India Meteorological Department

FDP STORM Bulletin No.19(24-03-2017)

1. CURRENT SYNOPTIC SITUATION at 0300 UTC of 24-03-2017:

SYNOPTIC FEATURES:

The upper air cyclonic circulation over northern parts of Bangladesh & adjoining Sub Himalayan West Bengal now lies over east Bihar & neighbourhood and extends upto 1.5 km above mean sea level.

The trough in lower level easterlies from southeast Arabian Sea to north interior Karnataka now runs from north Kerala to Telangana across Interior Karnataka at 1.5 km above mean sea level.

A trough in lower level westerlies runs from northeast Madhya Pradesh to south Madhya Maharashtra across Vidarbha & Marathawada and extends upto 0.9 km above mean sea level.

The Western Disturbance as an upper air cyclonic circulation over north Pakistan and adjoining Jammu & Kashmir has moved away east-north-east-wards and the trough aloft roughly along Long. 70.0°Eand north of Lat. 30.0°N has become less marked.

The induced upper air cyclonic circulation over Central Pakistan & adjoining West Rajasthan has become less marked.

The east-west trough from northeast Madhya Pradesh to Assam has become less marked. The upper air cyclonic circulation over coastal Karnataka & neighbourhood has become less marked.

A fresh feeble Western Disturbance likely to affect Western Himalayan region from 26thonwards.

SATELLITE OBSERVATIONS during past 24hrs and current observation:

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

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

Scattered low/medium clouds with embedded moderate to intense convection were seen over north Uttarakhand. Scattered medium/high clouds were seen over south Himachal Pradesh, Punjab, Haryana, extreme northwest Uttar Pradesh and Uttarakhand. Scattered low/medium clouds were seen over Sub-Himalayan West Bengal, east Meghalaya, Sikkim, Arunachal Pradesh, Assam, Nagaland and Manipur. Isolated low/medium clouds were seen over extreme north Rajasthan, southeast Madhya Pradesh, Marathawada, Chhattisgarh, south Odisha and Nicobar Islands.

Arabian Sea:

No significant clouds over the region.

Bay of Bengal & Andaman Sea:

Scattered low/medium clouds with embedded moderate to intense convection over Andaman Sea.

Convection:

Moderate convection was observed over North West parts of India.

OLR:- Upto 340 wm-2 was over Gujarat Madhya Pradesh Maharashtra Chhattisgarh Odisha Jharkhand South West Bengal Telangana Andhra Pradesh Karnataka North Tamilnadu, Upto 310 wm-2 was over South Rajasthan South Uttar Pradesh South Bihar Tripura Mizoram Upto 300 wm-2 was over North Uttar Pradesh North Bihar North West Rajasthan Assam Manipur , Upto 290 wm-2 was over Haryana Extreme North West Uttar Pradesh. Upto 280 wm-2 was over South Punjab South Himachal Pradesh Meghalaya Nagaland and Up to 200 wm-2 was over J&K. North Himachal Pradesh extreme Uttrakhand.

Jet Stream:
No Jet stream was observed over India.
Dynamic Features:
A positive vorticity field is seen over Madhya Pradesh Bihar West Bengal Himachal Pradesh and Konkan.
Moderate wind shear observed over Central India and Low wind shear is observed over North and South India.
Positive shear tendency observed over Kerala .
Precipitation:
IMR: Rainfall upto 30mm was observed over extreme North Jammu Kashmir, Rainfall upto 20mm was observed over rest North J&K extreme South J&K and Rainfall upto 10mm was observed over Rest J&K Punjab North Himachal Pradesh North Uttrakhand.
HEM: Rainfall up to 14 mm was observed over t J&K Himachal Pradesh and Uttrakhand and Rainfall up to 7mm was observed over Punjab.

RADAR and RAPID observation:
No significant convection was seen in DWR Composite and RGB Satellite imagery of 1600hrs IST.

Environmental condition (dust etc) and its forecast based on 00UTC of date:
No significant dust concentration observed over Arabian Peninsula but it was observed over west Rajasthan. Dust concentration is expected 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
12UTC charts on all days from Day0-4 show wind discontinuity at 925 hPa over Maharashtra adjoining Karnataka and Kerala. Similar features are also reflected at 850 hPa on day1.
850hPa anticyclonic flow lies over Arabian Sea on all Days; Localized weak, cyclonic flow over East UP and adjoining Bihar at 00UTC on Day-3 and Day-4 which is seen over W Bengal on Day-5.
2. Location of jet and jet core at 500hPa:-**500hPa Jet core (>60kt)**: Weak in magnitude on all Days. Well defined anticyclonic flow centred near Gujarat. Peak winds of jet core > 60 kt at 00UTC on Day-4 over J & K adjoining Punjab and Pakistan.
3. Convergence at 850 hPa: Strong low level convergence in land all along the west coast on all days at 12UTC.
4. Low level Vorticity:-Positive Vorticity (>15 x 10^{-5}/s): Lower values at 12UTC on all days.
At 00UTC high values along the west coast over peninsula and EW along the line of low level discontinuity, along the line of high NW winds over Punjab, Delhi & UP
5. Showalter Index: -3 to -4[Very Unstable]: Day-0&1: Along west coast in Kerala and Karnataka, parts of parts of Bihar and some locations in WB
Day3: Most part of NE, Kerala
Day-4 & 5: Most parts of J&K, some parts of NE.
6. K-Index :> 35[Very Unstable thunderstorm likely]: Day-0&1: Along west coast in Kerala and Karnataka, parts of AP adjoining Odisha and some locations in WB
Day-2 & 3: Most parts of NE India and some locations of Odisha and WB.
Day-4&5: Parts of J&K

7. Spatial distribution of TTI:
TTI >44 [Scattered Numerous Thunderstorms]: All along west coast in Karnataka and Kerala
TTI >50 [Scattered Thunderstorms few severe]: Day0 -over UP and Bihar, Day2: Over NE and Day3&4: Parts of J & K
8. Rainfall and thunder storm activity: Day-1: Light rains over NE and along west coast in Kerala
Day-2 :(> 2cm/day) Meghalaya, Day-3 & Light rains over NE.
Day-5: (>2cm/day) over J & K,

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

1. Weather Systems: In the analysis, a north-south trough is noticed over GWB, Jharkhand and Bihar and adjoining Bangladesh.
A CYCIR over Bihar region is seen during day 2 and the NE-SW oriented trough from it towards north Odisha and Chhattisgarh. The NE-SW oriented further shifted eastward and is seen parallel to east coast during day 3 to day 5 with associated CYCIR over Bihar and adjoining region during day 4 and day 5.
Another quasi-stationary CYCIR with north-south trough is seen over interior Karnataka, Marathawada and adjoining areas during next 2 days.
2. Location of jet and jet core at 500 hPa:**-500 hPa Jet core (>60kt):** The Jet at 500 hPa almost does not exist over India during next 5 days except a small belt over Bihar region on day 1.
3. Low level Vorticity:-Positive Vorticity 850hPa (>12 x 10^{-1}/s): Mainly along foothill of Himalaya and over GWB, Bihar and Jharkhand during next 2 days. Subsequently, the regions of eastern coastal states also witnessed vorticity maximum during day 3 to day 5.
The significant vorticity zones associated with the cyclonic circulations are seen over Karnataka and Konkan-Goa during next 2 days only in morning hours.
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 zone with values exceeding 4 is noticed over north eastern coastal states including GWB, Odisha, Jharkhand and Bihar during next 4/5 days. Some isolated regions of Karnataka coast and isolated region over Gujarat coast also indicated value > 4 during next 3 to 4 days.
Lifted Index (< -2): The areas with index less than -2 lies along east coast regions for next 5 days with gradually the LI areas with less than -2 mainly concentrated over GWB, Odisha, coastal AP, Bihar and adjoining areas after day 2. Some isolated pockets over Karnataka coast also indicated LI with less than -2.
Sweat Index (> 400): Then significant zones are confined along south east coast of India over Andhra coast initially and after 24 hr the maxima belts lie over GWB, Orissa, Bangladesh and adjoining NE states. Some parts of western Gujarat states and Karnataka coast also indicated the value > 400 the threshold values during initial 3 days.
Total Total Index (> 50): Above threshold value in some parts of central India and adjoining northern parts of India from day 1 up to day 5 particularly at 12 UTC of each day.
CAPE (> 1000): Mostly along east coast of India over Gangetic West Bengal, Odisha and adjoining regions during day next 5 days. The CAPE values also above threshold over Kerala and parts of coastal Karnataka, Konkan-Goa during day 3-5 and part of western Gujarat on day 2.
CINE (50-150): Maximum CINE values are found in some areas along east coast over GWB, Odisha, coastal AP and Tamilnadu from Day-1 to Day-5. The higher CINE values are also noticed over west coast and costal Gujarat and adjoining west Rajasthan.
5. Rainfall and thunderstorm activity: 10-40 mm rainfall over NE states, Bangladesh during next 2 days and over GWB, Bihar and Jharkhand regions during subsequent 2 days. .
J & K rainfall is likely during day 3 to 5 along with isolated rainfall over parts of extreme south Peninsula.

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

1. Model reflectivity (Max. dBz): (>25 dBz) mainly over extreme NE states after around 15 UTC of today and continued till subsequent 24 hrs (day 2) exceeding the threshold value is also seen over J & K region from day 2 afternoon to day 3 morning.

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

Total Total Index (> 50): Above threshold value over most parts of India during next 3 days except parts of extreme south peninsular region and northeastern states and J & K during morning hours.

K-Index (> 35): Less than threshold value over most parts of India during next 3 days but significant values are seen over some parts of NE states, eastern region including GWB, Odisha, Bihar and also part of Karnataka coast.

CAPE (> 1000): Mostly along east coast of India over Andhra Pradesh, Odisha, GWB, Bihar and Jharkhand during next 3 days. Another zone along west coast over Kerala, coastal Karnataka and Konkan & Goa. CAPE exceeding 1000 unit is also seen over western and eastern UP in the afternoon of day 1.

CINE (50-150): CIN values are mostly small all over India during all three days of forecasts except some areas along coastal areas of India over Odisha, GWB, coastal AP, coastal Karnataka and Konkan-Goa and some parts of Bihar, Jharkhand and adjoining UP on day 2.

5. Rainfall activity: - Rainfall activity (~ 10-40 mm) over NE states and south peninsula of day 1 and day 2.
Slight decrease of rainfall over NE states on day 3 but increase over J & K.

3. IOP ADVISORY FOR 24 and 48Hrs:

Summary and Conclusions:

Day 1 & Day 2:

In association with the upper air cyclonic circulation persisting over the east Bihar & neighbourhood and now extending upto 1.5 km above mean sea level, the wind flow over North East India has strengthened since yesterday. This is likely to lead to increased thunderstorm activity accompanied by hail and squall over Sikkim, Sub Himalayan West Bengal, Meghalaya and adjoining Assam during day 1. The persistence of the cyclonic circulation over the same region is likely to increase thunderstorm frequency and spread southwards to Mizoram and Tripura on day 2.

24 hour Advisory for IOP:
Arunachal Pradesh
Sikkim, Sub-Himalayan West Bengal
Meghalaya and adjoining Assam

48 hour Advisory for IOP:
Arunachal Pradesh
South Assam, Meghalaya, 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/
LowLevelWinds
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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
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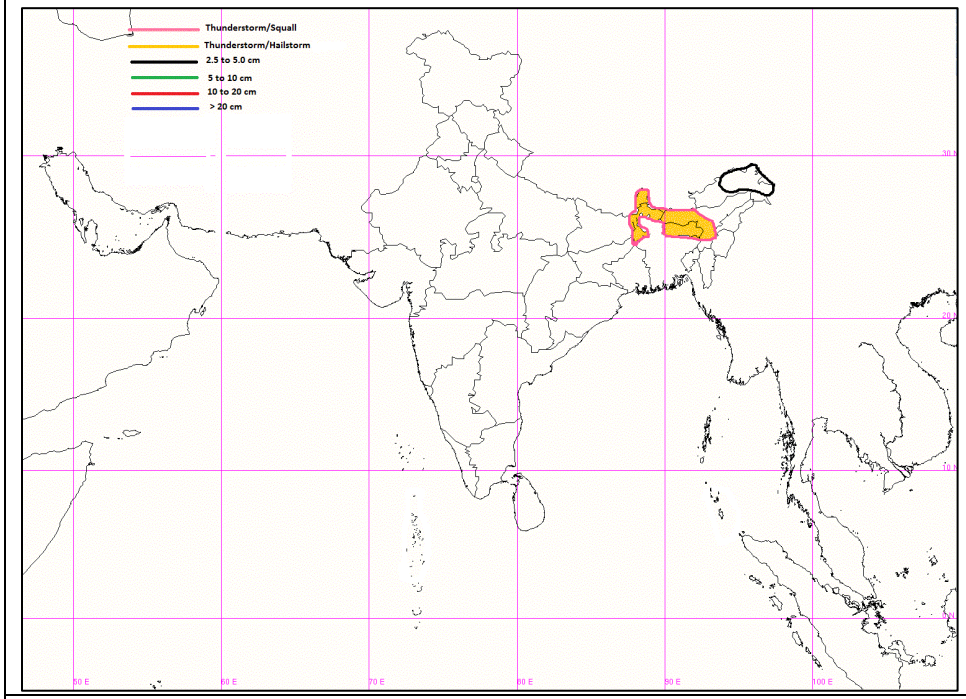
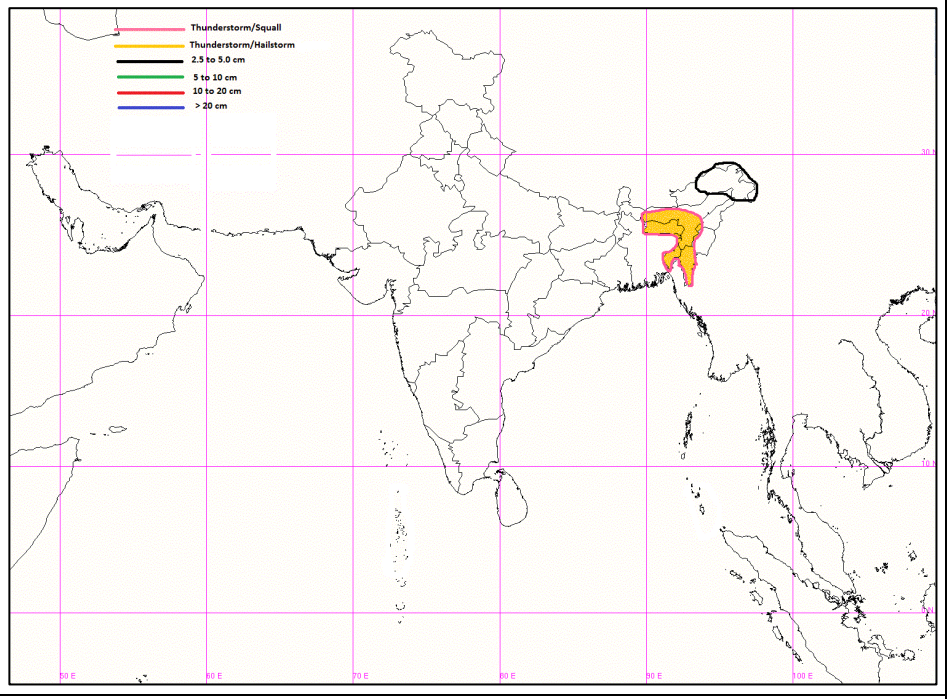
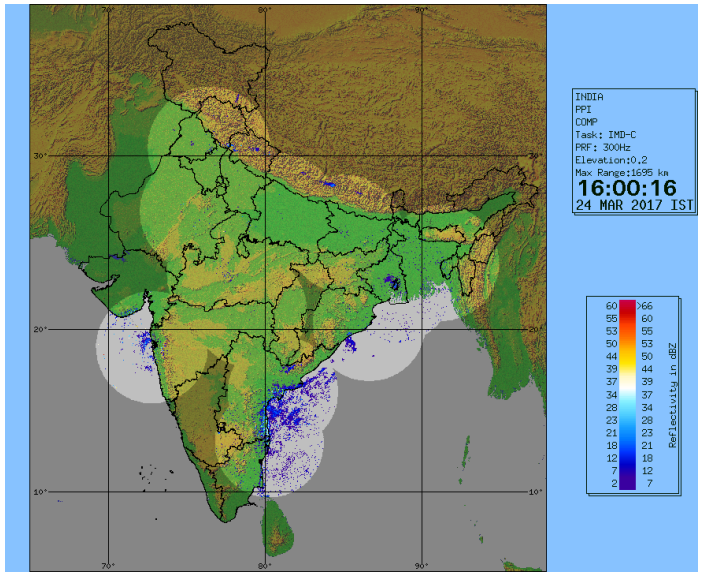
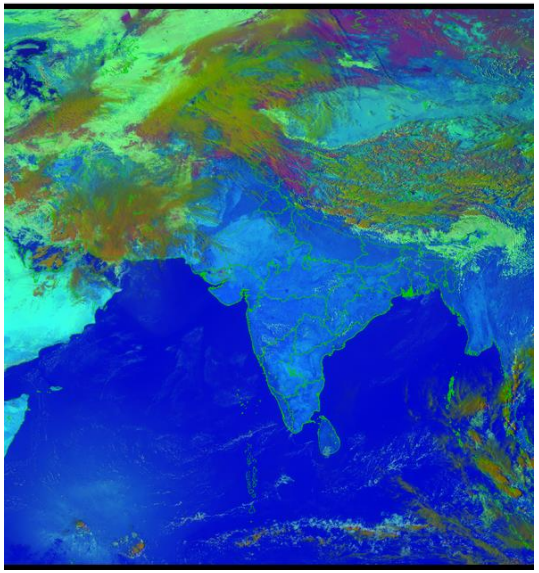
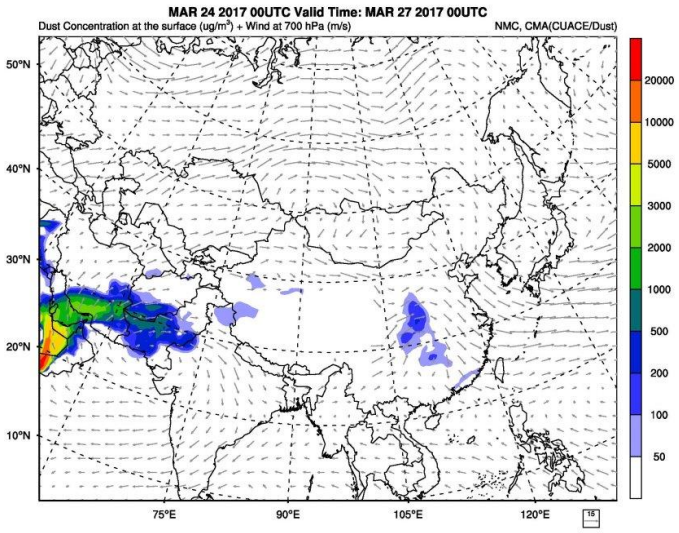


IOP Advisory for 24 hours

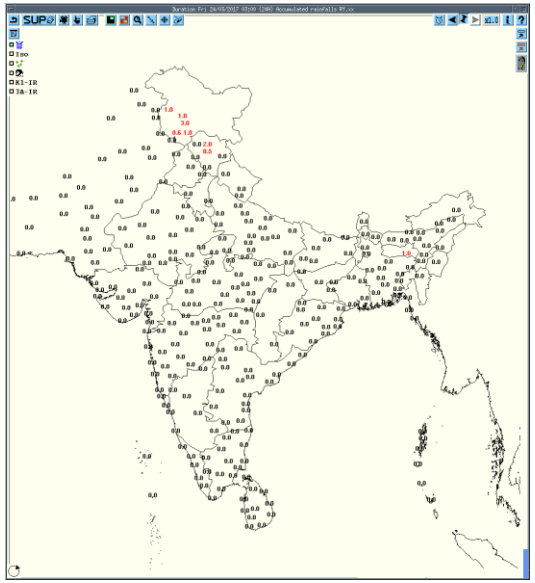


IOP Advisory for 48 hours

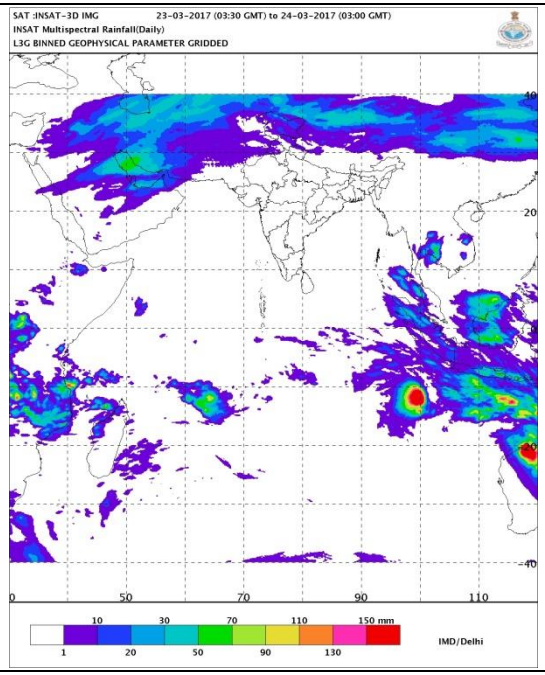
	
DWR Composite at 1600 hrs IST	**RGB Image of INSAT 3D at 1600 hrs IST**



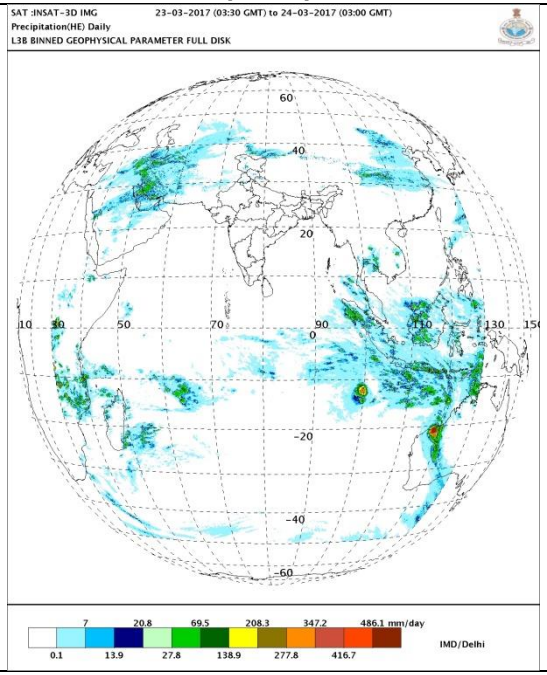
Forecast Dust Concentration at 00 UTC of 27 March



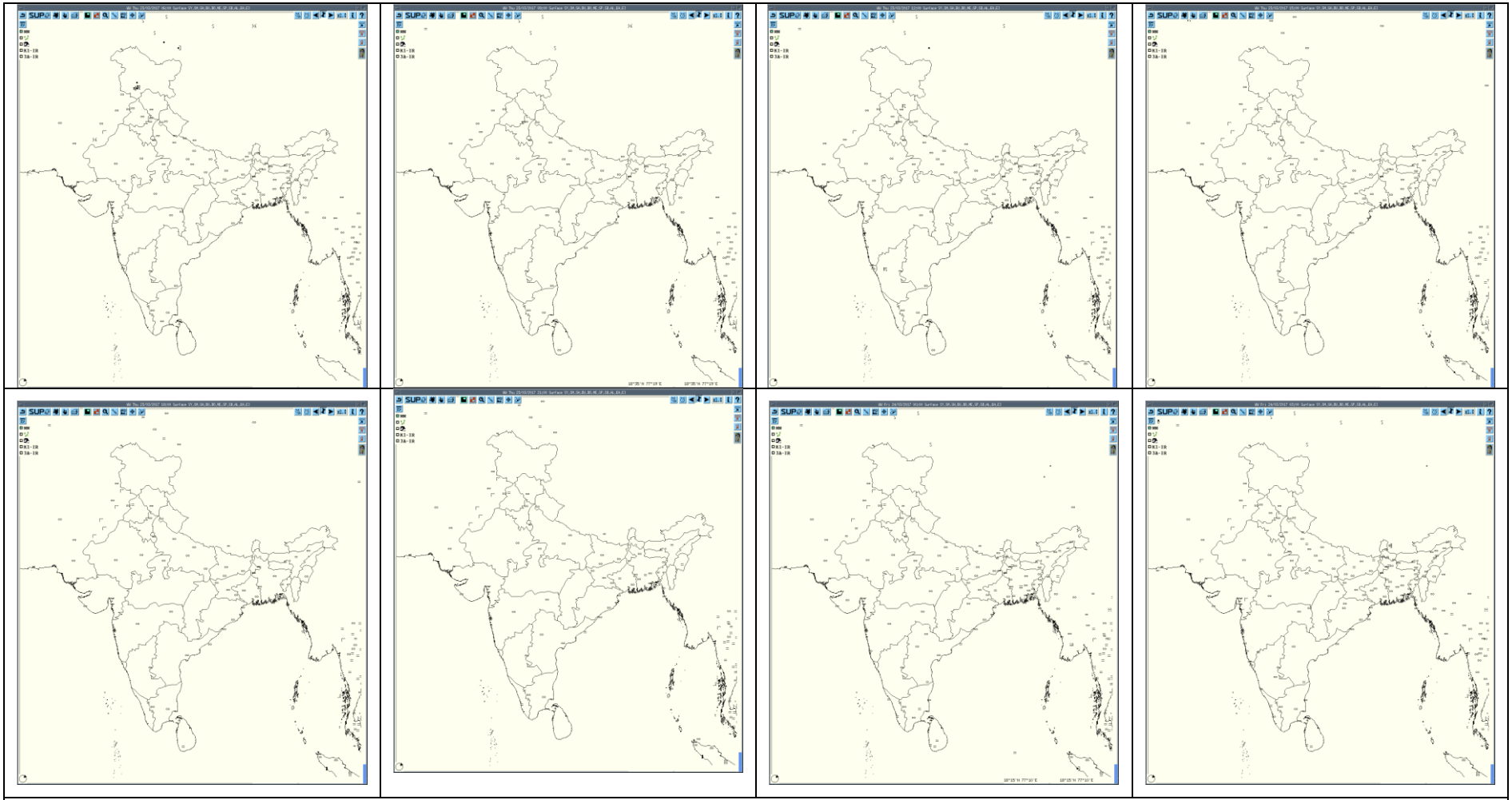
Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today



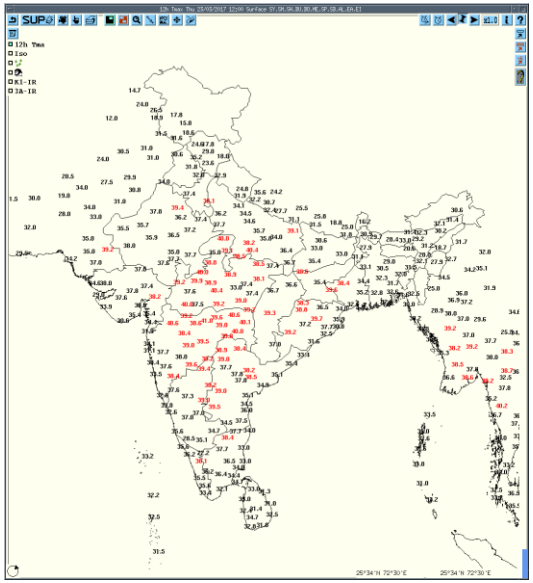
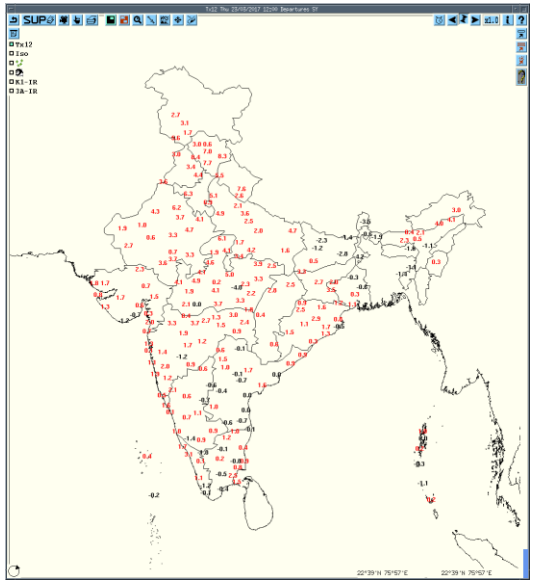
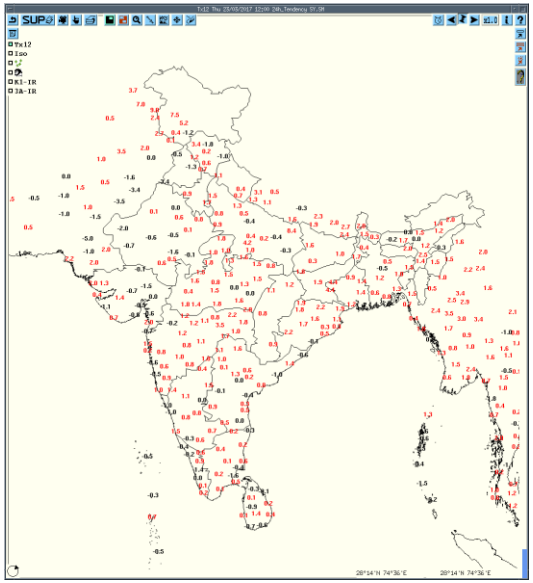
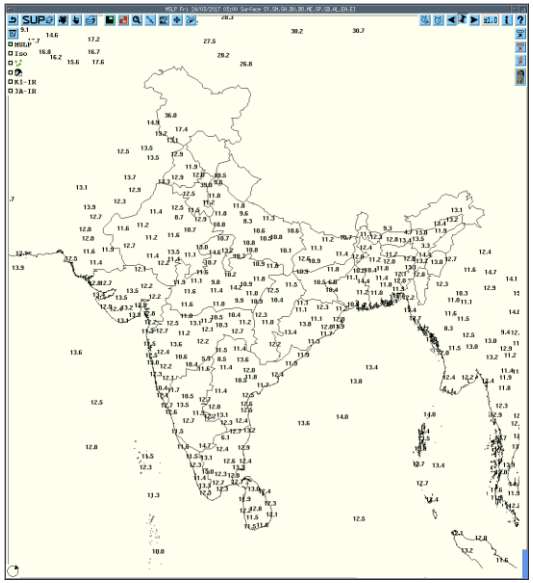
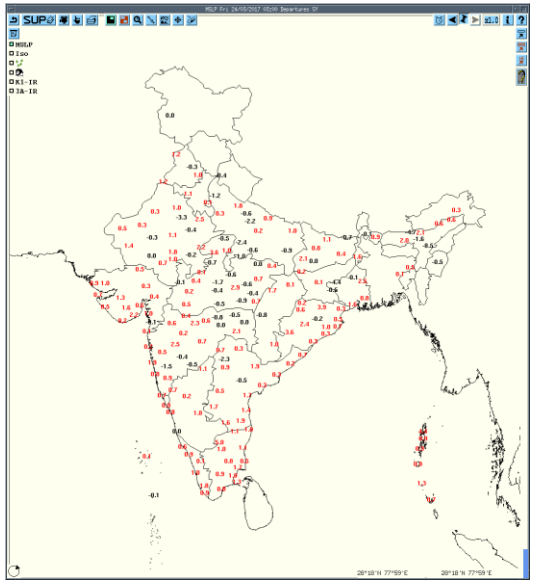
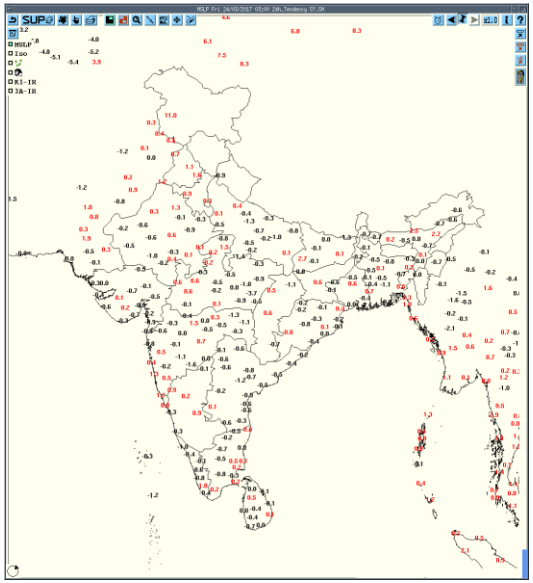
IMR Rainfall

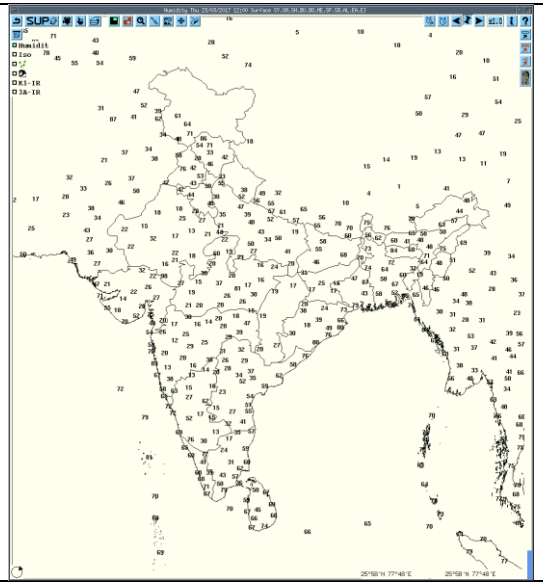
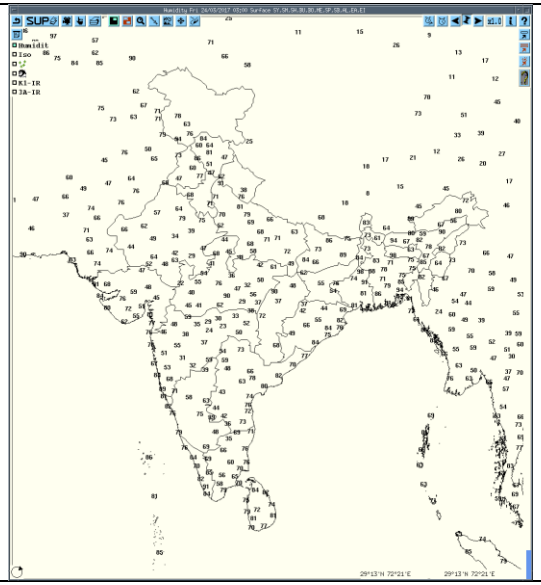


HEM Rainfall



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**

	
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**
23-03-2017	0600UTC	Banihal	Northwest India	J & K	Thunderstorm
		Kukernag	Northwest India	J & K	Thunderstorm
23-03-2017	0900UTC	Nil	Nil	Nil	Nil
23-03-2017	1200UTC	Bhunter	Northwest India	Himachal Pradesh	Thunderstorm
		Dharwad	South India	Karnataka	Thunderstorm
23-03-2017	1500UTC	Nil	Nil	Nil	Nil
23-03-2017	1800UTC	Nil	Nil	Nil	Nil
23-03-2017	2100UTC	Nil	Nil	Nil	Nil
24-03-2017	0000UTC	Nil	Nil	Nil	Nil
24-03-2017	0300UTC	Nil	Nil	Nil	Nil

Name of Station Reporting	Region	STATE	Weather Event	Date	Time of Commencement (IST)	Time of end (IST)
Kupwara	Northwest India	Jammu & Kashmir	TSRA		1830	1845
Kukernag	Northwest India	Jammu & Kashmir	TSRA		1045	1220
Banihal	Northwest India	Jammu & Kashmir	TSRA		1050	1110
Katra	Northwest India	Jammu & Kashmir	TSRA		1250	1310
Bhaderwah	Northwest India	Jammu & Kashmir	TSRA		1145	1215
Dharwad	South india	Karnataka	TS		1715	1725

Severe Weather warning based on DWR observation	
Name of issuing Radar station	**DWR LUCKNOW**
Geo-coordinates of issuing Station(Lat, Long,Alt)	---
Date and time of issue in UTC (yyyyMMddhhmm)	201703240600 UTC
Nature of severe weather expected	Nil
Name of issuing Radar station	**DWR PATNA**
Geo-coordinates of issuing Station(Lat, Long,Alt)	---
Date and time of issue in UTC (yyyyMMddhhmm)	201703240600 UTC
Nature of severe weather expected	Nil
Name of issuing Radar station	**DWR KARAIKAL**
Geo-coordinates of issuing Station(Lat, Long,Alt)	Lat:10.91381N,Long:79.84141E/Alt:25masl
Date and time of issue in UTC (yyyyMMddhhmm)	---
Nature of severe weather expected	DWR U/S
Name of issuing Radar station	**DWR MUMBAI**
Geo-coordinates of issuing Station(Lat, Long,Alt)	Lat–18˚54'04", Long-72˚48'32"/HeightAMSL–3.22meters.
Date and time of issue in UTC (yyyyMMddhhmm)	201703240700 UTC
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,16mabovemsl
Date and time of issue in UTC (yyyyMMddhhmm)	201703240620 UTC
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)	201703240625 UTC
Nature of severe weather expected	
Name of issuing Radar station	**DWR MACHILIPATNAM**
Geo-coordinates of issuing Station(Lat, Long,Alt)	LAT: 16.12’ LONG: 81.09’ ALT: 3.05m.
Date and time of issue in UTC (yyyyMMddhhmm)	201703240601 UTC
Nature of severe weather expected	Nil

Past 24 hours DWR Report:

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	Formation w.r.t radar station and Direction of movement	Remarks	Associated severe weather if any	Districts affected
NAGPUR	23/03/17	0302-2352 UTC	Nil	Nil	No Echoes	Nil	Nil
	24/3/17	0002-0302 UTC	Nil	Nil	No Echoes	Nil	Nil
AGARTALA	24/03/17	230300 UTC-240300 UTC	NIL	NIL	NIL	NIL	NIL