India Meteorological Department

FDP STORM Bulletin No. 26 (31-03-2017)

1. CURRENT SYNOPTIC SITUATION at 0300 UTC of the Day:

SYNOPTIC FEATURES:

The Western Disturbance as an upper air cyclonic circulation over eastern parts of Jammu & Kashmir & neighbourhood at 3.1 km above mean sea level has moved away east-north-eastwards.

Another western disturbance as a trough in mid & upper tropospheric westerlies with its axis at 7.6 km above mean sea level roughly along longitude 62.0°E and north of latitude 32.0°N now runs roughly along longitude 64.0°E and north of latitude 32.0°N.

The upper air cyclonic circulation over north Interior Karnataka and adjoining south Madhya Maharashtra now lies over north Interior Karnataka and adjoining Telangana and extends upto 0.9 km above mean sea level.

The Wind discontinuity from Comorin area to South Interior Karnataka across interior Tamilnadu now runs from Comorin area to interior Tamilnadu and extends upto 0.9 km above mean sea level.

An upper air cyclonic circulation lies over south Pakistan and adjoining West Rajasthan and extends upto 0.9 km above mean sea level.

The east-west trough from Bihar to Nagaland across Bangladesh and Assam extending upto 1.5 km above mean sea level now runs from Bihar to Manipur and extends upto 0.9 km above mean sea level with an embedded upper air cyclonic circulation over Bangladesh and adjoining northern parts of West Bengal extending upto 0.9 km above mean sea level.

A fresh western disturbance as an upper air cyclonic circulation lies over north Pakistan and neighbourhood and extends upto 3.1 km above mean sea level

SATELLITE OBSERVATIONS during past 24hrs and current observation:

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

Scattered multi-layered clouds were seen over J & K, north Himachal Pradesh in association with western disturbance over the area. Scattered low/medium clouds with embedded moderate to intense convection were seen over south Assam adjoining east Meghalaya and adjoining Manipur (Minimum CTT -60deg C). Scattered low/medium clouds with embedded isolated moderate to intense convection were seen over extreme south Kerala, south Tamilnadu, Nicobar Islands. Scattered low/medium clouds with embedded isolated weak to moderate convection were seen over Arunachal Pradesh, rest Manipur and north Tripura. Scattered low/medium clouds were seen over northwest Uttar Pradesh, south Chhattisgarh, south Odisha, Sikkim, rest north eastern states, north coastal Andhra Pradesh, rest Kerala and rest Tamilnadu. Scattered medium/high clouds were seen over Punjab, rest Himachal Pradesh, Haryana, Delhi, Uttarakhand, west Rajasthan and Maharashtra.

Arabian Sea:

Scattered low/medium clouds with embedded weak to moderate convection were seen over Comorin adjoining southeast Arabian Sea.

Bay of Bengal & Andaman Sea:

Scattered low/medium clouds with embedded moderate to intense convection were seen over south Bay of Bengal adjoining Indian Ocean and south Andaman Sea.

Convection: Light to moderate convection was observed over J&K and North East parts of India.
OLR: - Up to 230 wm^{-2} was over J & K North Himachal Pradesh, North Uttarakhand & North East states.
Jet Stream: No Jet stream and no trough observed over India.
Dynamic Features: A positive Vorticity field is seen over Vidarbha, Saurashtra Extreme East Rajasthan, Uttarakhand, Uttar Pradesh, Bihar, West Bengal.
Moderate wind shear observed over North India, Low wind shear observed over south adjoining central India and weak to moderate wind shear observed over rest parts of India .
Positive shear tendency observed over Central and south India .Negative shear tendency observed over North India .
Positive Low Level Convergence observed over Central India.
Precipitation:
IMR: Rainfall upto 20mm was observed over North West J&K Meghalaya
Rainfall upto 10mm was observed over Arunachal Pradesh , North East Assam, Nagaland Kerala and South Tamilnadu.
HEM: Rainfall upto 70mm was observed over North East States. Rainfall upto 14mm was observed over West J&K South Kerala and Extreme South Tamilnadu.

RADAR and RAPID observation:
Isolated convection was seen in DWR Composite at 1700 hrs IST over Meghalaya, Tripura adjoing east Bangladesh and south Assam.
RAPID RGB Satellite imagery is not available

Environmental condition (dust etc) and its forecast based on 00UTC of date:
No significant dust concentration observed over Arabian Peninsula and west Rajasthan. Dust concentration is expected not to increase over northern India for next three days.

2. NWP MODEL GUIDANCE:

NCMRWF (NCUM Forecasts based on 00 UTC of the day):-
1. Weather Systems: 12UTC Charts on all days from Day0-4 show feeble trough in MSLP over J & K from Day-3 onwards a low pressure system over Pakistan and adjoining Gujarat and Rajasthan.
12UTC charts on all days from Day0-1 show Wind discontinuity at 925 hPa: W-E; Maharashtra, Telangana and Odisha
12UTC charts on Day 4 show formation of a col region over Telangana. This is also evident at 850 hPa.
00UTC charts on All Days show weak CYCIR over Bihar & WB region at 925 and 850 hPa.
00 UTC: All day-A trough over Maharashtra, Karnataka extending upto Tamilnadu
850hPa anticyclonic flow lies over Oman is moving towards Arabian Sea in day 3 -4
2. Location of jet and jet core at 500hPa:-**500hPa Jet core (>60kt)**: Weak in magnitude on all Days, Jet core over Assam in day 2.
Well defined anticyclonic flow over central India moving towards SE as day progresses reaches over Bay of Bengal in day 1, Fresh anticyclone over Oman moving towards Arabian Sea from day 2.
3. Convergence at 850 hPa: At 12UTC on all days: Strong low level convergence in land all along the west coast and isolated regions over Odisha. Day-2 and Day3: over parts of Assam/Meghalaya.

4. Low level Vorticity:-Positive Vorticity (>15 x 10^{-5}/s): at 12UTC on all days over parts of Assam and Meghalaya. On Day0,1&2: Strong over northern UP & Bihar. At 00UTC: on all days along the line of low level confluence, Northern part of UP Day-0-3. Parts of Rajasthan on Day 4.

5. Showalter Index: -3 to -4[Very unstable]: Day-0: Isolated location over coastal Maharashtra , Goa, Kerala and J&K.
Day-1: Isolated location over Goa, coastal Karnataka, Kerala parts of J&K and in NE over Meghalaya, Tripura and Arunachal.
Day-2: Goa, coastal Karnataka, Kerala, some parts of Telangana, coastal Odisha, North Bihar and NE India
Day 3:Over Kerala, coastal Odisha, Bihar and NE India
Day4: Over Kerala, coastal Odisha & AP, Bihar and NE India

6. K-Index :> 35[Very Unstable thunderstorm likely]: Day 0-4: Parts of NE India
Day-0: over southern part of coastal Maharashtra ,
Day 1-2: Goa, coastal Karnataka, Kerala and parts of Odisha.
Day-3to4: Isolated location over Kerala, parts of TN, AP and coastal Odisha

7. Spatial distribution of TTI: TTI >50 [Scattered Thunderstorms few severe] :Day 0-1: Along the coast of Maharashtra and Karnataka, J&K, Punjab. Day 1 also includes Bihar, adjoining east UP and Uttarakhand
Day 2-4: Parts of J & K region
From Day 2-4: extending along the line of low level convergence over MP, Chhattisgarh, Odisha and WB.
Day-3: Over parts of west UP, Delhi NCR. Day 4: Parts of Bihar

8. Rainfall and thunder storm activity: Day-0-4: (>4cm/day) Over Most part of NE India
Day- 4 (>4cm/day) Most parts of J&K and some parts of Himachal Pradesh

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

1. Weather Systems: 00 UTC analysis shows CYCIR over UP, Bihar, GWB and adjoining areas. The trough from this system extends to coastal Odisha through WB and is persisting till 4th day.

2. Location of jet and jet core at 500 hPa:-500 hPa Jet core (>60kt): The Jet at 500 hPa does not exist over India during next 5 days.

3. Low level Vorticity:-Positive Vorticity 850hPa (>12 x 10^{-1}/s): Analysis shows the low level positive vorticity mainly along foothill of Himalayas, over east UP, GWB and few pockets of Maharashtra, Karnataka and NE stats and is persisting till 4/5days.

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):
Significant zones are noticed over GWB, Odisha, Jharkhand, Bihar, and eastern coast adjoining Bangladesh during next 4/5 days.

Lifted Index (< -2):
The areas with index less than -2 lies along east coast regions, GWB, Odisha, coastal AP, Bihar and adjoining areas with gradually the LI areas with less than -2 mainly extended towards south-eastern coastal regions and west costal region of India.

Sweat Index (> 400):
The significant zones are confined along east coast of India over Andhra coast, GWB, Odisha, Bangladesh and adjoining regions. Some parts of western Gujarat states and Karnataka coast along with few pockets in West Bengal also indicated the value > 400 K for next 5 days and isolated place of J & K also show > 400K index value during next 5 days.

Total Total Index (> 50):.
Above threshold value in most parts of central India and adjoining northern parts of India from day 1 to day 4 particularly at 12 UTC of each day.

CAPE (> 1000):
Mostly along east coast of India over Gangetic West Bengal, Odisha, Bihar, Jharkhand and adjoining regions and Kerala and parts of coastal Karnataka during next 5 days. The CAPE values above threshold values are also observed over Coastal Gujarat region from day 4.
CINE (50-150):
Maximum CINE values are found in some areas along east coast over GWB, Odisha, coastal AP and Tamil Nadu and also over Bihar, Jharkhand and Goa & Konkan from Day-1 to Day-5 and Maximum CINE value over Gujarat region during next day 2 to day 5.
5. Rainfall and thunderstorm activity:
10-40 mm rainfall shows over isolated place of NE States, the rainfall over NE states likely to continue during subsequent 4 to 5 days.

IMD WRF (based on 00UTC of the day):
1. Model reflectivity (Max. dBz): **(>25 dBZ)** Model reflectivity exceeding the threshold value, is seen over isolated pockets in north eastern states and J & K region in evening hours at day1.
2. Spatial distribution of Total Total Index, K-Index, CAPE and CINE [High potential for thunderstorm]
Total Total Index (> 50): Above threshold values is observed over most parts of India during next 3 days except parts of extreme south peninsular region, West Bengal and north-eastern states and J & K.
K-Index (> 35): Less than threshold value over most parts of India during next 3 days.
CAPE (> 1000): Mostly along east coast of India over Andhra Pradesh, Odisha, and GWB, Bihar and eastern UP during next 3 days, another zone along west coast over Kerala, coastal Karnataka and Konkan & Goa during next 3 days.
CINE (50-150): CINE values are mostly small all over India during all three days of forecasts except some areas along coastal areas of India over Odisha, GWB, Eastern UP, Bihar, Jharkhand, coastal AP, coastal Karnataka and Konkan-Goa during next 3 days and Rajasthan region for next 2 days.
3. Rainfall activity: 10-40 mm rainfall shows over isolated place of NE States, the rainfall over NE states likely to continue during subsequent 4 to 5 days.

3. IOP ADVISORY FOR 24 and 48Hrs:

Summary and Conclusions:

Day 1 & Day 2:

The east-west trough from Bihar to Manipur across Bangladesh and Assam with an embedded upper air cyclonic circulation over Bangladesh and adjoining northern parts of West Bengal , now extends upto 0.9 km above mean sea level and is superposed with a region of wind convergence over Tripura and adjoining South Assam upto 850 hPa. This is likely to result in very heavy rainfall over districts of south Assam on day 1. Heavy rainfall is also expected over the adjoining regions of Nagaland, Manipur, Mizoram and Tripura on day 1. On day 2, the rainfall is likely to continue over the same region, although with less intensity.

The guidance from the NWP model output from ECMWF, IMD1534 and NCEP IITM GFS, NEPS and Satellite imageries are also suggesting the similar area of rainfall activity on Day1 and Day2.

24 hour Advisory for IOP:
South Assam,
Rest Assam, Meghalaya, Nagaland, Manipur, Mizoram and Tripura

48 hour Advisory for IOP:
Assam, Meghalaya, Nagaland, Manipur, Mizoram and Tripura

ForNCMRWFNWPproducts:(http://www.ncmrwf.gov.in/HomePage/NEPS-prod-1.php)
ForIMDNWPproducts:(http://nwp.imd.gov.in/diagpro_new.php)
ForSynopticplotteddataandcharts
http://amssdelhi.gov.in/
http://www.amsskolkata.gov.in/
ForRAPIDtool:
http://rapid.imd.gov.in/
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Upperlevelwinds
http://satellite.imd.gov.in/archive/INSAT-3D-IMAGER/3D-PRODUCTS/AMV/HLW/MAR_2017/?C=M;O=D
Past24hourHEMandIMRrainfall(upto03UTCoftoday)
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HEM:http://satellite.imd.gov.in/img/3Ddaily_he.jpg
ForRadarimagesofthepast24hoursincludingmosaicofimages:
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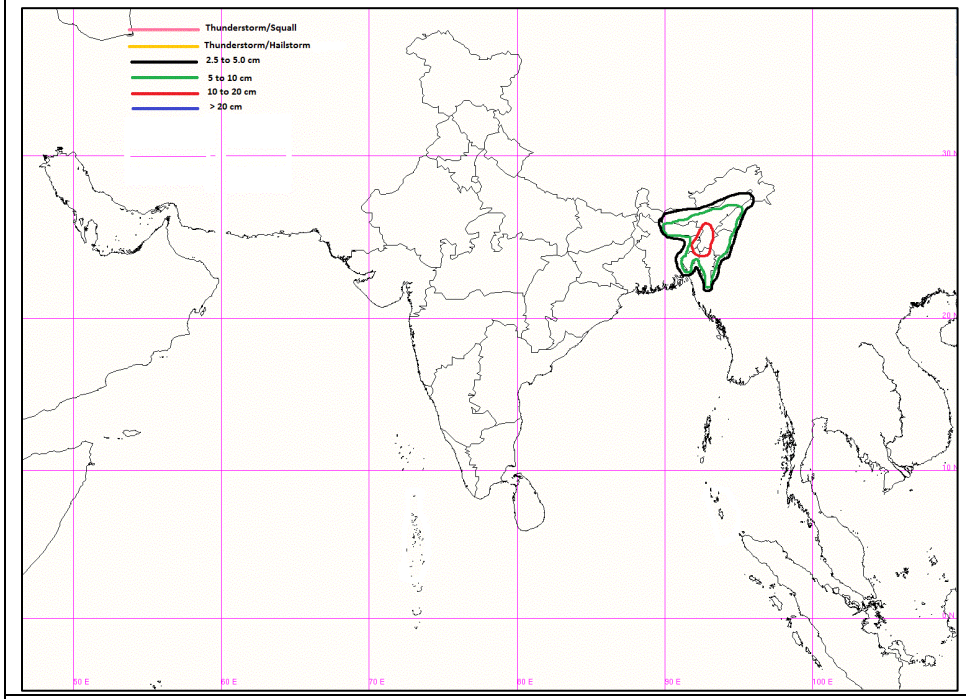
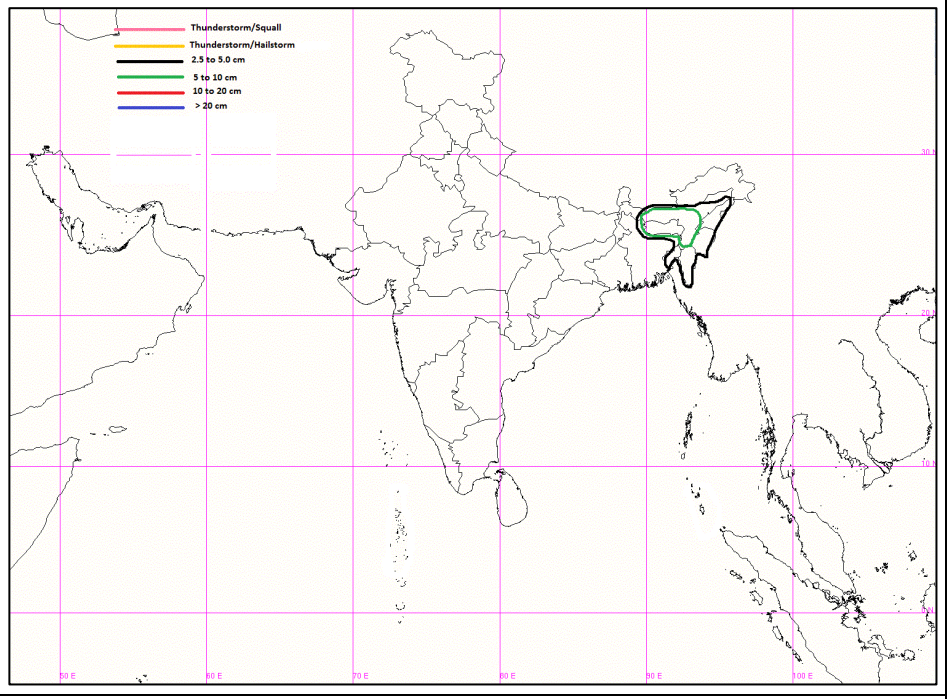
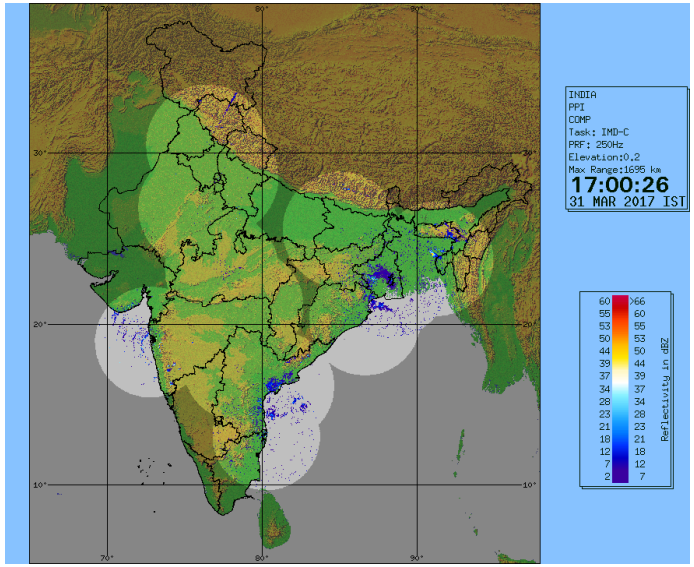
Satellite sounder based T-Phi gram
http://satellite.imd.gov.in/map_skm2.html



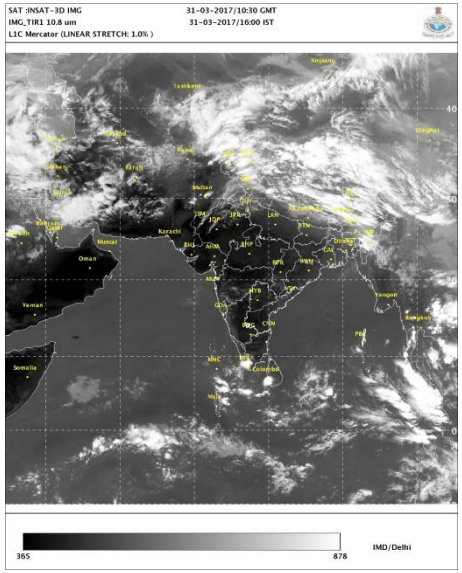
IOP Advisory for 24 hours



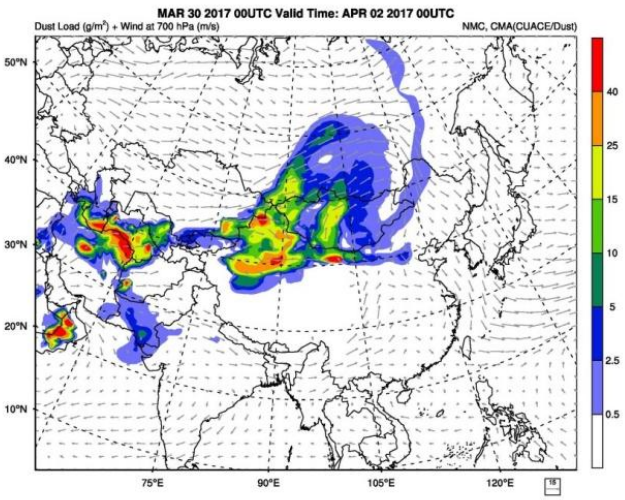
IOP Advisory for 48 hours



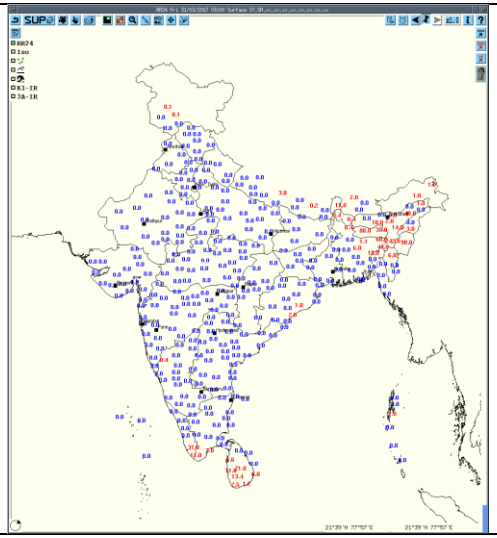
DWR Composite at 1700 hrs IST



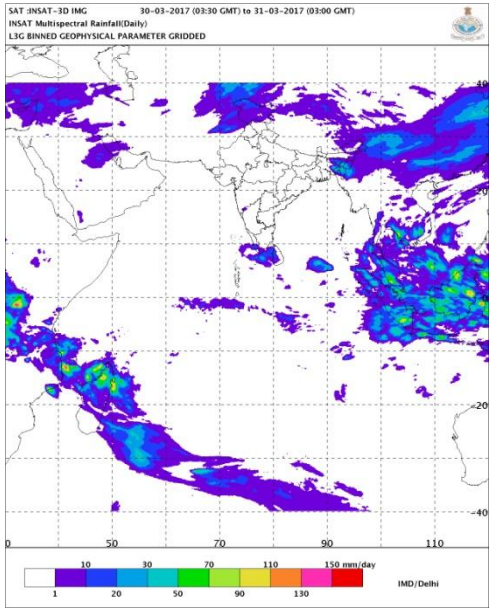
IR Image of INSAT 3D at 1600 hrs IST



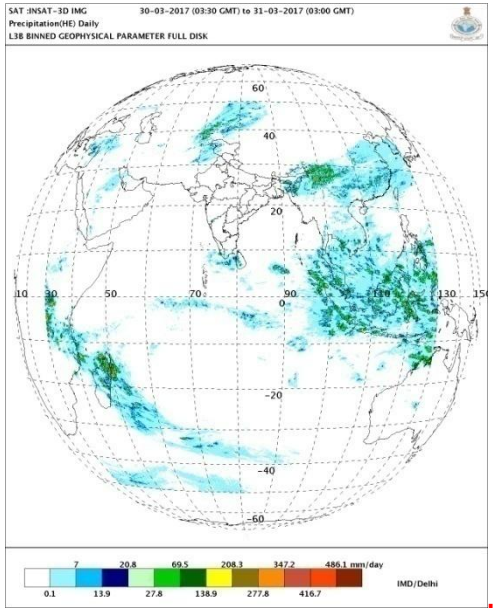
Forecast Dust Concentration at 00 UTC of 02 April



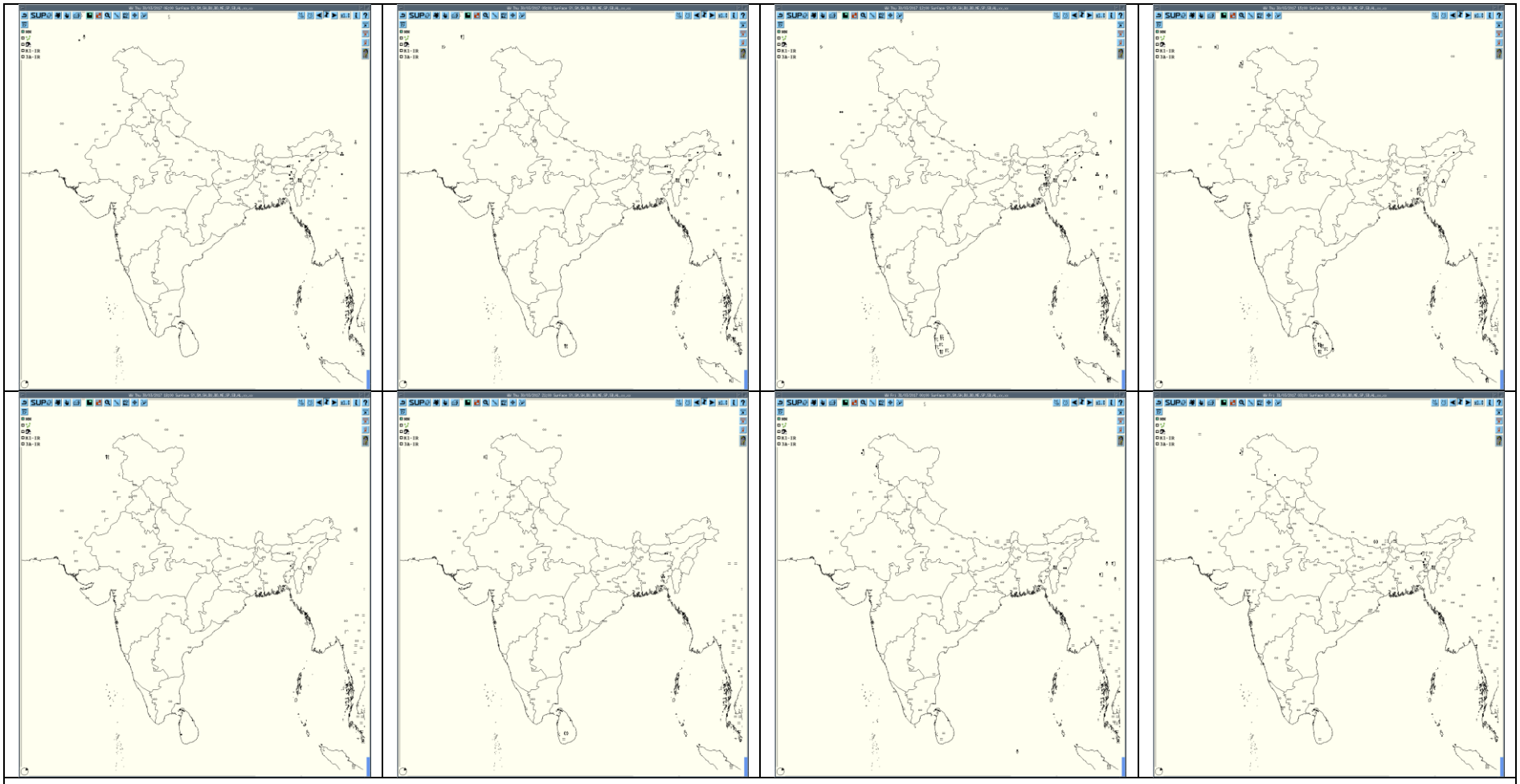
Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today



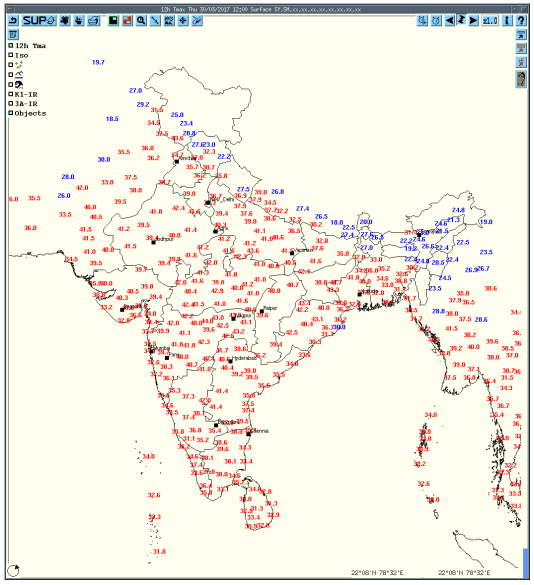
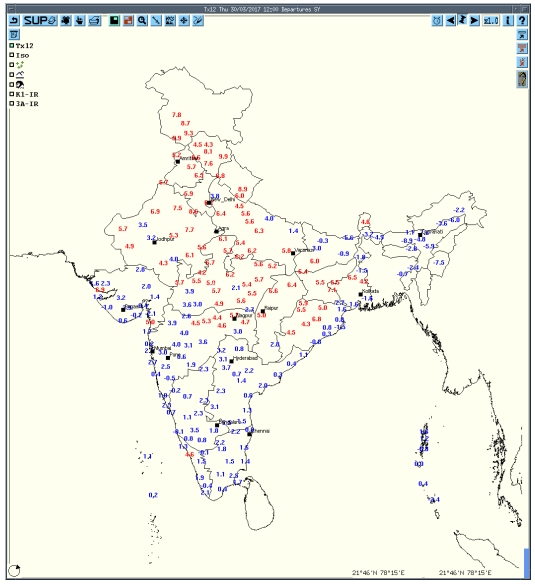
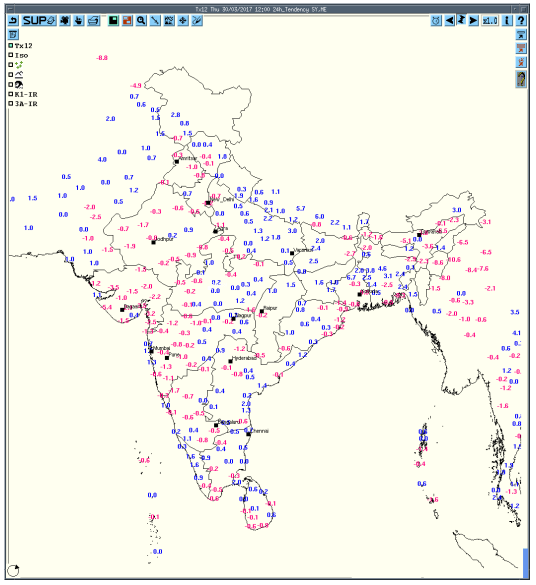
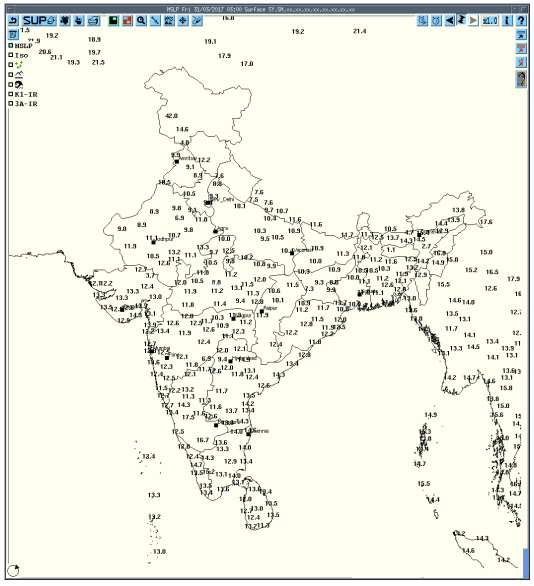
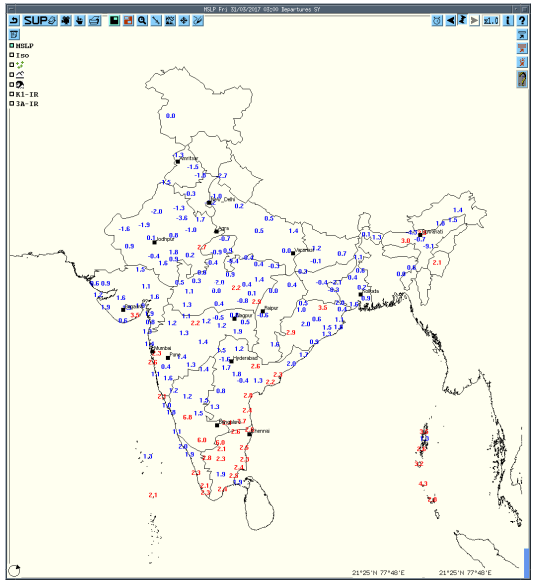
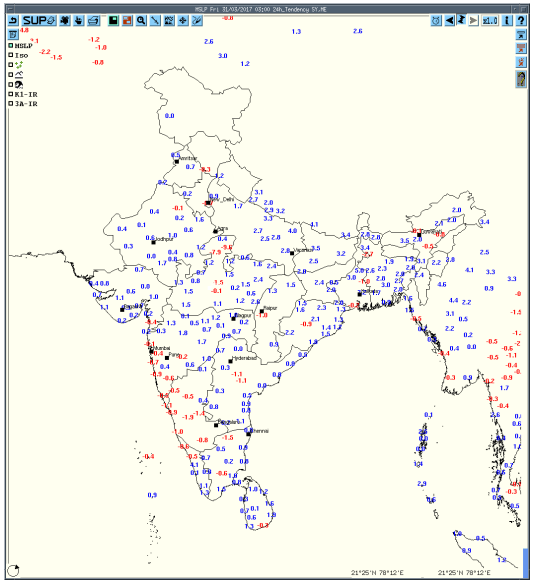
IMR Rainfall

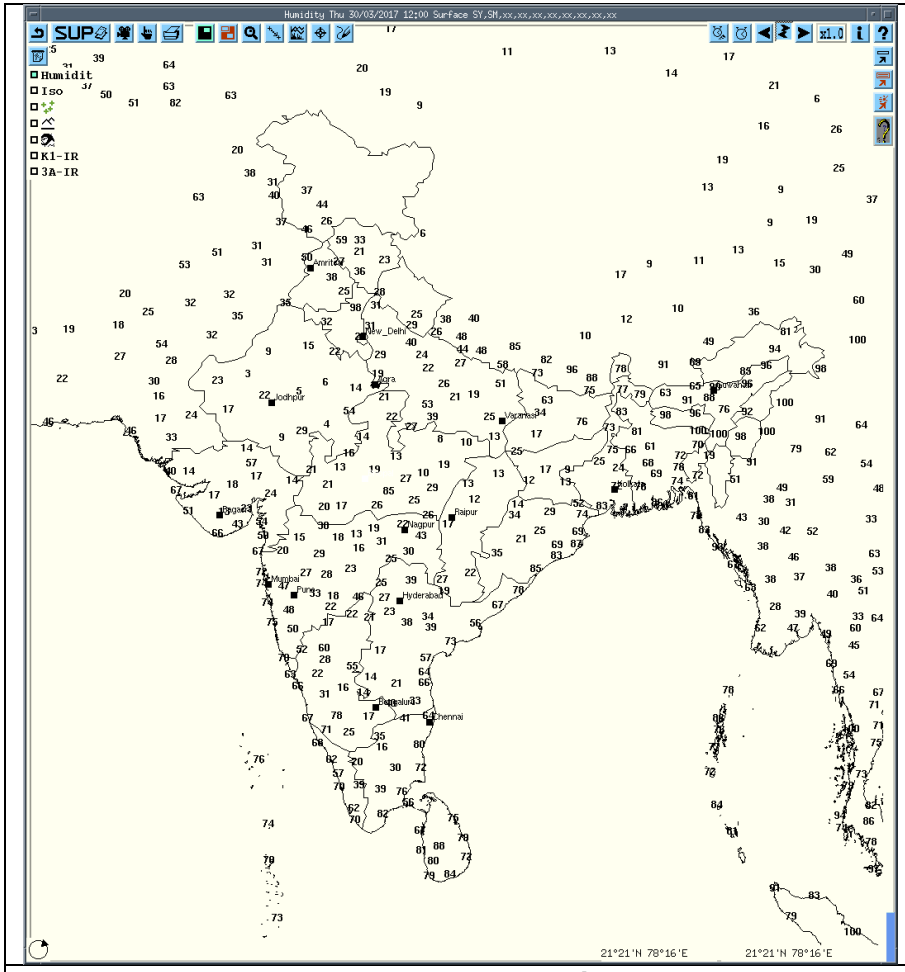


HEM Rainfall

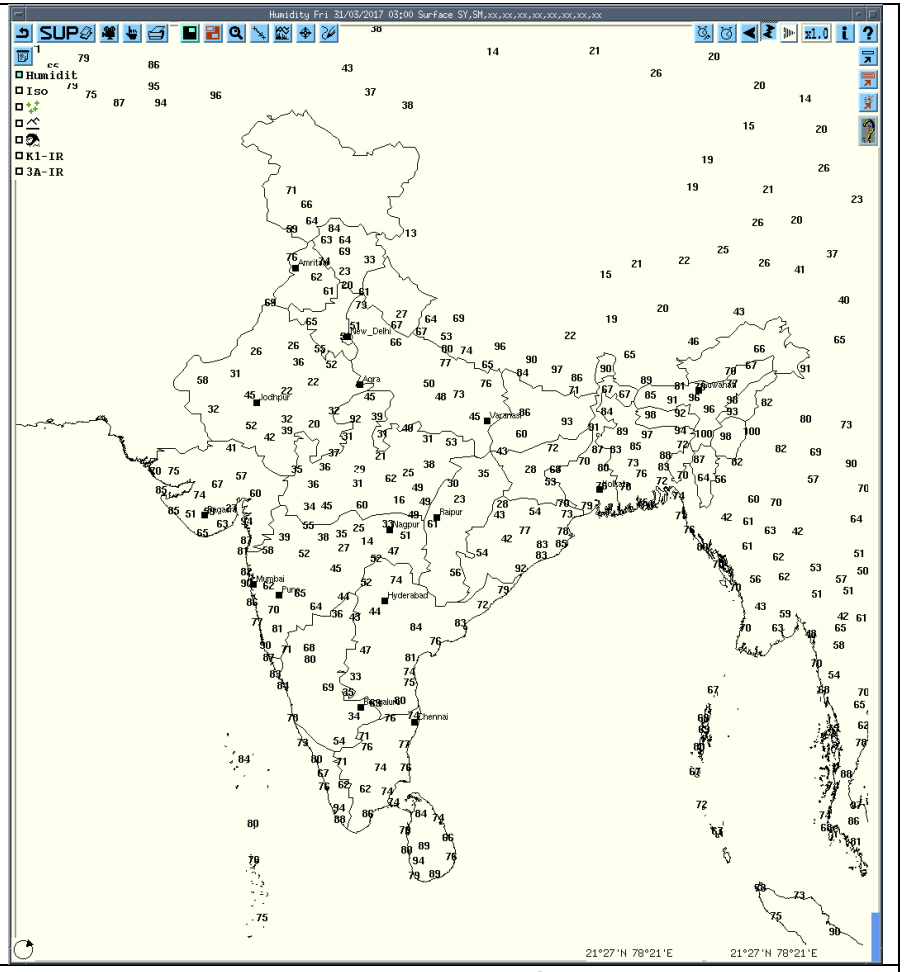


3hourly Past weather at 06, 09, 12, 15, 18, 21UTC of yesterday and 00 & 03 hrs UTC of today

		
Tmax	**Departure Tmax**	**Tendency Tmax**
		
MSLP	**Departure MSLP**	**Tendency MSLP**



RH at 12UTC yesterday



RH at 03UTC today

Realized weather past 24 hours (based on SYNERGIE data)					
Date	**Time of Reporting**	**Name of Station Reporting**	**Region**	**STATE**	**Weather Event**
30-03-2017	0600UTC	Silchar	Northeast India	Assam	Thunderstorm
30-03-2017	0900UTC	Silchar	Northeast India	Assam	Thunderstorm
		Imphal	Northeast India	Manipur	Thunderstorm
30-03-2017	1200UTC	Agartala	Northeast India	Tripura	Thunderstorm
		Kailashahar	Northeast India	Tripura	Thunderstorm
		Silchar	Northeast India	Assam	Thunderstorm
		Belgaum	South India	Karnataka	Thunderstorm
30-03-2017	1500UTC	Agartala	Northeast India	Tripura	Thunderstorm
30-03-2017	1800UTC	Imphal	Northeast India	Manipur	Thunderstorm
29-03-2017	2100UTC	Nil	Nil	Nil	Nil
31-03-2017	0000UTC	Silchar	Northeast India	Assam	Thunderstorm
		Kanyakumari	South India	Tamilnadu	Lightening
31-03-2017	0300UTC	Silchar	Northeast India	Assam	Thunderstorm

Name of Station Reporting	**Region**	**STATE**	**Weather Event**	**Date**	**Time of Commencement (IST)**	**Time of end (IST)**
Jorhat	Northeast India	Assam	TSRA	30.03.2017	30/0900	30/1000
Silchar	Northeast India	Assam	TSRA	30.03.2017	30/0830	31/0830
Cherrapunjee	Northeast India	Meghalaya	TSRA	30.03.2017	30/1433	30/1440
Shillong	Northeast India	Meghalaya	TSRA	30.03.2017	30/1140 30/1305	30/1230 30/1325
Imphal	Northeast India	Manipur	TSRA	30.03.2017	30/1250	30/2400
Imphal	Northeast India	Manipur	TSRA	31.03.2017	31/0000	31/0110
Lengpui	Northeast India	Mizoram	TSRA	30.03.2017	30/0830	30/1110
M.C Agartala	Northeast India	Tripura	TSRA	30.03.2017	30/1730	30/2050
M.O Kailashahar	Northeast India	Tripura	TSRA	31.03.2017	30/0830 30/1540	30/0850 30/2400
M.O Kailashahar	Northeast India	Tripura	TSRA	31.03.2017	31/0000	31/0830
Thiruvananthapuram City	South India	Kerala	TSRA	30.03.2017	1450	1520

TS Thunderstorm,
TSRA Thunderstorm with Rain

Past 24 hours DWR Report:

Radar Station Name	Date	Time Interval of Observation (UTC)	Organisation of cells (Isolated single cells /multiple cells/ convective regions /squall lines) with height of 20 dBZ echo top and maximum reflectivity	Formation w.r.t. radar station and Direction of movement	Remarks	Associated Severe Weather if any	Districts affected
Kolkata	31/03/17	0000-0300	NIL	NIL	NO ECHO	NIL	NIL
Paradeep	31/03/17	0410-2200	Convective regions with average height of 4 km having maximum reflectivity of 20 dBZ with very small areas showing reflectivity values in the range of 30-40 dBZ observed during late evening to mid night over the sea.	Mainly concentrated in the sea areas to the south of the RADAR(150-240 degrees) at a distance of 80- 200kms from the RADAR. Position is almost stationary. Increased dBZ values observed between 1230 to 1800 UTC.	NIL	NIL	NIL
Mohanbari	30/03/17	0432-0952 UTC	Cell type- Isolated Avg. ht.- 4.7 Km MAX_Z:- 31.5 dbZ	Distance- 120 Km Direction- SW Movement- Almost stationary	Weak cells Slowly dissipated	N/A	N/A
	30/03/17	0432-1032 UTC	Cell type- Isolated Avg. ht.- 4.0 Km MAX_Z:- 33.0 dbZ	Distance- 100 Km Direction- NE Movement- Ely	Weak cells Almost stationary for long period and later dissipated.	N/A	N/A
	30/03/17	0602-0952 UTC	Cell type- Isolated Avg. ht.- 4.5 Km MAX_Z:- 33.5 dbZ	Distance- 60 Km Direction- SE Movement- Ely	Weak cells Slowly moved towards SE direction and dissipated.	N/A	N/A

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	31/03/17	300300 - 300650	Multiple Cells with Maximum Height **15 km** and maximum reflectivity **55 dBZ**	NW (200 KM) at 1820 UTC of 29.03.17 from DWR Agartala moving ESE-wards at around 25 kmph	Cell dissipated at 0650 UTC of 30.03.17 over Mizoram	Thunderstorm with Rain	Unokoti District
	31/03/17	300915 – 301600	Multiple Cells with Maximum Height of **16 km** and maximum reflectivity **53 dBZ**	North (150 KM) from DWR Agartala moving SSE-wards at around 20 kmph	Cell dissipated at 1600 UTC of 30.03.17 over Southern parts of Bangladesh	Thunderstorm with rain (Heavy rain at one station in Dhalai District)	West, North, Unokoti, Dhalai, Khowai Districts
	31/03/17	302120 UTC – 310250 UTC	Multiple Cells with Maximum Height **14 Km** and maximum reflectivity **44 dBZ**	NNW (220 KM) from DWR Agartala moving ESE-wards at around 20 kmph	Cell dissipated at 0250 UTC of 31.03.17 over Meghalaya & Northern parts of Bangladesh	N/A	N/A
Lucknow	31-03-17	280300-290300	Nil	--	Radar was on standby mode from 30/0857 UTC and later was shut down till 30/1150 UTC due to power failure	--	--
Nagpur	31-03-17	300300-310300	Nil	--	**No Echoes**	--	--
Patiala	31-03-17	300300-310300	Nil	--	**No Echoes**	--	--
Srinagar	31-03-17	300300-310300	Nil	--	**No Echoes**	--	--
Jaipur	31-03-17	300300-310300	Nil	--	**No Echoes**	--	--