



India Meteorological Department
FDP STORM Bulletin No.10(15-03-2017)

1. CURRENT SYNOPTIC SITUATION at 0300 UTC of 15-03-2017:

SYNOPTIC FEATURES:

The Western Disturbance as a trough in mid-tropospheric westerlies with its axis at 3.1 Km above mean sea level roughly along longitude 56.0°E and north of latitude 30.0°N now seen as an upper air cyclonic circulation over central parts of Afghanistan & neighbourhood and extends upto 3.1 km above mean sea level.

An induced upper air cyclonic circulation lies over central Pakistan and adjoining west Rajasthan and extends upto 1.5 km above mean sea level.

The upper air cyclonic circulation over North Interior Karnataka & neighbourhood extending upto 0.9 Km above mean sea level persists.

A trough in lower level easterlies runs from Maldives area to Coastal Karnataka and extends upto 1.5 km above mean sea level.

A fresh Western Disturbance is very likely to affect northwest India region from 19th March onwards.

The wind discontinuity from the upper air cyclonic circulation over North interior Karnataka & neighbourhood to south Tamilnadu extending upto 0.9 Km above mean sea level has become less marked.

SATELLITE OBSERVATIONS during past 24hrs and current observation (Based on 0300 UTC Imagery of INSAT-3D):

Clouds (based on 0300UTC imagery):

Scattered multi/layered clouds were seen over J & K in association with western disturbance over the area.

Scattered low/medium clouds with embedded weak to moderate convection over Tamilnadu and Kerala. Scattered low/medium clouds over north Punjab, northeast Himachal Pradesh, Rajasthan, north Utrakhnad, Uttar Pradesh, north Madhya Pradesh, south Madhya Maharashtra, Bihar, northeast Jharkhand, north Gangetic west Bengal, Sikkim, Arunachal Pradesh, Telangana and South Interior Karnataka.

Arabian Sea:-

Scattered low/medium clouds with embedded moderate to intense convection seen over southeast Arabian Sea & adjoining Indian Ocean.

Bay of Bengal & Andaman Sea:-

Scattered low/medium clouds with embedded isolated weak to moderate convection seen over southwest Bay of Bengal.

Convection:

Weak to moderate convection (CTT reaching up to 240° K in some places) was observed over the entire north India.

Weak convection was observed over all Rajasthan, MP and UP with CTT > 250° K.

Strong convection with CTT reaching upto 220° K was observed over Tamil Nadu, Kerala, Andhra Pradesh.

Jet Stream:

No Jet stream and trough is observed.

Dynamic Features:

A positive vorticity field is seen over north UP & Bihar and coastal Karnataka. A weak to medium wind shear is present over north-eastern parts of country (North of 25 N). Positive shear tendency is observed over south & north India and negative shear tendency

is observed over most parts of the India. Higher water vapour content is seen over SW J&K adjoining Pak and southern states of T N & Kerala.

Precipitation:

IMR: Rainfall upto 10 mm was observed over NE parts of J&K , north H P , north Uttrakhand , central parts of Rajasthan, T N, Kerala, south AP and some parts of Telangana. Rainfall upto 30 mm was observed over some parts of Kerala adjoining TN.

HEM: Rainfall upto 7 mm was observed over southern states of Kerala, Tamilnadu, Andhra Pradesh, south interior Karnataka and isolated parts of Telangana. Rainfall upto 70 mm was observed over some parts of Kerala and south interior Karnataka.

RADAR observation during past 24 hrs and current observation based on 0900UTC:

No Significant convection was seen in DWR composite at 1420 IST of today.

Environmental condition (dust etc) and its forecast based on 00UTC of date:

No significant dust concentration observed over Arabian Peninsula and west Rajasthan. No significant change in dust concentration expected over northern India for next three days.

Particulate matter concentration expected to remain in Moderate category next 2 days.

2. NWP MODEL GUIDANCE:

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

1. Weather Systems:

A feeble CYCIR extending up to 850 hPa over Maharashtra and adjoining areas in the analysis shifts a little towards northward direction for 2 days to reach over north Madhya Pradesh and then re-establish over Madhya Maharashtra and interior Karnataka in day 3 and remains quasi-stationary over the region till day 5. Another feeble north-south trough lies over Assam and adjoining areas extending up to Bay of Bengal persists during next 2 days which orients in north-east to south-west direction starting from SHWB to interior Karnataka extending over GWB, Jharkhand, Chhattisgarh, Telangana and adjoining Vidarbha and Madhya Maharashtra.

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

The Jet at 500 hPa does not exist over India during next 5 days but strong westerly wind persists around 25 deg. N latitude which weaken in next 2 days, further strengthen in day 3 and weakens thereafter.

3.Low level Vorticity:-Positive Vorticity (>15 x 10⁻⁵/s):

Mainly along foothill of Himalaya during next 5 days with morning hour maxima. A significant vorticity zone over Madhya Maharashtra adjoining areas during next 2 days gradually moves northward and re-establish back over the region in next 3 days along with associated CYCIR. Another zone of significant vorticity appears along east coast in day 3 associated with the trough over the region.

4. Spatial distribution of T-storm Initiation Index, Lifted Index, Total Total Index, CAPE, CINE and Sweat Index (High potential for thunderstorm):

T-Storm Initiation Index (> 4): Less than the threshold value all over the country during next 2 days. The areas exceeding threshold lies over GWB and adjoining Orissa and Jharkhand during next 3 days and appears over southern part of coastal Andhra Pradesh after day 4.

Lifted Index (< -2): Less than threshold value over some pockets of Madhya Maharashtra and adjoining Telangana and Vidarbha region during next 2 days. The index crosses threshold along east coast from Day-2 onwards over GWB, Orissa and coastal Andhra

Pradesh. It reaches maximum negative value over Gangetic West Bengal and adjoining Orissa. Day 3 onwards, a significant zone is also seen over Rajasthan and adjoining Madhya Pradesh and Uttar Pradesh with eastward movement.

Sweat Index (> 300): This index shows characteristic variation similar to Lifted Index.

Total Total Index (> 50) : Above threshold value over Gujarat, Maharashtra and adjoining Rajasthan and Madhya Pradesh at 12 UTC during next 3 days. The significant zone lies over Central India including Madhya Maharashtra, Vidarbha, and Madhya Pradesh and adjoining south Rajasthan and Telangana.

CAPE (> 1000): Mostly along Andhra Pradesh and Tamilnadu coast during next 24 hours and over coastal Odisha and Gangetic West Bengal coast during Day-4 to Day-5. Maximum over GWB on day 4 and 5. During day 2 onwards over Kerala with maximum value during day 3.

CIN (50-150): Maximum CIN values are found in pockets along east coast over GWB, Odisha, coastal AP, and Rayalseema and Tamilnadu from Day-1 to Day-5. The zone sometime extends inland. CIN values are higher over coastal Gujarat and adjoining west Rajasthan.

5. Rainfall and thunder storm activity:

10-40 mm rainfall over Kerala and adjoining Konkan & Goa and interior Karnataka during next 4 days with maximum rainfall in day 1. 10-40 mm rainfall is likely over some areas over Delhi, east Uttar Pradesh, Uttrakhand and adjoining Haryana and Himachal Pradesh after day 4.

NCMRWF (NCUM Forecasts based on 00 UTC of the day):-

1. Weather Systems:

Feeble trough in forecasts Day-0 to Day-4 at MSLP seen over J&K. Weak CYCIR over Bihar in Day-5.

Wind discontinuity only in Day-0-4: at 925 and 850 hPa extends over parts of AP, Maharashtra, Odisha, Chhattisgarh and parts of Bihar.

Anticyclonic flow at 850 hPa over Odisha in Day-1&2 moves to Bay of Bengal in Day-3 and off Gujarat coast in Day-1 to Day3 also moves to Arabian Sea.

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

In Day-4 over Rajasthan and adjoining MP region

Weaker magnitude during Day-0 to Day-3

3. Convergence at 850 hPa:

Weak noisy low level convergence at several places over India

4. Low level Vorticity:-Positive Vorticity (>15 x 10⁻⁵/s):

Weak noisy scattered in 12UTC on all days.

Day-0 to Day-3 at 18 and 00UTC: NS orientation over peninsula near 77E along the NS trough at 850 hPa shifting eastwards.

Day-4: 00 to 12UTC high values over NW India Rajasthan-MP and shifting eastwards to over eastern India.

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

Day-0-2: Parts of TN extending to AP and Karnataka. NS orientation covering Maharashtra and MP.

Day-2-4: NS orientation, Central peninsula covering parts of Telangana, Karnataka, Maharashtra, MP, Chhattisgarh and Odisha (on day4)

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

Day-0-2: Parts of TN extending to AP and Karnataka. NS orientation covering Maharashtra and MP.

Day-2-4: NS orientation, Central peninsula covering parts of Telangana, Karnataka, Maharashtra, MP, Chhattisgarh and Odisha (on day4)

7. Spatial distribution of TTI: TTI >44 [Scattered Numerous Thunderstorms]:

Day-0-4: NS orientation, Central peninsula covering parts of Telangana, Karnataka, Maharashtra, MP, Chhattisgarh and Odisha (on day4)

Day3-Day-4 high values of TTI over NW India moving SE wards after Day-3.

8. Rainfall and thunder storm activity:

Day-0 -1: (>2cm/day) parts of TN Kerala region and extending northwards to over Telangana and adjoining AP. Parts of Arunachal and Tripura and Mizoram show rainfall > 4cm/day on day-3 to 5.

Day-5 (>4cm/day) rainfall seen over Bangladesh, adjoining West Bengal, Tripura and Mizoram. (>8cm/day also likely)

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

1. Weather Systems:

A feeble and quasi-stationary CYCIR extending up to 850 hPa Maharashtra coast and adjoining areas persists for 3 days. Another feeble north-south trough lies over Arunachal Pradesh and adjoining areas extending southward over coastal Myanmar persists during next 3 days. Another north-south trough extending over Delhi, east UP, Madhya Pradesh is seen during day 2 which orients along east coast over GWB, Jharkhand, Chhattisgarh, Telangana and adjoining Vidarbha during day 3

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

The Jet at 500 hPa does not exist over India during next 3 days but strong westerly wind persists around 25 deg. N latitude which weaken in next 24 hours, which further strengthen in day 2 onwards.

3. Low level Vorticity:-Positive Vorticity (>15 x 10⁻⁵/s):

Mostly along foothills of Himalaya during morning hours of next three days. Over Madhya Maharashtra and adjoin areas Karnataka and adjoining areas during next 24 hours. A north south zone starting from east Uttar Pradesh up to Madhya Maharashtra in day 2 which orients along east coast in day 3.

4. Model Reflectivity (Max. dBz):

>25 dBz over isolated places Over Kerala and adjoining Interior Karnataka during next 24 hours and over J&K during day 1 moves eastward over Himachal Pradesh and Uttarakhand in day 2. Parts of coastal Andhra Pradesh and GWB experiences during day 3.

5. Spatial distribution of Total Total Index, K-Index, CAPE and CINE (High potential for thunderstorm):

Total Total Index (> 50) : Above threshold value mostly over most parts of NW India during next 3 days. The index assumes higher values all over India except peninsular India in day 2 and 3.

K-Index (> 35): Less than threshold value over the India during next 3 days but significant values are seen over peninsular India and adjoining Maharashtra.

CAPE (> 1000): Mostly over Kerala, coastal Karnataka and Konkan & Goa during next 3 days. The zone over coastal Andhra Pradesh and Tamilnadu, extends over coastal Orissa and GWB in day 2 and 3.

CINE (50-150): CIN values are small (greater than – 200) all over India during all three days of forecasts except some places along east coast of India.

8. Rainfall activity:

Rainfall activity (~ 20-70 mm) in extreme south peninsular region over Kerala and adjoining interior Karnataka and Tamilnadu areas during next 24 hours which decreases thereafter

Rainfall ~20-40 mm over parts J&K and adjoining Himachal Pradesh during day 2. Some parts of Sikkim may get 20-40 mm of rainfall during day 3

ECMWF (based on 00UTC of the day):

Mean Sea Level:

No significant systems over Indian region till 20th March 2017.

Lower Level Winds (925 hpa & 850 hpa):

A trough in lower level easterlies is seen running from Marathwada to northern parts of south interior Karnataka on 15th March and become less marked thereafter.

An upper air cyclonic circulation is seen over northwest Rajasthan on 16th March and seen over northeast Rajasthan on 17th and persisted over the same area till 18th and become less marked thereafter.

Another upper air cyclonic circulation is seen over south interior Karnataka and neighbourhood on 16th and become less marked thereafter.

Western Disturbance (700 hpa & 500 hpa):

A western disturbance as trough running roughly along 60° E and north of 32° N at 500 hpa is seen on 15th March and seen as a feeble trough roughly along longitude 74° E and north of latitude 34° N on 16th March and moved away eastwards thereafter.

3. IOP ADVISORY FOR 24 and 48 Hrs:

Summary and Conclusions:

Synopsis based on synoptic conditions, NWP models and satellite imageries is as follows:

In association with the upper air cyclonic circulation over North Interior Karnataka & neighbourhood and the trough in lower level easterlies running from Maldives area to Coastal Karnataka, heavy rainfall occurrences are expected over the Kerala region. Also, in the peninsular region ahead of the trough, thunderstorms accompanied with squalls are expected over Interior Karnataka on day 1. On day 2, with the westward shift in the position of the trough, the thunderstorm and accompanying rainfall region is expected to shift westwards to over coastal Kerala and Lakshadweep.

24 hour Advisory for IOP:

Kerala
Interior Karnataka

48 hour Advisory for IOP:

Kerala and Lakshadweep

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 RAPID tool:

<http://rapid.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

Past 24 hour HEM and IMR rainfall (upto03UTCof today)

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

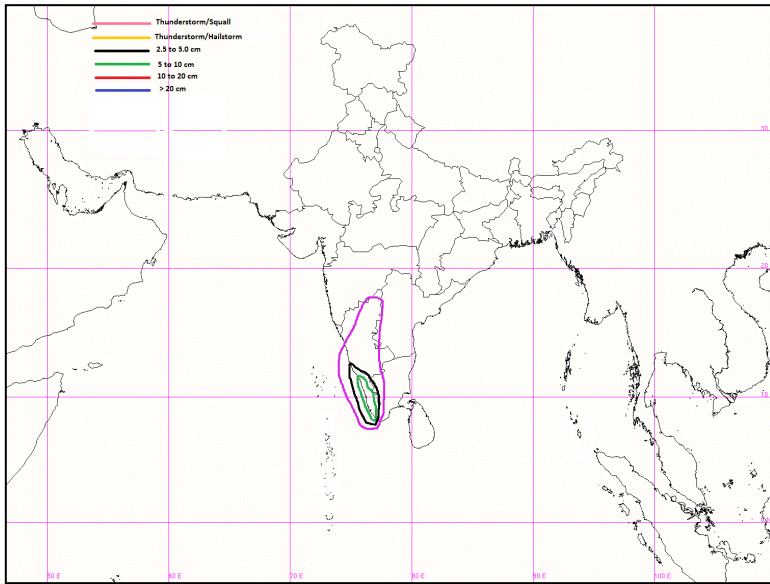
HEM: http://satellite.imd.gov.in/img/3Ddaily_he.jpg

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

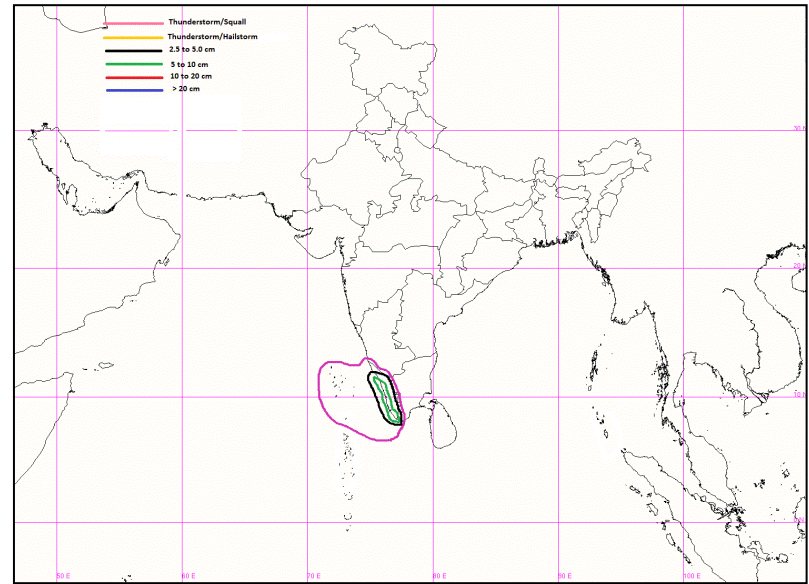
http://ddgmui.imd.gov.in/dwr_img/

Satellite sounder based T-Phi gram

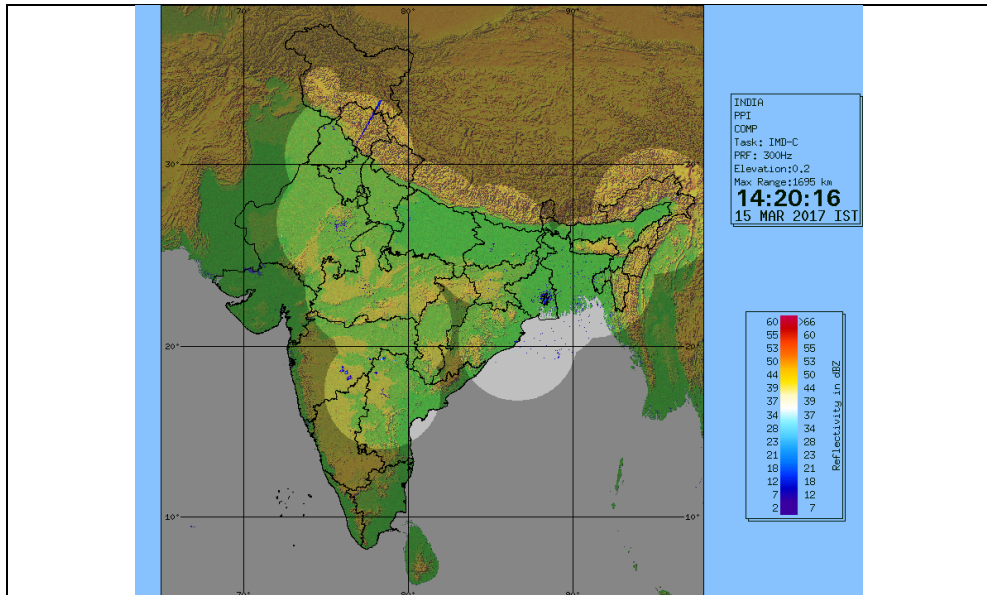
http://satellite.imd.gov.in/map_skm2.html



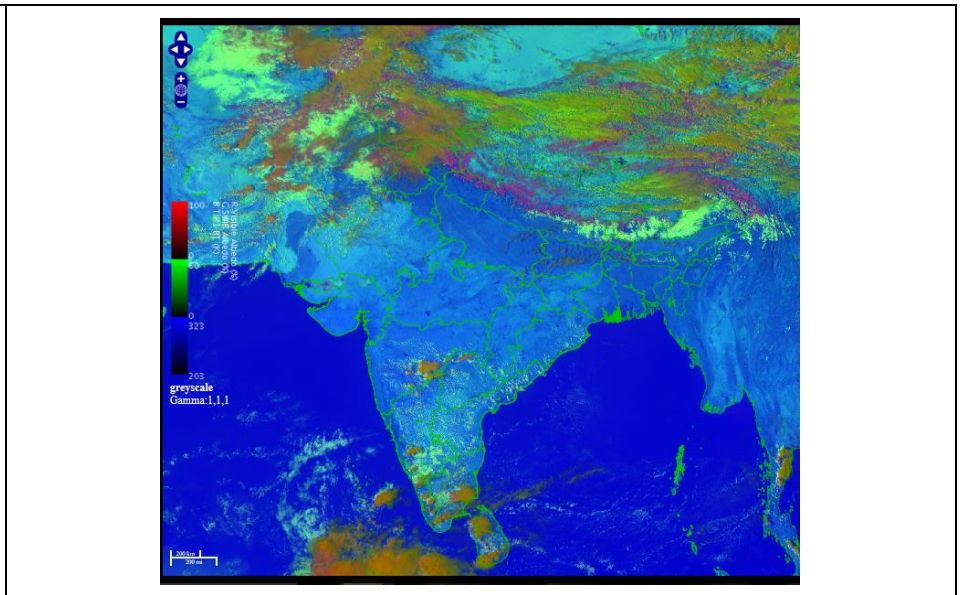
IOP Advisory for 24 hours



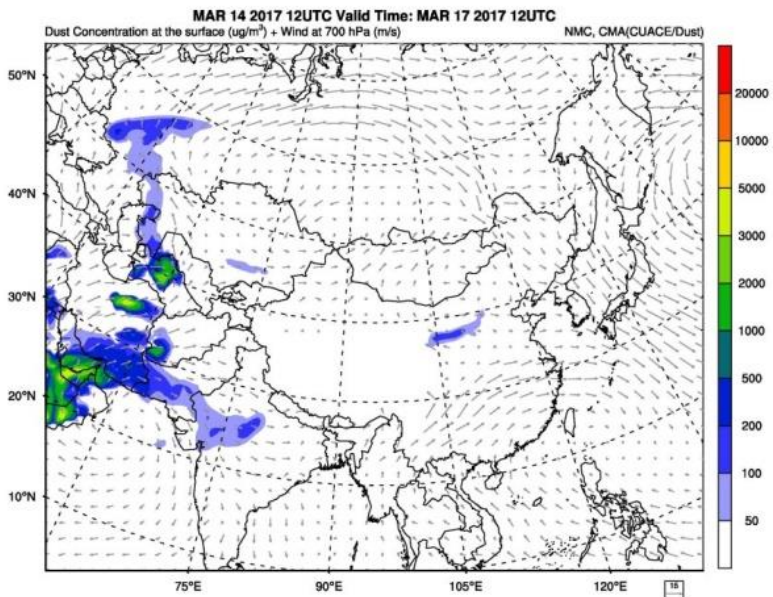
IOP Advisory for 48 hours



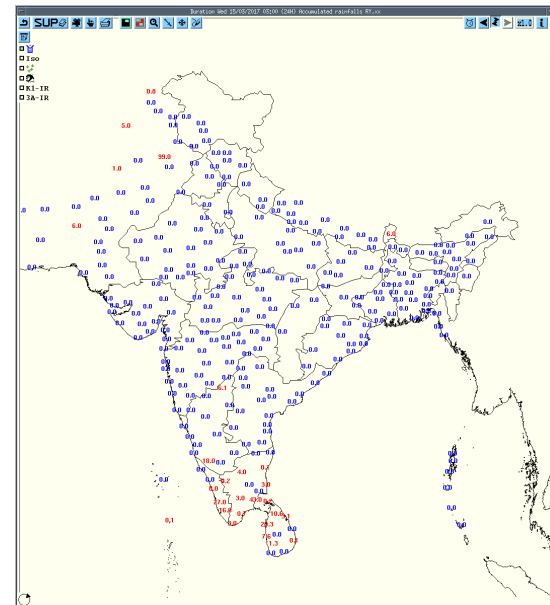
DWR Composite at 1420 IST of today



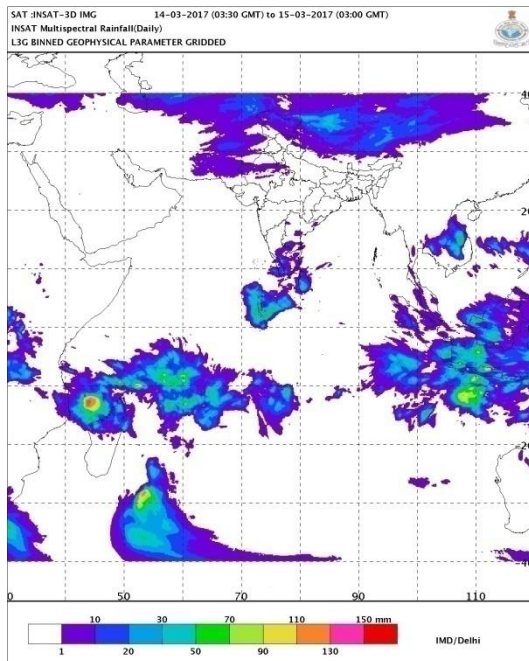
RGB Image of INSAT3D at 1500 IST of today



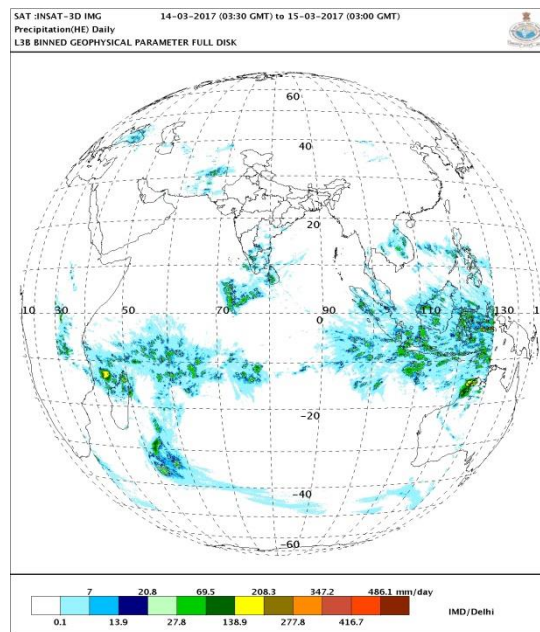
Forecast Dust Concentration at 12UTC of 17th March



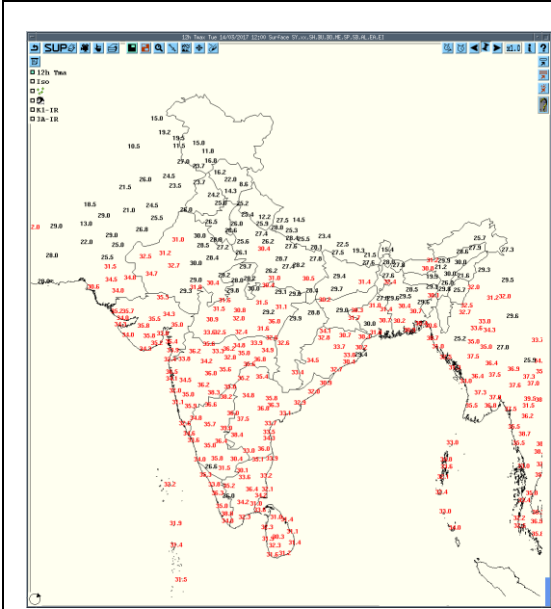
Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today



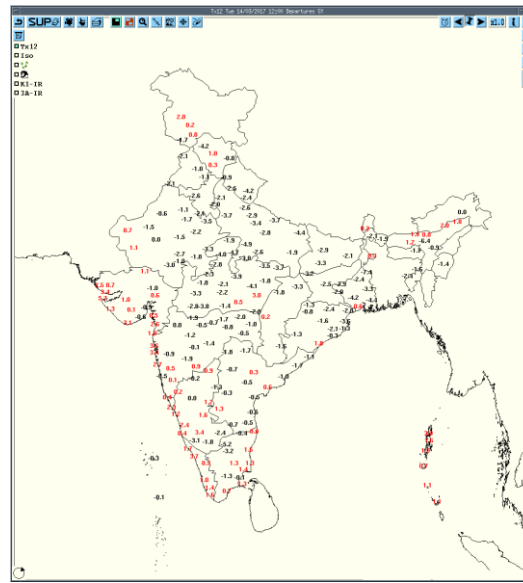
IMR Rainfall



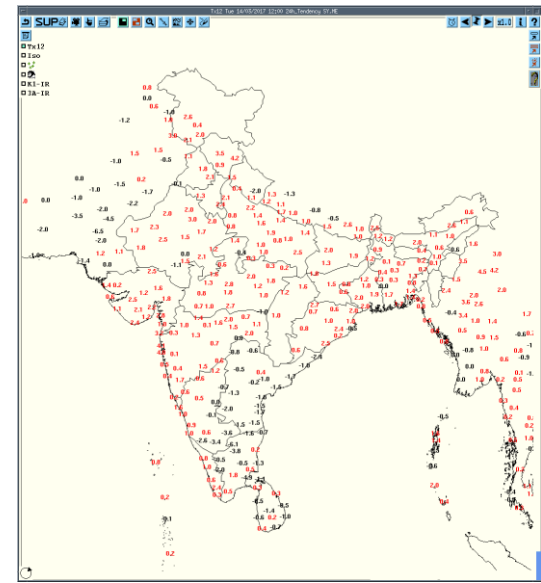
HEM Rainfall



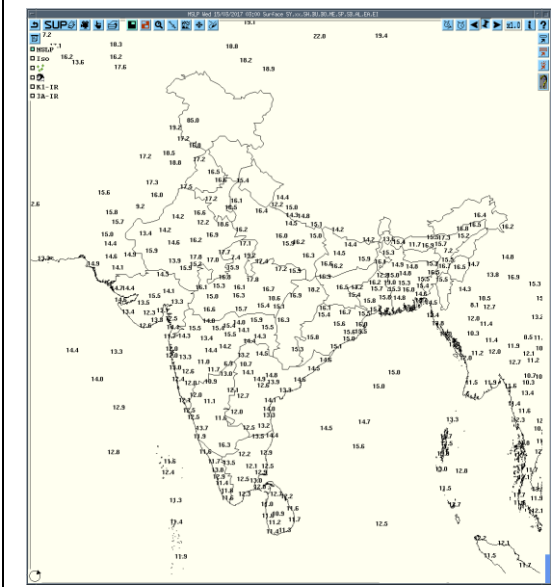
Tmax



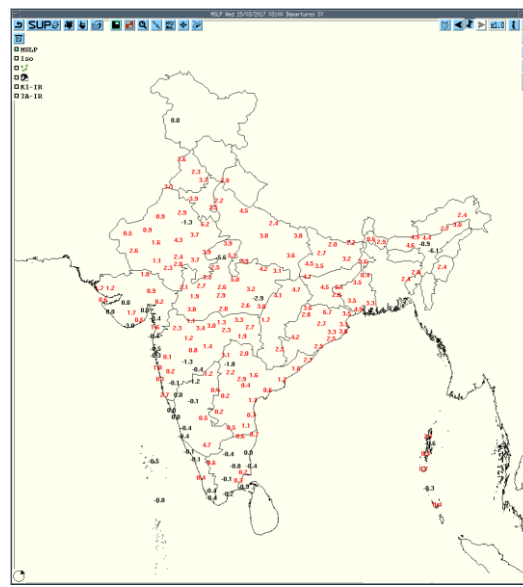
Departure Tmax



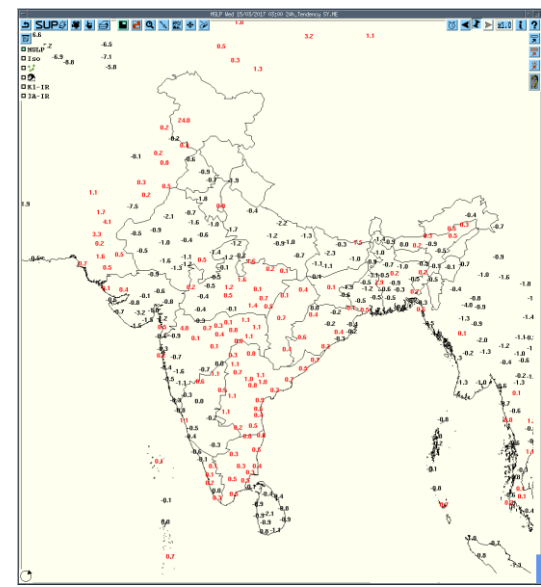
Tendency Tmax



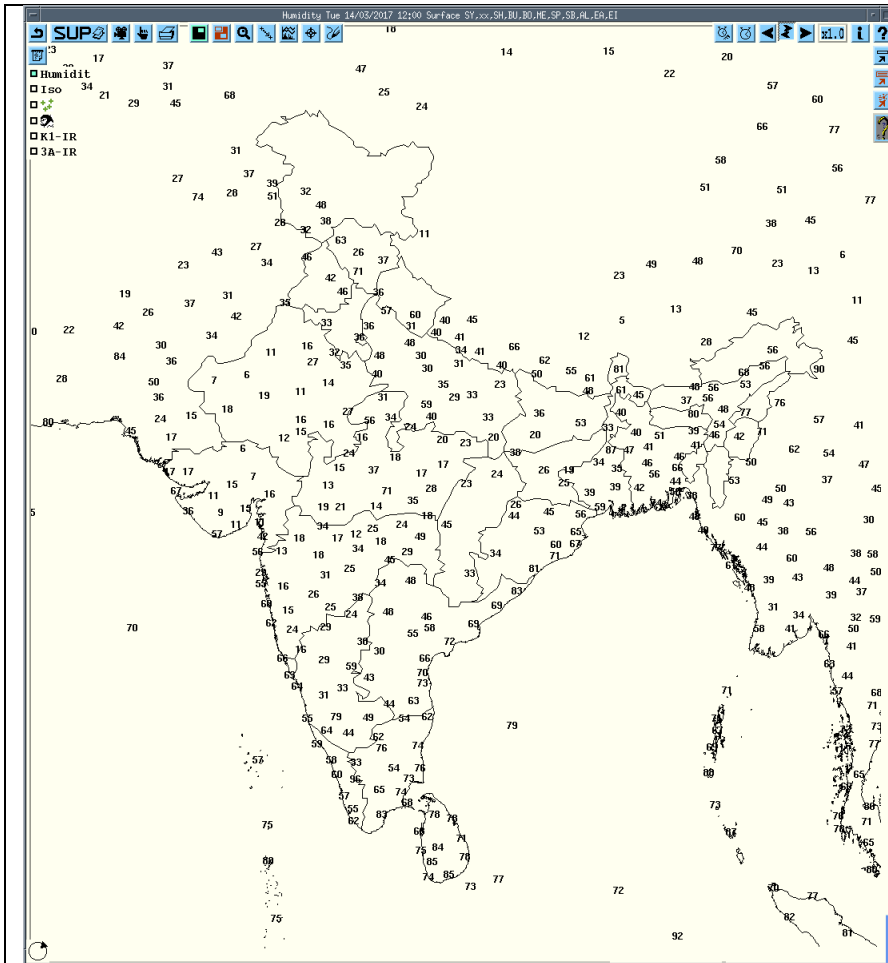
MSLP



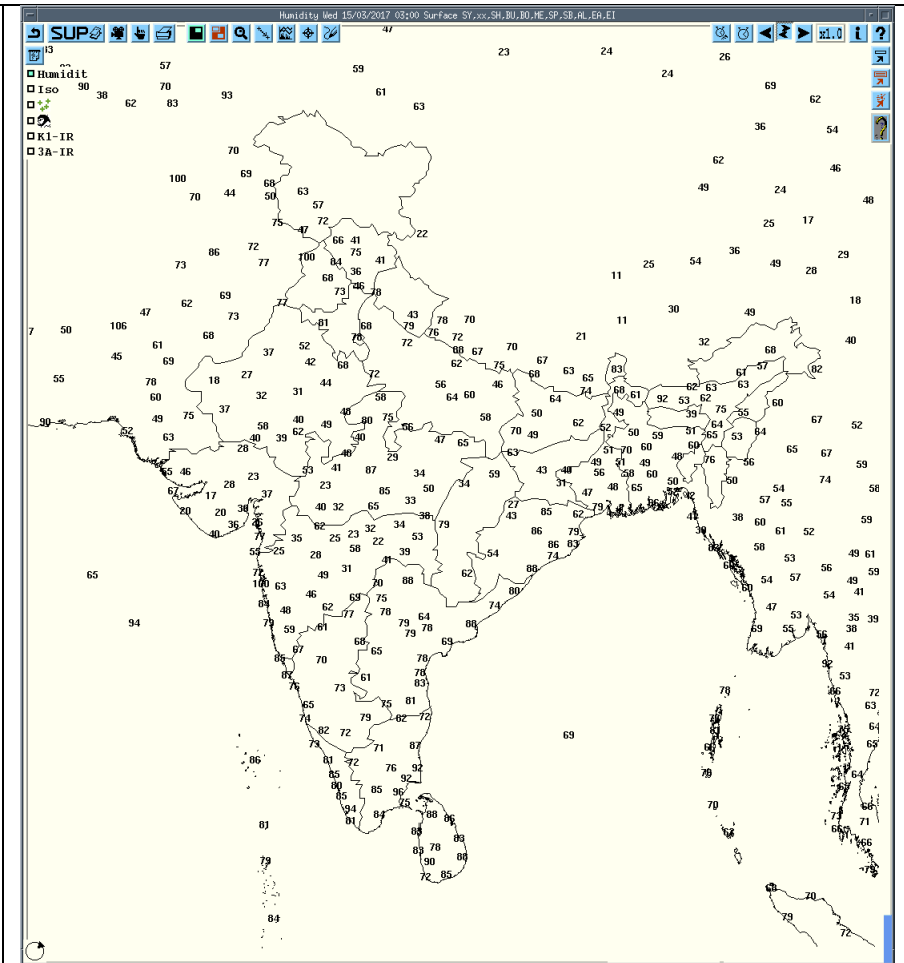
Departure MSLP



Tendency MSLP



RH 12UTC yesterday



RH 03UTC today

Realized weather past 24hours

| Date | Time of Reporting | Name of Station Reporting | Region | STATE | Weather Event |
|-------------|--------------------------|----------------------------------|---------------|----------------|----------------------|
| 14-03-2017 | 0600UTC | Nil | Nil | Nil | Nil |
| 14-03-2017 | 0900UTC | Nil | Nil | Nil | Nil |
| 14-03-2017 | 1200UTC | Madkeri | South India | Karnataka | Thunderstorm |
| | | Karipur | South India | Kerala | Thunderstorm |
| | | Cochin | South India | Kerala | Thunderstorm |
| | | Thiruvananthapuram | South India | Kerala | Thunderstorm |
| 14-03-2017 | 1500UTC | Hyderabad AP | South India | Andhra Pradesh | Lighting |
| | | Coimbatore | South India | Tamilnadu | Lighting |
| 14-03-2017 | 1800UTC | Hyderabad AP | South India | Andhra Pradesh | Lighting |
| | | Coimbatore | South India | Tamilnadu | Lighting |
| 14-03-2017 | 2100UTC | Hyderabad AP | South India | Andhra Pradesh | Lighting |
| | | Coimbatore | South India | Tamilnadu | Lighting |
| 15-03-2017 | 0000UTC | Nil | Nil | Nil | Nil |
| 15-03-2017 | 0300UTC | Nil | Nil | Nil | Nil |

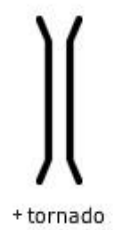
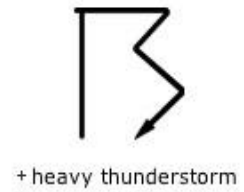
| Name of Station Reporting | Region | STATE | Weather Event | Date | Time of Commencement (IST) | Time of end (IST) |
|----------------------------------|---------------|----------------|----------------------|-------------|-----------------------------------|--------------------------|
| Tirupathi AP | South India | Andhra Pradesh | TSRA | 14-03-17 | 1500 | 1550 |
| Alappuzha | South India | Kerala | TSRA | 14-03-17 | 2040 | 2200 |
| Karipur | South India | Kerala | TSRA | 14-03-17 | 1740 | 1840 |
| Karipur | South India | Kerala | TSRA | 15-03-17 | 0200 | 0210 |
| Thiruvananthapuram City | South India | Kerala | TS | 14-03-17 | 1705 | 1725 |

TS Thunderstorm,
TSRA Thunderstorm with Rain

Severe Weather warning based on DWR observation

| | |
|---|--|
| Name of issuing Radar station | DWR PATNA |
| Geo-coordinates of issuing Station (Lat,Long,Alt) | -- |
| Date and time of issue in UTC(yyyyMMddhhmm) | 201703150600 UTC |
| Nature of severe weather expected | Nil. |
| Name of issuing Radar station | DWR KARAİKAL |
| Geo-coordinates of issuing Station (Lat,Long,Alt) | Lat:10.91381N,Long:79.84141E/Alt: 25m asl |
| Date and time of issue in UTC(yyyyMMddhhmm) | DWR U/S |
| Nature of severe weather expected | -- |
| Name of issuing Radar station | DWR NAGPUR |
| Geo-coordinates of issuing Station (Lat,Long,Alt) | Lat: 21.1458° N, Long: 79.0882° E |
| Date and time of issue in UTC(yyyyMMddhhmm) | 201703140700 UTC |
| Nature of severe weather expected | Nil |
| Name of issuing Radar station | DWR MUMBAI |
| Geo-coordinates of issuing Station (Lat,Long,Alt) | Lat-18° 54' 04", Long-72° 48' 32"/Height AMSL – 3.22 meters. |
| Date and time of issue in UTC(yyyyMMddhhmm) | 201703150700 UTC |
| Nature of severe weather expected | Nil. |
| Name of issuing Radar station | DWR HYDERABAD |
| Geo-coordinates of issuing Station (Lat,Long,Alt) | Lat-17.2562 ° N Long-78.7656 ° E |
| Date and time of issue in UTC(yyyyMMddhhmm) | 201703150700UTC |
| Nature of severe weather expected | Nil |
| Name of issuing Radar station | DWR AGARTALA |
| Geo-coordinates of issuing Station (Lat,Long,Alt) | 23.89° N, 91.25°E, 16m above msl |
| Date and time of issue in UTC(yyyyMMddhhmm) | 201703150600 |
| Nature of severe weather expected | Nil. |
| Name of issuing Radar station | DWR KOLKATA |
| Geo-coordinates of issuing Station (Lat,Long,Alt) | 22.5705° N / 88.353° E, 7m above msl |
| Date and time of issue in UTC(yyyyMMddhhmm) | 201703150731 UTC |
| Nature of severe weather expected | Nil. |

| | |
|------------------------|--------------------|
| ∞ | haze |
| ☁ | smoke |
| ☼ | dust or sand storm |
| ☁ | fog |
| ☂ | drizzle |
| • | rain |
| ✱ | snow |
| ▽ | showers |
| △ | hail |
| ⚡ | thunderstorm |
| Weather Symbols | |



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