

# India Meteorological Department FDP STORM Bulletin No. 93 (07-06-2018)

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

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

◆ Southwest Monsoon has further advanced into some more parts of Central Arabian Sea, remaining parts of Coastal Karnataka, most parts of South Interior Karnataka and Goa and some parts of North Interior Karnataka. The Northern Limit of Monsoon (NLM) passes through Lat. 15°N/ Long. 60°E, Lat. 15°N/ Long. 70°E, Mormugao, Gadag, Kurnool, Narsapur, Machilipatnam, Lat. 17°N/ Long. 85°E, Lat. 19°N/ Long. 90°E, Agartala, Lumding, north Lakhimpur and Lat. 29°N/ Long. 95°E. Conditions are favourable for further advance of Southwest Monsoon into some more parts of Central Arabian Sea, remaining parts of Goa, some parts of south Maharashtra, remaining parts of Karnataka and Rayalaseema, some parts of Telangana, some more parts of Coastal Andhra Pradesh and West Central Bay of Bengal during next 24 hours. Conditions are very likely to become favourable for further advance of Southwest Monsoon into some more parts of Southwest Monsoon into some more parts of Southwest Monsoon into some more parts of Andhra Pradesh in subsequent 48 hours. Conditions are also likely to become favourable for further advance of Southwest for further advance of Southwest Monsoon into some more parts of Maharashtra, some parts of Arabian Sea, remaining parts of Arabian Sea, remaining parts of Arabian Sea, remaining parts of Southwest Monsoon into some more parts of Maharashtra, Telangana & Coastal Andhra Pradesh in subsequent 48 hours. Conditions are also likely to become favourable for further advance of Southwest Monsoon into some more parts of Maharashtra, some parts of Arabian Sea, remaining parts of Arabian Sea, remaining parts of Northeastern States and most parts of Bay of Bengal during 09th to 11th June.

• The East-West trough now runs from northwest Rajasthan to Bihar across northeast Rajasthan, North Madhya Pradesh & southeast Uttar Pradesh and extends upto 1.5 km above mean sea level.

• The cyclonic circulation over northwest Madhya Pradesh & neighbourhood persists and now seen at 1.5 km above mean sea level embedded in the above trough.

• The cyclonic circulation over East Uttar Pradesh & neighbourhood persists and now seen between 3.1 km & 4.5 km above mean sea level.

• A cyclonic circulation at 3.1 km above mean sea level lies over northwest Uttar Pradesh and neighbourhood.

The off shore trough at mean sea level from south Maharashtra coast to north Kerala coast persists.
 The cyclonic circulation over south Madhya Maharashtra and adjoining south Konkan now lies over Marathwada and neighbourhood and seen at 3.1 km above mean sea level.

◆ The eastwest shear zone now runs roughly along Lat. 15°N across south Peninsular India and seen between 3.1 & 7.6 km above mean sea level.

• The cyclonic circulation over northern parts of Central Bay of Bengal and adjoining north Bay of Bengal now lies over west-central and adjoining northwest Bay of Bengal and extends between 2.1 km & 4.5 km above mean sea level. Under its influence, a low Pressure area is very likely to develop over North Bay of Bengal during next 48 hours. It is likely to concentrate into a depression during the subsequent 48 hours and move towards West Bengal-Bangladesh Coasts.

• A cyclonic circulation lies over Assam & neighbourhood between 1.5 km & 3.1 km above mean sea level.

#### 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 with embedded moderate to intense convection seen over Southwest Uttar Pradesh, and isolated weak to moderate convection seen over extreme East Uttar Pradesh. Scattered low/medium clouds over Jammu & Kashmir, Himachal Pradesh, Uttarakhand and rest Uttar Pradesh.

#### East:

Scattered low/medium clouds with embedded moderate to intense convection seen over Chhattisgarh, Odisha, Jharkhand, Bihar adjoining East Nepal, West Meghalaya, Central Assam, North Tripura, North Mizoram, Southwest Manipur and North Bangladesh. Scattered low/medium clouds seen over rest parts of the region.

#### West:

Scattered low/medium clouds with embedded moderate to intense convection seen over North Konkan & Marathawada and weak to moderate conviction seen over extreme Northwest Madhya Pradesh, South Madhya Pradesh, rest Maharashtra and Goa. Scattered low/medium clouds seen over rest North Madhya Pradesh and South Gujarat.

## South:

Broken low/medium clouds with embedded intense to very intense convection seen over Andaman Islands. Scattered low/medium clouds with embedded moderate to intense convection seen over Telangana, Rayalaseema, Coastal Andhra Pradesh, North Interior Karnataka, Kerala, North Tamilnadu, & Nicobar Islands and isolated weak to moderate convection seen over rest parts of the region. North Coastal Andhra Pradesh, Kerala, Lakshadweep, and Nicobar Islands. Scattered low/medium clouds with embedded isolated weak to moderate convection seen over rest parts of the region.

#### Arabian Sea:

Scattered low/medium clouds with embedded intense to very intense convection seen over East-Central Arabian Sea and moderate to intense convection seen over Southeast Arabian sea off Karnataka-Kerala coast, Comorin and Maldives.

#### Bay of Bengal & Andaman Sea:

Scattered low/medium clouds with embedded moderate to intense convection seen over Bay, Arakana Coast, Andaman Sea, Gulf of Martaban and Tenasserim Coast.

#### Past Weather:

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

Moderate to Intense convection was observed over Himachal Pradesh Punjab North-East Rajasthan Haryana Delhi Uttarakhand Uttar Pradesh Madhya Pradesh Chhattisgarh Odisha Jharkhand Bihar West Bengal Sikkim North-East States Telangana Andhra Pradesh South-East Gujarat Maharashtra Goa Karnataka Kerala Tamilnadu Lakshadweep Andaman & Nicobar Islands.

## OLR:-

Up to **150** wm<sup>-2</sup> was observed over Central Coastal Andhra Pradesh Andaman Islands.

Up to **230** wm<sup>-2</sup> was observed over North Uttarakhand North-West Uttar Pradesh West Meghalaya Nagaland Manipur South Mizoram South Odisha Chhattisgarh South Madhya Pradesh South-East Gujarat Maharashtra Telangana Rayalaseema rest Coastal Andhra Pradesh Karnataka Kerala Tamilnadu Lakshadweep & Nicobar Islands.

#### **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 & Kashmir, Arunachal Pradesh, Assam, Peninsula India and 5-20 Kts observed over rest India.

Negative Shear tendency is observed over North Interior Karnataka Telangana North Coastal Andhra Pradesh.

Vorticity (850 hPa) up to 250 is observed over South-West Rajasthan Uttar Pradesh East Madhya Pradesh East Vidarbha North Coastal Andhra Pradesh Extreme South Tamilnadu.

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

## Precipitation:

## IMR:

Rainfall > 150 mm was observed over South Marathwada North-East parts of North Interior Karnataka adjoining West-Central Telangana Central Parts of Coastal Andhra Pradesh.

Rainfall Up to 150 mm was observed over North-East Tamilnadu Andaman Islands.

Rainfall Up to 130 mm was observed over Vidarbha South Chhattisgarh adjoining East Telangana rest Coastal Andhra Pradesh.

Rainfall Up to 110 mm was observed over South-West Madhya Pradesh North Madhya Maharashtra North Marathwada Central Chhattisgarh South Odisha Central Tamilnadu.

Rainfall Up to 70 mm was observed over South-East Madhya Pradesh rest Telangana Rayalseema rest North Interior Karnataka South Madhya Maharashtra South Konkan.

Rainfall Up to 50 mm was observed over Central Parts of West Uttar Pradesh North-East Madhya Pradesh Sub Himalayan West Bengal North Assam Nagaland South Mizoram East Vidarbha North Kerala South-East parts of South Interior Karnataka.

Rainfall Up to 30 mm was observed over South-East Uttar Pradesh North Chhattisgarh North-west Jharkhand North-East Odisha.

Rainfall Up to 10 mm was observed Lakshadweep Nicobar Islands.

Rainfall Up to 10 mm was observed over South Himachal Pradesh East Punjab North-East Rajasthan Haryana Delhi South-East Uttarakhand North-West Bihar South Gangetic West Bengal rest North-East States South-East Gujarat Rest Karnataka South Kerala South Tamilnadu..

DWR Bhopal domain indicates multiple moderate echoes with dBZ > 50 and height around 15km at around 1600 IST. Light to moderate isolated/multiple echoes are also seen on DWR Chennai, Thiruvananthapuram, Kochi, Gopalpur, Paradeep, Visakhapatnam, Nagpur, Kolkata, Patna, Agartala, Patiala, Lucknow and Jaipur domains at around 1600IST.

RAPID RGB Satellite imagery at 1500 IST indicates significant convection over Central Uttar Pradesh, Central Madhya Pradesh, Jharkhand adjoining North Chhattisgarh, Bihar, Odisha, Sub-Himalayan West Bengal adjoining West Assam, Konkan & Goa, South Madhya Maharashtra, Coastal Karnataka, Kerala, Lakshadweep and Andaman & Nicobar Islands.

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

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

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

Delhi – SAFAR analysis & Forecast	07.06.2018	08.06.2018
PM10 (micro-g/m <sup>3</sup> )	150	127
PM2.5 (micro-g/m <sup>3</sup> )	64	55

## 2. NWP MODEL GUIDANCE:

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

#### 1. Weather Systems:

#### Low level Cycirs, Troughs:

00 UTC Day2-5: Weak CYCIR at 850/925 hPa over north BoB and intensifying in day 3-5 forecast and tracking towards WB via Bangladesh

00UTC Day 1-4: E-W trough at 850/925 hPa from Punjab to north Chhattisgarh across east Rajasthan, MP.

00UTC of Day 2-3: CYCIR along and off coast of Goa to Mumbai

#### Synoptic systems:

00UTC Day 4-5: WD as trough over J & K

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

3. Convergence at 850 hPa:

#### Day/Index: Subdivisions with Lower Level Convergence > 15 x 10^-5 /s

Day0: East\_RJ,

- Day1: East\_MP,
- Day2: Assam\_Meghalaya,
- Day3: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT,
- Day4: Assam\_Meghalaya, NE\_NMMT, Jammu\_Kashmir, Odisha, Coastal\_AP

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

#### Day/Index: Subdivisions with Lower Level Vortex > 15 x 10^-5 /s

Day0: TN\_Puducherry,

- Day1: Konkan\_Goa, Chhattisgarh, TN\_Puducherry, Kerala,
- Day2: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, TN\_Puducherry, Coastal\_Karnataka, Kerala,
- Day3: Assam\_Meghalaya, NE\_NMMT, Guj\_Reg, TN\_Puducherry, Kerala,
- Day4: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Gangetic\_WB, Bihar, Himachal\_Pradesh, Odisha, Chhattisgarh, TN\_Puducherry, Kerala

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

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

- Day0: Arunachal\_Pradesh, NE\_NMMT, Sub\_Himalayan\_WB, Jharkhand, Bihar, West\_UP, Uttarakhand, Hry\_Chd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, East\_RJ, Odisha, East\_MP, Guj\_Reg, Saurashtra\_Kutch, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Telangana, NI\_Karnataka,
- Day1: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Gangetic\_WB, Jharkhand, Bihar, East\_UP, West\_UP, Uttarakhand, Hry\_Chd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, Odisha, East\_MP, Saurashtra\_Kutch, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana, NI\_Karnataka,
- Day2: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Gangetic\_WB, Jharkhand, Bihar, East\_UP, West\_UP, Uttarakhand, Hry\_Chd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, Odisha, West\_MP, East\_MP, Guj\_Reg, Saurashtra\_Kutch, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana,
- Day3: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Jharkhand, Bihar, East\_UP, West\_UP, Uttarakhand, Hry\_Chd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, Odisha, West\_MP, East\_MP, Guj\_Reg, Saurashtra\_Kutch, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana,

Day4: Arunachal\_Pradesh, Sub\_Himalayan\_WB, Jharkhand, Bihar, East\_UP, West\_UP, Uttarakhand, Hry\_Chd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, East\_RJ, Odisha, East\_MP, Guj\_Reg, Saurashtra\_Kutch, Konkan\_Goa, Madhya\_Maharashtra, 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\_RJ, East\_RJ, Guj\_Reg, Saurashtra\_Kutch,
- Day1: Arunachal\_Pradesh, Sub\_Himalayan\_WB, Uttarakhand, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, Vidarbha, Chhattisgarh,
- Day2: Arunachal\_Pradesh, Sub\_Himalayan\_WB, Uttarakhand, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ,
- Day3: Arunachal\_Pradesh, Sub\_Himalayan\_WB, West\_UP, Uttarakhand, Hry\_Chd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, Saurashtra\_Kutch,
- Day4: Arunachal\_Pradesh, Sub\_Himalayan\_WB, West\_UP, Uttarakhand, Hry\_Chd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, East\_RJ, Guj\_Reg, Saurashtra\_Kutch

## 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\_Chd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, 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,
- Day1: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Gangetic\_WB, Jharkhand, Bihar, East\_UP, West\_UP, Uttarakhand, Hry\_Chd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, East\_RJ, Odisha, West\_MP, East\_MP, Guj\_Reg, Saurashtra\_Kutch, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana, Rayalseema, NI\_Karnataka,
- Day2: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Jharkhand, Bihar, East\_UP, West\_UP, Uttarakhand, Hry\_Chd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, East\_RJ, Odisha, West\_MP, East\_MP, Guj\_Reg, Saurashtra\_Kutch, Konkan\_Goa, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana, TN\_Puducherry, NI\_Karnataka,
- Day3: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Gangetic\_WB, Jharkhand, Bihar, East\_UP, West\_UP, Uttarakhand, Hry\_Chd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, East\_RJ, Odisha, West\_MP, East\_MP, Guj\_Reg, Saurashtra\_Kutch, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana, TN\_Puducherry,
- Day4: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Gangetic\_WB, Jharkhand, Bihar, East\_UP, West\_UP, Uttarakhand, Hry\_Chd\_Delhi, Punjab, Himachal\_Pradesh, Jammu\_Kashmir, West\_RJ, East\_RJ, Odisha, West\_MP, East\_MP, Guj\_Reg, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal\_AP, Telangana, TN\_Puducherry

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

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

- Day1: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Bihar, Uttarakhand, Odisha, Konkan\_Goa, Madhya\_Maharashtra, Marathwada, Chhattisgarh, Andaman\_Nicobar, Coastal\_AP, Telangana, TN\_Puducherry, Coastal\_Karnataka, NI\_Karnataka, SI\_Karnataka, Kerala,
- Day2: Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Gangetic\_WB, Jharkhand, Uttarakhand, Odisha, East\_MP, Konkan\_Goa, Madhya\_Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Andaman\_Nicobar, Telangana, TN\_Puducherry, Coastal\_Karnataka, NI\_Karnataka, SI\_Karnataka, Kerala,
- Day3: Arunachal\_Pradesh, NE\_NMMT, Gangetic\_WB, Jharkhand, West\_UP, Uttarakhand, Himachal\_Pradesh, Odisha, East\_MP, Konkan\_Goa, Madhya\_Maharashtra, Vidarbha, Chhattisgarh, Andaman\_Nicobar, Telangana, TN\_Puducherry, Coastal\_Karnataka, NI\_Karnataka, SI\_Karnataka, Kerala,
- Day4: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Sub\_Himalayan\_WB, Gangetic\_WB, West\_UP, Uttarakhand, Himachal\_Pradesh, Jammu\_Kashmir, Odisha, East\_MP, Guj\_Reg, Konkan\_Goa, Madhya\_Maharashtra, Vidarbha, Chhattisgarh, Andaman\_Nicobar, Coastal\_AP, TN\_Puducherry, Coastal\_Karnataka, NI\_Karnataka, SI\_Karnataka, Kerala,
- Day5: Arunachal\_Pradesh, Assam\_Meghalaya, NE\_NMMT, Gangetic\_WB, Jharkhand, East\_UP, Odisha, East\_MP, Konkan\_Goa, Madhya\_Maharashtra, Chhattisgarh, Andaman\_Nicobar, Coastal\_AP, 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)
- \*\* Heavy rainfall activity > 8cm along Odisha coast and some parts of interior Odisha in Day 3-5

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

## 1. Synoptic Systems:

The analysis based on 00 UTC indicates an East- West Oriented Trough extends from Northwest Rajasthan to Bihar across Northeast Rajasthan, North Madhya Pradesh and Southeast Uttar Pradesh in lower Troposphere (850hPa). The forecast shows the Trough persist till day3. Analysis shows another cyclonic circulation over Northwest Madhya Pradesh and adjoining area. The forecast shows it will become less marked on day2. The analysis shows an off shore Trough extends from South Maharashtra to North Kerala coast at (925hPa). The forecast shows it will persist till day3. The analysis shows another cyclonic circulation at 850hPa over Assam and adjoining area. The forecast shows it will persist till day3.

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

Although the presence of strong westerlies is found over extreme South Peninsular 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 along the East-West Trough, around the cyclonic circulations, central parts of India, Northwest Rajasthan, Madhya Pradesh, Vidharbha adjoining areas and over extreme South Peninsular India during next 3 days; Low level Positive Vorticity is also seen over parts J&K, Himachal Pradesh, Punjab, Haryana and adjoining areas from day 2 onwards.

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

**T-Storm Initiation Index (> 3):** Over parts of Gujarat, Rajasthan, East Uttar Pradesh, Bihar, Jharkhand, Gangetic West Bengal, SHWB, Orissa, coastal Maharashtra, Konkan & Goa, coastal and North Interior Karnataka, Tamil Nadu, Telangana, Madhya Maharashtra, Marathwada, Vidharbha, Chhattisgarh, East and west Madhya Pradesh, Andhra Pradesh, along east and west coast of India, Sikkim, Assam and adjoining areas on day 1; on day 2 and 3 it remains over same region and also appear over parts of J&K, Punjab, Haryana, Delhi, Himachal Pradesh, Uttarakhand, West Uttar Pradesh, NE states; Significant zone lies over Gujarat, Rajasthan, Punjab, Haryana and adjoining area.

Lifted Index (< -2): Similar to T-storm Index lies over parts of Gujarat, Rajasthan, East Uttar Pradesh, Bihar, Jharkhand, Gangetic West Bengal, SHWB, Orissa, coastal Maharashtra, Konkan & Goa, coastal and North Interior Karnataka, Tamil Nadu, Telangana, Madhya Maharashtra, Marathwada, Vidharbha, Chhattisgarh, East and west Madhya Pradesh, Andhra Pradesh, along east and west coast of India, Sikkim, NE states on day 1; from day 2 onwards it remains over same region but also appears J&K, Punjab, Haryana, Delhi, Himachal Pradesh, Uttarakhand, West Uttar Pradesh and adjoining areas.

**Total Total Index (> 50):** Higher than Threshold value of the Index is seen over parts of J&K, Himachal Pradesh, Uttarakhand, Gujarat, Rajasthan, Vidharbha, Marathwada, Telangana, Sikkim, Foothills of Himalaya and Arunachal Pradesh on day 1; over parts of J&K, Himachal Pradesh, Uttarakhand, Punjab, Haryana, Delhi, West Uttar Pradesh, Rajasthan, Vidharbha, Marathwada, Chhattisgarh, Madhya Pradesh, Sikkim, Foothills of Himalaya and Arunachal Pradesh on day 2; on day 3 it remains over same region and also appears over Orissa and East Uttar Pradesh.

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 and west Rajasthan during next 3 days.

**CAPE (> 1000):** Mostly seen over parts of Gujarat, Rajasthan, along west coast and east coast, GWB, SHWB, Orissa, Bihar, Jharkhand, Andhra Pradesh, Rayalaseema, Karnataka, Konkan and Goa, Telangana, coastal Maharashtra including Mumbai, Madhya Maharashtra, Marathwada, Vidharbha, Chhattisgarh, coastal Tamil Nadu, East and West Madhya Pradesh, Sikkim, NE states and adjoining areas during next 3 days; over parts of Uttar Pradesh, Haryana and adjoining areas on day 2; on day 3 over parts of Punjab, Haryana, Delhi, Himachal Pradesh, Uttarakhand and adjoining areas; maximum value of the index is seen over parts of Gujarat, coastal Maharashtra including Mumbai and Rajasthan.

**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 on day 1 and 3; over most of the parts of the country except South Interior Karnataka adjoining North Kerala and J&K on day 2; significant zone with highest value of the index lies over parts of Gujarat and West Rajasthan

#### 5. Rainfall Activity:

Above 200 mm Rainfall: over parts of South coastal Maharashtra, North Interior Karnataka, Konkan and Goa on day 2.

130- 200 mm Rainfall: over parts of Konkan and Goa on day 1 and 2; over parts of South Interior Karnataka on day 1; over parts of North Interior Karnataka on day 2; over parts of coastal Maharashtra on day 2 and 3; over parts of Vidharbha on day 3.

70-130 mm Rainfall: over parts of coastal Maharashtra including Mumbai, coastal and Interior Karnataka, Konkan and Goa during next 3 days; over parts of Marathwada and Telangana on day 1; over parts of Orissa and adjoining Chhattisgarh on day 2; over most of the parts of Vidharbha, Madhya Maharashtra, Marathwada, Telangana and West Madhya Pradesh on day 3.

40-70 mm Rainfall: over parts of coastal Maharashtra, Madhya Maharashtra, coastal and Interior Karnataka, Kerala, Foothills of Himalaya, Konkan and Goa during next 3 days; over parts of Marathwada and Telangana on day 1 and 3; over parts of Sikkim, Assam, Manipur and Mizoram on day 1; over parts of Uttarakhand, East Uttar Pradesh, Bihar, Chhattisgarh, Orissa, Mizoram, Nagaland, Manipur and adjoining area on day 2; over parts of Vidharbha, Madhya Maharashtra, Marathwada, Telangana, West Madhya Pradesh, Tripura and Uttarakhand on day 3.

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

Up to 10 mm rainfall: Over parts of J&K, Himachal Pradesh, Uttarakhand, Punjab, Rajasthan, Haryana, Delhi, 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 on day 2 and 3; on day 1 it disappear over parts of Punjab, Haryana, Delhi, Rajasthan, Gujarat and West Madhya Pradesh.

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

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

>25 dBZ Model Reflectivity: On day 1, over parts of J&K, Himachal Pradesh, Uttarakhand, 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, East Madhya Pradesh, Chhattisgarh and East Uttar Pradesh; On day 2 and 3 over parts of Uttarakhand, Kerala, Tamil Nadu, Orissa, Andhra Pradesh, Chhattisgarh, Telangana, Assam, Arunachal Pradesh Tripura, Mizoram, Meghalaya and adjoining area, Rayalaseema, Madhya Maharashtra, Marathwada, Vidharbha, South coastal Maharashtra, Konkan and Goa, GWB, North Bihar and adjoining East Uttar Pradesh; On day 3 over parts of J&K, Punjab, Haryana, Delhi, Himachal Pradesh, Uttarakhand, West Uttar Pradesh, Madhya Pradesh, Vidharbha, Bihar, Jharkhand and GWB.

#### 2. Spatial distribution of 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, Vidharbha and NE states during next 3 days; below threshold value is also seen over parts of J&K and Himachal Pradesh on day 1 and 3 and over parts of Punjab, Haryana, Delhi and adjoining area 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 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, including Mumbai, 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 J&K, Punjab, Haryana, Rajasthan, Delhi, Rajasthan, West Uttar Pradesh, Himachal Pradesh and Uttarakhand from day 2 onwards; Maximum value of the index is seen over the parts of Gujarat, Andhra Pradesh, Orissa, NE states and coastal Tamil Nadu.

**CIN (50-150):** The value of the index lies in above range over most of the parts of the country except southern parts of the west coast on day 1; over most of the parts of the country except Eastern parts of the country Bihar, Jharkhand, GWB, SHWB, and extreme south peninsular India on day 2 and 3; it has significant larger values over North-western and Central parts of country including Punjab, Haryana, Gujarat, Rajasthan and West Madhya Pradesh.

#### 3. Rainfall and thunderstorm activity:

Above 200 mm Rainfall: over parts of South coastal Karnataka on day 1 and 3; over parts of South Coastal Maharashtra, Konkan and Goa on day 2 and 3.

130- 200 mm Rainfall: over parts of South coastal Karnataka, Kerala, Konkan and Goa during next 3 days; over parts of South coastal Maharashtra and North Interior Karnataka on day 2 and 3.

70- 130 mm Rainfall: over parts of coastal and Interior Karnataka, Kerala adjoining Tamil Nadu, Coastal Maharashtra, Konkan and Goa during next 3 days; over parts of Assam, Meghalaya, Orissa and Chhattisgarh on day 2; over parts of Assam, Meghalaya and Arunachal Pradesh on day 3.

40-70 mm Rainfall: over parts of Kerala, Karnataka, coastal Maharashtra, Madhya Maharashtra, including Mumbai, Tamil Nadu, Orissa, Andhra Pradesh, Chhattisgarh, Sikkim, NE states, Konkan and Goa during next 3 days; over parts of Himachal Pradesh and Uttarakhand on day 3; over parts of Jharkhand on day 2 and 3; over parts of Telangana on day 1 and 2.

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

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

#### Summary and Conclusions:

- Most thermodynamic indices (T-STORM Initiation Index, Lifted Index, CAPE) from IMDGFS deterministic model indicate high probability of thunderstorm occurrence over Gujarat region extending to east coast through central Indian region on day 1 as well as on day 2. There is another high probability zone along foothills of Himalayas on both days. K- Index shows western parts of Maharashtra also as a favorable zone.
- The synoptic analysis indicates an east-west trough from northwest Rajasthan to Bihar across northeast Rajasthan, North Madhya Pradesh & southeast Uttar Pradesh and extends upto 1.5 km above mean sea level. A cyclonic circulation is seen embedded in the trough over northwest Madhya Pradesh & neighbourhood. Another cyclonic circulation is seen over East Uttar Pradesh & neighbourhood. A third cyclonic circulation lies over northwest Uttar Pradesh and neighbourhood. In association with these systems, convective activity is likely over eastern parts of the plains and over east India on day 1. The activity is likely to continue on day 2 as well.
- The off shore trough at mean sea level from south Maharashtra coast to north Kerala coast persists. Together with the cyclonic circulation over Marathwada and neighbourhood and the east-west shear zone across south Peninsular India along Lat. 15°N and the strengthening of monsoon current over Arabian Sea, the western coast is very likely to experience good convective activity and associated heavy rainfall on day 1 and day2. Coastal Karnataka is likely to get more than 20 cm rain on both days. The heavy rainfall belt is expected to shift northwards and South Konkan & Goa will get more than 20 cm rain on day 2.
- Under the influence of the favourable flow of moisture laden wind, coastal Odisha is likely to experience convective activity accompanied by 5-10 cm rainfall on day 1 and day 2. Similarly, the cyclonic circulation lies over Assam & neighbourhood between 1.5 km & 3.1 km above mean sea level also will contribute to the development of thunderstorms over NE India with possibility of 5-10 cm rainfall. The activity will reduce on day 2.
- Central India also is likely to experience convective activity due to the above normal temperatures prevailing over the region and also with the increase in moisture availability. However, they are not likely to cause significant rainfall amounts.

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

24 hour Advisory for IOP:	48 hour Advisory for IOP:
Significant Rainfall: Coastal Karnataka, Interior Karnataka, Telangana, Kerala Konkan and Goa, Madhya Maharashtra Assam & Meghalaya Sub-Himalayan West Bengal & Sikkim, Odisha, Andaman and Nicobar Islands	Significant Rainfall: Coastal Karnataka, Interior Karnataka, Telangana, Kerala Konkan and Goa, Madhya Maharashtra, Marathawada Sub-Himalayan West Bengal & Sikkim, Odisha
<ul> <li>Thunderstorm with squall or gusty winds:</li> <li>Tamilnadu, Interior Karnataka, Telengana, Rayalaseema, Coastal Andhra Pradesh</li> <li>Konkan and Goa, Madhya Maharashtra, Marathwada,</li> <li>Vidarbha, Chhattisgarh, Madhya Pradesh,</li> <li>Uttar Pradesh, East Rajasthan</li> <li>Jharkhand, Bihar, Odisha</li> <li>Assam &amp; Meghalaya</li> </ul> Thunderstorm with squall and hail Nil	<ul> <li>Thunderstorm with squall or gusty winds:</li> <li>Tamilnadu, Interior Karnataka, Telengana, Rayalaseema, Coastal Andhra Pradesh</li> <li>Konkan and Goa, Madhya Maharashtra, Marathwada,</li> <li>Vidarbha, Chhattisgarh, Madhya Pradesh,</li> <li>Uttarakhand, Uttar Pradesh</li> <li>Gangetic West Bengal, Jharkhand, Bihar, Odisha</li> <li>Thunderstorm with squall and hail</li> <li>Nil</li> </ul>
Duststorm: Nil	Nil

# **Graphical Presentation of Potential Areas for Severe Weather:**















# Past 24 hours DWR Report:

Radar Station name	Date	Time interval of observa tion (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
		060600	Convective CB region over the sea with max reflectivity 54dbz and height 10kms.	S (119 kms) moving Wly	Since last observation maximum reflectivity of 54dbz at 0531 UTC	Thunderstorm	Over the sea.
		060900	Multiple cb cells with max reflectivity 55dbz and height 10kms.	49kms(NNW) AT 08:51UTC and moving Southerly.	Another cb cell southerly over the sea with reflectivity 57 dbz	Thunderstorms and rain.	Koraput, (odissa) kalingapatnam, Visakhapatnam (AP).
		061200	Multiple CB CELLs with max reflectivity 55dbz and height 10kms.	38kms(NORT H) AT 09:11UTC. And moving SW ly.	-	Heavy thunderstorms and moderate rain.	Vizianagaram, Visakhapatnam (AP).
Visakhapatnam	07-06-18	061500	CB region in which cb cells having max reflectivity 55dbz and height 10kms.	54kms(WEST) At 12:01UTC. And moving WSW ly.	cb region formed behind the converged cb cells(reported).	Severe thunderstorms and moderate rain.	Vizianagaram, Visakhapatnam. East Godavari (AP).
		061800	Conviction region with max reflectivity 43dbz .	122kms(W) 15:21UTC and moving Westerly.	Another cb cell over the bay of Bengal with reflectivity 46 dbz at 17:31 UTC.	-	EAST GODAVARI Districts(AP).
		070000	Isolated cb cells over the sea with max reflectivity 55dbz and height 9.5kms	138kms(SE) at 22:51UTC and moving NE ly.	From 22:51 UTC moving Easterly.	-	Over the sea.
		070300	Multiple cb cells with max reflectivity 57dbz and height 9kms.	202kms(ESE) 00:51UTC and moving Easterly.	-	-	Over the sea.

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
Agartala	07-06-18	060300 to 070300* (*DWR operational from 0600 to 2000IST)	A.)Multiple cells formed over N-TRP @070042Z;13KMS;47dBZ	70-100 Kms E/NE/N;30 Kmph;SE'ly	Cell PERSISTED @070300z	NOT	KNOWN
Mohanbari	07-06-18	060722	Cell type- Small cluster of cells Avg. ht 8.0 Km MAX_Z:- 45.5 dBZ	Distance- 150 Km Direction- West Movement- Stationary			
		060822	Cell type- Multiple cell Avg. ht 8.0 Km MAX_Z:- 49.0 dBZ	Distance- 150 Km Direction- East Movement- Stationary			

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
		060301- 060731	NIL	NIL	NOSIG ECHO	NIL	N/A
Kolkata	07-06-18	060732- 060951	Isolated Single cell with maximum reflectivity of 56.0 dBz at 0841 UTC and maximum height 9.95 Km at 0841 UTC	Coming from SSE (52.4 Km) and moving WNW-Ward Direction.	4. isolated Single cell coming from SSE (52.4 km) at 0732 UTC , matured and dissipated at 0951 UTC in SW at a Distance of 36.4 KM from Radar.	Thunderstorm /Rainl	N/A
		060952- 062351	NIL	NIL	NOSIG ECHO	NIL	N/A
Patna	07-06-18	060300- 040300	Nil	Nil	Nil	Nil	Nil

Radar Station name	Date	Time interval of observat ion (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
		060300 - 060600	MULTIPLE CELLS DBZ 51.5 HT. 09-12 KM	NE,SE,SW SECTORS. .MOVMENT SOUTH EAST - WARDS		TS/RA	Halwara,Barnala, Patran, Rajpura, Chandigrah, Yamnanagar, Hisar, Bhiwani, Sirsa, Panipat, Meerut and its adjoing areas
Patiala	07-06-18	060600 - 060900	MULTIPLE CELLS DBZ 56.5 HT. 09-13 KM	NE, NW, SE SECTORS. .MOVMENT SOUTH EAST - WARDS		TS/RA	Ludhiana, Khanna, Sirhind, Rajpura, Patiala, Ambala, Pehowa, Karnal, Kurushetra, Yamnanagar and its adjoing areas
		060900- 061200	MULTIPLE CELLS DBZ 48.5 HT. 09-10 KM	N, SE SECTORS. .MOVMENT SOUTH EAST - WARDS		TS/RA	Panipat, Karnal, Sonepat, Shamli, Palampur, Nduan, Hamirpur and its
		061200 - 061500	MULTIPLE CELLS DBZ 47.5 HT. 08 -09 KM	N SECTORMOVMENT SOUTH EAST - WARDS		TS/RA	Hamirpur, Bilaspur and its adjoing areas
		061500- 070252	No Significant Echoes				
Jaiour	07-06-18	060302- 060602`	Multiple cell with average height of 3.5 km & maximum reflectivity 49 dBZ	Multiple cell develop from 0302 UTC of 06/06/2018 towards E,SE,NE of Jaipur and moved to E Wards at speed 05-10 km/hr	Multiple cell develop from 0302 UTC on 06/06/2018 towards E, SE, NE of Jaipur and reaches maximum reflectivity from 0322 UTC to 0342 UTC OF 06/06/18 and died at 0602 UTC.	Dust storm/Thunder storm/ Light rain at Isolated places	Dausa, Alwar, Karauli, Bharatpur, Dholpur, Sawaimadhopur, Jaipur Districts.
Julipui		060932- 061512	Multiple cell with average height of 4.5 km & maximum reflectivity 59.50 dBZ	Multiple cell develop from 0932 UTC of 06/06/2018 towards E,SW,NW,S of Jaipur and moved to SE Wards at speed 15-20 km/hr	Multiple cell develop from 0932 UTC on 06/06/2018 towards E,SW,NW,S of Jaipur and reaches maximum reflectivity at 1132 UTC OF 06/06/18 and died at 1512 UTC	Dust storm/Thunder storm/ Light rain at Isolated places	Ajmer, Nagaur, Bundi, Kota, Bhilwara Districts.

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

Realised TS/HS/SQ du	ring past 24hours	s ending at 0300UTC of toda	y (received from RMCs/MCs)		Realised TS/HS/SQ during past 24hours ending at 0300UTC of today (received from RMCs/MCs)					
	Region	State/Sub Division	Weather Event (TS/Hail/Squall)	Date	Time of	Time of				
					Comme	end				
					ncement	(IST)				
					(IST)					
Sundernagar	Northwest India	Himachal Pradesh	Thunderstorm	06-06-18	1304	1315				
					1812	1818				
Patiala	Northwest India	Punjab	Thunderstorm	06-06-18	1230	1300				
Ludhiana	Northwest India	Punjab	Thunderstorm	06-06-18	1125	1150				
Akola	Central India	Vidarbha	Thunderstorm	06-06-18	2000	2045				
Nagpur	Central India	Vidarbha	Thunderstorm	07-06-18	0018	0220				
					0120	0350				
Yeotmal	Central India	Vidarbha	Thunderstorm	06/07-06-18	062350	070200				
Indore	Central India	West Madhya Pradesh	Thunderstorm	06-06-18	1655	1940				
Satna	Central India	East Madhya Pradesh	Thunderstorm	06-06-18	1400	1500				
Sagar	Central India	East Madhya Pradesh	Thunderstorm	06-06-18	1805	1845				
Chhindwada	Central India	East Madhya Pradesh	Thunderstorm	07-06-18	0515	0530				
Raipur	Central India	Chhattisgarh	Thunderstorm	06-06-18	1830	2100				
Ambikapur	Central India	Chhattisgarh	Thunderstorm	06-06-18	1135	1210				
Jagdalpur	Central India	Chhattisgarh	Thunderstorm	06-06-18	1930	2010				
Pendra Rd	Central India	Chhattisgarh	Thunderstorm	06-06-18	1355	1445				
					1650	1750				
Mana	Central India	Chhattisgarh	Thunderstorm	06/07-06-18	061940	062150				
					070450	070710				

# **IMPORTANT LINKS:**

For NCMRWF NWP products:( <u>http://www.ncmrwf.gov.in/HomePage/NEPS-prod-1.php</u> )
For IMD NWP products:( <u>http://nwp.imd.gov.in/diagpro_new.php</u> )
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/
Low Level Winds
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
Past24hourHEMandIMRrainfall(upto03UTCoftoday)
IMR: http://satellite.imd.gov.in/img/3Ddaily_imr.jpg
HEM: http://satellite.imd.gov.in/img/3Ddaily_he.jpg
ForRadarimagesofthepast24hoursincludingmosaicofimages:
http://ddgmui.imd.gov.in/dwr_img/
Satellite sounder based T- Phigram
http://satellite.imd.gov.in/mAndhra Pradesh skm2.html

# WEATHER SYMBOLS:



