



India Meteorological Department

FDP STORM Bulletin No. 45 (20-04-2018)

1. CURRENT SYNOPTIC SITUATION:

NWFC INFERENCE (0300UTC of the Day):

- ♦ The Western Disturbance as an upper air cyclonic circulation extending upto 3.1 Km above mean sea level over Pakistan & neighbourhood now lies over north Pakistan & neighbourhood. The trough aloft in mid and upper tropospheric levels with its axis at 5.8 Km above mean sea level now runs roughly along longitude 68°E to the north of latitude 28°N.
- ♦ A cyclonic circulation lies over northwest Madhya Pradesh and adjoining East Rajasthan and extends upto 1.5 km above mean sea level.
- ♦ A trough runs from north Pakistan to above cyclonic circulation across southern parts of Punjab & Haryana and extends upto 1.5 km above mean level.
- ♦ A cyclonic circulation lies over East Uttar Pradesh & neighbourhood and extends upto 0.9 km above mean sea level.
- ♦ A cyclonic circulation lies over Sub Himalayan West Bengal & adjoining west Assam and extends upto 1.5 km above mean level.
- ♦ The east west trough at 0.9 km above mean sea level from east Bihar to south Assam now runs from cyclonic circulation over East Uttar Pradesh & neighbourhood to Manipur across Bihar and the cyclonic circulation over Sub Himalayan West Bengal & adjoining west Assam.
- ♦ The cyclonic circulation at 0.9 km above mean sea level over Chhattisgarh and adjoining Odisha now lies over interior parts of Odisha at 1.5 km above mean sea level.
- ♦ The north south wind discontinuity at 0.9 km above mean sea level from North Interior Karnataka to south Tamilnadu now runs from southeast Madhya Pradesh to south Tamilnadu across east Vidarbha, Telangana & Rayalaseema.

SATELLITE OBSERVATIONS during past 24 hrs and current observation:

Current Observation (based on 0900UTC imagery of INSAT 3D):

Western Disturbance (WD):

Broken multi-layered clouds seen over Afghanistan, North Pakistan, Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Uttarakhand, North Uttar Pradesh, and over the area between lat 37.0N to 43.0N and long 70.0E to 100.0E in association with Western Disturbance over the area.

Westerly trough: Trough in westerlies runs roughly along long 68.0E & north of lat 28.0N.

Convective Activity:-

Convective Cells Are Developing Over South Tripura (**Minimum CTT Minus 78 Deg C**) & NE Bangladesh (**Minimum CTT Minus 70 Deg C**) Central Odisha (**Minimum CTT Minus 81 Deg C**) North Andhra Pradesh (**Minimum CTT Minus 79 Deg C**), South Karnataka (**Minimum CTT Minus 79 Deg C**), Northwest Tamilnadu (**Minimum CTT Minus 71 Deg C**)

Precipitation Nowcast Based On WMO Scope Product:

Based on 0900 UTC satellite data indicate precipitation is likely to take place during next three (03 hrs) over Jammu & Kashmir, North Himachal Pradesh, North Uttarakhand, Tripura, Mizoram, Odisha and Lakshadweep.

Clouds descriptions within India:

Broken low/medium clouds with embedded intense to very intense convection seen over North Andhra Pradesh, South Interior Karnataka, West Tamilnadu and Lakshadweep (**Minimum CTT Minus 53 Deg C**). Broken low/medium clouds with embedded moderate to intense convection seen over Jammu & Kashmir (**Minimum CTT Minus 64 Deg C**), Himachal Pradesh (**Minimum CTT Minus 67 Deg C**) and Uttarakhand (**Minimum CTT Minus 51 Deg C**). Scattered low/medium clouds with embedded intense to very intense convection seen over Odisha, North Andhra Pradesh, South Tripura, Sikkim, and rest Northeastern States. Scattered low/medium clouds with embedded isolated weak to moderate convection seen over Haryana, North Uttar Pradesh, Gangetic and Sub-Himalayan West Bengal, Konkan & Goa and isolated weak convection over Rayalaseema. Scattered low/medium clouds seen over South Telangana, North Coastal Andhra Pradesh and Kerala.

Arabian Sea:-

Scattered low/medium clouds with embedded moderate to intense convection seen over Southeast Arabian Sea.

Bay of Bengal & Andaman Sea:

No significant clouds seen over the region.

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

Intense to Very Intense convection was observed over Karnataka Kerala and Moderate to Intense convection was observed over Jammu & Kashmir Himachal Pradesh Punjab Uttarakhand Tripura Rayalseema Tamilnadu and Weak to Moderate convection observed over Rajasthan North-West Madhya Pradesh Haryana Delhi Uttar Pradesh Sikkim Rest North-East States Coastal Odisha South Konkan & Goa South Telangana South Coastal Andhra Pradesh.

OLR:-

Up-to 230wm^{-2} observed over Jammu & Kashmir Himachal Pradesh North Uttarakhand Sikkim Arunachal Pradesh Assam Nagaland South Coastal Andhra Pradesh Rayalseema Goa South Interior Karnataka Kerala North Tamilnadu.

Synoptic features: Westerly Trough: roughly along Longitude 68.0E & north of Latitude 28.0N

Dynamic Features:

Up to 30- 80 knots **wind shear** is observed over North & Central India and 10-15 knots over south peninsula India.

Negative Shear tendency observed over J & K Himachal Pradesh and Positive Shear tendency over rest parts of India

Positive Vorticity field at 850 hPa is observed over J & K Himachal Pradesh Punjab Haryana Uttarakhand Uttar Pradesh Bihar North-East Madhya Pradesh Telangana.

Negative Low Level Convergence over Uttarakhand north Uttar Pradesh & Positive Low Level Convergence over rest parts of India.

Precipitation:

IMR:

Rainfall upto 130-150 mm observed over South Interior Karnataka North Kerala and

Rainfall upto 50-70 mm observed over some parts of West Jammu & Kashmir and

Rainfall upto 30-50 mm observed over some parts of East Jammu & Kashmir North Himachal Pradesh West Rayalseema South Kerala and

Rainfall upto 01-10 mm observed over South Himachal Pradesh North Punjab north Uttarakhand Meghalaya Tripura South Telangana East Rayalseema South Coastal Andhra Pradesh Tamilnadu.

HEM:

Rainfall upto 139-278 mm observed over West Parts of South Interior Karnataka and

Rainfall upto 70-139 mm observed over West Jammu & Kashmir North Kerala and

Rainfall upto 27-70 mm observed over North Himachal Pradesh and

Rainfall upto 0.1-07 mm observed over North Punjab South Himachal Pradesh North Uttarakhand North-West Uttar Pradesh Meghalaya Tripura south Telangana Rayalseema South Coastal Andhra Pradesh South Kerala North Tamilnadu

RADAR and RAPID RGB Observation:

Moderate Isolated/multiple echoes were seen on DWR Agartala, Chennai, Gopalpur, Kolkata Machilipatnam, Hyderabad, Srinagar, Thiruvananthapuram and Vishakhapatnam Lucknow (dBZ around 45-50 and height>10km) and Light Moderate Isolated/multiple echoes were seen on DWR Delhi, Mohanbari, Paradeep at around 1710 IST.

RAPID RGB Satellite imagery at 1600 IST indicates significant convection over Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Northern parts of Uttar Pradesh, Odisha, Coastal Andhra Pradesh, Rayalseema, Southern parts of South Interior 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 decrease over north-western part of India for next few days.

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

Delhi – SAFAR analysis & Forecast	20.04.2018	21.04.2018
PM10 (micro-g/m ³)	217	197
PM2.5 (micro-g/m ³)	87	80

2. NWP MODEL GUIDANCE:

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

1. Weather Systems:

Low level Cycirs, Troughs:

00 & 12UTC of Day 1-2: 850 hPa trough from U.P to Peninsular India across MP and Maharashtra

Confluence & Wind Discontinuity Regions:

12 UTC of Day 0-2: 925& 850 hPa N-S discontinuity over Southern Peninsular India and in Day 0-4 SW-NE discontinuity over MP Chhattisgarh & Odisha

Synoptic Systems: 12 UTC of Day 0-2: WD as a trough over J & K

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

12UTC of Day 0 Over Rajasthan associated with WD.

3. Convergence at 850 hPa:

Day/Index: Subdivisions with Lower Level Convergence > 15×10^{-5} /s

Day0: Jharkhand, West UP, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, Odisha, Chhattisgarh, Telangana,

Day1: Assam Meghalaya, Gangetic WB, Jharkhand, Madhya Maharashtra, SI Karnataka,

Day2: Arunachal Pradesh, NE NMMT, Odisha, East MP, Madhya Maharashtra, NI Karnataka, SI Karnataka,

Day3: Assam Meghalaya, Jharkhand, Odisha, West MP, East MP, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, NI Karnataka, SI Karnataka,

Day4: Odisha, Madhya Maharashtra, Chhattisgarh, Tamilnadu, Puducherry, SI Karnataka.

4. Low level Vorticity:-Positive Vorticity:

Day/Index: Subdivisions with Lower Level Vortex > 15×10^{-5} /s

Day0: Assam Meghalaya, Sub Himalayan WB, Bihar, East UP, West UP, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, East MP,

Day1: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Gangetic WB, Himachal Pradesh,

Day2: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Uttarakhand, Himachal Pradesh,

Day3: Arunachal Pradesh, Assam Meghalaya, Himachal Pradesh,

Day4: Arunachal Pradesh, Assam Meghalaya, Odisha.

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

Day/Index: Subdivisions with Showalter Index < -4

Day0: Arunachal Pradesh, Sub Himalayan WB, Bihar, East UP, Uttarakhand, Punjab, Himachal Pradesh, Jammu Kashmir, Odisha, Coastal AP, Telangana, Rayalseema, Tamilnadu, Puducherry, Coastal Karnataka, SI Karnataka, Kerala,

Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Bihar, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu, Puducherry, Coastal Karnataka, SI Karnataka, Kerala,

Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Tamilnadu, Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day3: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Odisha, Konkan Goa, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Tamilnadu, Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Chhattisgarh, Coastal AP, Tamilnadu, Puducherry, Coastal Karnataka, SI Karnataka, Kerala.

6. Spatial distribution of TTI: TTI >50 [Scattered Thunderstorms few severe]:

Day/Index: Subdivision with Total Totals Index > 52

Day0: Arunachal Pradesh, Sub Himalayan WB, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, Odisha, West MP, East MP, Gujarat Region, Saurashtra Kutch, Chhattisgarh, Coastal AP, Telangana, Rayalseema,
Day1: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Bihar, East UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, Odisha, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Coastal Karnataka, SI Karnataka, Kerala,
Day2: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Uttarakhand, Punjab, Himachal Pradesh, Jammu Kashmir, Odisha, Konkan Goa, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Coastal Karnataka, NI Karnataka, SI Karnataka,
Day3: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, East MP, Madhya Maharashtra, Marathwada, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Coastal Karnataka, NI Karnataka, SI Karnataka,
Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Vidarbha, Chhattisgarh, Coastal AP, Telangana, NI Karnataka

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

Day/Index: Subdivisions with K Index > 40

Day0: Arunachal Pradesh, NE NMMT, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Odisha, Gujarat Region, Saurashtra Kutch, Madhya Maharashtra, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu, Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,
Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Uttarakhand, Odisha, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu, Puducherry, Coastal Karnataka, SI Karnataka, Kerala,
Day2: Arunachal Pradesh, Sub Himalayan WB, Odisha, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu, Puducherry, Coastal Karnataka, SI Karnataka, Kerala,
Day3: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Odisha, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu, Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,
Day4: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Odisha, Vidarbha, Chhattisgarh, Coastal AP, Telangana, Rayalseema, Tamilnadu, Puducherry, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,

8. Rainfall and thunder storm activity:

Day/Index : Subdivisions with Precipitation > 2 cm

Day1: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Uttarakhand, Punjab, Himachal Pradesh, Jammu Kashmir,
Day2: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Kerala,
Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT,
Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Coastal AP,
Day5: Arunachal Pradesh, Odisha.

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

1. Synoptic Systems:

The analysis based on 00 UTC indicates a cyclonic circulation in lower troposphere (925 hPa) over North Pakistan and adjoining Punjab and northwest Rajasthan. Analysis shows another cyclonic circulation over north west Madhya Pradesh adjoining southwest Uttar Pradesh and Haryana in lower troposphere. A trough runs from north Pakistan to above cyclonic circulation across southern parts of Punjab & Haryana. The forecast shows this trough and cyclonic circulation will become less marked in next 24 hours. The analysis shows a cyclonic circulation over East Uttar Pradesh and adjoining areas. The forecast shows it will move eastward and lies over north Bihar and adjoining areas on day2. Another cyclonic circulation is seen in the analysis over SHWB and adjoining Assam. An East-west trough is seen in the analysis extending from cyclonic circulation east Uttar Pradesh to Manipur. The analysis shows a North-South Trough extending from southeast Madhya Pradesh to south Tamilnadu across east Vidarbha, Telangana & Rayalaseema. The forecast shows it will persist for next 72 hours.

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

Although the presence of strong westerlies is found over northern parts of India, east and northeast India but no jet core over the Indian region for the next 3 days.

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

Low level Positive Vorticity is seen mostly along the foothills of Himalaya, J&K, Himachal Pradesh and Uttarakhand; along the north-south trough for next 3 days. Low level Positive Vorticity is also seen over J&K, Rajasthan, adjoining Punjab, Himachal Pradesh, Uttarakhand, west Uttar Pradesh, Haryana and along the North-south Trough on day 1. It is inferred that East and North east India has Positive Vorticity from day 2 onwards.

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

T-Storm Initiation Index (> 3): The threshold value of the index > 3 is seen over coastal areas of Gangetic West Bengal and Kolkata, parts of Orissa, Bihar, Jharkhand, Andhra Pradesh, Telangana, Rayalaseema, Kerala, Karnataka, Tamil Nadu, parts of Gujarat, coastal Maharashtra including Mumbai, Konkan & Goa, Madhya Maharashtra, Marathwada, Vidarbha adjoining Chhattisgarh, coastal areas along the east coast and west coast, Sikkim, Assam, Meghalaya, Tripura and adjoining area, SHWB on all 3 days; over parts of Rajasthan and Uttar Pradesh on day 1; Maximum value of the index is seen over parts of GWB, Orissa, Andhra Pradesh, coastal Maharashtra, Karnataka, Konkan and Goa, Bihar, Jharkhand, Chhattisgarh, Vidarbha, coastal Tamil Nadu, Telangana during next 3 days; over parts of East Uttar Pradesh and Gujarat on day 1.

Lifted Index (< -2): The threshold value of the index is below -2 over parts of Gujarat, coastal Andhra Pradesh, Karnataka, Telangana, Rayalaseema, Konkan and Goa, Kerala, Tamil Nadu, southern part of west coast, coastal areas along the east coast, Chhattisgarh, Bihar, Jharkhand, Vidarbha, Orissa, GWB, SHWB, Sikkim, Assam, Meghalaya, Tripura and adjoining areas on all 3 days; over parts of J&K, Punjab, Haryana, Himachal Pradesh, Uttarakhand, Rajasthan, Uttar Pradesh on day 1; maximum negative value of the index less than -10 is seen over parts of GWB and Orissa on day 2.

Total Total Index (> 50): The threshold value of the index is > 50 is seen over most of the parts of country except J&K, Extreme south peninsular India and NE states during next 3 days; maximum value of the index >60 is seen over parts of Rajasthan, Haryana, Delhi, Madhya Pradesh, Chhattisgarh, Vidarbha, Bihar, Jharkhand, Uttar Pradesh, Telangana, Marathwada during next 3 days; over parts of Punjab, Himachal Pradesh, Uttarakhand, Gujarat, GWB, SHWB, Madhya Maharashtra, Karnataka, Orissa and Andhra Pradesh on day 2 and 3.

Sweat Index (> 300): Although the threshold value of the Index >300 is seen in most parts of the country except central parts of Madhya Pradesh and northern parts of Chhattisgarh, Marathwada and adjoining areas on day 1, over most of the parts of country except Rajasthan and central parts of Madhya Pradesh and northern parts of Chhattisgarh, Marathwada and adjoining areas on day 2; on day 3 the threshold value of the index is above 300 over parts of J&K, Himachal Pradesh, Uttarakhand, Gujarat, Bihar, Jharkhand, Orissa, GWB, SHWB, Sikkim, NE states, south Chhattisgarh, Vidarbha, Konkan and Goa, Kerala, Tamil Nadu, southern part of west coast, coastal areas along the east coast and south peninsular India but the maximum value of the index greater than 800 is seen over parts of GWB, Orissa, Bihar, Jharkhand and adjoining areas on day 2.

CAPE (> 1000): Mostly in areas of southern peninsular India, along west coast and east coast, parts of Orissa, Andhra Pradesh, Telangana, Rayalaseema, Kerala, Tamil Nadu, Karnataka, coastal Maharashtra including Mumbai, Konkan and Goa, Gujarat, Bihar, Jharkhand, Chattisgarh, GWB, SHWB, Sikkim, Assam, Tripura and adjoining areas during next 3 days; over parts of East Uttar Pradesh, south west Rajasthan on day 1; over parts of East Vidarbha on day 1 and 2; Maximum value of the index greater than 2500 is seen mostly over parts of GWB, coastal Orissa, Jharkhand, Coastal Andhra Pradesh, Coastal Tamil Nadu, south coastal Maharashtra, Karnataka, Konkan & Goa, coastal Kerala and Telangana on day 1 and 2; over parts of Bihar, SHWB and adjoining areas on day 2; on day 3 over parts of Bihar, Jharkhand, SHWB, GWB, Coastal Orissa, Coastal Andhra Pradesh, Coastal Tamil Nadu and Coastal Karnataka.

CIN (50-150): Although the threshold value of the Index lies in the range of (50–150) over most part of the country except Haryana, Delhi, Madhya Pradesh, west Vidarbha, Madhya Maharashtra, Marathwada on day 1; over coastal areas of Gangetic West Bengal and Kolkata, parts of Orissa, Bihar, Jharkhand, Andhra Pradesh, Telangana, Rayalaseema, Kerala, Karnataka, Tamil Nadu, parts of Gujarat, coastal Maharashtra including Mumbai, Konkan & Goa, Madhya Maharashtra, Marathwada, Vidarbha adjoining Chhattisgarh, coastal areas along the east coast and west coast, Sikkim, Assam, Meghalaya, Tripura and adjoining area, SHWB on day 2 and 3.

5. Rainfall Activity:

70- 130 mm Rainfall: over parts of Tripura and adjoining areas on day 2.

40-70 mm Rainfall: over parts of J&K and Himachal Pradesh on day 1; over parts of Tripura and adjoining areas on day 2.

10- 40 mm Rainfall: over parts Karnataka, Kerala, Tamil Nadu, Sikkim and NE states during next 3 days; over parts of Jammu and Kashmir, Uttarakhand and Himachal Pradesh on day 1.

Up to 10 mm rainfall: Over parts of J&K, Foothills of Himalaya, Himachal Pradesh, Uttarakhand, Sikkim, NE states, Orissa, Bihar, Jharkhand, GWB, SHWB, Chhattisgarh, Andhra Pradesh, Kerala, Karnataka, Tamil Nadu, Telangana, Rayalaseema, Konkan and Goa on all 3 days; over parts of Punjab, Haryana and adjoining areas, Rajasthan, Uttar Pradesh and Gujarat on day 1; over some parts of Vidarbha on day 3.

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

1. Model Reflectivity (Max. dBZ): > 25 dBZ Model Reflectivity: Over parts of J&K, Himachal Pradesh, Uttarakhand, Punjab, north west Rajasthan, Haryana, Uttar Pradesh, north Chhattisgarh, Bihar, Jharkhand, Orissa, GWB, SHWB, Sikkim, NE states, Kerala, Karnataka and Tamil Nadu on day 1; over parts of Uttarakhand, Jharkhand, Orissa, GWB, Sikkim and NE states on day 2; over parts of GWB, Orissa, Sikkim and NE states on day 3; maximum value of the Model reflectivity is seen over parts of J&K, Himachal Pradesh and Uttarakhand on day 1; over NE states on day 2; over parts of GWB, Orissa and NE states on day 3.

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

Total Index (> 50): Above threshold value is observed over most parts of the country except extreme south peninsular India, southern parts of west coast and the east coast, southern parts of Andhra Pradesh, south interior Karnataka, Konkan and Goa, south coastal Maharashtra, Bihar, Jharkhand, Sikkim, GWB and NE states during all 3 days; below threshold value is seen over some parts of J&K, Punjab, Himachal Pradesh, Haryana, West Rajasthan, Telangana and Orissa on day 1; over parts of Telangana and Chhattisgarh on day 3 ; maximum value of the index is seen over parts of J&K, Himachal Pradesh, Uttarakhand, Punjab, Haryana, Delhi, Rajasthan, Uttar Pradesh, Madhya Pradesh, Madhya Maharashtra, Marathwada, Vidarbha, Jharkhand, GWB, Telangana, Orissa, Chhattisgarh, Andhra Pradesh and North interior Karnataka on day 1; over parts of Bihar, Jharkhand, Uttar Pradesh, GWB, Orissa, Telangana, Karnataka, Andhra Pradesh, Madhya Pradesh and Vidarbha on day 2; over parts of Gujarat, Rajasthan, Madhya Pradesh, Vidarbha, Madhya Maharashtra, Marathwada, Jharkhand, GWB, Karnataka and Orissa 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.

CAPE (> 1500): Greater than threshold value over parts of Gujarat, coastal areas of west coast, coastal Maharashtra, Konkan and Goa, coastal areas along the east coast, southern parts of Madhya Maharashtra, Vidarbha, Bihar, Jharkhand, Chhattisgarh, Orissa, GWB and Kolkata, SHWB, parts of Tamil Nadu, Kerala, Karnataka, Andhra Pradesh, Telangana, Rayalaseema, Extreme south peninsular India and NE states on all 3 days; over some parts of East Uttar Pradesh and East Madhya Pradesh on day 1; Maximum value of the index greater than 3500 is seen over the parts of Karnataka, coastal Kerala, coastal Orissa, coastal Andhra Pradesh, coastal Maharashtra, Konkan and Goa, GWB, coastal Tamil Nadu, Telangana, south Chhattisgarh and Jharkhand on day 1 and 2; over parts of GWB, coastal Orissa, coastal Andhra Pradesh, SHWB, Assam and adjoining areas, Karnataka, Konkan and Goa, Kerala on day 3; over some parts of Vidarbha on day 1.

CIN (50-150): Although the threshold value of the Index lies in the range of (50–150) over most part of the country except Madhya Pradesh, north Chhattisgarh, west Vidarbha, North Madhya Maharashtra and Marathwada on day 1; on day 2 and 3 the threshold value of the Index lies in the range of (50–150) over J&K, Bihar, Jharkhand, GWB, Orissa, Telangana, Karnataka, Andhra Pradesh, Vidarbha, Gujarat, Madhya Maharashtra, Marathwada, Jharkhand, GWB, Karnataka, Orissa and extreme south peninsular India; the maximum value of the index > 400 is seen over Gujarat, Bihar, Jharkhand, GWB, Orissa, Chhattisgarh, Telangana, Northern parts of Coastal Maharashtra on day 1; over parts of Bihar, Jharkhand, Orissa and coastal Maharashtra on day 2; over parts of Chhattisgarh, Orissa, North interior Karnataka , north coastal Maharashtra and Andhra Pradesh on day 3.

3. Rainfall and thunderstorm activity:

70- 130 mm Rainfall: over parts of Assam, Arunachal Pradesh, Meghalaya, Tripura, Mizoram and adjoining areas on day 1 and 2; over parts of J&K and Himachal Pradesh on day 1; over parts of GWB, Sikkim and Assam on day 3.

40-70 mm Rainfall: over parts of Assam, Arunachal Pradesh, Meghalaya, Tripura, Mizoram and adjoining areas on day 1 and 2; over parts of J&K, Himachal Pradesh and south interior Karnataka on day1; over parts of GWB, Sikkim and Assam on day 3.

10- 40 mm Rainfall: over parts of Sikkim, SHWB, Kerala, Karnataka, Tamil Nadu and NE states during next 3 days; over parts of J&K, Himachal Pradesh, Uttarakhand, Punjab, south interior Karnataka and Orissa on day 1; over parts of GWB and Orissa on day 3.

Up to 10 mm Rainfall: Over parts of J&K, Himachal Pradesh, Uttarakhand, Punjab, foothills of Himalaya, Kerala, Tamil Nadu, Karnataka, Orissa, Bihar, Jharkhand, GWB, Andhra Pradesh, Telangana, Rayalaseema, Sikkim, SHWB and NE states during next 3 days; over parts of Punjab on day 1 and 2; over parts of Gujarat on day 2; over some parts of south Chhattisgarh on day 3; over parts of west Uttar Pradesh on day 1.

3. IOP ADVISORY FOR 24 and 48Hrs:

Summary and Conclusions:

- o Most thermodynamic indices (T-STORM Initiation Index, Lifted Index, CAPE, CINE) from IMD GFS deterministic model indicate high probability of thunderstorm occurrence along the peninsular coast of India – from Gujarat, southwards to Maharashtra, Karnataka, Kerala, Tamilnadu, Coastal Andhra Pradesh and northwards to Odisha, West Bengal, Bihar and plains of Uttar Pradesh. The values decrease in spatial extent as well as intensity on day 2, and are confined mostly to the east and south peninsular coast of India. SWEAT index which also accounts for the wind shear between 850 and 500 hPa levels, indicates a maximum probability of thunderstorms over Gujarat and Northern Uttar Pradesh on day 1 and with increasing probability over West Bengal, Jharkhand and Odisha on day 2. Reflectivity values from IMD WRF model indicate high probability of convection over Jammu and Kashmir, Himachal Pradesh, Assam and Meghalaya, Tripura and Mizoram on day 1. The 850-200 hPa wind shear is very high over North India on both day 1 and 2.
- o Synoptic analysis indicates that two cyclonic circulation lie in the lower levels (1) over East Uttar Pradesh & neighbourhood and (2) over Sub Himalayan West Bengal & adjoining west Assam. An east west trough in the lower levels runs from the cyclonic circulation over East Uttar Pradesh & neighbourhood to Manipur across Bihar and the cyclonic circulation over Sub Himalayan West Bengal & adjoining west Assam. There is another cyclonic circulation in the lower levels over interior parts of Odisha. All three circulations are also captured by models. Due to the above cyclonic circulations, thunderstorms are expected to occur over east and North East India on day 1. On day 2, the models indicate that the thunderstorm intensity is likely to increase over East and North east India.
- o There is also a cyclonic circulation over northwest Madhya Pradesh and adjoining East Rajasthan in the lower levels. A trough runs from north Pakistan to above cyclonic circulation across southern parts of Punjab & Haryana in the lower levels. The overlying westerly trough appears to be moving very fast, and only on day 1, thunderstorms are expected over Northwest India and some heavy rainfall over Jammu and Kashmir. Intensity is likely to decrease on day 2.
- o A north south wind discontinuity in the lower levels runs from southeast Madhya Pradesh to south Tamilnadu across east Vidarbha, Telangana & Rayalaseema. ECMWF and IMD GFS deterministic model indicate that the discontinuity line is likely to move eastwards across the peninsular India on day 2. Associated widespread thunderstorm activity is expected over south peninsular India on day 1.

Day-1 & Day-2:

24hour Advisory for IOP:

Significant Rainfall:

Jammu and Kashmir, Himachal Pradesh, Uttarakhand,
South and west Assam and Meghalaya, Mizoram and Tripura
Sub Himalayan West Bengal

Thunderstorm with squall or gusty winds:

Interior Tamil Nadu, Kerala, South Interior Karnataka,
Rayalaseema, Coastal Andhra Pradesh, Northeast Telangana,
Punjab, Haryana, Uttar Pradesh, North Rajasthan
North Gangetic West Bengal, Sub Himalayan West Bengal, Bihar,
Jharkhand, Odisha, South Chhattisgarh,
Tripura, Mizoram, Manipur, South and west Assam and Meghalaya

Thunderstorm with squall and hail

Himachal Pradesh, Uttarakhand

48hour Advisory for IOP:

Significant Rainfall:

South and west Assam and Meghalaya, Mizoram and Tripura,
Sub Himalayan West Bengal
Kerala

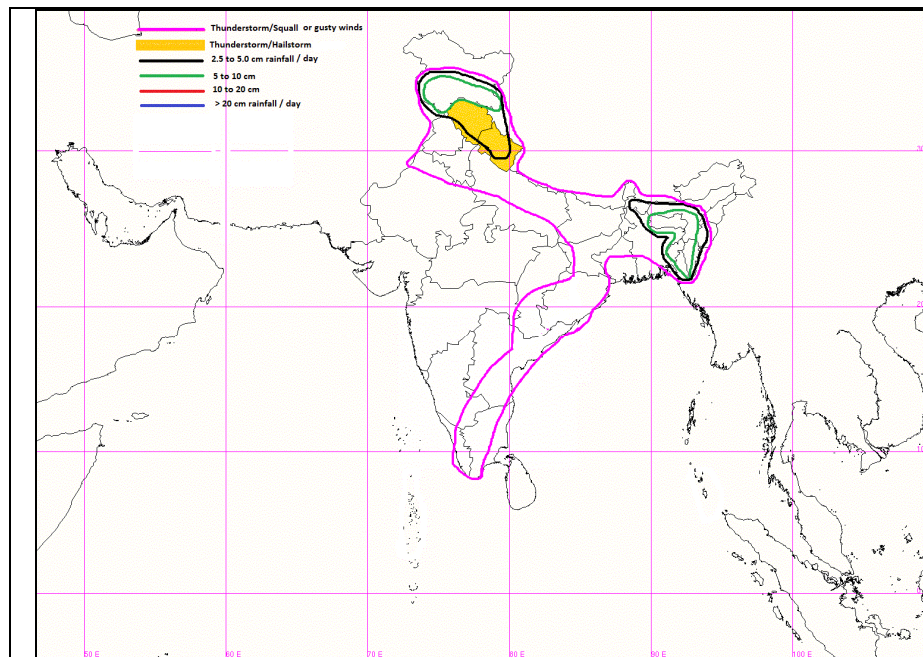
Thunderstorm with squall or gusty winds:

Kerala, Gangetic West Bengal, Odisha, Jharkhand
West and South Assam, Meghalaya, Mizoram and Tripura

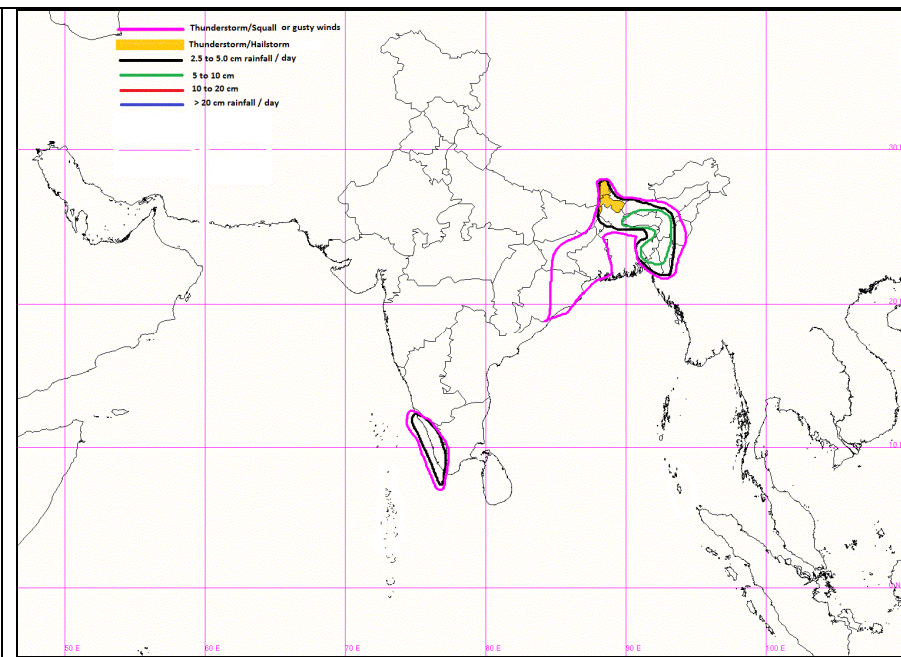
Thunderstorm with squall and hail

Sub Himalayan West Bengal

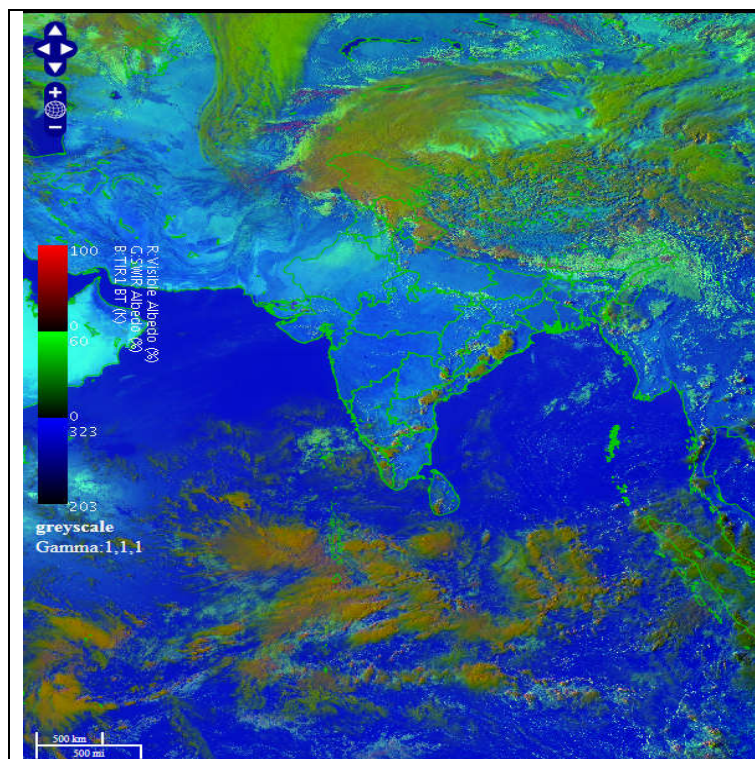
Graphical Presentation of Potential Areas for Severe Weather:



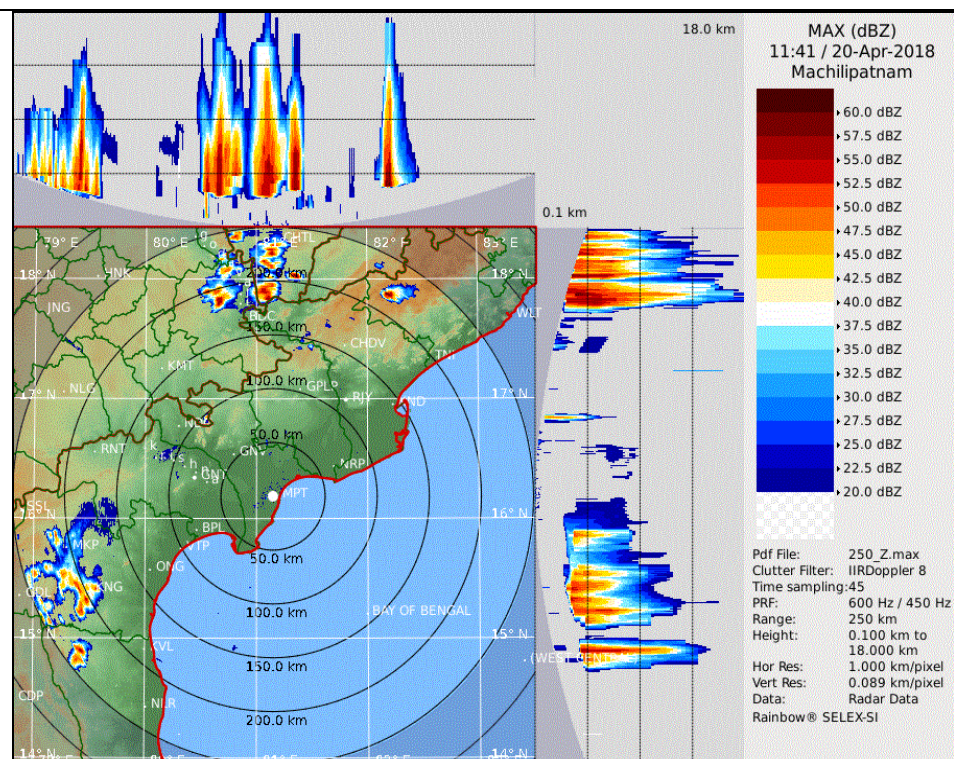
IOP Advisory for 24 hours



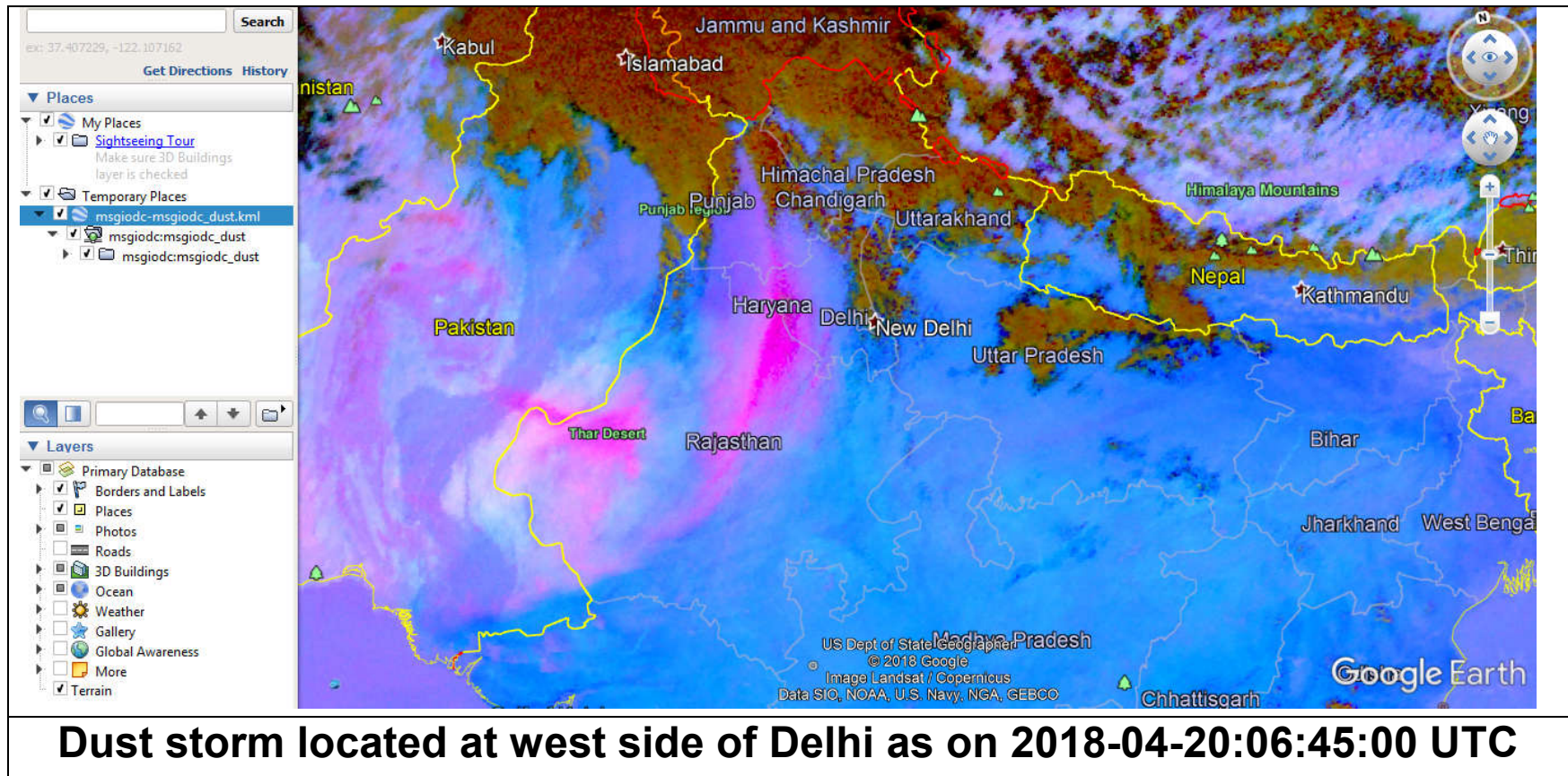
IOP Advisory for 48 hours

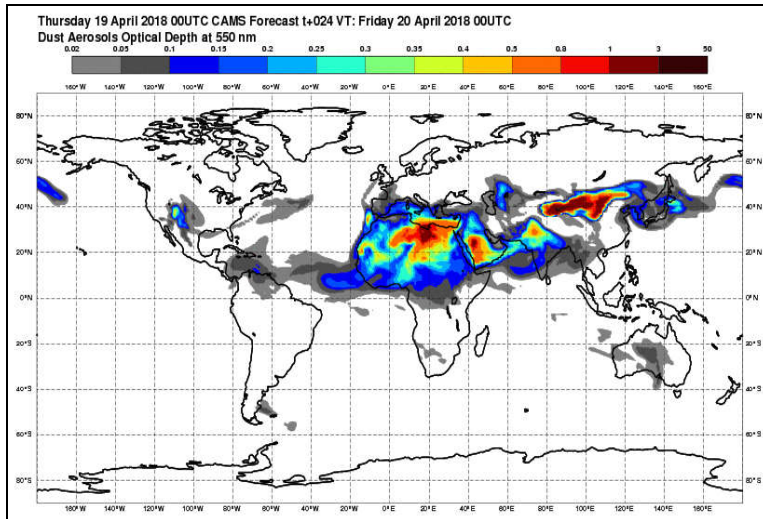


RAPID RGB Imagery at 1600 IST of the Day

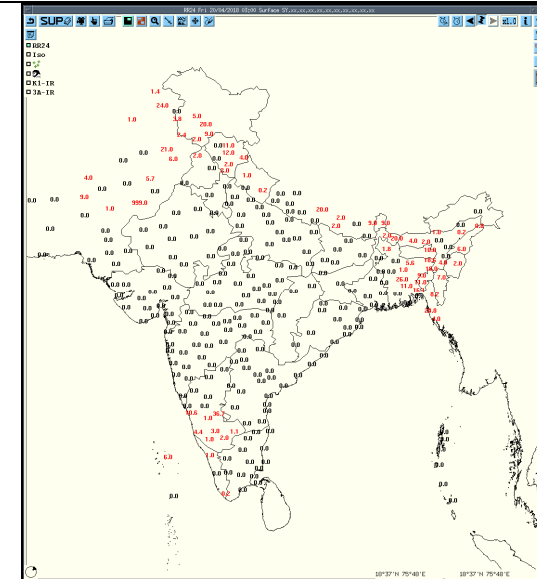


DWR Machilipatnam at 1711 IST of the Day

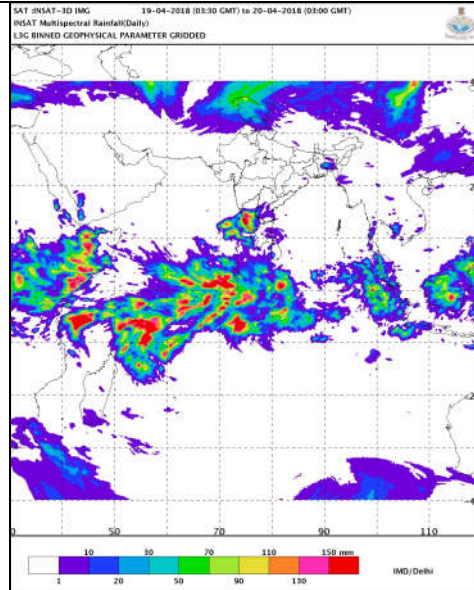




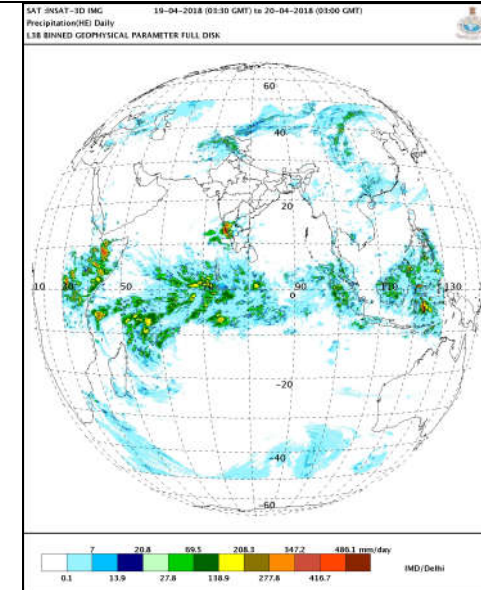
Dust Forecast



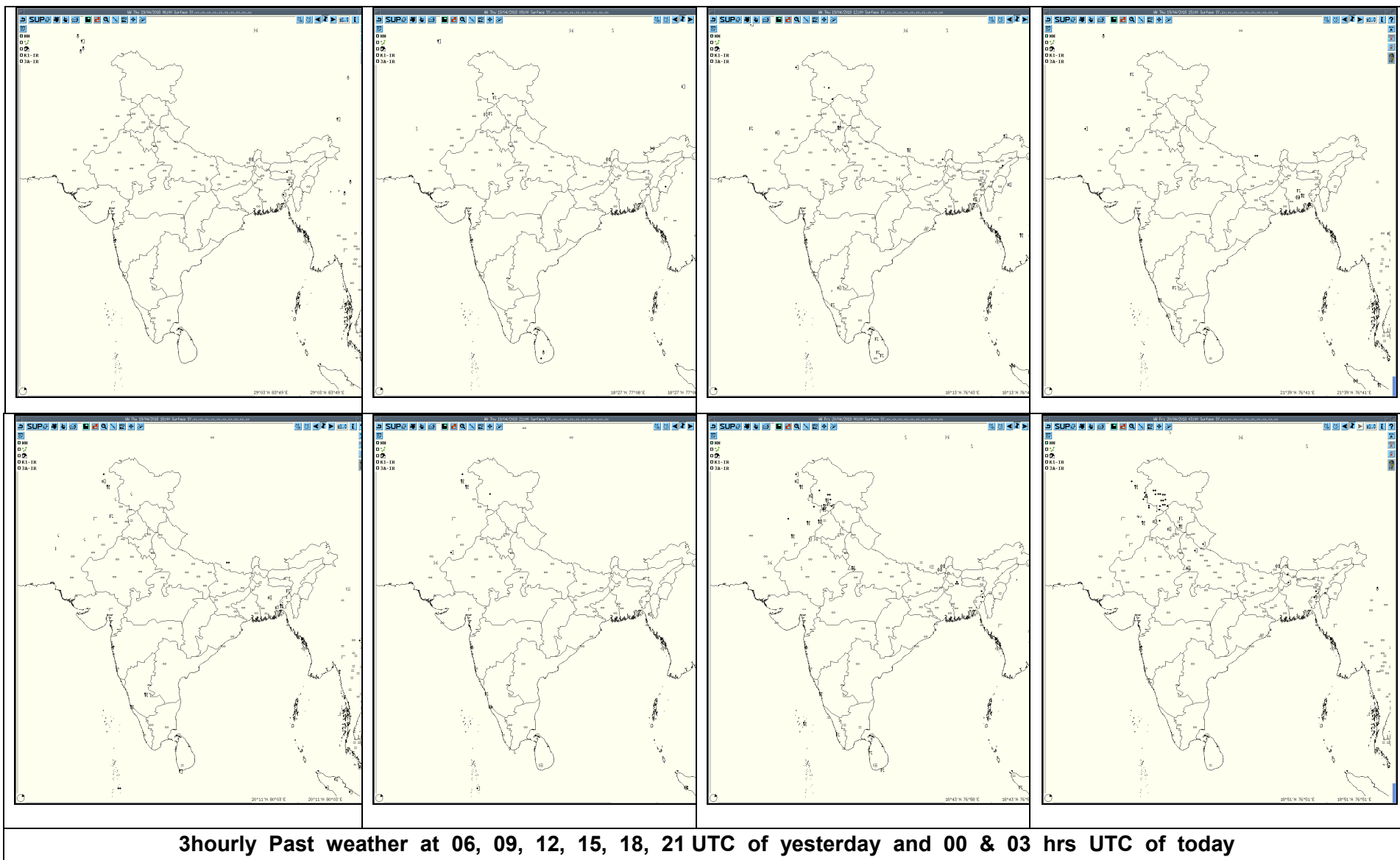
Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today



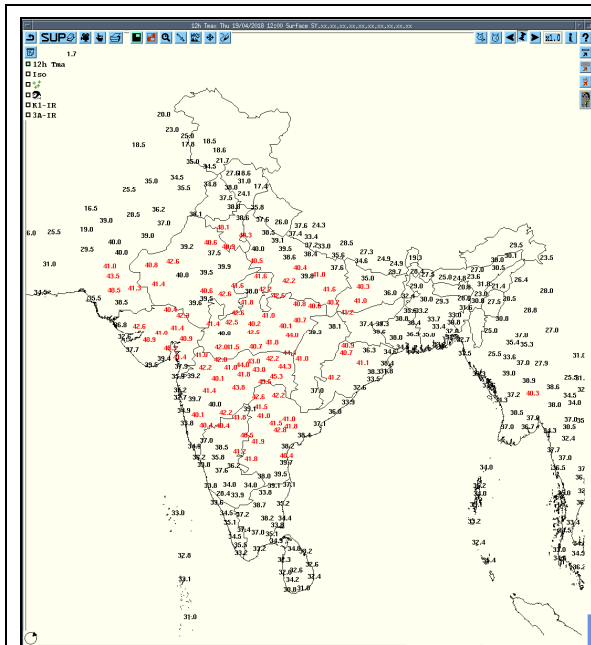
IMR



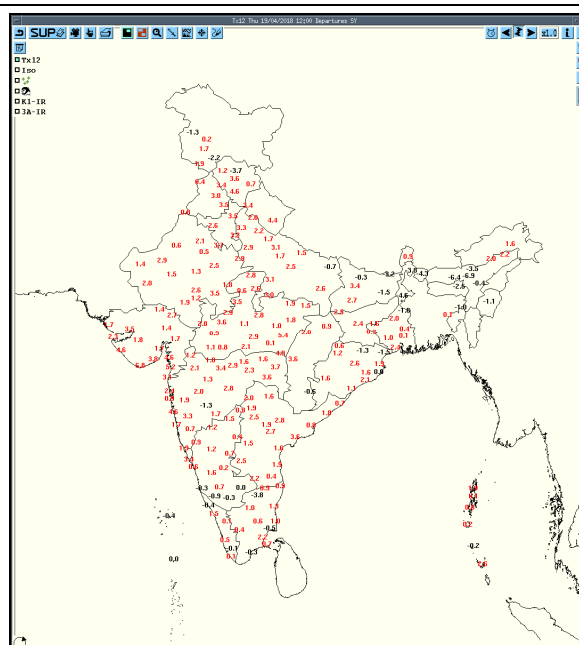
HEM



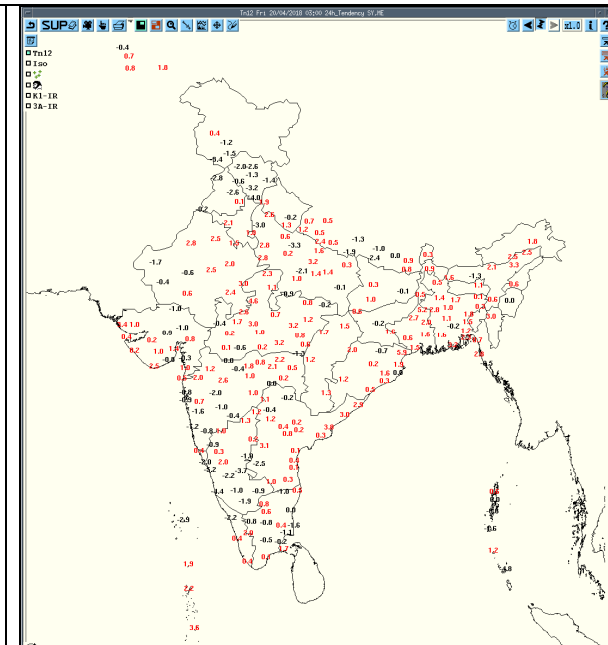
3hourly Past weather at 06, 09, 12, 15, 18, 21 UTC of yesterday and 00 & 03 hrs UTC of today



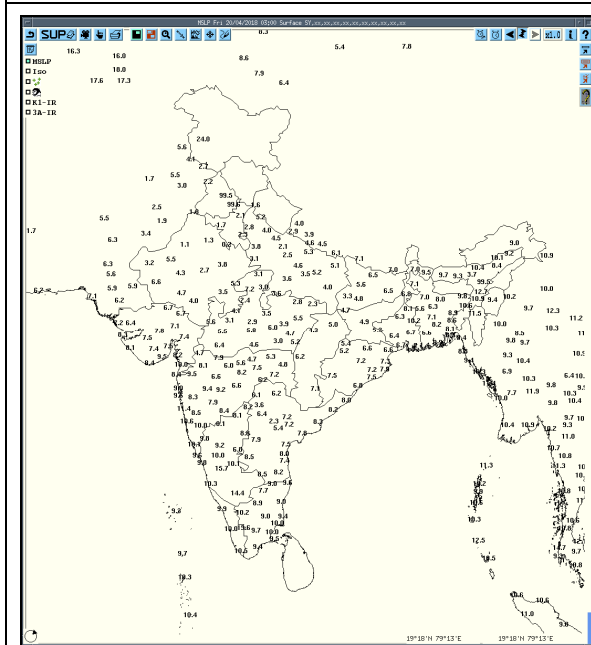
Tmax



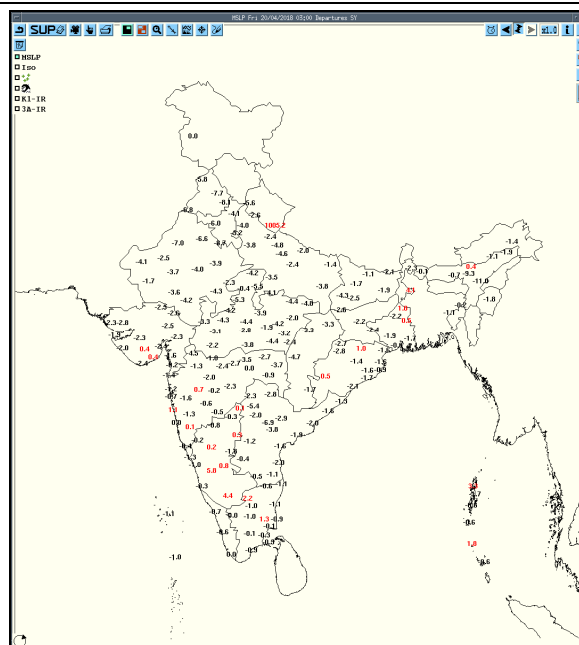
Departure Tmax



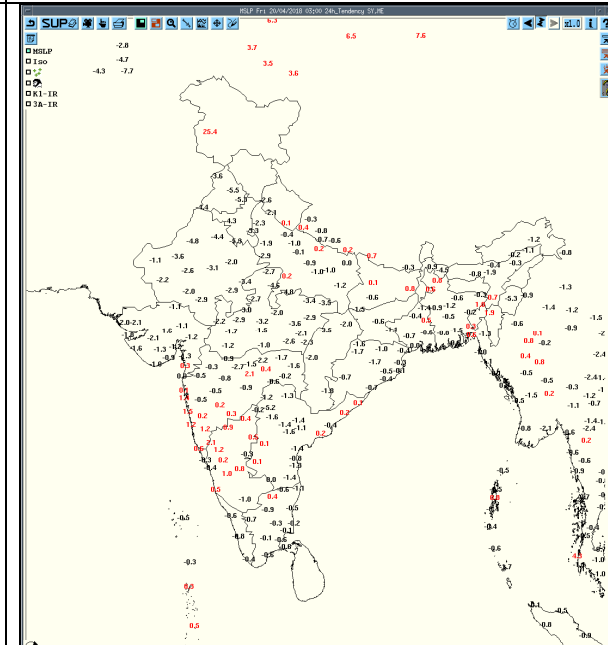
Tendency Tmax



MSLP



Departure MSLP



Tendency MSLP

Past 24 hours DWR Report:

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	20-04-18	190300-190432	Multiple Cells Lat-26.2874N Long-86.0431E Maximum Reflectivity: 51 dBZ Echo Top: 6 KM	Range: 125 KM from DWR Patna in NE direction Movement: Stationary	Warning issued	Thunderstorm	MADHUBANI, DARBHANGA
		190432-191542	NIL	N/A	N/A	N/A	N/A
		191542-191652	Single Cell Lat-26.7830N Long-85.4273E Maximum Reflectivity: 50.5 dBZ Echo Top: 12 KM	Range: 138 KM from DWR Patna in NNE direction Movement: towards South East	Warning issued	Thunderstorm	SITAMADHI, MADHUBANI, DARBHANGA
		191652-200300	NIL	N/A	N/A	N/A	N/A
Srinagar	20-04-18	190300-200300	Multiple cells continued to persist in se and NW direction and moves SE&NE- wards.	Persisted over SE an NE of DWR Srinagar	Thunderstorm Observed/Reported at Qazigund, Kukernag, Pahalgam, Gulmarg, Banihal, Baderwah, Batote, Katra And Jammu	Light to moderate rain /thunder/hail with heavy falls at south Kashmir	Light to moderate rain most places with heavy falls at isolated places
Kolkata	20-04-18	190301-200300	Nil	Nil	No Sig Echo	Nil	Nil
Jaipur	20-04-18	191712-200300	Multiple cell with average height of 6.0 km & maximum reflectivity 55.0 dBZ	Multiple cell develop from 1712 UTC of 19/04/2018 towards E,NE of Jaipur and moved to SW,W Wards at speed 10-15 km/hr.	Multiple cell develop from 0732 UTC of 15/04/2018 towards NW,W, SW,S,SE of Jaipur and reaches maximum reflectivity during 2032 UTC OF 19/04/2018 to 0212 UTC of 20/04/18 and continue up to 0300 UTC OF 20/04/2018	Thunderstorm, Duststorm with Light rain at Isolated places	Jaipur, Bharatpur, Dholpur, Dausa, Karuli, Tonk, Ajmer, Sawai madhopur Districts

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
Patiala	20-04-18	190300-190900	NO ECHO	--	--	--	--
		190900-191200	Multiple echoes Reflectivity: 64.0 dbz Ht. 13 kms.	All sectors Dir. NE - ly	--	Duststorm/ Thundersto rm/Rain	Amritsar, Sangrur, Nabha, Patiala, Roop Nagar, Chandigarh, Rajpura, Rohru, Solan etc.
		191200-191500	Multiple echoes Reflectivity: 58.5 dbz Ht. 12 kms.	NE/ SE Sectors Dir. NE-ly	--	Duststorm/ Thundersto rm/Rain	Ambala, Chandigarh, Rajpura, Solan, Sirhind etc. ,
		191500-191800	Multiple echoes Reflectivity: 50.5 dbz Ht. 11-12 kms.	NW/NE SECTORS DIR. NE-ly	--	Duststorm/ Thundersto rm/Rain	Amritsar, Gurdaspur, Mandi, Nadun, Palampur.
		191800 - 192100	Multiple echoes Reflectivity: 50.0 dbz Ht. 10-12 kms.	NE/WNW SECTORS DIR. NE - ly	--	Duststorm/ Thundersto rm/Rain	Mandi, Bhunter, Chamba, Dalhousie.
		192100-200000	Multiple echoes Reflectivity: 42.5dbz Ht. 08-10 kms.	NE/NW SECTORS DIR. NE - ly	--	Duststorm/ Thundersto rm/Rain	Rohru, Gurdaspur, Ferozpur, Hoshiarpur
		200000-200252	Multiple echoes Reflectivity: 46.5dbz Ht. 08-09 kms.	NW sector DIR. NE- ly	--	Duststorm/ Thundersto rm/Rain	Faridkot, Amritsar, Gurdaspur, Hoshiarpur, Bathinda.
Lucknow	20-04-18	192222-200132	NO SIGNIFICANT CELL	--	--	-	-
		200132-200302	Multiple cells with average height of 6.0KM with Maximum Reflectivity of 41.0 dBZ	W(200KM)m oving in E'ly Direction at speed of 67 km/hr.	Multiple cell at 01:32 UTC at W(200KM) moved in E'ly direction and got maximum reflectivity at 02:22 UTC at W(150KM) and remained stable upto 03:02 UTC from W(100KM) to WNW(100KM).	-	-

Realised past 24hrs TS/SQ/HS Data:

Realised TS/HS/SQ during past 24 hours ending at 0300UTC of today(received from RMCs/MCs)						
Name of Station Reporting	Region	State/Sub Division	Weather Event (TS/Hail/Squall)	Date	Time of Commencement (IST)	Time of end (IST)
Qazigund	Northwest India	Jammu & Kashmir	Thunderstorm	19/20-04-18	192215	200355
Kukernag	Northwest India	Jammu & Kashmir	Thunderstorm	20-04-18	0200	0240
Jammu	Northwest India	Jammu & Kashmir	Thunderstorm	20-04-18	0100 0425	0110 0530
Banihal	Northwest India	Jammu & Kashmir	Thunderstorm	19/20-04-18	191435 192200 200258	191520 192350 200635
Batote	Northwest India	Jammu & Kashmir	Thunderstorm	19/20-04-18	191245 200505	191535 200655
Katra	Northwest India	Jammu & Kashmir	Thunderstorm	19/20-04-18	192200 200200	192300 200600
Gulmarg	Northwest India	Jammu & Kashmir	Thunderstorm	19-04-18	1420 1815	1515 2000
Sundernagar	Northwest India	Himachal Pradesh	Thunderstorm	19/20-04-18	191819 192250 200000 200648	191910 192400 200020 200720
L. Kheri	Northwest India	East Uttar Pradesh	Thunderstorm	20-04-18	0715	0740
Agra(IAF)	Northwest India	West Uttar Pradesh	Thunderstorm	20-04-18	0600	0830
Agra(TAJ)	Northwest India	West Uttar Pradesh	Thunderstorm	20-04-18	0630	0730
Moradabad	Northwest India	West Uttar Pradesh	Thunderstorm	20-04-18	0530	0630
Najibabad	Northwest India	West Uttar Pradesh	Thunderstorm	20-04-18	0700	0745
Meerut	Northwest India	West Uttar Pradesh	Thunderstorm	20-04-18	0710	0750
Muzaffarnagar	Northwest India	West Uttar Pradesh	Thunderstorm	20-04-18	0730	0800
Jaipur	Northwest India	East Rajasthan	Thunderstorm	20-04-18	0550	0610
Banasthali	Northwest India	East Rajasthan	Thunderstorm	20-04-18	0530	0540
Ambala	Northwest India	Haryana	Thunderstorm	19-04-18	1745	1810
Patiala	Northwest India	Punjab	Thunderstorm	19-04-18	1650	1735
Amritsar	Northwest India	Punjab	Thunderstorm	19/20-04-18	191428 200430 200630	191550 200520 200815
Ludhiana	Northwest India	Punjab	Thunderstorm	19/20-04-18	191540 00700	191620 200800
Chandigarh	Northwest India	Chandigarh	Thunderstorm	19-04-18	1720	1750
Dehradun	Northwest India	Uttarakhand	Thunderstorm	19-04-18	2055	2130
Tehri	Northwest India	Uttarakhand	Thunderstorm	19-04-18	2050	2220
Barapani	Northeast India	Meghalaya	Thunderstorm	19-04-18	1315	1330
Shillong	Northeast India	Meghalaya	Thunderstorm	19-04-18	0900	1100
Agartala	Northeast India	Tripura	Thunderstorm	19-04-18	2125	2225
Barapani	Northeast India	Meghalaya	Thunderstorm	19-04-18	1315	1330
Port Blair	East India	Andaman & Nicobar Islands	Thunderstorm	19-04-18	1210	1340

Realised TS/HS/SQ during past 24 hours ending at 0300UTC of today(received from RMCs/MCs)						
Name of Station Reporting	Region	State/Sub Division	Weather Event (TS/Hail/Squall)	Date	Time of Commencement (IST)	Time of end (IST)
Kannur	South India	Kerala	Thunderstorm	19-04-18	1815	1900
Karipur A P	South India	Kerala	Thunderstorm	19-04-18	1745	2200
Kozhikode	South India	Kerala	Thunderstorm	19-04-18	1835	1955
Thiruvananthapuram AP	South India	Kerala	Thunderstorm	19-04-18	1530	1800

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)

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

Past24hourHEMandIMRainfall(upto03UTCof today)

IMR: http://satellite.imd.gov.in/img/3Ddaily_imr.jpg

HEM: http://satellite.imd.gov.in/img/3Ddaily_he.jpg

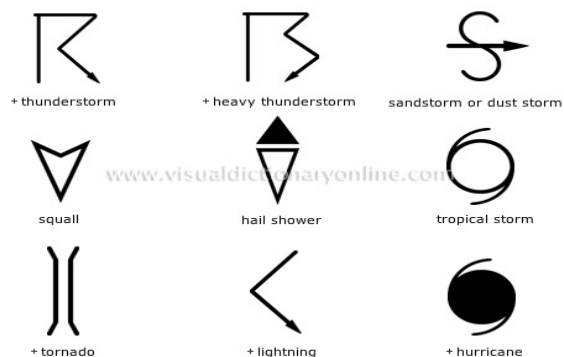
For Radar images of the past 24 hours including mosaic of images:

http://ddgmui.imd.gov.in/dwr_img/

Satellite sounder based T- Phigram

http://satellite.imd.gov.in/mAndhra_Pradesh_skm2.html

WEATHER SYMBOLS:



∞	haze
☁	smoke
☼	dust or sand storm
☼	fog
☼	drizzle
•	rain
*	snow
▽	showers
△	hail
☼	thunderstorm
Weather Symbols	