



India Meteorological Department

FDP STORM Bulletin No. 7 (13-03-2018)

1. CURRENT SYNOPTIC SITUATION:

NWFC INFERENCE (0300UTC of the Day):

- ♦ The well marked low pressure area over Equatorial Indian Ocean and adjoining southwest Sri Lanka & Maldives, Comorin area concentrated into a depression and lay centred at 0830 IST of today, the 13th March 2018 over southeast Arabian sea and adjoining Equatorial Indian Ocean near latitude 5.0°N and longitude 76.0°E, about 480 km southeast of Minicoy, 390 km south southwest of Thiruvananthapuram and 290 km east-northeast of Male (Maldives). It is very likely to move northwestwards and intensify further into a deep Depression during next 48 hours.
- ♦ A fresh feeble Western Disturbance as an upper air cyclonic circulation lies over north Pakistan and adjoining Jammu & Kashmir at 3.1 km above mean sea.
- ♦ The other Western Disturbance as a trough now seen as a cyclonic circulation over Iran & neighbourhood at 3.1 km above mean sea with a trough aloft in mid & upper tropospheric westerlies with its axis at 5.8 km above mean sea level roughly along Long. 55°E to the north of Lat. 25°N.
- ♦ The north-south trough from southwest Madhya Pradesh to north coastal Karnataka across western parts of Madhya Maharashtra now lies as a cyclonic circulation over north Madhya Maharashtra & adjoining Madhya Pradesh at 0.9 km above mean sea level.
- ♦ A east-west trough runs from east Bihar to Manipur across north Bangladesh with an embedded cyclonic circulation over Sub-Himalayan West Bengal and adjoining Bihar & Jharkhand at 0.9 km above mean sea level.

SATELLITE OBSERVATIONS during past 24hrs and current observation:

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

VORTEX:

Vortex over Southeast Arabian Sea & Comorin adjoining Indian Ocean lay centred within half a degree of 6.0°N/75.5°E. Intensity T1.5 repeats T1.5. Associated broken low/medium clouds with embedded intense to very intense convection over area between lat 2.0°N to 9.5°N, long 71.0°E to 82.0°E and Comorin Maldives West Srilanka (Minimum CTT -83°C).

WESTERN DISTURBANCE (WD):

Broken low/medium clouds with embedded moderate to intense convection was observed over Jammu & Kashmir (Minimum CTT Minus 63°C) in association with WD over the area.

Clouds descriptions within India:

Scattered low/medium clouds with embedded moderate to intense convection seen over South Kerala and South Tamilnadu. Scattered low/medium clouds with embedded weak to moderate convection seen over Sikkim, Southeast Assam, Manipur, Nagaland, North Tripura, Mizoram, rest Kerala, rest Tamilnadu, South Karnataka, Lakshadweep and Bay Islands. Scattered low/medium clouds with isolated weak convection seen over Meghalaya. Scattered low medium clouds seen over North Himachal Pradesh, North Uttarakhand, Sub-Himalayan West Bengal, rest Tripura, Maharashtra, Rayalaseema, South Coastal Andhra Pradesh and rest Karnataka.

Arabian Sea:

Broken low/medium clouds with embedded intense to very intense convection seen over Southeast Arabian Sea, Comorin, Maldives and West Srilanka.

Bay of Bengal & Andaman Sea:

Scattered low/medium clouds with isolated weak convection seen over Southwest Bay.

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

Moderate to intense convection was observed over J & K Tamilnadu Kerala and weak to moderate convection over Sub-Himalayan West Bengal Sikkim Arunachal Pradesh Assam Nagaland & Manipur.

OLR:

Upto 250 Wm^{-2} was observed over J & K North Himachal Pradesh North Uttarakhand Sikkim Arunachal Pradesh Kerala Tamilnadu.

Synoptic features

Westerly Trough & Jet-Stream: Trough in westerlies roughly along longitude 65.0°E & north of latitude 25.0°N .

Dynamic Features:

Positive shear tendency is observed over the country. Medium to high wind shear is observed over North & Central India.

Precipitation:

IMR: Rainfall upto 10-30 mm observed over N J & K some parts of SHWB.

Rainfall upto 1-10 mm observed over Rest J & K North Himachal Pradesh Sikkim rest parts of SHWB Arunachal Pradesh Assam Meghalaya South Nagaland Manipur Kerala & Tamilnadu.

HEM:

Rainfall upto 14 mm observed over NW J&K SHWB south Sikkim and Arunachal Pradesh some parts of Assam east Meghalaya Nagaland Manipur Kerala & Tamilnadu.

RADAR and RAPID RGB Observation:

Isolated/multiple moderate convection is seen on DWR Thiruvanthapuram (Max Ref. Factor $>50 \text{ dBZ}$ and height around 5km) at 1122 UTC.

Light to Moderate convection is seen over Manipur, Mizoram, central parts of Tamilnadu and Kerala in RAPID RGB Satellite imagery at 1600IST.

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

Higher Dust concentration was observed over North Africa and Arab countries. Dust concentration is expected to increase over northern and north-western part of India for next five days. PM10 concentration is expected to increase over IGP in next five days.

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

Delhi – SAFAR analysis & Forecast	13.03.2018	14.03.2018
PM10 (micro-g/m^3)	172	190
PM2.5 (micro-g/m^3)	89	98

2. NWP MODEL GUIDANCE:

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

1. Weather Systems: Low level CYCIRs, Troughs:

12 UTC of Day 0-1: 850 hPa Trough over western Rajasthan. **In Day 2** CYCIR is seen over western U.P and NCR

12 UTC of Day 0: Feeble trough at 850 hPa over East and NE India & adjoining Bangladesh in Day 0-4

Confluence & Wind Discontinuity Regions: 12 UTC of Day 0-2: North–South (tilted eastward) wind discontinuity over central India extending from Maharashtra-MP-Chhattisgarh-Odisha. In Day 2-4 N-S wind discontinuity over southern peninsular India

Synoptic Systems: 00UTC Charts show: Feeble Western disturbance during Day 1-4 over J&K

2. Location of jet and jet core (>60kt) at 500hPa: Weaker core winds at 12 UTC on all days over India.

3. Convergence at 850 hPa:

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

Day0: Odisha, Madhya Maharashtra, Coastal ANDHRA PRADESH, Rayalaseema, Coastal Karnataka, SI Karnataka,

Day1: Himachal Pradesh, Jammu Kashmir, Odisha, West MP, East MP, Madhya Maharashtra, Coastal ANDHRA PRADESH, Telangana, SI Karnataka,

Day2: NE NMMT, Gangetic WB, Jharkhand, Odisha, SI Karnataka,

Day3: Assam Meghalaya, Jharkhand, Odisha, West MP, East MP, Chhattisgarh, SI Karnataka,

Day4: Arunachal Pradesh, Assam Meghalaya, Gangetic WB, Jharkhand, Odisha, East MP, Chhattisgarh, SI Karnataka

4. Spatial distribution of Low level Vorticity:

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

Day0: Bihar, Uttarakhand, Himachal Pradesh, Jammu Kashmir, Coastal Andhra Pradesh, Tamilnadu Puducherry, Coastal Karnataka, Kerala,

Day1: West UP, Haryana, Chandigarh, Delhi, Odisha, West MP, Madhya Maharashtra,

Day2: Gangetic WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Odisha, East MP, Chhattisgarh, Coastal ANDHRA PRADESH,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Uttarakhand, Himachal Pradesh, Odisha,

Day4: Arunachal Pradesh, Assam Meghalaya, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Odisha

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

Day/Index: Subdivisions with Showalter Index < -4

Day0: Assam, Meghalaya, NE NMMT, Sub Himalayan WB, Uttarakhand, Himachal Pradesh,

Day1: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Jammu Kashmir,

Day2: Arunachal Pradesh, Sub Himalayan WB, Himachal Pradesh, Jammu Kashmir,

Day3: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, TAMILNADU Puducherry,

Day4: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Uttarakhand, Odisha, TAMILNADU Puducherry, SI Karnataka, Kerala,

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

Day/Index: Subdivisions with K Index > 40

Day0: Sub Himalayan WB, Uttarakhand, SI Karnataka, Kerala,

Day1: Arunachal Pradesh, Sub Himalayan WB, Coastal Karnataka, NI Karnataka, SI Karnataka,

Day2: Arunachal Pradesh, Sub Himalayan WB, Tamilnadu, Puducherry,

Day3: NE NMMT, Sub Himalayan WB, Vidarbha, Tamilnadu, Puducherry, SI Karnataka,

Day4: Odisha, Telangana, Rayalaseema, Tamilnadu, Puducherry, SI Karnataka, Kerala,

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

Day/Index: Subdivision with Total Totals Index > 52

Day0: Arunachal Pradesh, Assam Meghalaya, NE NMMT, Sub Himalayan WB, Uttarakhand, Haryana Chandigarh Delhi, Punjab, Himachal Pradesh, Jammu Kashmir,

Day1: Arunachal Pradesh, Uttarakhand, Punjab, Himachal Pradesh, Jammu Kashmir, West Rajasthan,

Day2: Arunachal Pradesh, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Haryana Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir,

Day3: Arunachal Pradesh, Assam, Meghalaya, NE NMMT, Sub Himalayan WB, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir,

Day4: Arunachal Pradesh, Assam, Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Uttarakhand, Himachal Pradesh, Jammu & Kashmir, Odisha, Chhattisgarh

8. Rainfall and thunder storm activity:

Day/Index: Subdivisions with Precipitation > 2 cm

Day1: Jammu & Kashmir, Tamilnadu, Puducherry, Kerala,

Day2: Himachal Pradesh, Jammu Kashmir, Tamilnadu, Puducherry,

Day3: Arunachal Pradesh, Assam, Meghalaya, NE NMMT, Jammu & Kashmir, Kerala,

Day4: Arunachal Pradesh, Assam, Meghalaya, NE NMMT, Kerala,

Day5: Arunachal Pradesh, Assam, Meghalaya, NE NMMT

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

1. Synoptic Systems:

The analysis based on 00 UTC shows a north-south oriented trough over Madhya Maharashtra persists and orientation gradually becomes north-east to south-west during next 3 days. Forecast shows that a cyclonic circulation over north Pakistan and adjoining Punjab moves eastward and lies over Punjab and adjoining areas on day3. Forecasts also show the north-west to south-east trough from Bihar to Bangladesh persists during next 3 days. Cyclonic circulation over southeast Arabian sea and adjoining Equatorial Indian ocean moves north-westward during next 3 days. Contour at 500 hPa shows a Western Disturbance would affect northwest parts of India during day3 to day4.

2. Location of Jet and Jet Core (>60kt) at 500hPa: Presence of no jet core over the Indian region for the next 3 days.

3. Low Level Vorticity {850hPa Positive Vorticity ($>12 \times 10^{-1}/s$)}: Mostly along the trough over Madhya Maharashtra, along the foot hill of Himalaya, parts of Rajasthan, along Gangetic plain, parts of central India and north eastern states during next 3 days.

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

T-Storm Initiation Index (> 4): Higher than threshold value 4 over the Gangetic West Bengal on day1. Less than threshold value 4 all over the country but it is 3-3.5 along west coast and east coast during next 3 days.

Lifted Index (< -2): Higher than threshold value -2 all over the country during next 3 days but it is less than threshold value -2 over the Gangetic West Bengal on day 1 and along the east coast during next 3 days.

Total Total Index (> 50) : Above threshold value over the central parts of India and Gangetic plain during next 3 days.

Sweat Index (> 300): Mostly over the Gangetic West Bengal and along the Odisha coast and Andhra Pradesh coast, during next 3 days and parts of Gujarat and Rajasthan on day2 and day3.

CAPE (> 1000): Mostly along southern parts of west coast and east coast during next 3 days and over Gangetic West Bengal on day1.

CIN (50-150): Mostly along east coast, west coast and over parts of north eastern states during next 72 hours and parts of Rajasthan and Gujarat on day3.

5. Rainfall Activity:

10-20 mm rainfall: over parts of Arunachal Pradesh and Tripura on day1, 10 mm rainfall over the rest parts of north eastern states on day2 & day3.

Up to 10 mm rainfall: over parts of Madhya Pradesh and Karnataka on day3.

10-70 mm rainfall: over J&K and most parts of Tamilnadu on day1, 10-20 mm rainfall from day1 to day3,

10 mm rainfall: over parts of Kerala on day1, 10-40 mm rainfall on day2 and 10-20 mm rainfall on day3.

Up to 10 mm rainfall: over Himachal Pradesh and Uttarakhand during next 3 days.

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

1. Model Reflectivity (Max. dBz): 5-30 dBZ Model reflectivity over parts of J&K during next 2 days

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

Total Total Index (> 50) : Above threshold value is observed over most parts of the country except south peninsula, J&K and Arunachal Pradesh during next 48 hour.

K-Index (> 35): Less than threshold value is observed over the country during the next 48 hour.

CAPE (> 1000): Greater than threshold value over the southern part of west coast, east coast, Gangetic West Bengal and parts of north-eastern states during the next 72 hours.

CIN (50-150): Mostly over Panjab, Haryana, Uttar Pradesh, west coast, east coast, Gangetic West Bengal and parts of north eastern states during next 3 days.

3. Rainfall and thunderstorm activity:

Rainfall 10-40 mm: over parts of J&K, Arunachal Pradesh and Tamilnadu on day1.

Rainfall 10-70 mm: over J&K on day1 and day2.

Rainfall 10-40 mm: over Tamilnadu on day1 and day2.

Rainfall 10-20 mm: over NMMT on day1.

3. IOP ADVISORY FOR 24 and 48Hrs:

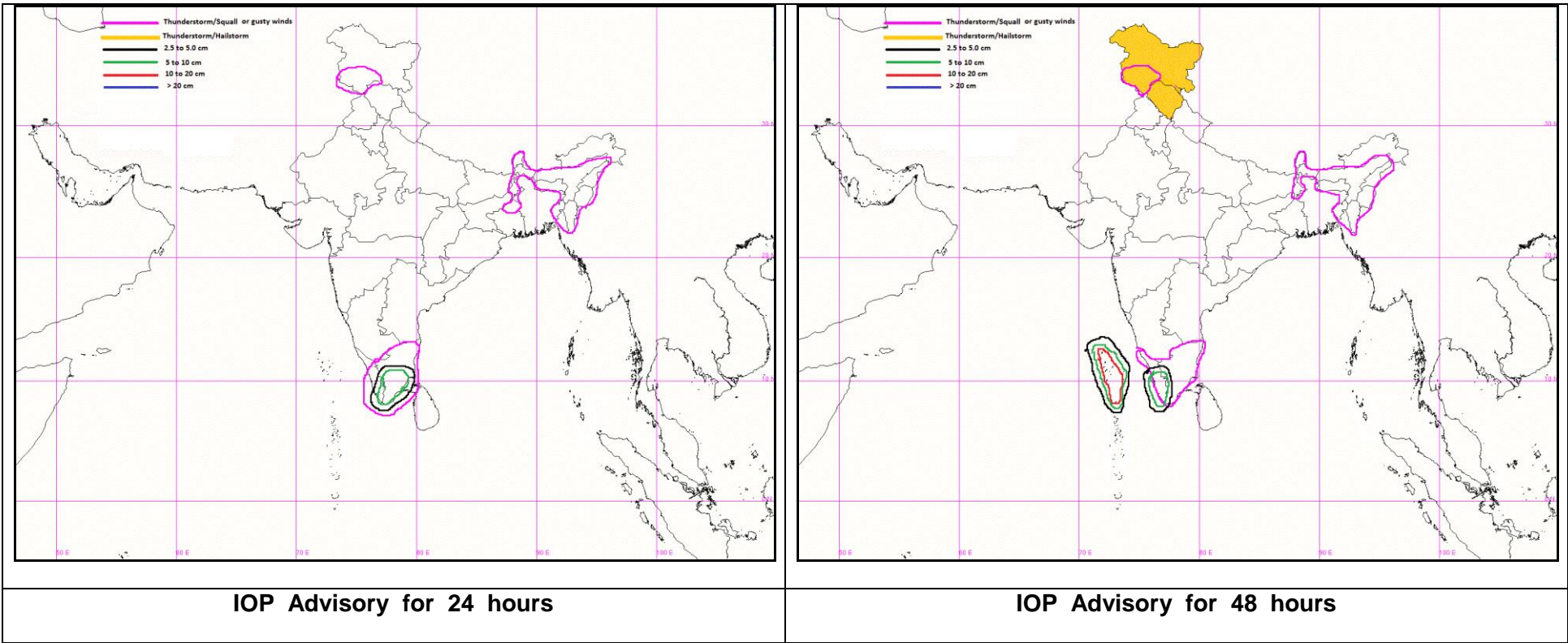
Summary and Conclusions:

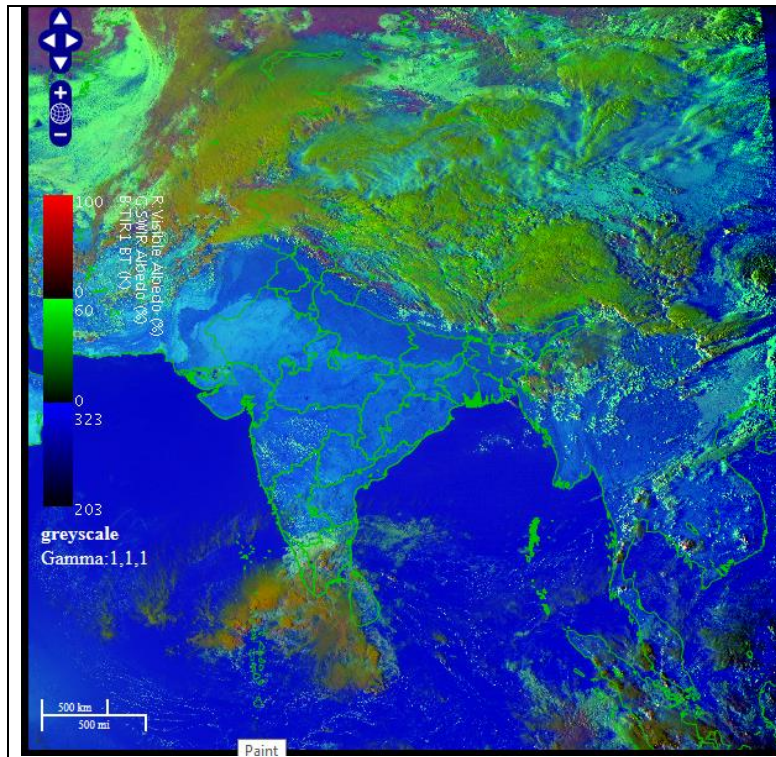
- Prevailing synoptic & dynamic conditions and likely development of distance convection due to the depression over southeast Arabian Sea, thunderstorm activity likely over south coastal Tamilnadu and south Kerala during next 48 hours.
- Synoptic & dynamical conditions and model guidance also suggests the thunderstorm with gusty winds at isolated places very likely over Sub-Himalayan West Bengal and adjoining Gangetic West Bengal, Assam & Meghalaya and Nagaland, Manipur & Mizoram during next 48 hours.
- In addition to model guidance, approaching western disturbance and warming in lower levels indicate the thunderstorm with gusty wind very likely over Jammu Division of Jammu & Kashmir during next 24 hours and thunderstorm with gusty wind and hail storm also likely during subsequent 24 hours over Jammu & Kashmir and Himachal Pradesh.

Day-1 & Day-2:

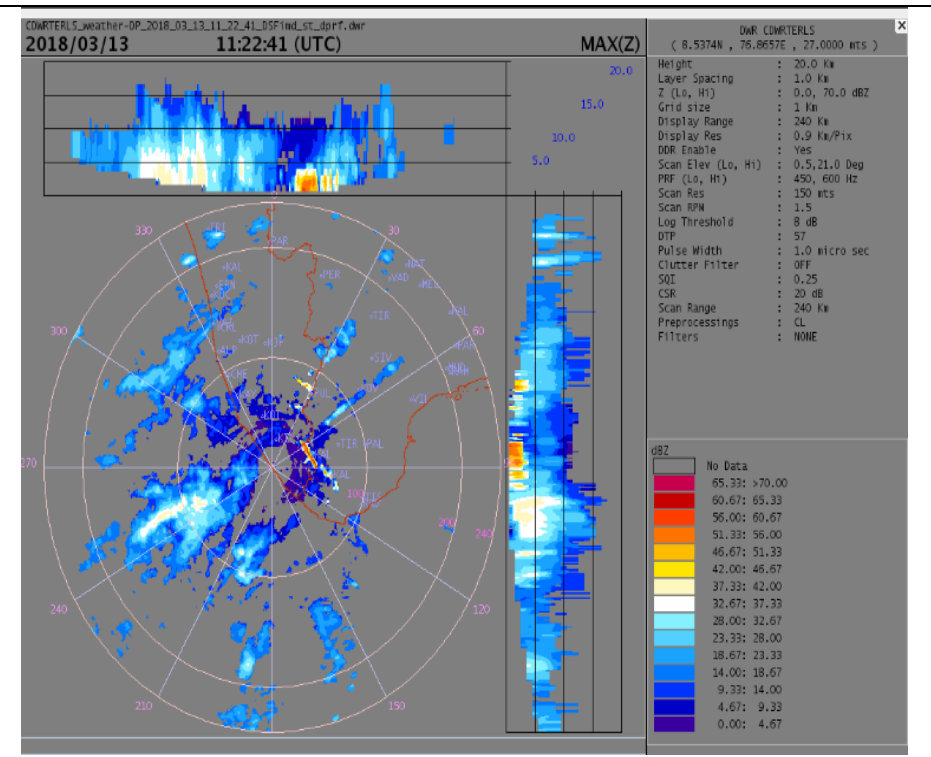
24 hour Advisory for IOP: Rainfall: South Tamilnadu, extreme South Kerala Thunderstorm with associated phenomenon: J & K(Jammu Division), North GWB, SHWB & Sikkim, Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura, Tamilnadu, Kerala	48 hour Advisory for IOP: Rainfall: Lakshadweep Islands, South Kerala Thunderstorm with associated phenomenon: J & K, Himachal Pradesh, SHWB & Sikkim, Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura, Tamilnadu, Kerala
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Graphical Presentation of Potential Areas for Severe Weather:

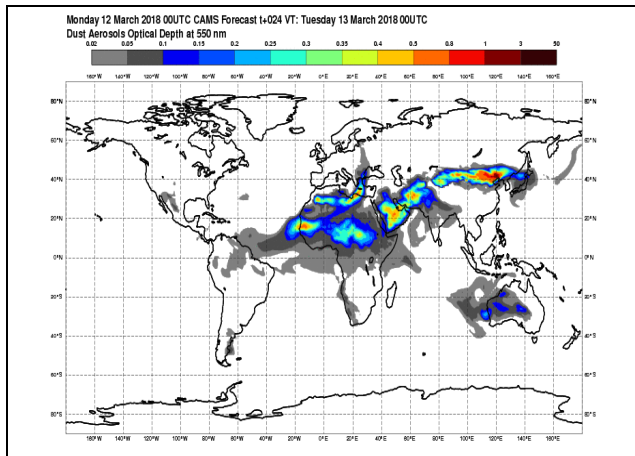




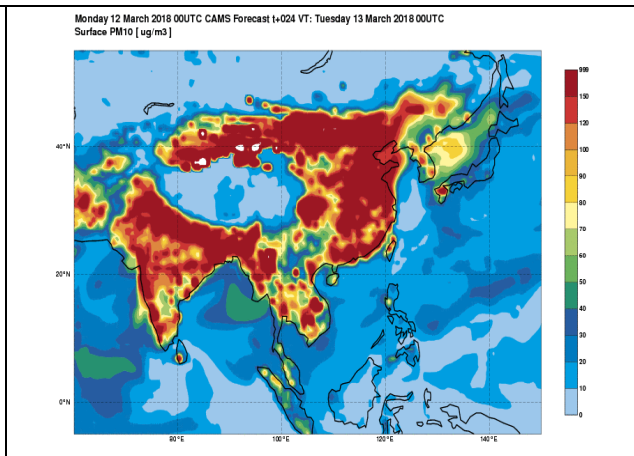
RAPID RGB Imagery at 1600 IST of the Day



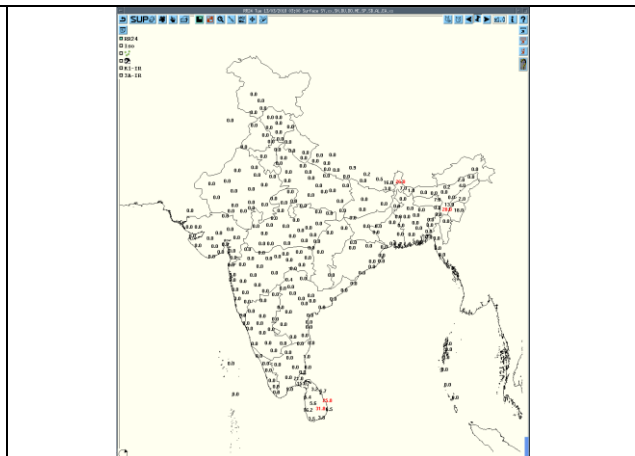
DWR Thiruvananthapuram at 1122 UTC of the Day



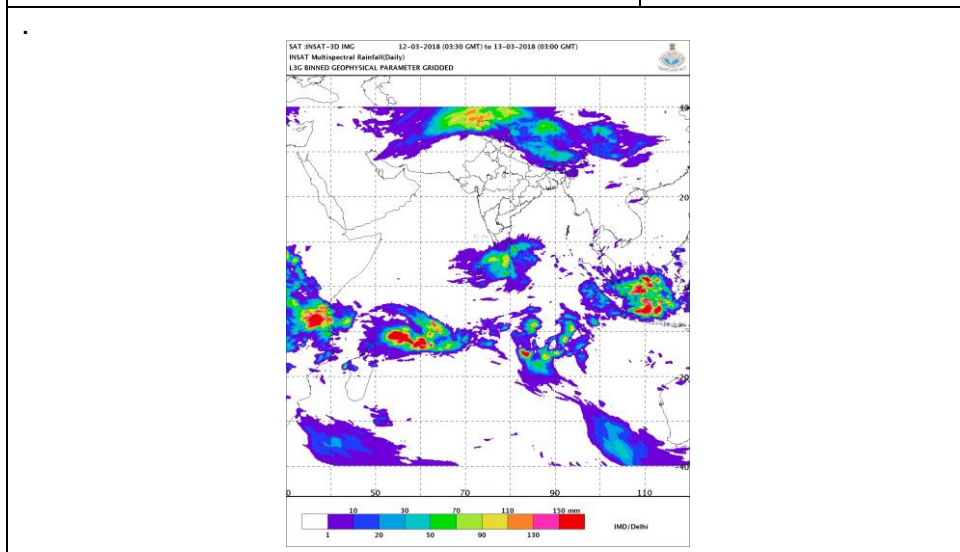
Forecast Dust Concentration



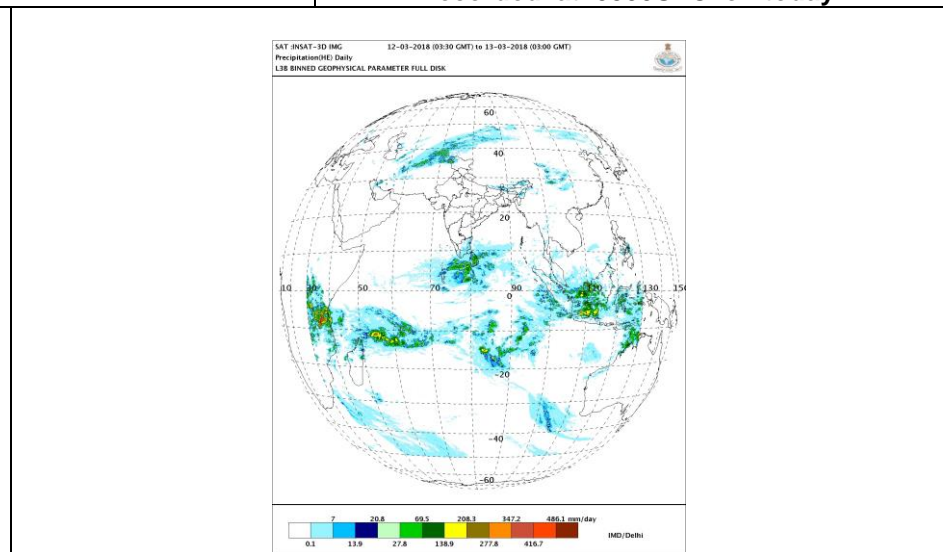
PM10 Forecast



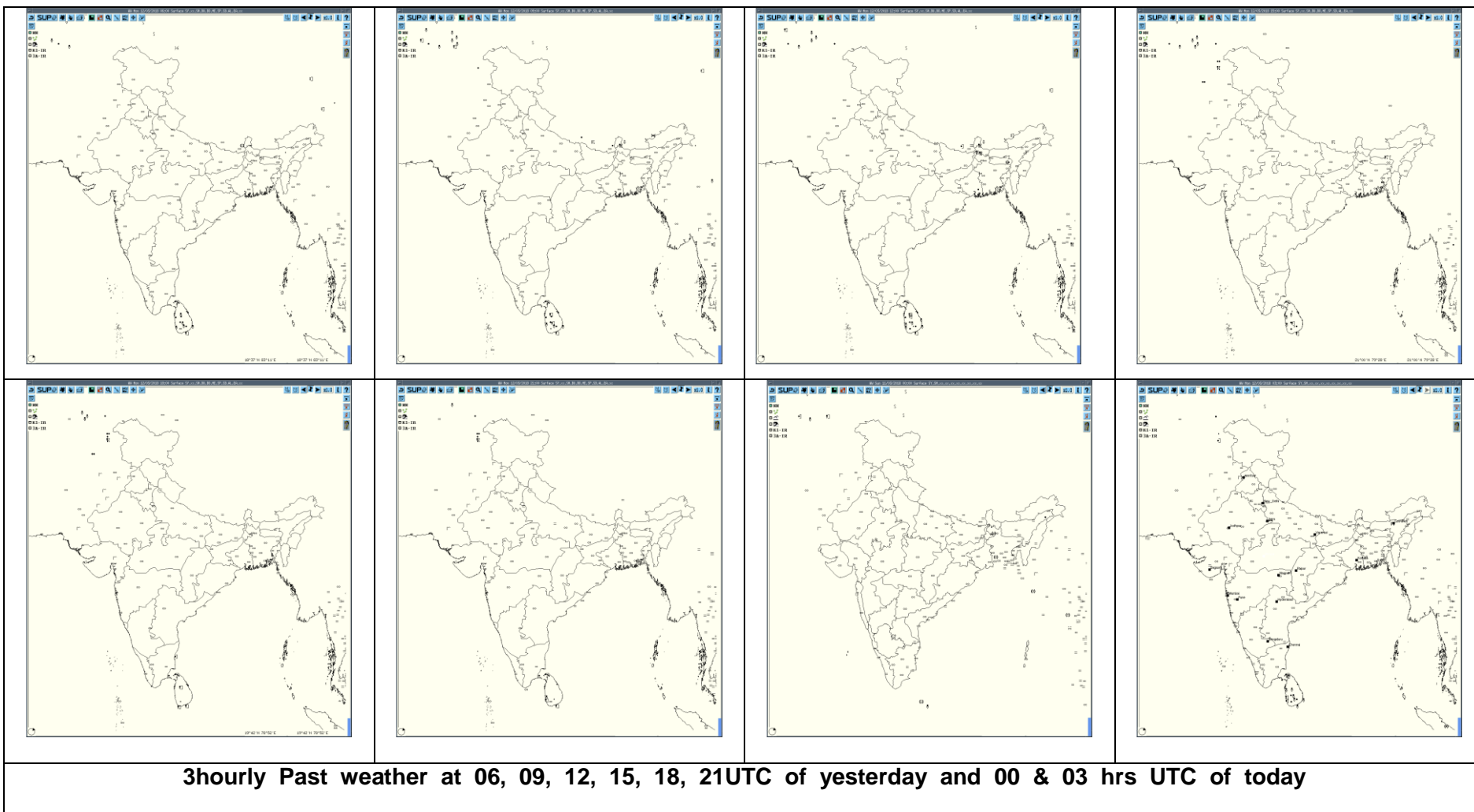
**Accumulated 24 Hour rainfall (in red)
recorded at 0300UTC of today**

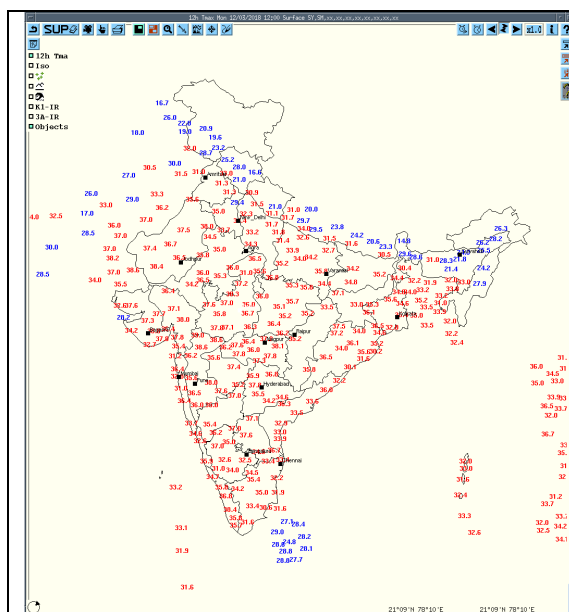


IMR

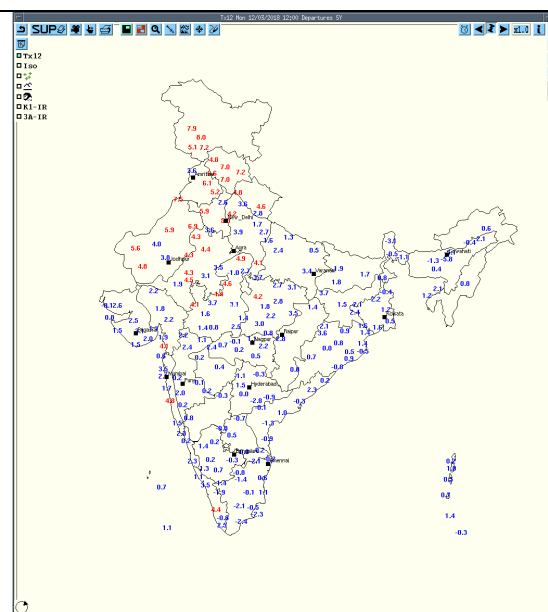


HEM

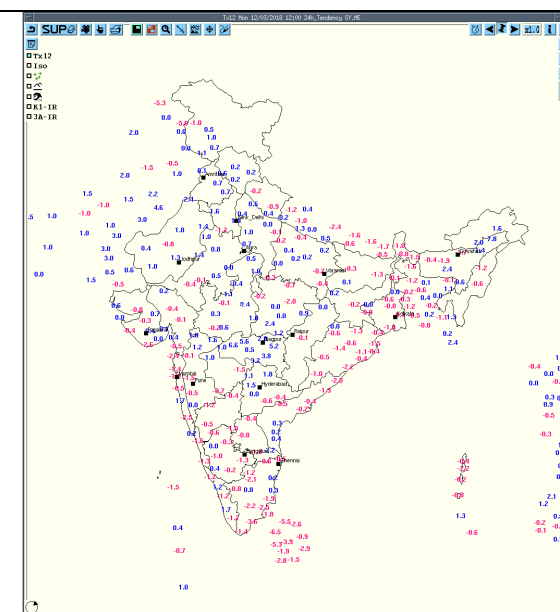




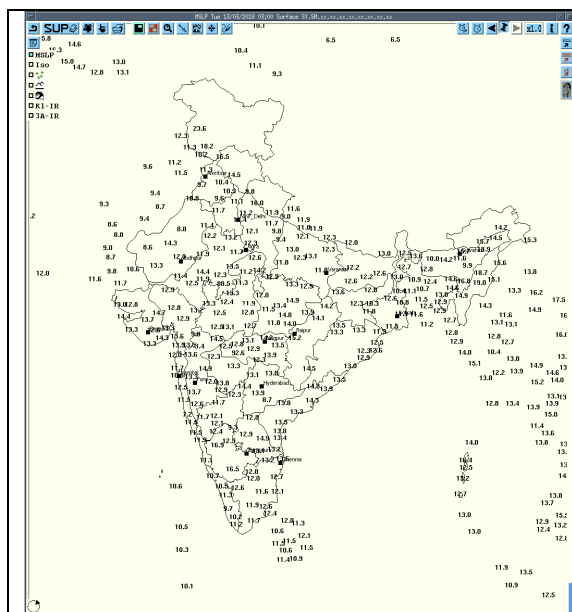
Tmax

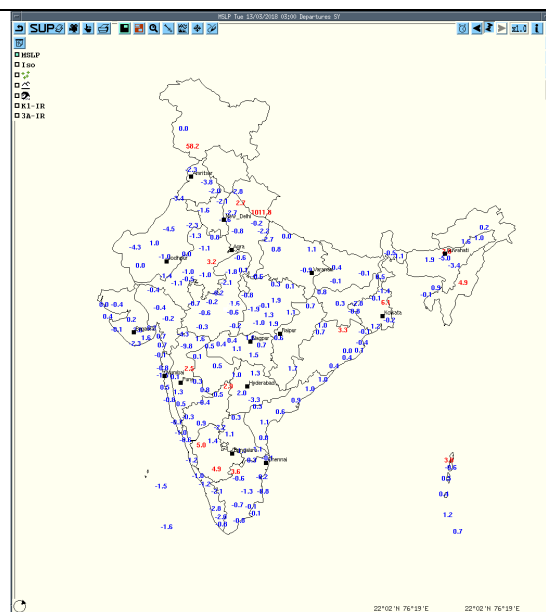


Departure Tmax

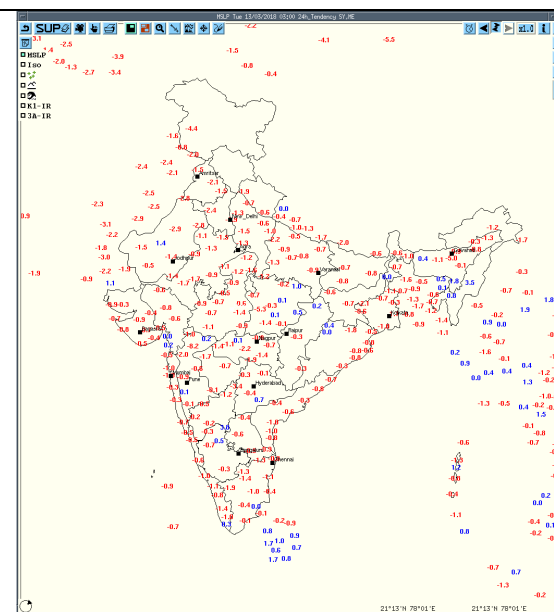


Tendency Tmax

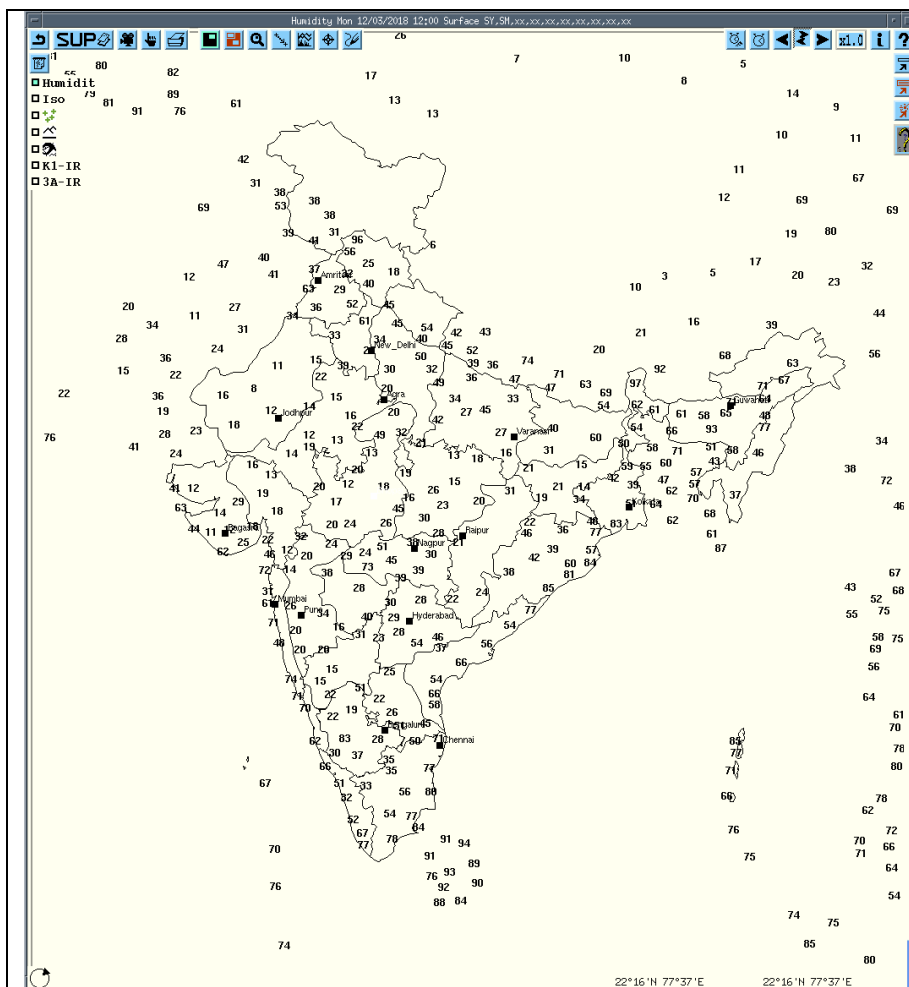


MSLP

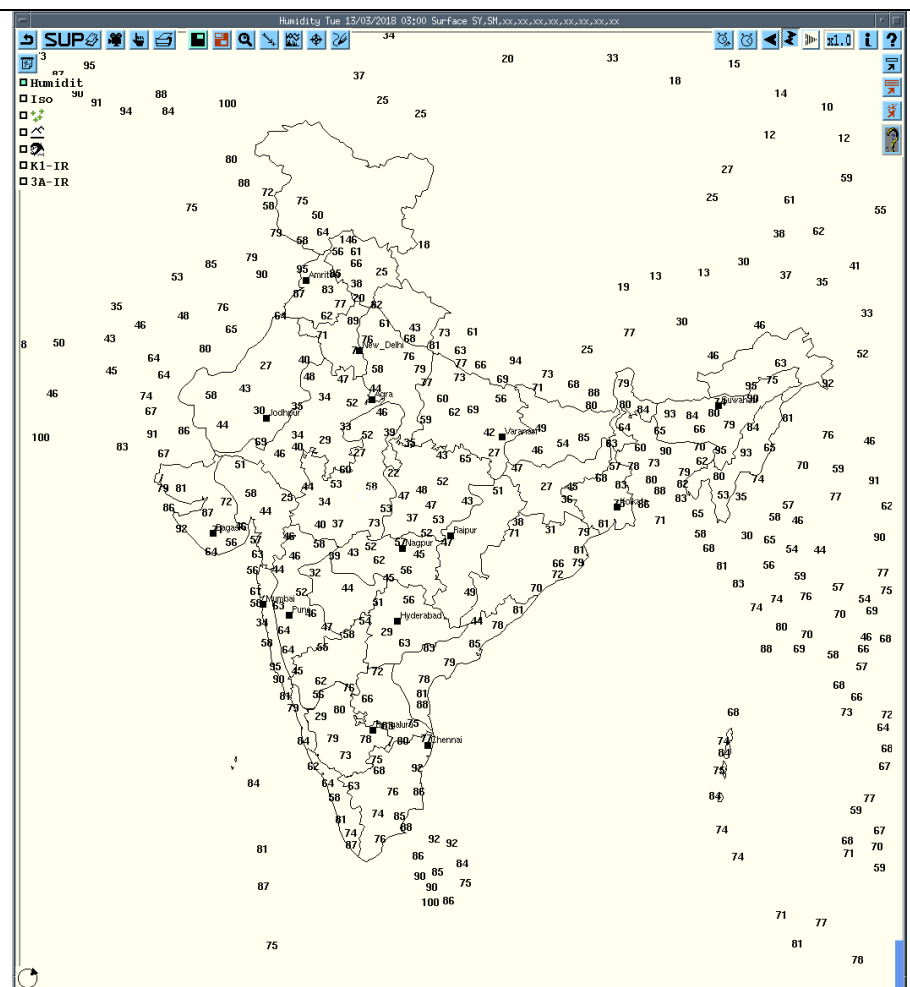
Departure MSLP



Tendency MSLP



RH at 12UTC yesterday



RH at 03UTC today

Past 24 hours DWR Report:

DWR Station Name	Date of Report	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
Visakhapatnam	12/03/18	12/1200 12/1500	COVECTIVE CELL of 45 dBZ over east coast NEly at a distance of 57kms		A line of convictive belt is formed over east coast.	NIL	NIL
	12/03/18	12/1500 12/1800	A CB CELL of 58 dBZ NEly at a distance of 80kms with height 8kms.		A line of convictive cells are formed.	NIL	NIL
	13/03/18	12/1800 13/0000	Convictive cell of 45 dBZ NEly at a distance of 112kms.	SE LY	-	NIL	NIL
Agartala	13/03/18	12/0300 13/0300	ISLTD(42.50 dBZ over Bangladesh @120902UTC,max ht 8kms)	40 Kms at NW/ movement W to E wards at 40 kmph	Locally dissipated in its area of formation	Not known	Not known
			ISLTD(43 dBZ over Meghalaya @121002UTC,max ht 10 kms)	200 Kms at NE/ movement W to E wards at 30 kmph	Dissipated @121112 UTC over Meghalaya hills.	Not known	Not known
			Multiple Cells (54.50 dBZ over Silchar seen at 130052UTC,max ht 12 Kms)	200 Kms at NE/ movement W to E wards at 35 kmph	Cells persist	Not known	Not known
Lucknow	13/03/18	12/0300 13/0300	NIL	NIL	NIL	NIL	NIL
Patna	13/03/18	12/0300 13/0300	NIL	NIL	NIL	NIL	NIL
Kolkata	12/03/18	0301-0911	NIL	NIL	NO ECHO	NIL	NIL
		0911 -1251	Multiple Isolated small cells developed and merge with another cells to form a multi cell system with maximum reflectivity of 59.5 dBz at 1111 UTC and maximum height of 8.42 km at 1111 UTC	Cells formed in NW /104 km from Radar moving in SE-ly direction.	Multiple Isolated small cells formed at 1021 UTC in West/63.6 km from Radar and mature and dissipated at 1251 UTC in ESE/124km from Radar.	Thunderstorm/ Rain	N/A
		1251-2400	NIL	NIL	NO ECHO	NIL	NIL
	13/03/18	0000-0300	NIL	NIL	NO ECHO	NIL	NIL

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 Commence ment (IST)	Time of end (IST)
Guwahati	Northeast India	Assam	Thunderstorm	12-03-18	1925	2115
Silchar	Northeast India	Assam	Thunderstorm	13-03-18	0250	0300
N/Lakhimpur	Northeast India	Assam	Thunderstorm	12/13-03-18	12/2320	13/0045
Tezpur	Northeast India	Assam	Thunderstorm	12-03-18	1830	1840
Jorhat	Northeast India	Assam	Thunderstorm	12-03-18	2015	315
Shillong	Northeast India	Meghalaya	Thunderstorm	12-03-18	1540	1625
Imphal	Manipur	Manipur (NMMT)	Thunderstorm	12-03-18	0530	0830
Port Blair	East India	Andaman & Nicobar Islands	Thunderstorm	12-03-18	1440	1525
Gangtok	East India	Sikkim	Thunderstorm	12-03-18	1300	1800
Tadong	East India	Sikkim	Thunderstorm	12-03-18	1340	1400
Jalpaiguri	East India	West Bengal (SHWB)	Thunderstorm	12-03-18	1645	2300
Alipore	East India	West Bengal(GWB)	Thunderstorm	12-03-18	1625 1745	1710 1805
DumDum	East India	West Bengal(GWB)	Thunderstorm	12-03-18	1650	1705
Diamond Harbour	East India	West Bengal(GWB)	Thunderstorm	12-03-18	2205	2250

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

Past24hourHEMandIMRrainfall(upto03UTCof today)

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

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

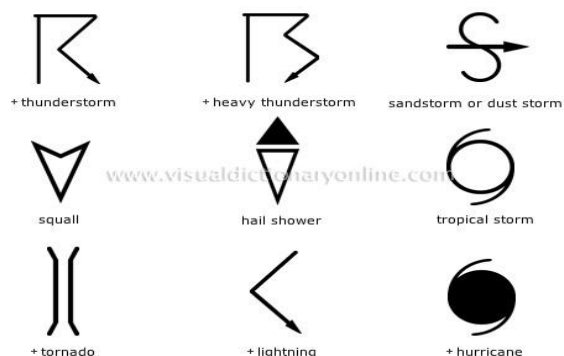
For Radar images of the past 24 hours including mosaic of images:

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	