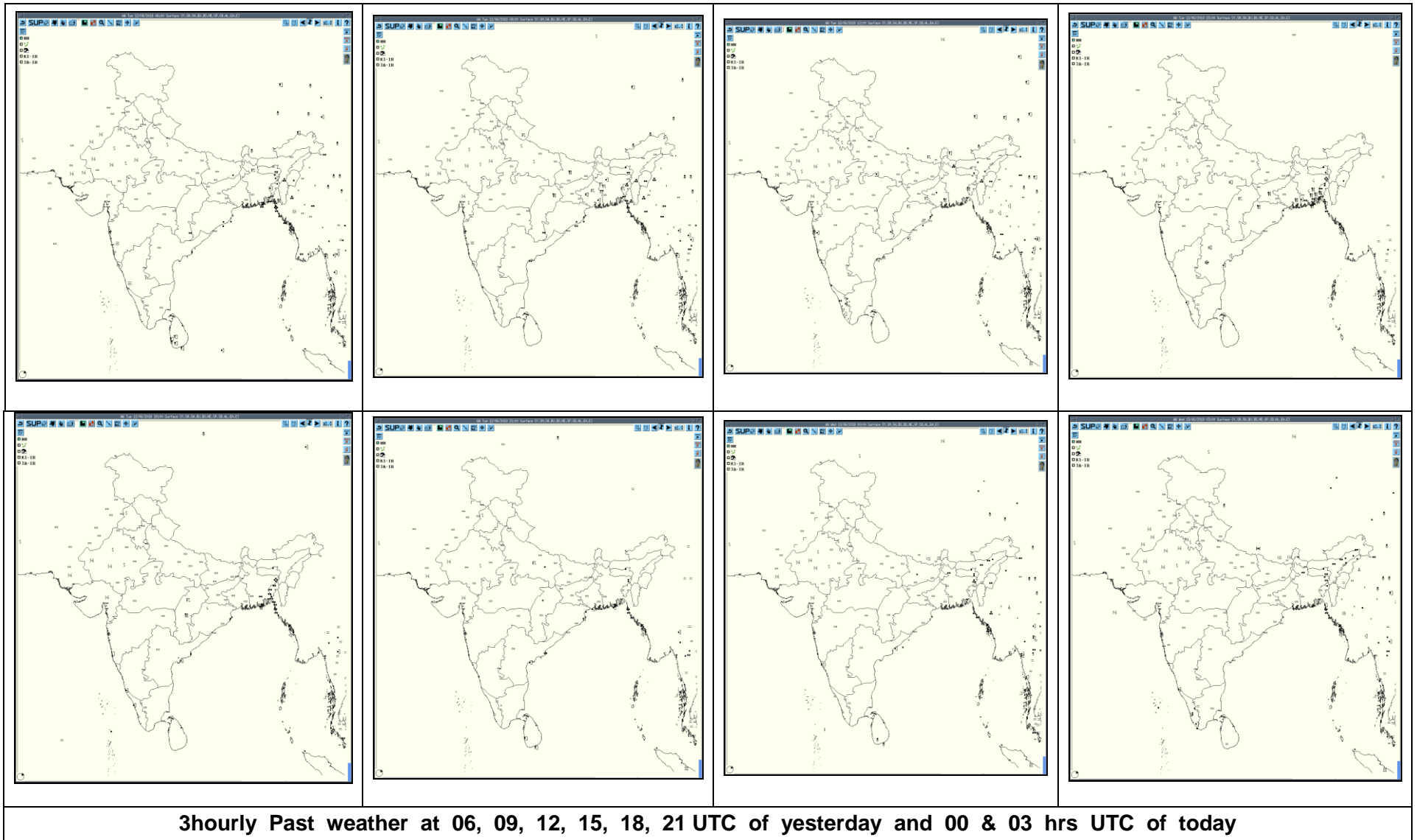
**Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today**



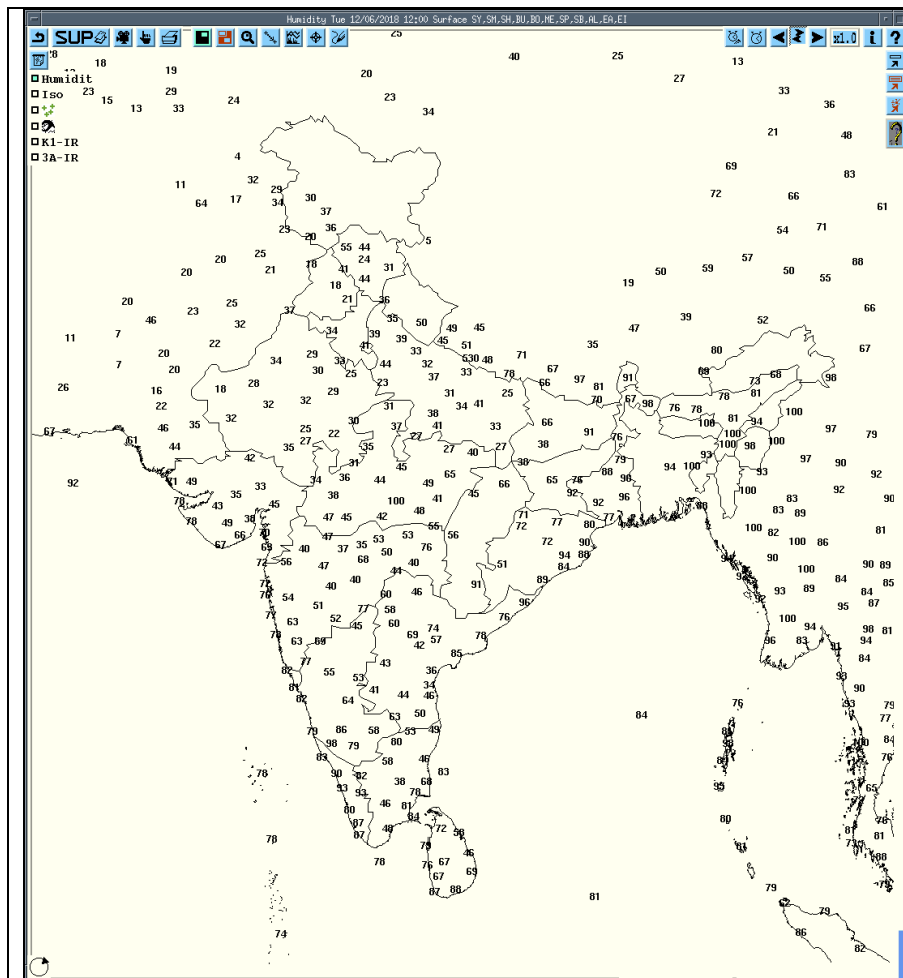
**HEM**



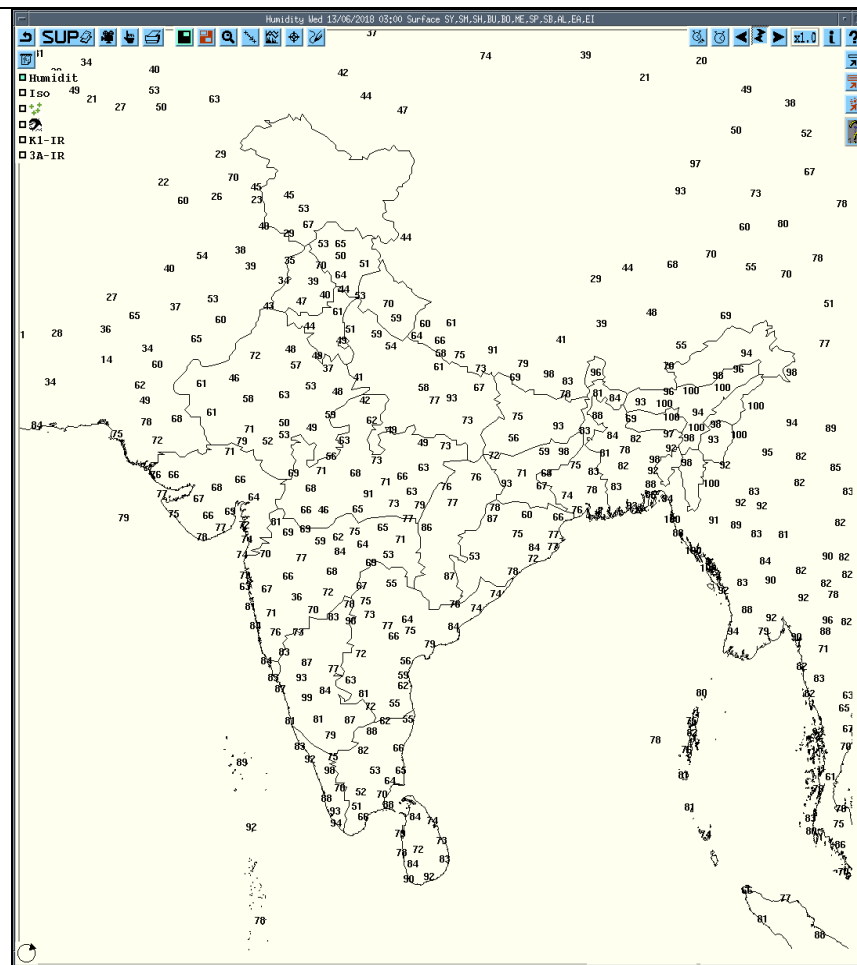
**IMR**







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	12/06/18	0600UTC	Isolated single cell in NNW Convective region in W and sea region with max. reflectivity of 47 dBz and height of 6 kms	NNW (105 kms) &W (101 kms) &N(200 kms) moving Ely	Since last observation cb cells are dissipating max. reflectivity of 47 dbz at 0411 UTC		Sea area
	12/06/18	0900UTC	Convective region with max. reflectivity of 46 dBz and height of 9 kms	NW (150 kms) &W (58 kms) & ESE(69 kms) moving SEly	Convective region with max. reflectivity of 46 dbz at 0831 UTC		Visakhapatnam Dist. (AP) Koraput Dist. (Orissa)
	12/06/18	1200UTC	Multiple cells and Convective region with max. reflectivity of 50 dBz and height of 13 kms	Multiple cells in W (200 kms) & convective region NW (111 kms) & ESE(175 kms) moving SEly	CB cells are formed at 1051UTC and developing to 50dBz at 1131 UTC.		Visakhapatnam , Khammam, East Godavari Dist. (AP) Korput Dist. (Orissa)
	12/06/18	1500UTC	Multiple cells with max. reflectivity of 53 dBz and height of 12 kms	W (138 kms) E (150 kms) moving Ely	CB cells are developed well to 53dBz at 1221 UTC.		Khammam, East Godavari Dist. (AP) Bay of Bengal
	12/06/18	1800UTC	Convective region with max. reflectivity of 52 dBz and height of 13 kms	S (200 kms) W (230 kms) moving Ely	Convective region decreases its reflectivity from 1731 UTC		Khammam, East Godavari Dist. (AP) Bay of Bengal
	13/06/18	0000UTC	Multiple cells and Convective region with max. reflectivity of 54 dBz and height of 13 kms	N(100 KMS) S (85 kms) NE (211 kms) moving Ely	CB cells are forming and developing to 54 dBz at 2101 UTC and start dissipating.		Srikakulam, Visakhapatnam, East Godavari Dist. (AP) Bay of Bengal
	13/06/18	0300UTC	Multiple cells and Convective region with max. reflectivity of 49 dBz and height of 13 kms	E(18 KMS) S (10, 224 kms) NE (63 kms) moving Ely	CB cells are forming and developing to 52 dBz at 0031 UTC in Bay of Bengal region.		Bay of Bengal

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	13/06/18	2122 UTC of 12/06/18 to 0300 UTC of 13/06/18	Multiple cells with average height of 6.0 km & maximum reflectivity 49.5 dBZ	Multiple cells develop from 2122 UTC of 12/06/2018 towards NW,W, S,SE, E of Jaipur and moved to SE,E Wards at speed 15-20 km/hr	Multiple cells develop from 2122 UTC of 12/06/2018 towards NW,W, S,SE, E of Jaipur and reaches maximum reflectivity from 2222 UTC to 0002 UTC of 13/06/2018 and continue	Dust storm/Thunderstorm/ Light rain at Isolated places	Nagaur, Jaipur, Dausa, Sikar, Karauli, Bharatpur, Dholpur, Alwar, Tonk, Jhunjhunu Districts
Kolkata	12-06-18	0301—1131 UTC	NIL	NIL	Radar kept off due to maintenance/fault	NIL	N/A
	12-06-18	1132--2351 UTC	NIL	NIL	NSIG ECHO	NIL	N/A
	13-06-18	0001--0301	NIL	NIL	NSIG ECHO	NIL	N/A

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
Patiala	13-06-2018	12/06/2018 0300 - 0600	NO ECHO	---	-		--
		12/06/2018 0600 -0900	MULTIPLE CELLS DBZ 48.5 HT. 9-11KM	NE SECTORS, MOVEMENT SE WARDS			DALHOUSIE ,BHUNTER, UK, GANGOTRI AND ADJ AREA.
		12/06/2018 0900- 1200	MULTIPLE CELLS DBZ 45.0 HT. 8-9 KM	N, NW SECTORS, MOVEMENT TOWARDS SE DIRECTION			PALAMPUR,,BILASPUR.,BHUNTER,DALHOUSIE ITS ADJOINING AREAS.
		12/06/2018 1200 - 1500	MULTIPLE CELLS DBZ 54.5 HT. 9-10 KM	NE,N,W SECTORS, MOVEMENT TOWARDS SE DIRECTION			UTTERKASHI,GANGOTRI,DALHOUSIE,PALAMPUR,BARNALA AND ITS ADJOINING AREAS.
		12/06/2018 1500 -2400	NO SIGNIFICANT ECHO=	-----		-----	-----
		13/06/2018 0000-0252	NO SIGNIFICANT ECHO=				

## 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)
Mukteshwar	Northwest India	Uttarakhand	Thunderstorm	12-06-18	1350	1450
Ambikapur	Central India	Chhattisgarh	Thunderstorm	12-06-18	1415	1500
Pendra Rd	Central India	Chhattisgarh	Thunderstorm	12-06-18	1800	2330
Bilaspur				12-06-18	2010	2130
Mana	Central India	Chhattisgarh	Thunderstorm	12/13-06-18	2215 0300	0200 0430
Jorhat	Northeast India	Assam	Thunderstorm	12-06-18	12/2230	13/0300
Agartala	Northeast India	Tripura	Thunderstorm	12-06-18	12/1410 12/2120	12/1950 12/2300
Hyderabad	South India	Telangana	Thunderstorm	12-06-18	1805	1935
Masulipatnam	South India	Coastal Andhra Pradesh	Thunderstorm	12-06-18	1705, 2235	1740 2320
Kurnool	South India	Rayalaseema	Thunderstorm	12-06-18	1900	2020
Bapatla	South India	Coastal Andhra Pradesh	Thunderstorm	12-06-18	1530	1635
Tirupathi AP	South India	Coastal Andhra Pradesh	Thunderstorm	12-06-18	1750	1850
Honavar	South India	Coastal Karnataka	Thunderstorm	12-06-18	2210	2230
Shirali	South India	Coastal Karnataka	Thunderstorm	12-06-18	2330	0045
Coochbehar	East India	Sikkim	Thunderstorm	12-06-18	1530	1645
Alipore	East India	GWB	Thunderstorm	12-06-18	1455	1925
DumDum	East India	GWB	Thunderstorm	12-06-18	1435	2040
Diamond Harbour	East India	GWB	Thunderstorm	12-06-18	1540	2030
Haldia	East India	GWB	Thunderstorm	12-06-18	1518	1835
Digha	East India	GWB	Thunderstorm	12-06-18	1900	2000
Bankura	East India	GWB	Thunderstorm	12-06-18	1215	1340
Sriniketan	East India	GWB	Thunderstorm	12-06-18	1140 1417	1250 1433
Patna	East India	Bihar	Thunderstorm	12-06-18	1435	1605
Bhagalpur	East India	Bihar	Thunderstorm	12-06-18	0830	0930
Ranchi	East India	Jharkhand	Thunderstorm	12-06-18	2015	2110
Jamshedpur	East India	Jharkhand	Thunderstorm	12-06-18	1500	1800
Balasore	East India	Odisha	Thunderstorm	12-06-18	1805	2010
Jharsuguda	East India	Odisha	Thunderstorm	12-06-18	1720	2050
Paradeep	East India	Odisha	Thunderstorm	12-06-18	1000	1030

## 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)

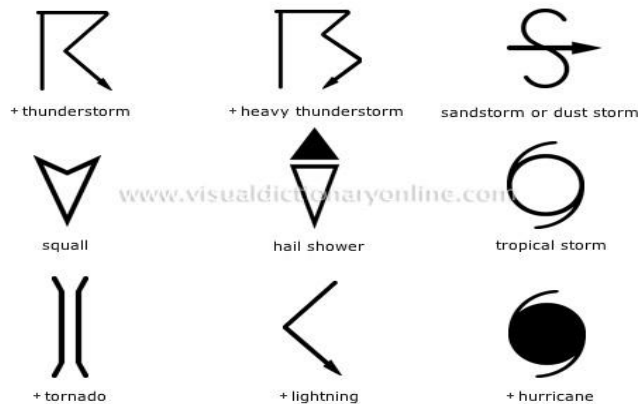
For Radar images of the past 24 hours including mosaic of images:

[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>	