



## **India Meteorological Department**

### **FDP STORM Bulletin No. 90 (04-06-2018)**

#### **1. CURRENT SYNOPTIC SITUATION:**

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

- ♦ Southwest monsoon has further advanced into some more parts of South Interior Karnataka, remaining parts of Tamilnadu & Puducherry, some parts of Rayalaseema and Coastal Andhra Pradesh, remaining parts of Southwest Bay of Bengal and some more parts of Westcentral Bay of Bengal .The Northern Limit of Monsoon (NLM) passes through Lat. 14°N/ Long. 60°E, Lat. 14°N/ Long. 70°E, Shirali, Chitradurga, Arogyavaram, Sriharikota, Lat. 14°N/ Long. 85°E, Lat. 19°N/ Long. 90°E, Agartala, Lumding, north Lakhimpur and Lat. 29°N/ Long. 95°E. Conditions are becoming favorable for further advance of Southwest Monsoon into some more parts of Central Arabian Sea, remaining parts of Karnataka and Rayalaseema, some parts of south Konkan & Goa, Telangana, some more parts of Coastal Andhra Pradesh and Central Bay of Bengal during next 48hours. Conditions are very likely to become favorable for further advance of Southwest Monsoon into some more parts of Maharashtra, Telangana & Coastal Andhra Pradesh in subsequent 2-3 days.
- ♦ An East-West trough runs from Punjab to Gangetic West Bengal across Haryana, North Madhya Pradesh, north Chhattisgarh & Jharkhand extending upto 1.5 km above mean sea level.
- ♦ The cyclonic circulation over Punjab & neighbourhood now lies over Haryana & neighbourhood at 1.5 km above mean sea level embedded in the above trough.
- ♦ The cyclonic circulation over southwest Uttar Pradesh & neighbourhood persists and now seen at 1.5 km above mean sea level embedded in the above trough.
- ♦ The cyclonic circulation over Bihar & neighbourhood extending upto 1.5 km above mean sea level has merged with the above trough.
- ♦ A North-South trough at 1.5 km above mean sea level runs from the cyclonic circulation over southwest Uttar Pradesh to West Central Bay of Bengal off south Andhra Pradesh coast across East Madhya Pradesh, East Vidharbha & Telangana .
- ♦ The cyclonic circulation over Bangladesh & adjoining West Bengal persists and now seen between 3.1& 4.5 km above mean sea level.
- ♦ The cyclonic circulation over east Vidarbha & adjoining Chhattisgarh extending upto 0.9 km above mean sea level has become less marked.
- ♦ The cyclonic circulation over southwest Bay of Bengal off Tamilnadu & Srilanka Coasts now lies over West Central Bay of Bengal off Andhra Pradesh coast at 3.1 km above mean sea level.
- ♦ A cyclonic circulation lies over Southeast Arabian Sea off Kerala-Karnataka coasts and extends upto 0.9 km above mean sea level.
- ♦ The east-west shear zone roughly along Lat. 12°N over south Peninsular India persists and now seen between 3.1 & 7.6 km above mean sea level.

- ♦ The cyclonic circulation over East central & adjoining Southeast Arabian Sea at 3.1 km above mean sea level has merged with the above system.
- ♦ A Low Pressure Area is very likely to develop over North Bay of Bengal around 08th June.

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

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

##### Clouds descriptions within India:

###### North

Scattered low/medium clouds seen over East Uttar Pradesh.

###### East:

Broken low/medium clouds with embedded moderate to intense convection seen over extreme south Gangetic West Bengal, Northeast Assam, adjoining Nagaland. Scattered low/medium clouds with embedded isolated weak to moderate convection seen over rest parts of the region except southwest Bihar.

###### West:

Scattered low/medium clouds over south Konkan and Goa, Madhya Maharashtra, Marathwada.

###### South:

Scattered low/medium clouds with embedded moderate to intense convection seen over Kerala and Nicobar Islands. Scattered low/medium clouds with embedded weak to moderate convection seen over Karnataka, West Tamil Nadu, Rest Bay Islands.

###### Arabian Sea:

Scattered low/medium clouds with embedded moderate to intense convection over Southeast and East central Arabian Sea and Comorin.

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

Scattered low/medium clouds with embedded moderate to intense convection seen over Bay of Bengal, south of Lat 15.5N and Bay between lat 17.5N to 21.5N east of long 88.5E Arakan Coast and Andaman Sea.

#### Past Weather:

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

Moderate to Intense convection was observed over North-East States Vidarbha Chhattisgarh Orissa Jharkhand Marthwada North Telengana Goa Karnataka Kerala Tamilnadu Lakshadweep Andaman & Nicobar Islands (.)

**OLR:-** Up to **230**  $\text{wm}^{-2}$  was observed over North-East States South Rayalseema South Konkan and Goa South Madhya Pradesh Orissa Jharkhand Karnataka Kerala Tamilnadu Lakshadweep Andaman Islands.  
& between **340-370**  $\text{wm}^{-2}$  was observed over Gujarat Rajasthan Madhya Pradesh Haryana Uttar Pradesh and Punjab (.)

##### Synoptic Features:

**Westerly Trough & Jet-Stream** - Westerly Trough & Jet-Stream are not observed over Indian region.

### **Dynamic Features:**

**Wind Shear, Vorticity & Convergence:** Wind shear up to 30-40 Kts is observed over Jammu and Kashmir Himachal Pradesh Uttarakhand 15-20 Kts over rest India (.)

Positive Shear tendency is observed over the country (.)

Vorticity (850 hPa) up to 250 is observed over Haryana Delhi Uttar Pradesh adjoining East Madhya Pradesh (.)

Positive low level convergence (5-10 Kts) observed over most parts of India except Orissa Konkan and GOA North Coastal Karnataka (.)

### **Precipitation:**

#### **IMR:**

Rainfall Up to 90 mm was observed over South Konkan and Goa South Interior Karnataka North-East Tamilnadu North-East Chhattisgarh North-West Orissa Bay Islands Lakshadweep (.)

Rainfall Up to 70 mm was observed over South Madhya Maharashtra Rest Karnataka Telangana Nagaland Manipur and Mizopur (.)

Rainfall Up to 10 mm was observed over South Gujarat Vidarbha Rest Chhattisgarh Rest Orissa Rest North East States.

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

DWR Chennai, Kochi, Thiruvananthapuram, Visakhapatnam, Machhilipatnam, Gopalpur, Paradip, Kolkata, Agartala, Patna, Goa domain indicates initiation of convection along the east and west coast of India, as well as east and northeast India at about 0920 UTC (1650 IST).

RAPID RGB Satellite imagery at 1230 IST as well as Meteosat II Generation MPE (Multisensor Precipitation Estimate) imagery of 0915 UTC (1445 IST) indicate that convection is starting to build up in eastern India as well as Karnataka and Konkan coasts 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 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	04.06.2018	05.06.2018
PM10 (micro-g/m3)	153	169
PM2.5 (micro-g/m3)	57	63

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

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

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

**Low level Cycirs, Troughs:**

**00 UTC Day0-4:** Weak CYCIR over north BoB at 850 hPa

**Confluence & wind Discontinuity regions:**

**12 UTC of Day-0 to Day-3:** N-S wind discontinuity over western UP adjoining Rajasthan extending to over Maharashtra.

**Synoptic systems:**

00 & 12 UTC of Day-1 to Day-2 at 500 hPa: Weak CYCIR over Kerala at 500 hPa

00 & 12 UTC of Day-3 to Day-4 at 500 hPa: Weak CYCIR over coastal AP and Odisha

**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: West\_MP, Marathwada, NI\_Karnataka, SI\_Karnataka,

Day1: West\_MP, Marathwada,

Day2: East\_MP,

Day3: Nil

Day4: Nil

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

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

Day0: Assam\_Meghalaya, TN\_Puducherry,

Day1: TN\_Puducherry,

Day2: Jammu\_Kashmir, Vidarbha, TN\_Puducherry,

Day3: TN\_Puducherry, Kerala,

Day4: East\_MP, Vidarbha, Chhattisgarh, 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, Jharkhand, Bihar, Uttarakhand, Himachal\_Pradesh, Jammu\_Kashmir, Odisha, Guj\_Reg, Saurashtra\_Kutch, Konkan\_Goa, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana, Rayalseema, TN\_Puducherry, NI\_Karnataka, SI\_Karnataka,

Day1: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Jharkhand, Bihar, East\_UP, Uttarakhand, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, Odisha, Guj\_Reg, Saurashtra\_Kutch, Konkan\_Goa, Madhya\_Maharashtra, Marathwada, Chhattisgarh, Coastal\_AP, Telangana, Rayalseema, NI\_Karnataka, SI\_Karnataka

Day2: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Uttarakhand, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, Odisha, East\_MP, Saurashtra\_Kutch, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana, Rayalseema, NI\_Karnataka, SI\_Karnataka,

Day3: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Uttarakhand, Himachal\_Pradesh, Jammu\_Kashmir, Odisha, East\_MP, Guj\_Reg, Saurashtra\_Kutch, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana, NI\_Karnataka,

Day4: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Jharkhand, Bihar, East\_UP, West\_UP, Uttarakhand, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, Odisha, West\_MP, East\_MP, Guj\_Reg, Saurashtra\_Kutch, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana,

## **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\_MP, Guj\_Reg, Saurashtra\_Kutch, Konkan\_Goa, Madhya\_Maharashtra, NI\_Karnataka,

Day1: Arunachal\_Pradesh, Sub\_Himalayan\_WB, Uttarakhand, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, Saurashtra\_Kutch,

Day2: Arunachal\_Pradesh, Sub\_Himalayan\_WB, Uttarakhand, Punjab, Himachal\_Pradesh, Jammu\_Kashmir,

Day3: Arunachal\_Pradesh, Sub\_Himalayan\_WB, Uttarakhand, Himachal\_Pradesh, Jammu\_Kashmir, Vidarbha,

Day4: Arunachal\_Pradesh, Sub\_Himalayan\_WB, Uttarakhand, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, East\_MP, Vidarbha, Chhattisgarh,

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

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

Day0: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Jharkhand, East\_UP, West\_UP, Uttarakhand, Hry\_Chhd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, Odisha, West\_MP, East\_MP, Guj\_Reg, Saurashtra\_Kutch, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana, Rayalseema, TN\_Puducherry, NI\_Karnataka, SI\_Karnataka,

Day1: Arunachal\_Pradesh, NE\_NMMT, Sub\_Himalayan\_WB, Jharkhand, East\_UP, West\_UP, Uttarakhand, Hry\_Chhd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, East\_RJ, Odisha, West\_MP, East\_MP, Guj\_Reg, Saurashtra\_Kutch, Konkan\_Goa, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana, Rayalseema, TN\_Puducherry, NI\_Karnataka, SI\_Karnataka,

Day2: Arunachal\_Pradesh, NE\_NMMT, Sub\_Himalayan\_WB, Jharkhand, East\_UP, West\_UP, Uttarakhand, Hry\_Chhd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, East\_RJ, Odisha, West\_MP, East\_MP, Guj\_Reg, Saurashtra\_Kutch, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana, Rayalseema, TN\_Puducherry, NI\_Karnataka, SI\_Karnataka,

Day3: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Jharkhand, Bihar, East\_UP, West\_UP, Uttarakhand, Hry\_Chhd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, Odisha, West\_MP, East\_MP, Guj\_Reg, Saurashtra\_Kutch, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana, Rayalseema, TN\_Puducherry, NI\_Karnataka,

Day4: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Jharkhand, Bihar, East\_UP, West\_UP, Uttarakhand, Hry\_Chhd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, East\_RJ, Odisha, West\_MP, East\_MP, Guj\_Reg, Saurashtra\_Kutch, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana,

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

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

Day1: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Himachal\_Pradesh, Konkan\_Goa, Andaman\_Nicobar, Coastal\_Karnataka, SI\_Karnataka, Kerala,

Day2: Assam\_Meghalaya, NE\_NMMT, Uttarakhand, Himachal\_Pradesh, Jammu\_Kashmir, Konkan\_Goa, Madhya\_Maharashtra, Marathwada, Andaman\_Nicobar, Telangana, Coastal\_Karnataka, NI\_Karnataka, SI\_Karnataka, Kerala,

Day3: Assam\_Meghalaya, NE\_NMMT, West\_UP, Uttarakhand, Himachal\_Pradesh, Odisha, East\_MP, Konkan\_Goa, Marathwada, Chhattisgarh, Andaman\_Nicobar, Coastal\_AP, Telangana, Rayalseema, TN\_Puducherry, Coastal\_Karnataka, NI\_Karnataka, SI\_Karnataka, Kerala,

Day4: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, East\_UP, Uttarakhand, Himachal\_Pradesh, Odisha, Konkan\_Goa, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Andaman\_Nicobar, Coastal\_AP, Telangana, Rayalseema, TN\_Puducherry, Coastal\_Karnataka, NI\_Karnataka, SI\_Karnataka, Kerala,

Day5: Assam\_Meghalaya, NE\_NMMT, West\_UP, Uttarakhand, Hry\_Chhd\_Delhi, Himachal\_Pradesh, Jammu\_Kashmir, Odisha, East\_MP, Konkan\_Goa, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Andaman\_Nicobar, Coastal\_AP, Telangana, TN\_Puducherry, Coastal\_Karnataka, NI\_Karnataka, SI\_Karnataka, Kerala,

**\*\* Heavy rainfall activity > 8cm at few places along west coast in Day 4-5 (includes Mumbai)**

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

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

The analysis based on 00 UTC indicates a cyclonic circulation over Haryana and adjoining Punjab in lower Troposphere (850hPa). The forecast shows it will merge with Trough on day1. An East- West Oriented Trough extends from Punjab to Gangetic West Bengal across Haryana, North Madhya Pradesh, North Chhattisgarh and Jharkhand. The forecast shows it will persist till day1. Analysis shows another cyclonic circulation over South West Uttar Pradesh and adjoining area. The forecast shows It will persist till day3 with South-westward shift. The analysis shows a North- South Trough extends from this cyclonic circulation to West Central Bay of Bengal off South Andhra Pradesh coast across East Madhya

Pradesh, East Vidharbha and Telangana. The forecast shows it will become less marked on day1. Another cyclonic circulation is seen in the analysis over Southeast Arabian sea off Kerala-Karnataka in lower Troposphere (925hPa). The Forecast shows it will persist till day3 with slight Northward shift.

## **2. Location of Jet and Jet Core (>60kt) at 500hPa:**

Although the presence of strong westerlies is found over some Eastern parts of India but no jet core over the Indian region for the next 3 days.

## **3. Low Level Vorticity {850hPa Positive Vorticity ( $>12 \times 10^{-1}/s$ ):850hPa Positive Vorticity ( $>12 \times 10^{-1}/s$ ):.**

Low level Positive Vorticity is seen mostly along the East-West Trough, around the cyclonic circulations, central parts of India, Punjab, Northwest Rajasthan, Madhya Pradesh, Vidharbha and adjoining areas during next 3 days; Low level Positive Vorticity is also seen over parts Tamil Nadu and Kerala on day 2..

## **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, Bihar, Jharkhand, Gangetic West Bengal, SHWB, Orissa, coastal Maharashtra, Konkan & Goa, coastal and Interior Karnataka, Tamil Nadu, Telangana, Rayalaseema, Madhya Maharashtra, Marathwada, Vidharbha, Chhattisgarh, East and west Madhya Pradesh, Andhra Pradesh, along east and west coast of India during next 3 days; over parts of J&K, Haryana, Punjab, parts of west Uttar Pradesh on day 1; over parts of Assam, Meghalaya, Tripura, Sikkim and adjoining areas on day 2; over parts of Punjab, Haryana, Delhi, West Uttar Pradesh, Sikkim and NE states on day 3; Significant zone lies over Gujarat, Rajasthan, Orissa, Andhra Pradesh, Madhya Pradesh, Madhya Maharashtra and North coastal Maharashtra.

**Lifted Index (< -2):** Similar to T-storm Index lies over Gujarat, Rajasthan, J&K, Himachal Pradesh, Uttarakhand, Haryana, Gangetic plains and along east and west coast of India with an extension over Interior Karnataka and Telangana, East Uttar Pradesh, West Uttar Pradesh, Bihar, Jharkhand, Madhya Pradesh, Orissa, SHWB, Assam, Arunachal Pradesh, Meghalaya, Mizoram, Tripura, Nagaland and adjoining areas, Telangana, Vidharbha, Chhattisgarh, Andhra Pradesh, coastal Maharashtra, Konkan & Goa, coastal and Interior Karnataka, Kerala, Tamil Nadu, Madhya Maharashtra and Marathwada on day 1; on day 2 it remains over the same region but disappears over parts of J&K, Haryana, Himachal Pradesh, Uttarakhand and West Uttar Pradesh; on day 3 it remains over same region but disappear over J&K, Himachal Pradesh, Uttarakhand and appears over Punjab and Haryana..

**Total Total Index (> 50):** Higher than Threshold value of the Index is seen over parts of J&K, Himachal Pradesh, Uttarakhand, Gujarat, East and Southeast Rajasthan, Uttar Pradesh, Chhattisgarh, Vidharbha, Telangana, Karnataka, Andhra Pradesh, Madhya Pradesh, Madhya Maharashtra, Marathwada, coastal Maharashtra, Orissa, Sikkim and Arunachal Pradesh and mainly over most of the parts of the country except extreme South Peninsular India, North west Rajasthan, Punjab, Haryana, Delhi, Assam, Tripura, Meghalaya, Mizoram, Nagaland and Manipur on day 1 and 2; it also appears over parts of Punjab on day 2; over parts J&K, Himachal Pradesh, Uttarakhand, Punjab, Haryana, Delhi, East Rajasthan, Uttar Pradesh, Gujarat, Madhya Maharashtra, Marathwada, Vidharbha, Telangana, Chhattisgarh, Sikkim and Arunachal Pradesh adjoining areas on day 3.

**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, Himachal Pradesh, Uttarakhand, Foothills of Himalaya, Arunachal Pradesh and adjoining areas during next 3 days.



**CAPE (> 1000):** Mostly seen over parts of Gujarat, South Rajasthan, along west coast and east coast, GWB, Orissa, Bihar, Jharkhand, Andhra Pradesh, Rayalaseema, coastal Tamil Nadu, Karnataka, Konkan and Goa, Telangana, coastal Maharashtra including Mumbai, Madhya Maharashtra, Marathwada, Vidharbha, Chhattisgarh, East and West Madhya Pradesh, Sikkim, NE states and adjoining areas during next 3 days; maximum value of the index is seen over parts of GWB, Orissa, coastal and Interior Andhra Pradesh, coastal areas along the East coast, Gujarat, North coastal Maharashtra including Mumbai.

**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 some parts of Northwest Rajasthan; significant zone with highest value of the index lies over parts of Gujarat and West Rajasthan.

## **5. Rainfall Activity:**

70-130 mm Rainfall: over parts of South Interior Karnataka on day 1; over parts of Telangana and coastal Karnataka on day 3.

40-70 mm Rainfall: over parts of Kerala, South Interior Karnataka and Mizoram on day 1; over parts of Meghalaya and North Interior Karnataka on day 2; over parts of Telangana, Chhattisgarh, Konkan and Goa, coastal Karnataka, North Kerala, Andhra Pradesh and Madhya Maharashtra on day 3.

10-40 mm Rainfall: over parts of J&K, Himachal Pradesh, Uttarakhand, Foothills of Himalaya, Bihar, Jharkhand, Sikkim, NE states, GWB, SHWB Orissa, Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Madhya Maharashtra, Marathwada coastal Maharashtra, Konkan and Goa during next 3 days; over parts of Telangana on day 2; over parts of Telangana, Chhattisgarh and East Vidharbha on day 3.

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

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

### **1. Model Reflectivity (Max. dBz):**

**>25 dBZ Model Reflectivity:** >25 dBZ Model Reflectivity: On day 1, over parts of Kerala, Tamil Nadu, Karnataka, NE states, Orissa, Bihar, Jharkhand, GWB, SHWB, Sikkim, Telangana, Rayalaseema, Andhra Pradesh, Madhya Maharashtra, Marathwada, Vidharbha, coastal Maharashtra including Mumbai, Konkan and Goa; On day 2 over parts of Karnataka, Kerala, Tamil Nadu, GWB, Jharkhand, Orissa, Andhra Pradesh, Chhattisgarh and adjoining Telangana; On day 3 mostly over parts of Kerala, Tamil Nadu, Andhra Pradesh, GWB, Jharkhand, Orissa, Sikkim, NE states, Madhya Maharashtra, Marathwada, Chhattisgarh, East Madhya Pradesh, Vidharbha, Karnataka, Telangana, Rayalaseema, Konkan and Goa, Uttarakhand and adjoining West Uttar Pradesh.

### **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 Gujarat, 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, East Madhya Pradesh, Vidharbha and NE states during next 3 days; below threshold value is also seen over parts of J&K, Punjab, Haryana, Delhi and adjoining areas on 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 Gujarat, Madhya Pradesh, Vidharbha, Interior Karnataka, Telangana, Chhattisgarh, Kerala, Tamil Nadu, Andhra Pradesh, Orissa, Bihar, Jharkhand, Uttar Pradesh, Himachal Pradesh, Uttarakhand, J&K, Punjab, Haryana, Delhi, Rajasthan, GWB, SHWB, South Madhya Maharashtra, Marathwada, Konkan and Goa, South coastal Maharashtra, 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, Konkan & Goa, coastal areas along the east coast, SHWB, GWB, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Bihar, Jharkhand, Telangana, Rayalaseema, Madhya Maharashtra, Marathwada, East and West Madhya Pradesh, Chhattisgarh, Vidharbha and NE states during next 3 days; over parts of West Uttar Pradesh, West Rajasthan and Uttarakhand on day 2; over parts of Punjab, Himachal Pradesh, Uttarakhand, Haryana and West Uttar Pradesh on day 3; Maximum value of the index is seen over the parts of Orissa, GWB, coastal and Interior Andhra Pradesh, coastal Tamil Nadu, some parts of Telangana, Sikkim and NE states.

**CIN (50-150):** the value of the index lies in above range over most of the parts of the country except some parts of North West Rajasthan on day 1; and over most of the parts of the country except Eastern parts of the country Bihar, Jharkhand, GWB, SHWB and North Orissa on day 2 and 3; it has significant larger values over North-western and Central parts of country including J&K, Punjab, Haryana, Gujarat, Rajasthan, Madhya Pradesh, Vidharbha, Madhya Maharashtra and Marathwada.

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

70- 130 mm Rainfall: over parts of Mizoram, coastal Karnataka adjoining North Kerala on day 1; over parts of Orissa on day 2 and 3; over parts of Kerala, coastal Karnataka, Konkan and Goa on day 3.

40- 70 mm Rainfall: over parts of Kerala and coastal Karnataka during next 3 days; over parts of Manipur, Mizoram and adjoining areas on day 1; over parts of Jharkhand, Orissa, Chhattisgarh, Andhra Pradesh and Madhya Pradesh on day 2; over parts of Uttarakhand, Sikkim, Assam, Orissa, Telangana, Chhattisgarh, Andhra Pradesh, South coastal Maharashtra, Konkan and Goa on day 3.

10- 40 mm Rainfall: Over parts of Kerala, Tamil Nadu, Karnataka, Konkan and Goa, Andhra Pradesh, Sikkim, GWB, SHWB, Foothills of Himalaya, Bihar, Jharkhand, Orissa, coastal Maharashtra, Madhya Maharashtra and NE states during next 3 days; over parts of Chhattisgarh, Himachal Pradesh and Uttarakhand on day 2; over parts of East Uttar Pradesh, Vidharbha, Telangana and Marathwada on day 3

Up to 10 mm Rainfall: Over parts of J&K, Himachal Pradesh, Uttarakhand, Foothills of Himalaya, Kerala, Tamil Nadu, Karnataka, Konkan and Goa, Sikkim, GWB, SHWB, East Uttar Pradesh, Bihar, Jharkhand, Chhattisgarh, Orissa, Telangana, Rayalaseema, Madhya Maharashtra, coastal Maharashtra, Vidharbha, Marathwada, Madhya Pradesh, Andhra Pradesh, Gujarat and NE states during next 3 days; Over parts of Punjab, Haryana and West Uttar Pradesh on day 2 and 3; over parts of Rajasthan, Delhi and adjoining areas on day 3.

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

#### Summary and Conclusions:

o Most thermodynamic indices (T-STORM Initiation Index, K-Index, Lifted Index, CAPE) from IMDGFS deterministic model indicate high probability of thunderstorm occurrence over the central and south peninsular Indian region, excluding Northwest Indian region; with maximum values over Gujarat region on day 1 and increasing in intensity over the same location as well as central India on day 2. SWEAT index, which accounts for the wind shear between 850 and 500 hPa levels in addition to thermodynamic parameters, indicates a similar pattern, with highest probability of convection over central India on day 1 and day 2. The 850-200 hPa wind shear is weak over the Indian region excluding the Jammu region on day 1 and increasing over Rajasthan region on day 2. The reflectivity forecast values from IMD WRF model indicates highest probability of rainfall over southwest peninsular India on day 1 and over the region of Andhra Pradesh on day 2.

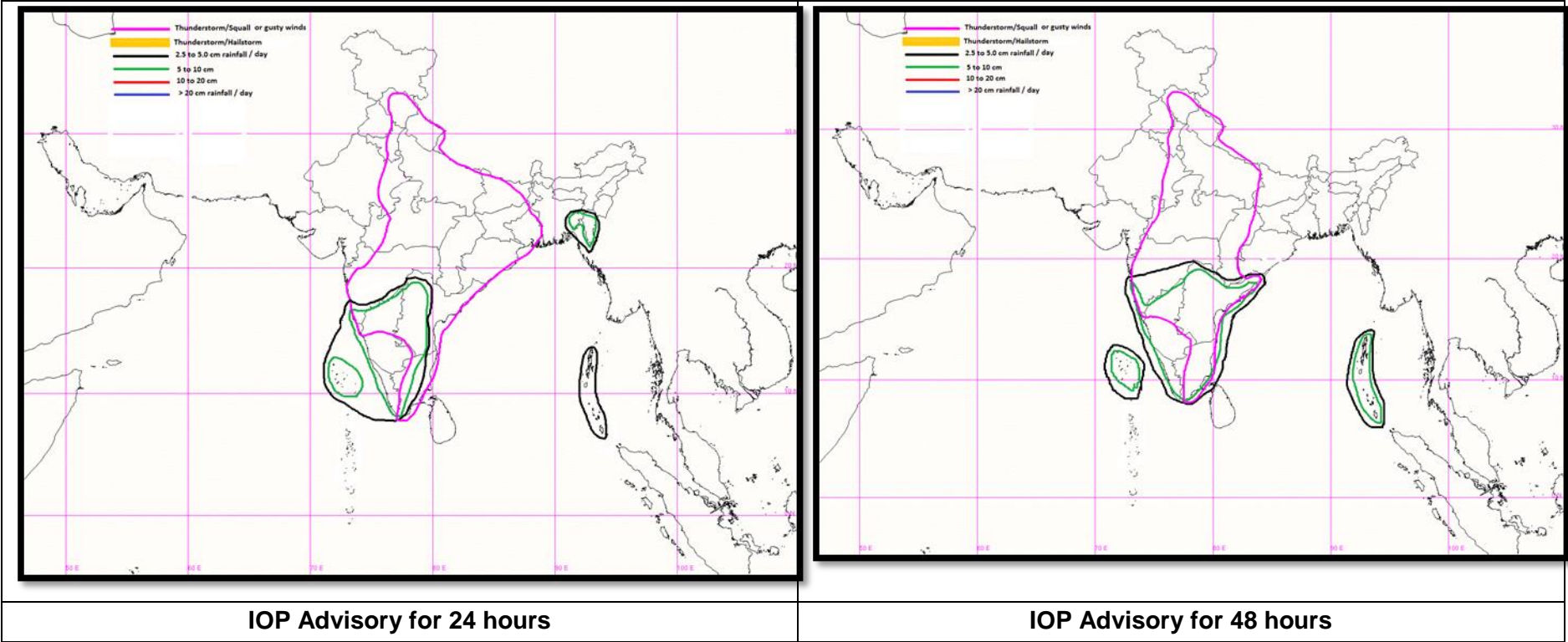
o Synoptic analysis indicates that an East-West trough runs from Punjab to Gangetic West Bengal, in which three cyclonic circulations are embedded; (a) cyclonic circulation over over Haryana & neighbourhood (b) cyclonic circulation over southwest Uttar Pradesh & neighbourhood and (c) cyclonic circulation over Bihar & neighbourhood. The easterly flow into north India to the north of the troughline is likely to bring moisture into north India. This is likely to result in convective activity throughout north India in the afternoon. The IMD GFS deterministic model indicates that towards the afternoon of day 1, the circulation over Bihar & neighbourhood is likely to become more prominent. Some isolated heavy rainfall spells are expected over Tripura and Mizoram on day 1 in association with the circulation as well as the circulation in the middle levels over Bangladesh.

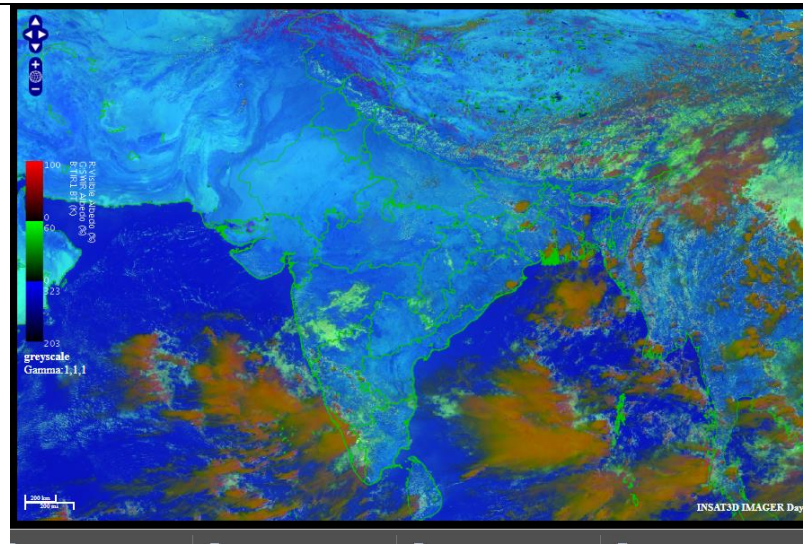
o Synoptic analysis also indicates that there are two cyclonic circulation over South India (a) in the mid-levels over West Central Bay of Bengal off Andhra Pradesh and (b) in the lower levels over Southeast Arabian Sea off Kerala-Karnataka coasts. The eastwest shear zone at upper levels over south Peninsular India persists along Lat. 12°N. This is likely to bring weather with isolated heavy showers throughout the peninsular India on day 1 and 2.

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

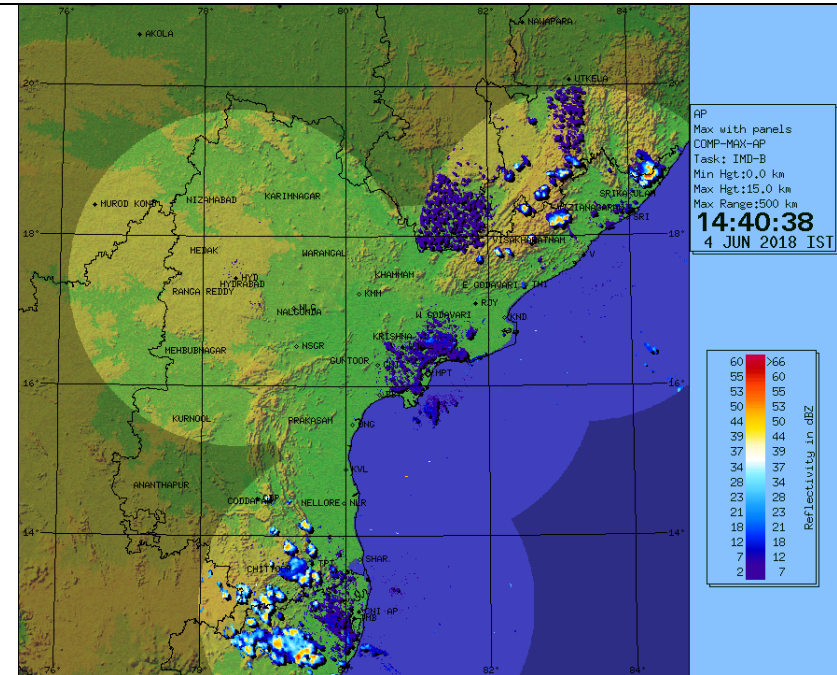
<b>24 hour Advisory for IOP:</b>	<b>48 hour Advisory for IOP:</b>
<p><b>Significant Rainfall:</b> Kerala, Telangana, Rayalaseema, Lakshadweep, Interior Tamil Nadu, Karnataka Mizoram, Tripura Andaman and Nicobar Islands</p> <p><b>Thunderstorm with squall or gusty winds:</b> Tamilnadu, North Interior Karnataka, Telengana, Coastal Andhra Pradesh, Rayalaseema Konkan and Goa, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Madhya Pradesh, Uttarakhand, Uttar Pradesh, Himachal Pradesh Gangetic West Bengal, Jharkhand, Bihar, Odisha</p> <p><b>Thunderstorm with squall and hail</b> Nil</p> <p><b>Thunderstorm with Duststorm:</b> East Rajasthan</p> <p><b>Dust Storm:</b> West Rajasthan</p>	<p><b>Significant Rainfall:</b> Kerala, Telangana, Rayalaseema, Coastal Andhra Pradesh, Karnataka, Tamil Nadu, Lakshadweep Andaman &amp; Nicobar Islands</p> <p><b>Thunderstorm with squall or gusty winds:</b> Tamilnadu, North Interior Karnataka, Telengana, Coastal Andhra Pradesh, Rayalaseema, Lakshadweep Madhya Maharashtra, Marathwada, Konkan and Goa Vidarbha, Chhattisgarh, Madhya Pradesh, Uttarakhand, Uttar Pradesh, Himachal Pradesh</p> <p><b>Thunderstorm with squall and hail</b> Nil</p> <p><b>Thunderstorm with Duststorm:</b> East Rajasthan</p> <p><b>Dust Storm:</b> West Rajasthan</p>

Graphical Presentation of Potential Areas for Severe Weather:



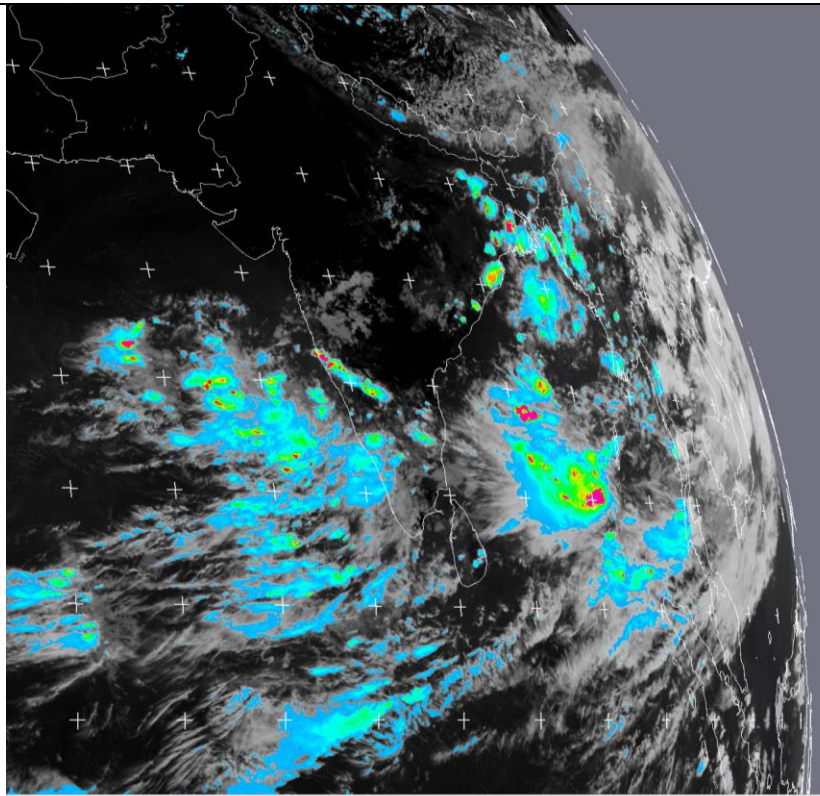


**RAPID RGB Imagery at 1230 IST of the Day**



**DWR mosaic reflectivity image at 1440 IST**

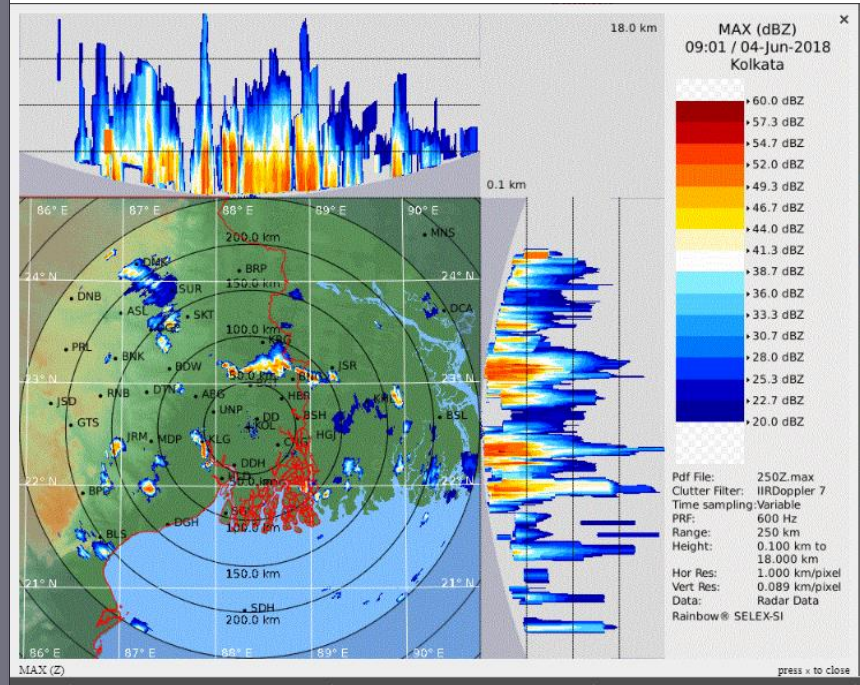




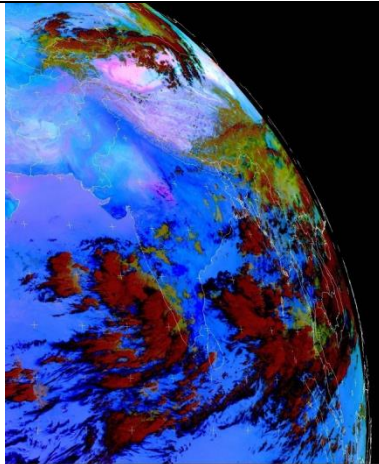
EUMETSAT

MPEF MPE, 2018-06-04 09:15:00

Meteosat II Generation MPE (Multisensor Precipitation Estimate) imagery of 0915 UTC

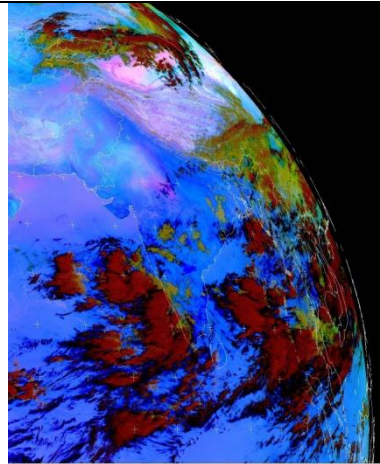


DWR Kolkata imagery at 0901 UTC



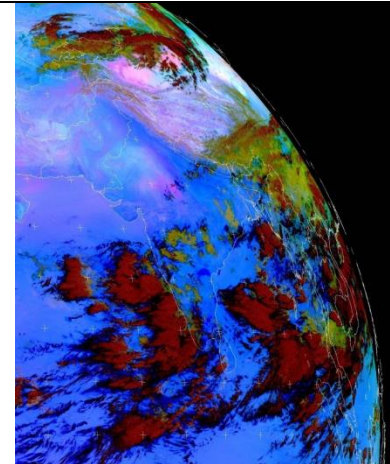
EUMETSAT

Meteosat IODC Dust, 2018-06-04 06:00:00



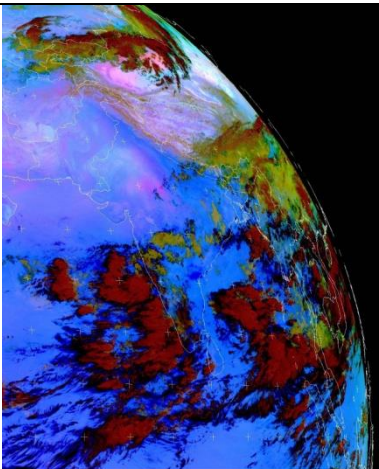
EUMETSAT

Meteosat IODC Dust, 2018-06-04 05:00:00



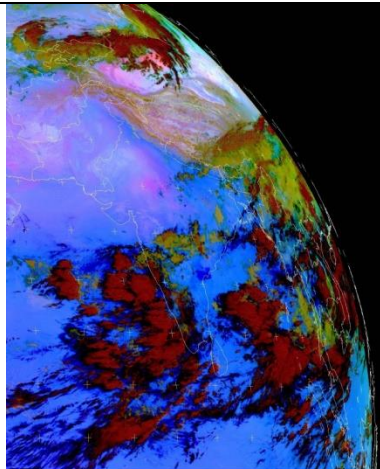
EUMETSAT

Meteosat IODC Dust, 2018-06-04 04:00:00



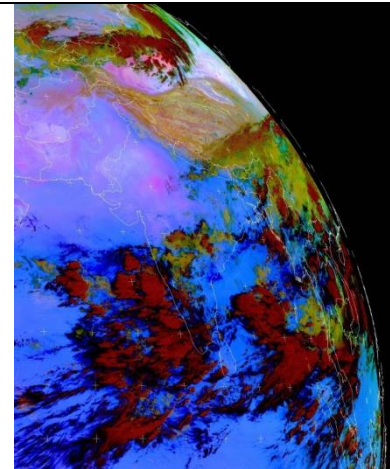
EUMETSAT

Meteosat IODC Dust, 2018-06-04 03:00:00



EUMETSAT

Meteosat IODC Dust, 2018-06-04 02:00:00



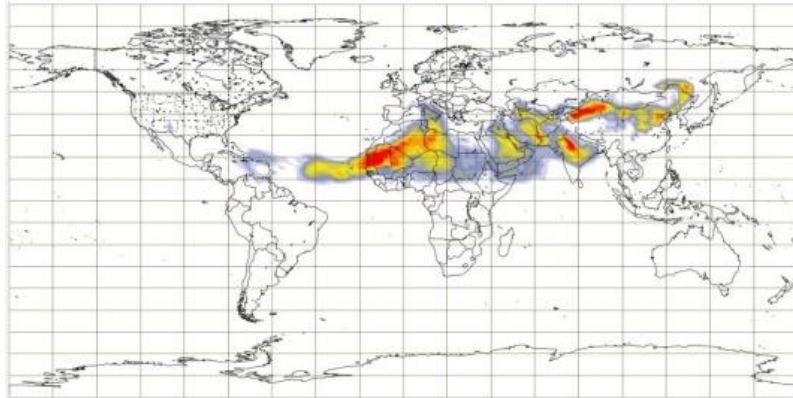
EUMETSAT

Meteosat IODC Dust, 2018-06-04 01:00:00

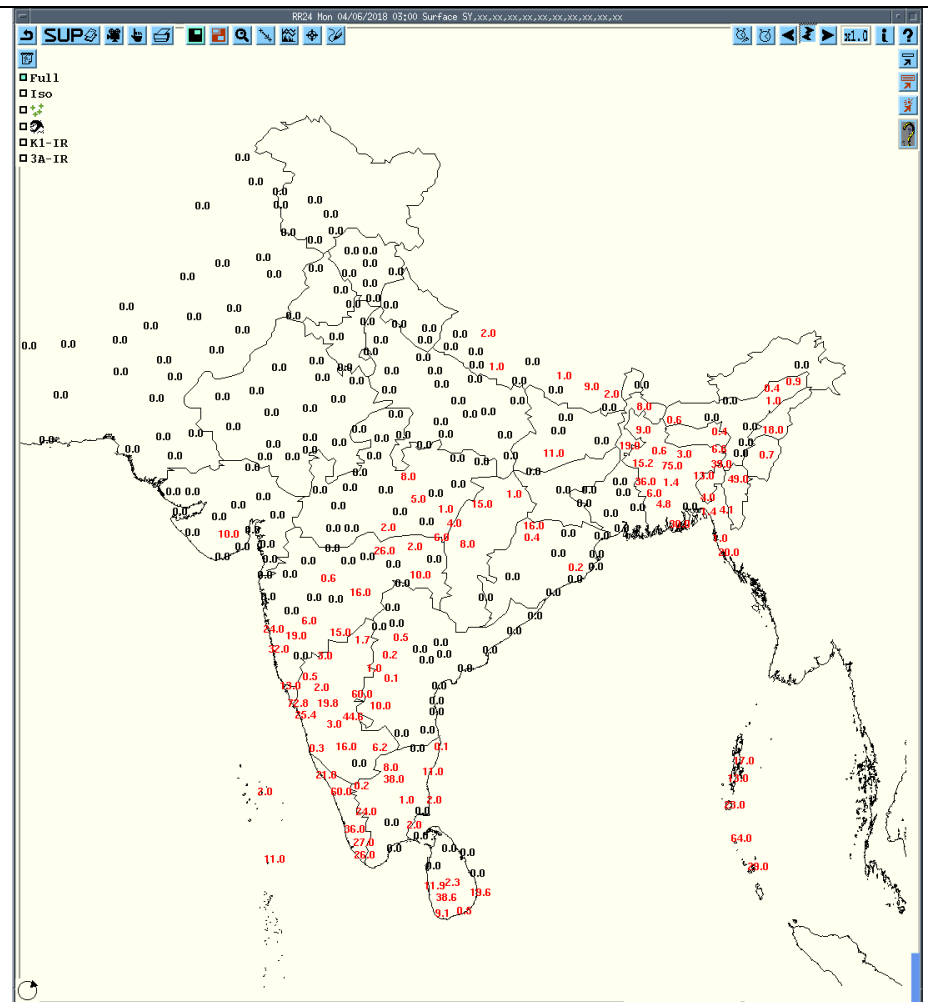
Observed Satellite Dust Images of today



Sunday 3 Jun, 00 UTC T+24 Valid: Monday 4 Jun, 00 UTC

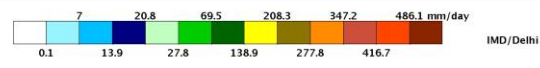
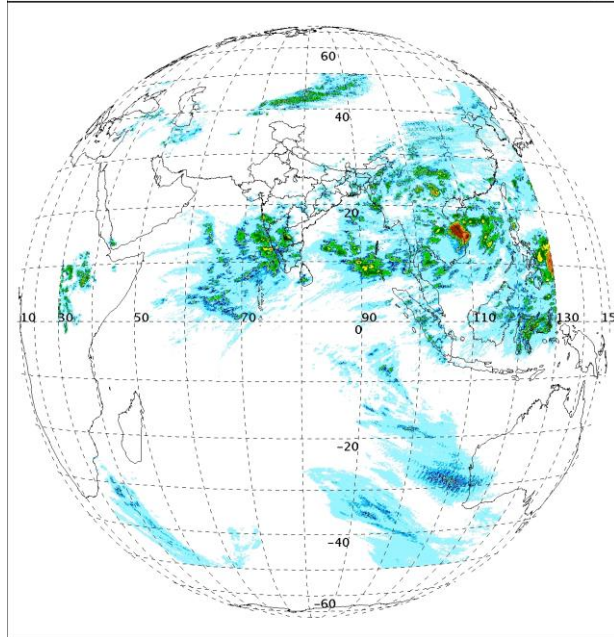


## Dust Forecast



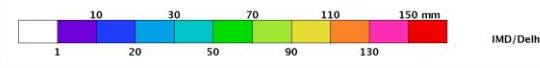
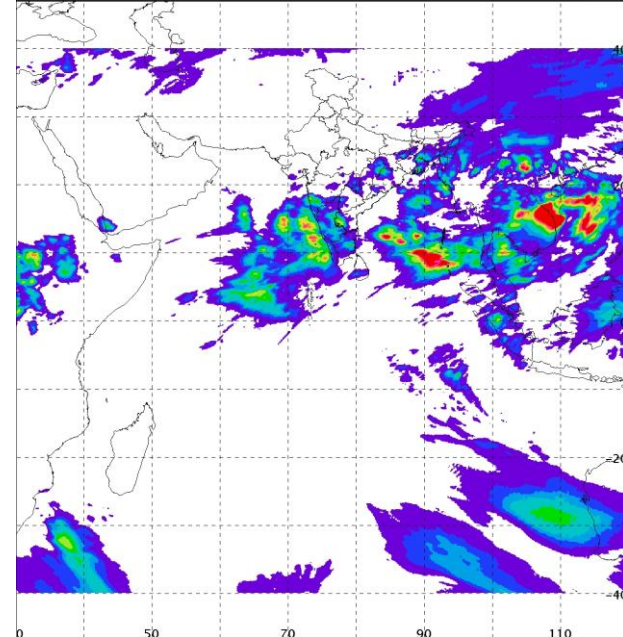
**Accumulated 24 Hour rainfall (in red) recorded  
at 0300UTC of today**

SAT :INSAT-3D IMG  
 03-06-2018 (03:30 GMT) to 04-06-2018 (03:00 GMT)  
 Precipitation(HE) Daily  
 L3B BINNED GEOPHYSICAL PARAMETER FULL DISK

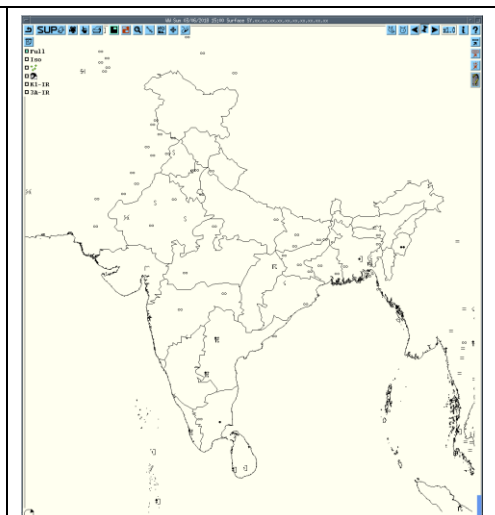
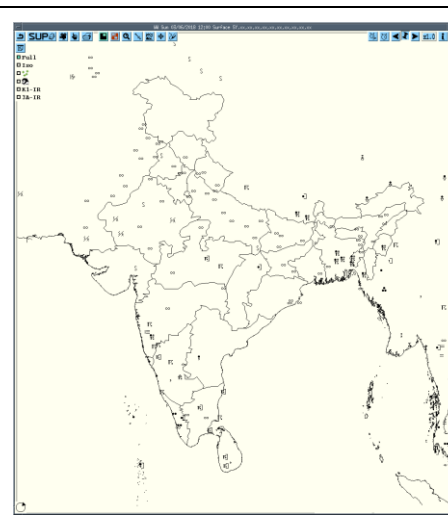
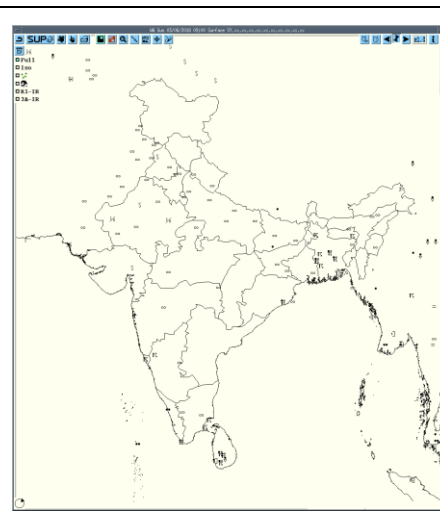
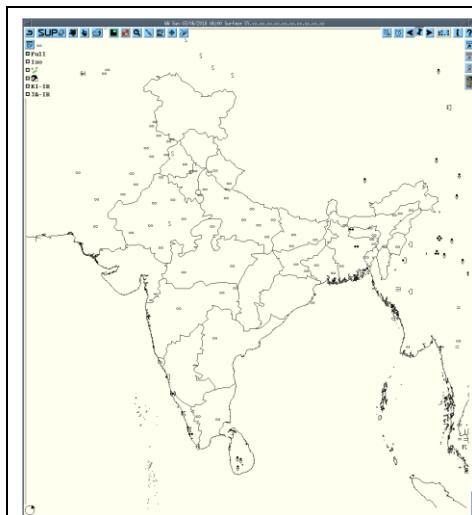


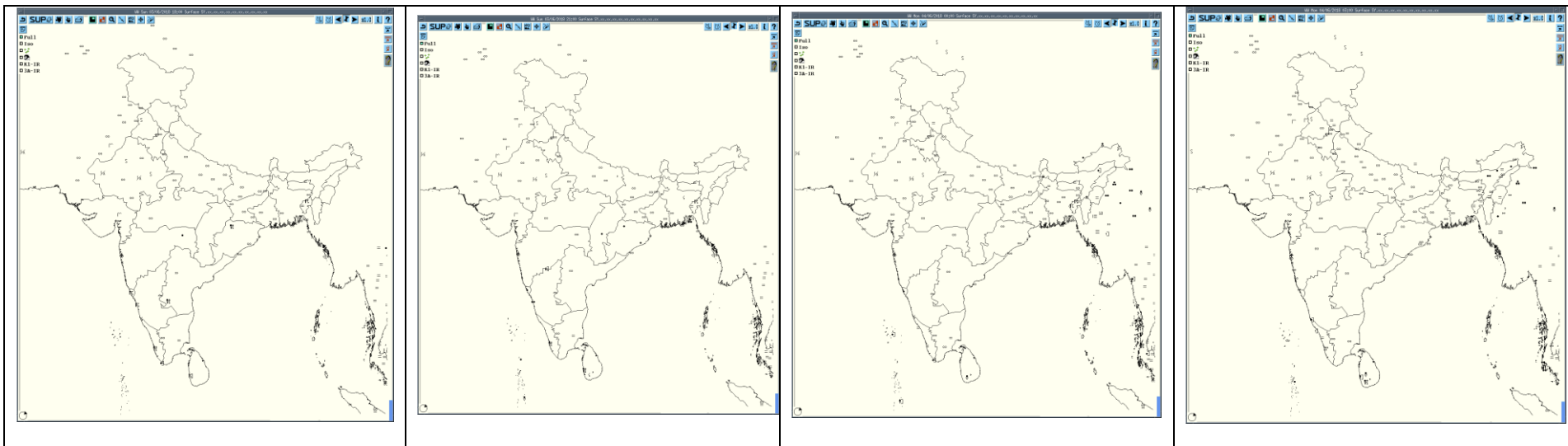
**HEM**

SAT :INSAT-3D IMG  
 03-06-2018 (03:30 GMT) to 04-06-2018 (03:00 GMT)  
 INSAT Multispectral Rainfall(Daily)  
 L3G BINNED GEOPHYSICAL PARAMETER GRIDDED

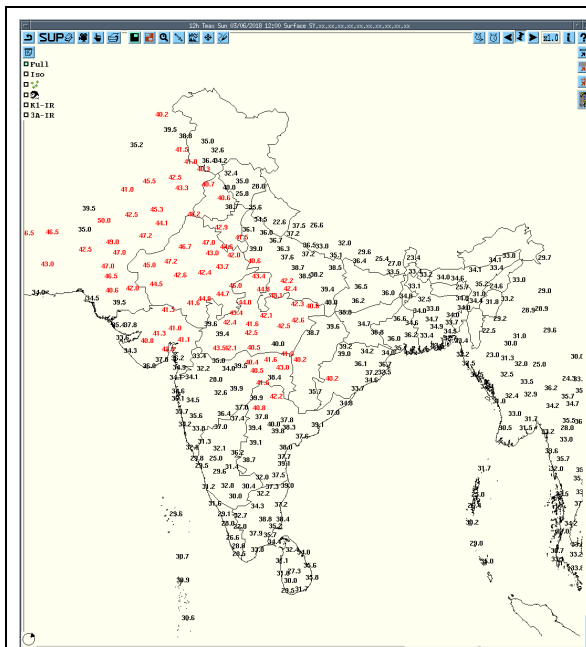


**IMR**

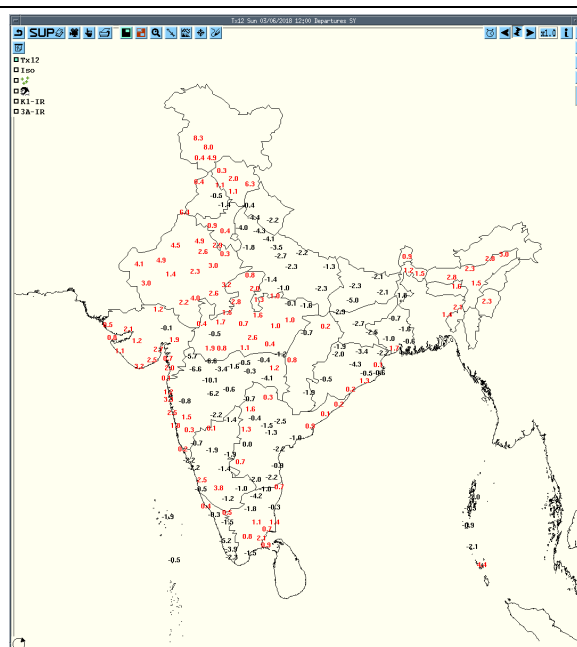




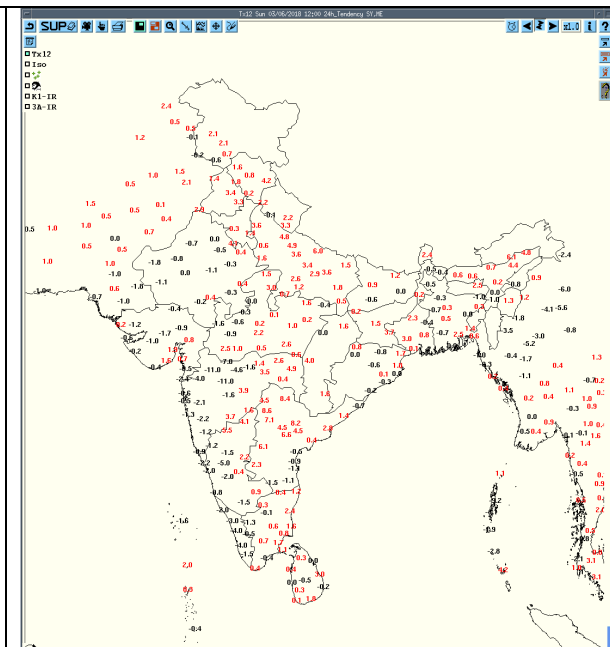
3hourly Past weather at 06, 09, 12, 15, 18, 21 UTC of yesterday and 00 & 03 hrs UTC of today



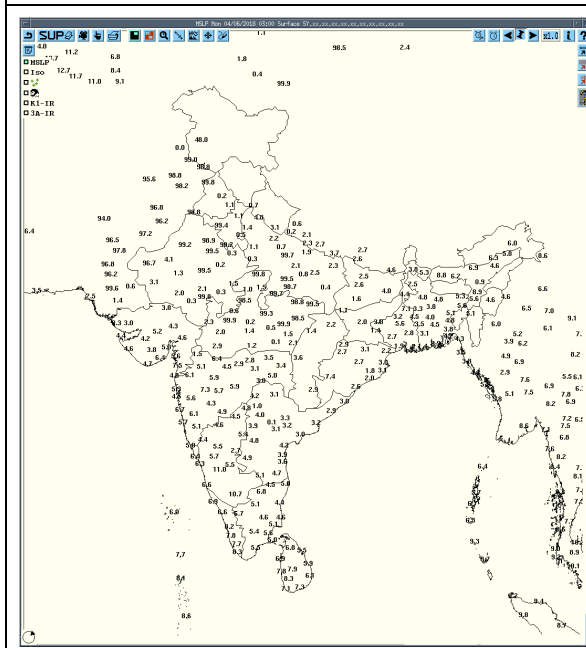
**Tmax**



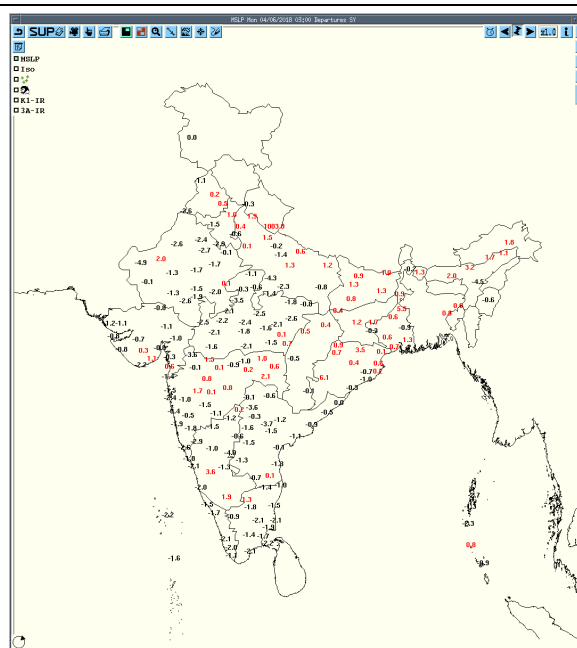
**Departure Tmax**



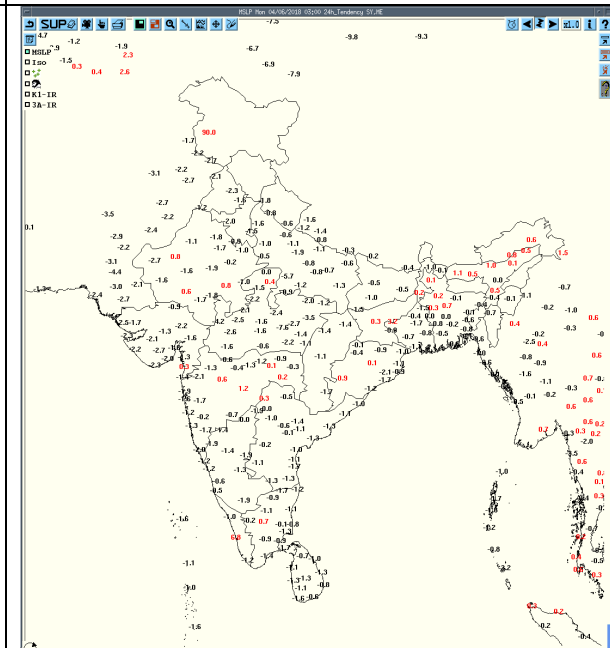
**Tendency Tmax**



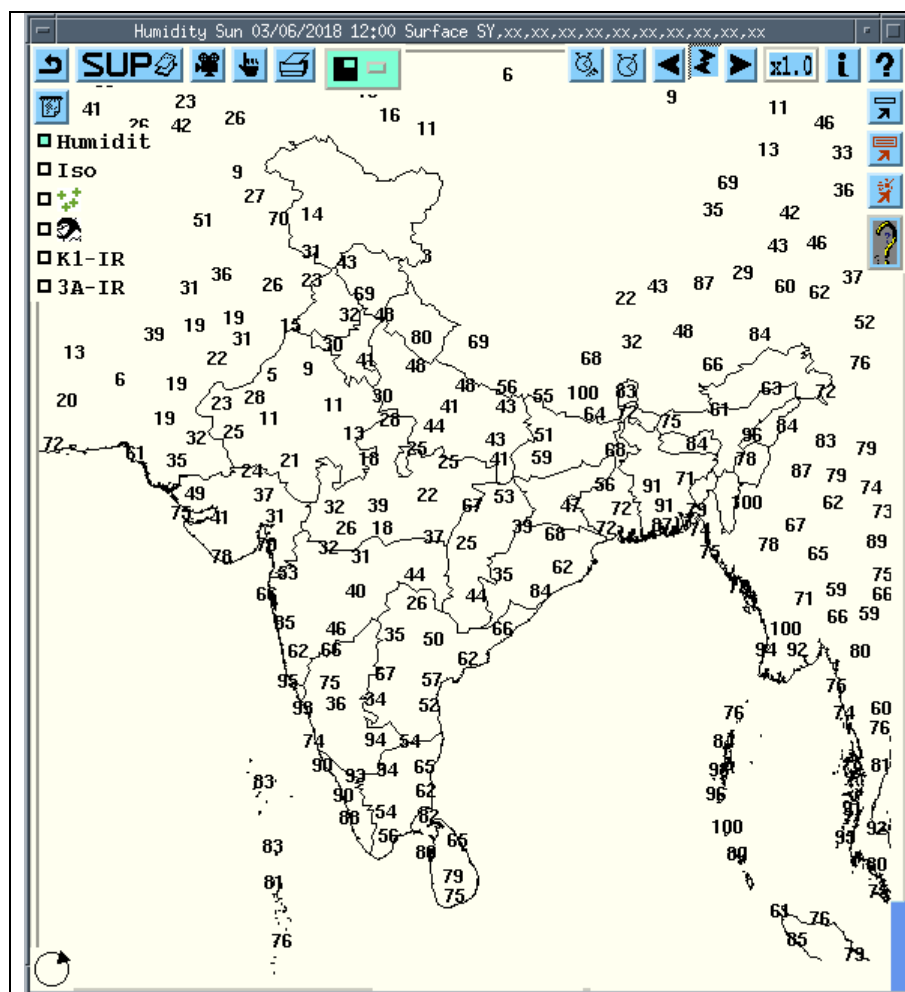
**MSLP**



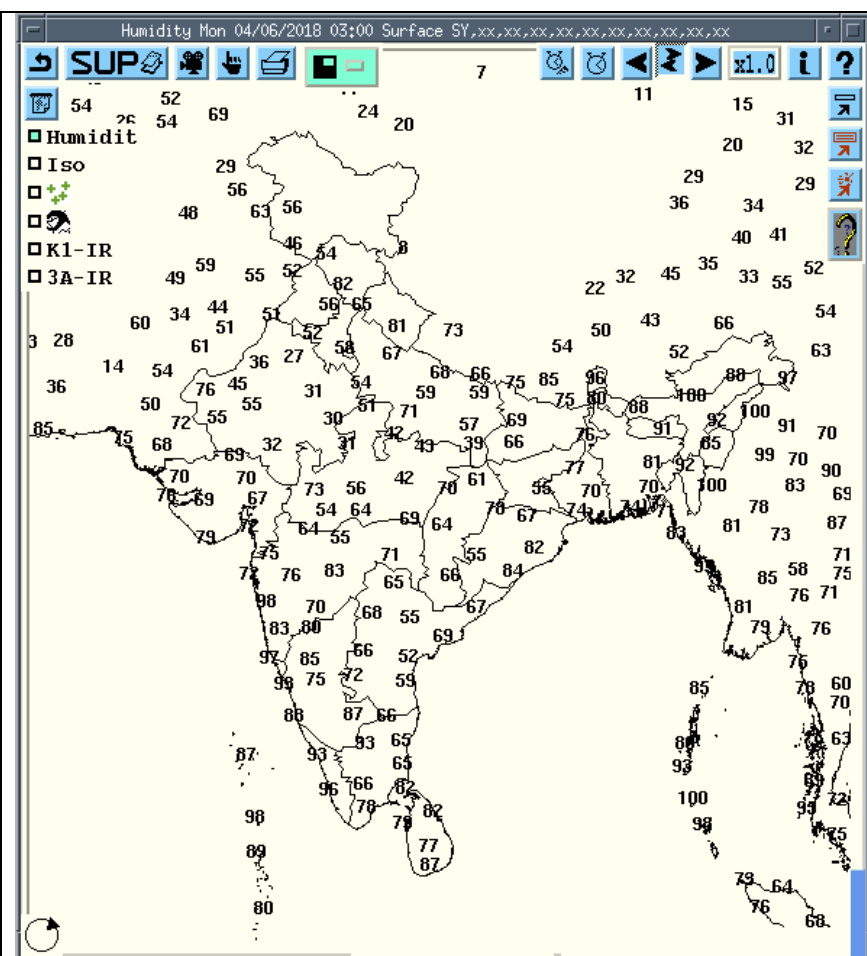
**Departure MSLP**



**Tendency MSLP**



RH at 1200UTC yesterday



RH at 0300UTC today

## Past 24 hours DWR Report:

Radar Station Name	Date	Time Interval of Observation (UTC)	Organisation of cells (Isolated single cells /multiple cells/ convective regions /squall lines) with height of 20 dBZ echo top and maximum reflectivity	Formation w.r.t. radar station and Direction of movement	Remarks	Associated Severe Weather if any	Districts affected
DWR KOLKATA	02-06-2018	0301---2351 UTC	NIL	NIL	Radar kept off due to maintenance/fault	NIL	NIL
	03-06-2018	2351---0301 UTC	NIL	NIL	Radar kept off due to maintenance/fault	NIL	NIL

Radar Station Name	Date	Time Interval Of Observation (UTC)	Organisation 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
PATNA 04/06/2018		030300 - 030650	NIL	N/A	N/A	N/A	N/A
		030650 - 030950	<b>Multiple Cell</b>  Maximum Reflectivity: <b>44.5 dBZ</b> Echo Top: <b>10 KM</b>	Range: <b>88.9 KM</b> from DWR Patna in <b>E</b> direction Movement: towards <b>Easterly</b>	Warning issued	N/A	BUXAR,ROHTAS,BHABHUA, BANKA,EAST AND WEST CHAMPARAN

	030810 - 031110	<b>Multiple Cell</b>  Maximum Reflectivity: <b>46.5 dBZ</b> Echo Top: <b>12.1 KM</b>	Range: <b>82.4 KM</b> from DWR Patna in NE direction Movement: towards <b>Easterly</b>	Warning issued	N/A	BHOJPUR,GAYA, SITAMADHI,SHEOHAR, MUZAFFARPUR
	030915 - 031215	<b>Multiple Cell</b>  Maximum Reflectivity: <b>46.5 dBZ</b> Echo Top: <b>09 KM</b>	Range: <b>39.1 KM</b> from DWR Patna in E direction Movement: towards N.E.	Warning issued	N/A	BHOJPUR,PATNA, SARAN,BANKA, BHAGALPUR,SIWAN
	031215 - 040110	NIL	N/A	N/A	N/A	N/A
	040110 - 040300	<b>SINGLE Cell</b>  Maximum Reflectivity: <b>40 dBZ</b> Echo Top: <b>08 KM</b>	Range: <b>117 KM</b> from DWR Patna in SSE direction Movement: towards N	Warning issued	N/A	NAWADA

Radar Station name	Date	Time interval of observation (UTC)	Organization of the cells (Isolated single cells/multiple cells/ convective regions/ squall lines) with height of 20 dBZ echo top and maximum reflectivity	Formation w.r.t radar station and Direction of movement	Remarks	Associate d severe weather if any	Districts affected
VISAKHAPATNAM	03/06/18	0600UTC	Isolated Cb cells in bay region with maximum reflectivity of 49 dbz with height of 6 kms	ESE (237 kms )moving S ly.	Since last observation cb cells dissipated at 0331 UTC and again isolated cb cells formed from 0411 UTC and dissipated at 0501 UTC with maximum of 49 dbz at 0431 UTC.	NIL	BAY OF BENGAL



VISAKHAPATNAM	03/06/18	0900UTC	Isolated Cb cells in bay region with maximum reflectivity of 45 dbz with height of 8 kms	(SE)200km	Since last observation cb cells dissipated at 0631 UTC and again isolated cb cells formed from 0731 UTC and dissipated at 0831 UTC with maximum of 45 dbz at 0821 UTC.	NIL	BAY OF BENGAL
VISAKHAPATNAM	03/06/18	1200UTC	Multiple Cb cells towards NW to NE with maximum reflectivity of 60 dbz with height of 10 kms	(WNE)205 km and (West ) 171 km and moving SEly	CB cells formed since last observation and developing	Thunder storm with rain	East Godavari (AP), Khammam(Telangana) and Koraput, Rayagada (Odisha)
VISAKHAPATNAM	03/06/18	1500UTC	Multiple CB cells with max reflectivity 61dbz and height 10kms.	139kms(NNW) 12:41UTC. And moving SE ly.	-	-	Nabarangapur(odissa)
VISAKHAPATNAM	03/06/18	1800UTC	Conviction region with reflectivity 32dbz .	110kms(NW) 15:01UTC and movement is untraceable.	-	-	-

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	Associat ed severe weather if any	Districts affected
MC JAIPUR	04/06/18	0300 UTC	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
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AGARTALA	04/06/18	030300Z to 040300Z	At 030302Z MULTIPLE CELLS ARE FOUND OVER BANGLADESH. ABOUT 10KMS, 45 DBZ.	ABOUT 150 TO 180 KMS NORTH-NORTH-WEST, 25KMPH NNE-LY.	PERSISTS OVER B/DESH AND ADJOINING MEGHALAYAN HILLS AT 030452Z	NOT KNOWN	-----
			At 031152Z MULTIPLE CELLS ARE FOUND OVER BANGLADESH AND AGARTALA. 14KMS, 50 DBZ.	STRETCHING FROM AGARTALA TO 150KMS EAST, 30 KMPH E-LY	AT 031200Z THE SYSTEM PASSED OVER OVER AGARTALA AND ADJOINING B/DESH THEN THE SYSTEM PERSISTS OVER HILLS OF MIZORAM AT 031412Z	TS ACCOMPANIED WITH RAIN AND HIGH WIND	AGARTALA, ADJOINING B/DESH & HILLS OF MIZORAM
** DWR WAS NON-OPERATIONAL FROM 030453Z TO 031150Z DUE TO POWERFAILURE AND DG SET IS NON-OPERATIONAL DUE TO DEFICIENCY OF FUEL							

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
DWR Patiala	04/06/18	030618/0300 UTC to 040618/0300 UTC	NO significant ECHO	NIL	NIL	NIL	NIL

## 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)

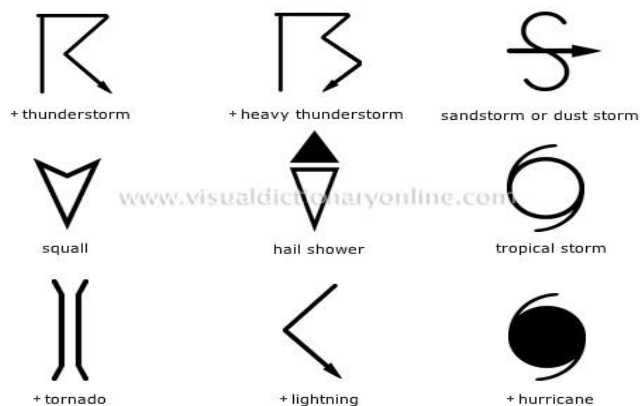
For Radar images of the past 24 hours including mosaic of images:

[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>	