India Meteorological Department

FDP STORM Bulletin No.23(28-03-2017)

1. CURRENT SYNOPTIC SITUATION at 0300 UTC of 28-03-2017:

SYNOPTIC FEATURES:

The western disturbance as a trough in mid-tropospheric westerlies with its axis at 5.8 km above mean sea level roughly along longitude 48.0°E and north of latitude 25.0°N now runs roughly along longitude 50.0°E and north of latitude 25.0°N.
The upper air cyclonic circulation over North Interior Karnataka & neighbourhood persists and now seen between 0.9 km and 1.5 km above mean sea level.
The upper air cyclonic circulation over south Chhattisgarh & neighbourhood persists and now lies at 0.9 km above mean sea level.
The upper air cyclonic circulation over east Bihar & neighbourhood now lies over Sub Himalayan West Bengal & neighbourhood and extends upto 0.9 km above mean sea level. A north south trough runs from Sub Himalayan West Bengal to north Odisha across Gangetic West Bengal between 1.5 km and 2.1 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 and north Himachal Pradesh in association with western disturbance over the area. Scattered low/medium clouds were seen over south Himachal Pradesh, north Uttarakhand, north Punjab and coastal Tamilnadu. Scattered low/medium clouds with embedded moderate to intense convection were seen over central Assam, Arunachal Pradesh, east Nagaland and adjoining Manipur. Scattered low/medium clouds with embedded isolated weak convection were seen over Sikkim and east Assam. Scattered low/medium clouds were seen over rest northeast states. Scattered low/medium clouds with embedded moderate to intense convection were seen over bay islands.

Arabian Sea:

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

Bengal & Andaman Sea:

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

Convection: Light to moderate convection was observed over J & K and North East parts of India.

OLR: - Upto 270 wm^{-2} over Jammu & Kashmir, Himachal Pradesh, and NE States.
Upto 300 wm^{-2} over Uttar Pradesh, Bihar, Kerala and south coastal Karnataka
Upto 340 wm^{-2} over rest parts of India.

Jet Stream: No Jet stream and no trough observed over India.

Dynamic Features: A positive Vorticity field is seen over Uttarakhand, Uttar Pradesh, Bihar, West Bengal and south Coastal Konkan. Moderate wind shear observed over north-west 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 northern parts and negative shear tendency observed over rest parts of India .

Precipitation:

IMR: Rainfall upto 50mm was observed over central parts of North West Jammu Kashmir. Rainfall upto 20mm was observed over rest North West J&K and rainfall upto 10mm was observed over west adjoining east Jammu Kashmir NE Bangladesh, Meghalaya, south Assam , east Arunachal Pradesh & NW Manipur.

HEM: Rainfall upto 70mm was observed over extreme NW Jammu Kashmir. Rainfall upto 14mm was observed over west Jammu Kashmir NE Bangladesh, Meghalaya, south Assam, north Nagaland & NW Manipur

RADAR and RAPID observation:

No significant convection was seen in DWR Composite of 1530hrs IST and convective clouds were observed over J & K, North Himachal Pradesh, central Assam, Arunachal Pradesh, east Nagaland and adjoining Manipur in RGB Satellite imagery of 1530hrs IST.

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

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; which is not seen at 00UTC

12UTC charts on all days from Day0-4 show Wind discontinuity at 925 hPa: Kerala, Karnataka and Maharashtra

00UTC charts on Day-1-Day-2 show weak CYCIR over eastern UP and Bihar region at 925 and 850 hPa. 850hPa anticyclonic flow lies over Arabian Sea on all Days

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 moving towards SE as day progresses reach over Bay of Bengal in day 4.

Jet core >60kt on Day-2&3 at 12UTC over Bangladesh

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. Only in Day-2 over parts of Assam/Meghalaya

4. Low level Vorticity:-Positive Vorticity (>15 x 10^{-5}/s): at 12UTC on Day0,1&2: Strong over northern UP. Day-1-3 strong over Assam, parts of Bihar and WB, Isolated locations over Odisha and along west coast.

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 coastal Maharashtra, Goa, coastal Karnataka, Kerala and J&K.

Day-2: over coastal Kerala and Karnataka

Day-3: over parts of J&K, southern part of Kerala

Day-4: parts of J&K, some parts of NE and over parts of coastal Kerala and Karnataka.

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

Day-0: Parts of J&K, isolated location over coastal Maharashtra, Goa, Odisha, most parts of NE.

Day-1: Isolated location over coastal Maharashtra, Goa, Odisha, most parts of NE

Day-2 &3: Over NE states, parts of coastal Maharashtra, Karnataka and Kerala

Day-4: Parts of J&K, some parts of NE and over parts of coastal Kerala and Karnataka

7. Spatial distribution of TTI:

TTI >44 [Scattered Numerous Thunderstorms]: Coastal Maharashtra, Telangana and adjoining Maharashtra and Odisha extending to WB and Bangladesh.

TTI >50 [Scattered Thunderstorms few severe] : Isolated locations of J &K in all days Coastal Maharashtra, HP and Uttarakhand in day-0 & 1, coast of Kerala and Karnataka and J & K in Day-2, Parts of interior Maharashtra in Day 3

8. Rainfall and thunder storm activity: Day-1: (>4cm/day) J & K region, Meghalaya, Mizoram, Nagaland and parts of Assam

Day-2, 3, 4 and Day-5: (>4cm/day) widespread over NE India.

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

1. Weather Systems: 00 UTC analysis shows trough over Bihar to Andhra through WB and coastal Odisha. Day 1 CYCIR over Bihar and adjoining area, trough extended from this system to costal Odisha through WB which persist during day 4 to 5 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 UP and Bihar in the analysis as well as during next day.

3. Low level Vorticity:-Positive Vorticity 850hPa (>12 x 10^{-1}/s): Mainly along foothill of Himalaya and over east UP, GWB and Odisha during next 2 to 3 days. The Maharashtra region also witnessed vorticity maximum during day 1 to day 2.

The significant vorticity zones associated with the cyclonic circulations are seen over Karnataka, Konkan-Goa and west coast during next 3 to 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 and adjoining Bangladesh and Konkan & Goa during next 4/5 days.

Lifted Index (< -2): The areas with index less than -2 lies along east coast regions over 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): Then 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 also indicated the value > 400 K for next 5 days and over J & during next 5 days.

Total Total Index (> 50): Above threshold value in some parts of central India and adjoining northern parts of India from day 1 to day 5 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 during next 5 days. The CAPE values also above threshold over Kerala and parts of coastal Karnataka, Konkan-Goa during day 4-5 days.

CINE (50-150): Maximum CIN values are found in some areas along east coast over GWB, Odisha, coastal AP and Tamil Nadu and also over Bihar and Jharkhand from Day-1 to Day-5 and Maximum CIN value over Gujarat region during next 4/5day.

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 and J & K rainfall is likely during day 1.

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

1. **Model reflectivity (Max. dBz)**: **(>25 dBz)** dBZ exceeding the threshold value is seen over J & K region after 05UTC of today.

2. Spatial distribution of Total Total Index, K-Index, CAPE and CINE [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 north-eastern states and J & K during morning hours.

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 during next 3 days. Another zone along west coast over Kerala, coastal Karnataka and Konkan & Goa
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.
3. Rainfall activity: Rainfall activity (~ 10-40 mm) over NE states up to 3 days and J & K for next day.

3. IOP ADVISORY FOR 24 and 48Hrs:

Summary and Conclusions:

Day 1 & Day 2:

Presently, the western disturbance as a trough in mid-tropospheric westerlies with its axis at 5.8 km above mean sea level roughly along longitude 48.0°E and north of latitude 25.0°N now runs roughly along longitude 50.0°E and north of latitude 25.0°N. The upper air cyclonic circulation over North Interior Karnataka & neighbourhood persists and now seen between 0.9 km and 1.5 km above mean sea level.

The upper air cyclonic circulation over south Chhattisgarh & neighbourhood persists and now lies at 0.9 km above mean sea level. The upper air cyclonic circulation over east Bihar & neighbourhood now lies over Sub Himalayan West Bengal & neighbourhood and extends upto 0.9 km above mean sea level.

A north south trough runs from Sub Himalayan West Bengal to north Odisha across Gangetic West Bengal between 1.5 km and 2.1 km above mean sea level which give rise to thunderstorm with hail activities over these areas on Day-1. This will extend up to Arunachal Pradesh. However, NMMT will experience the Thunder squall with hail activities for both Day1 and Day2.

24 hour Advisory for IOP:
Sub Himalayan West Bengal, Assam, Meghalaya, Arunachal Pradesh.
Nagaland, Manipur, Mizoram and Tripura
48 hour Advisory for IOP:
Sub Himalayan West Bengal, 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
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ForRAPIDtool:
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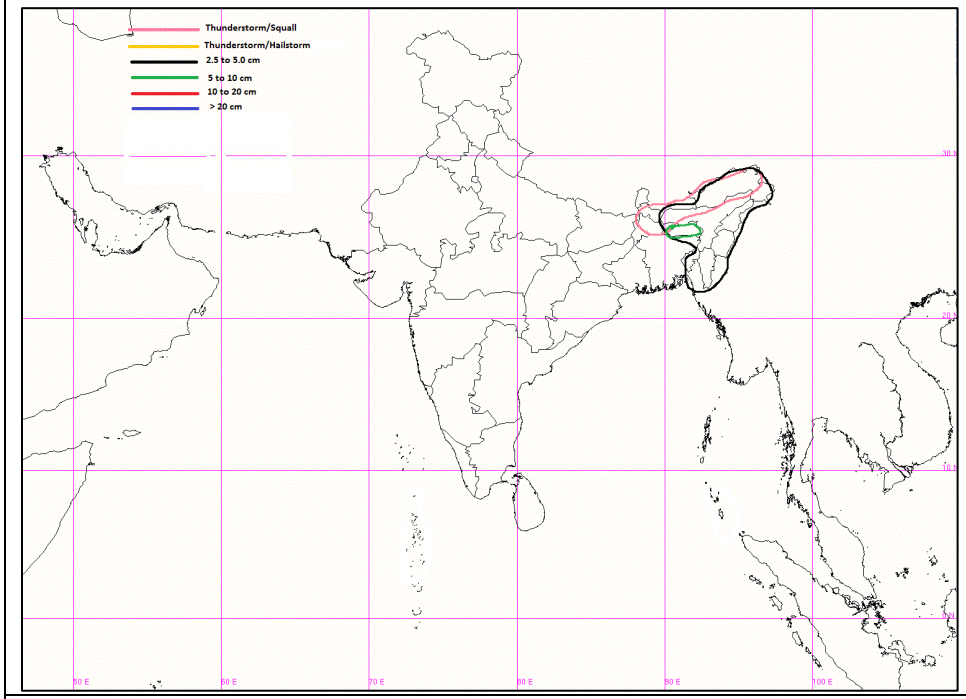
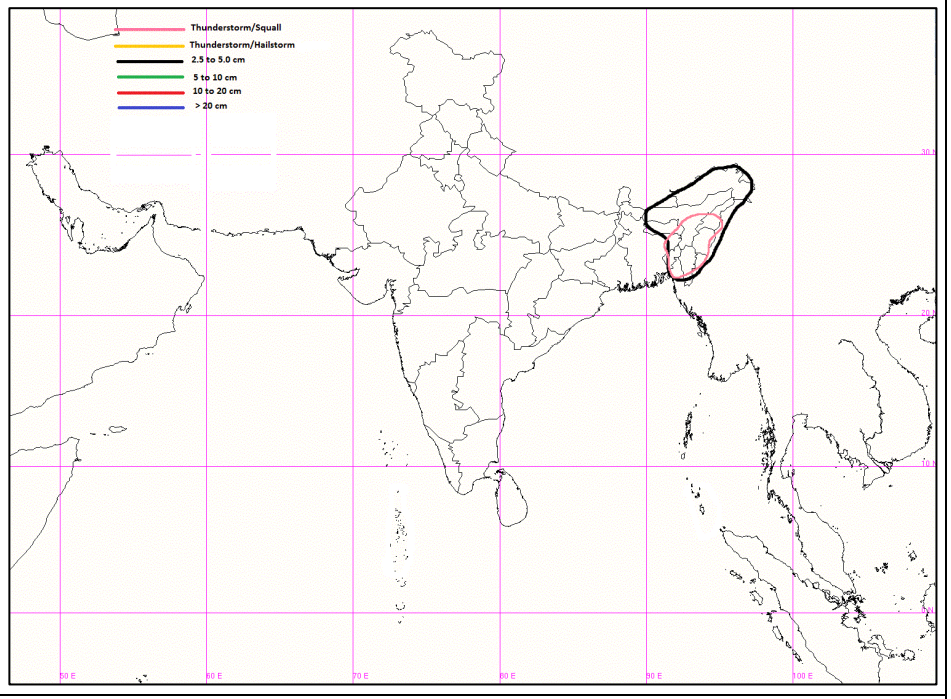
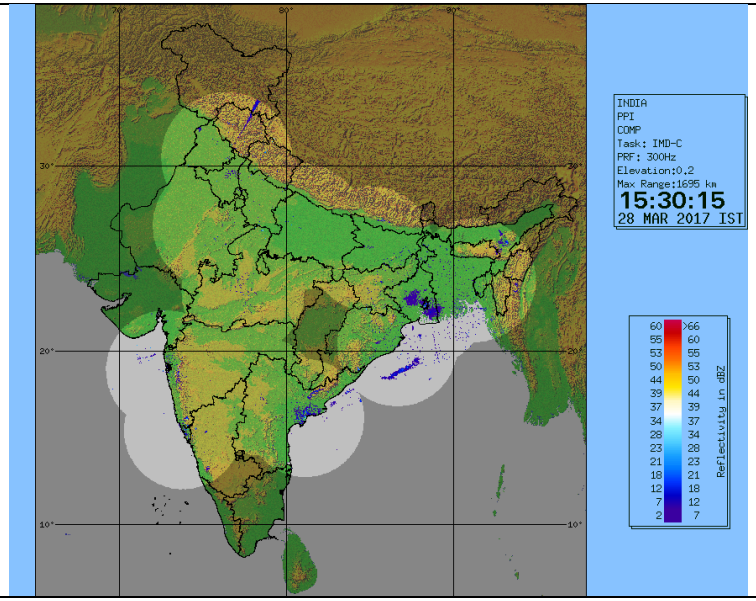
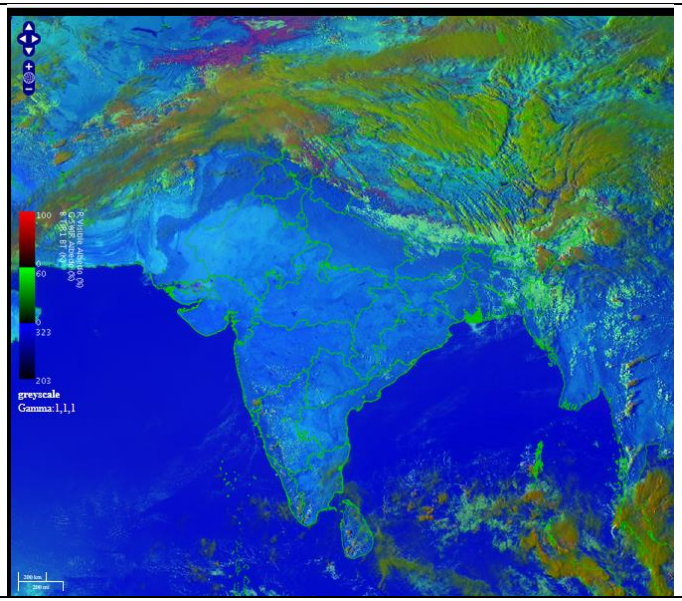
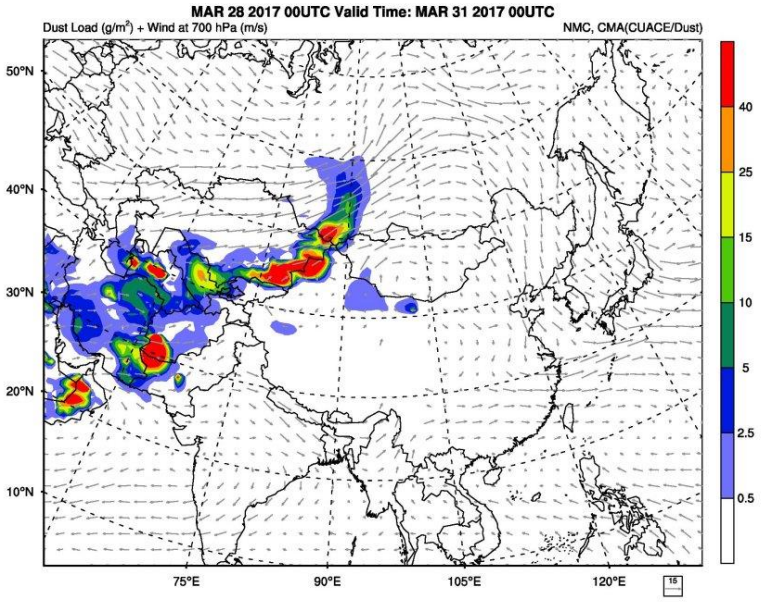


IOP Advisory for 24 hours

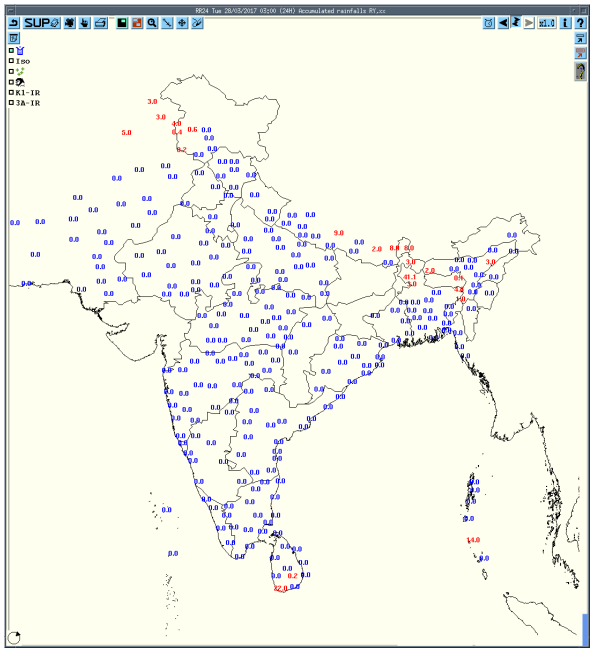


IOP Advisory for 48 hours

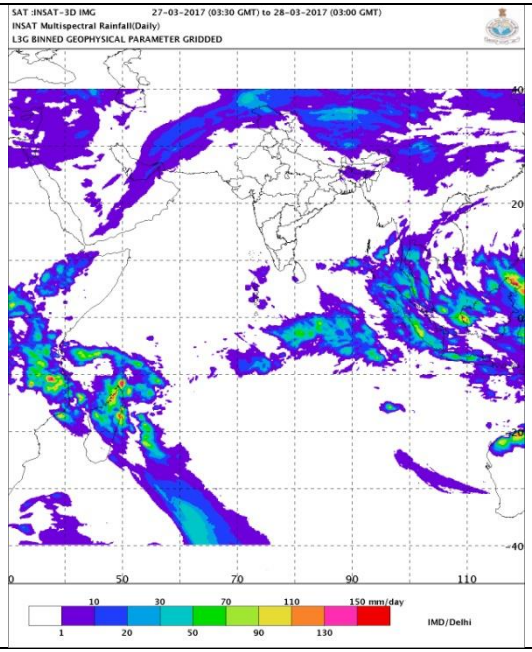
	
DWR Composite at hrs 1530 IST	**RGB Image of INSAT 3D at 1530 hrs IST**



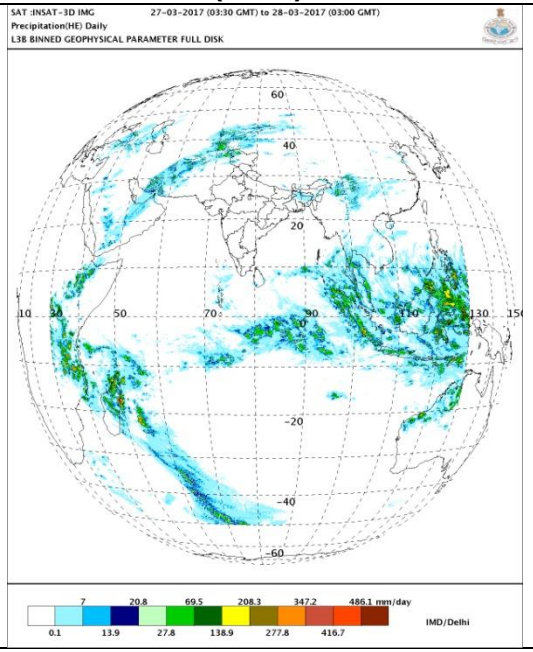
Forecast Dust Concentration at 00 UTC of 31 March



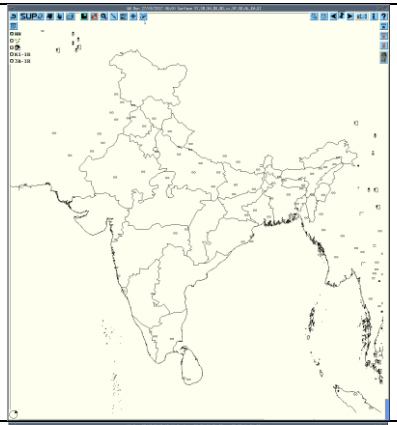
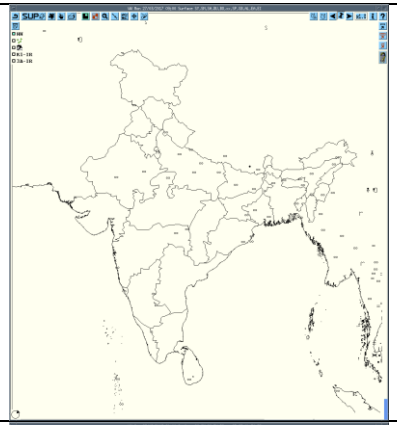
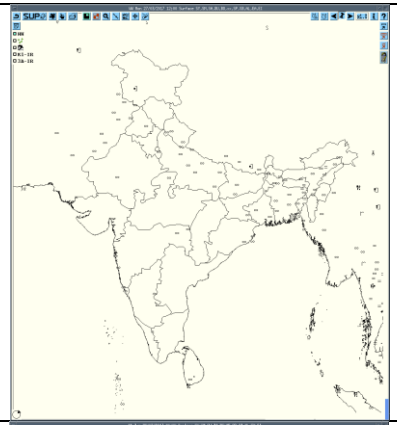
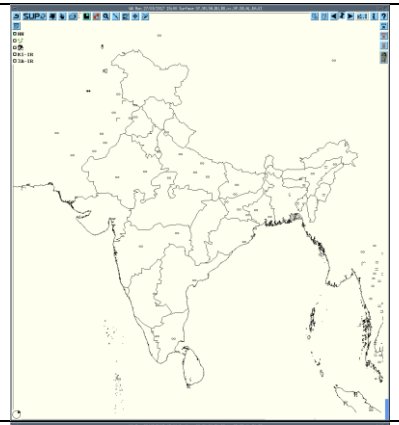
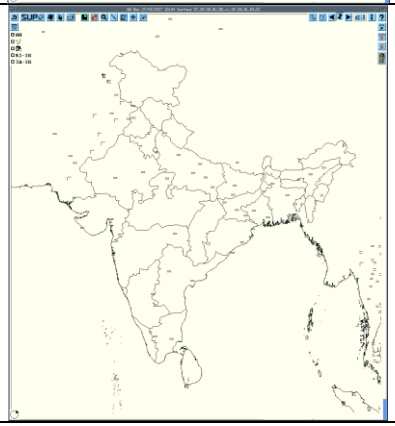
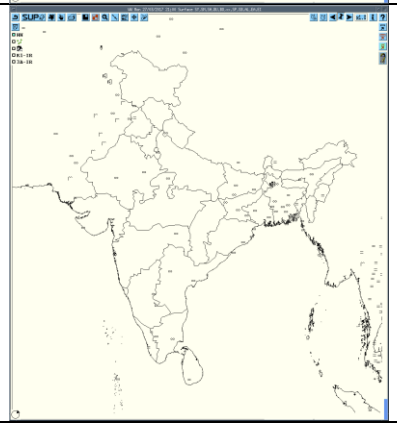
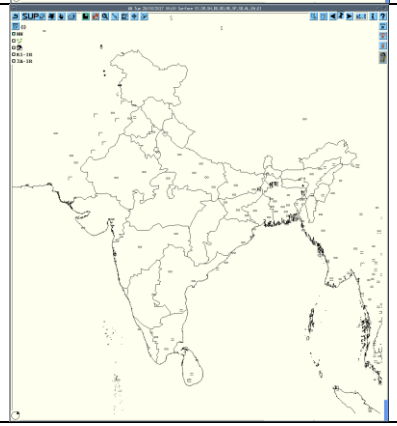
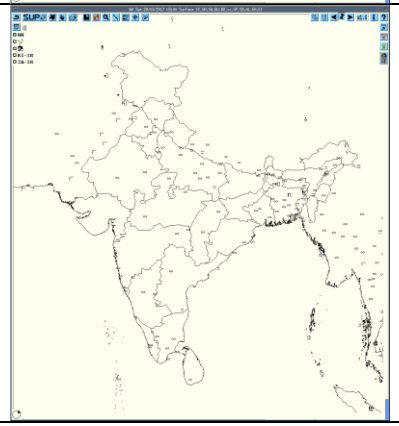
Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today



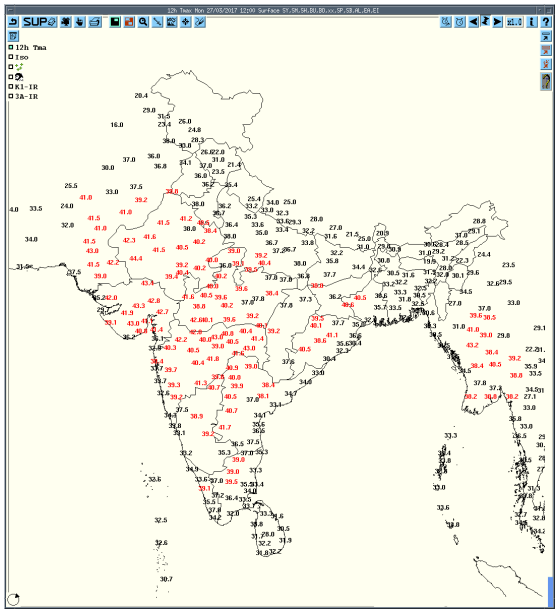
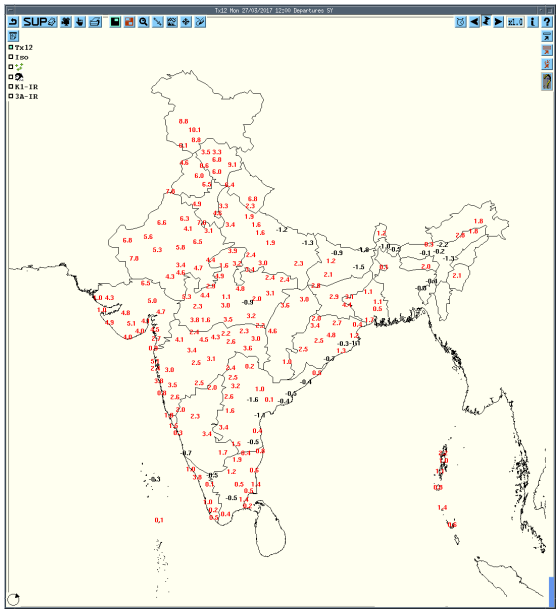
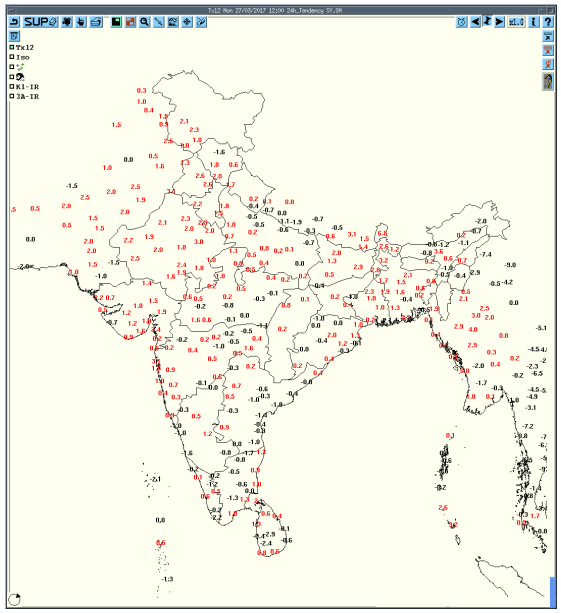
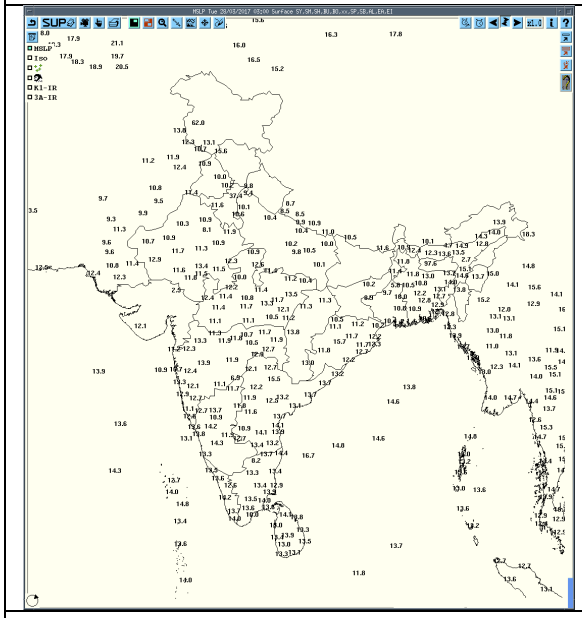
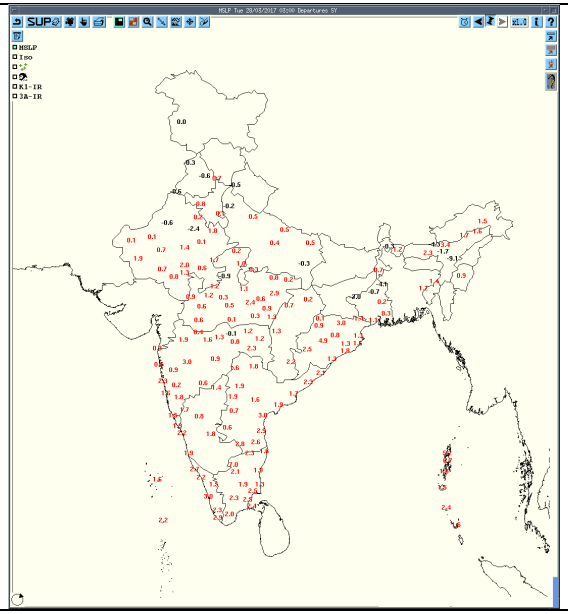
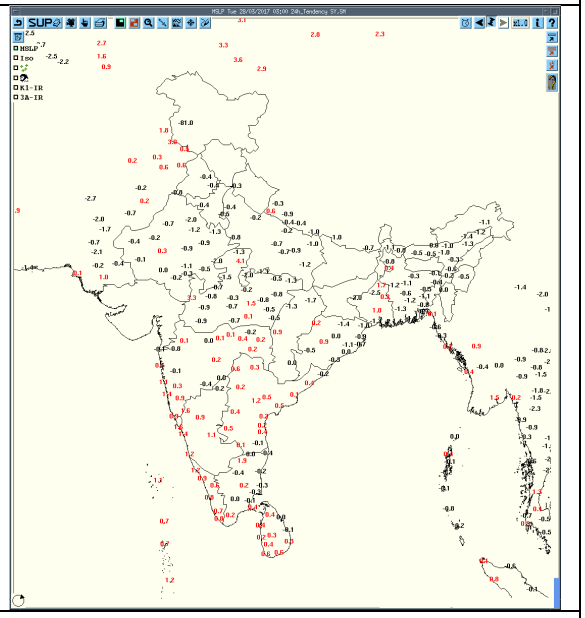
IMR Rainfall

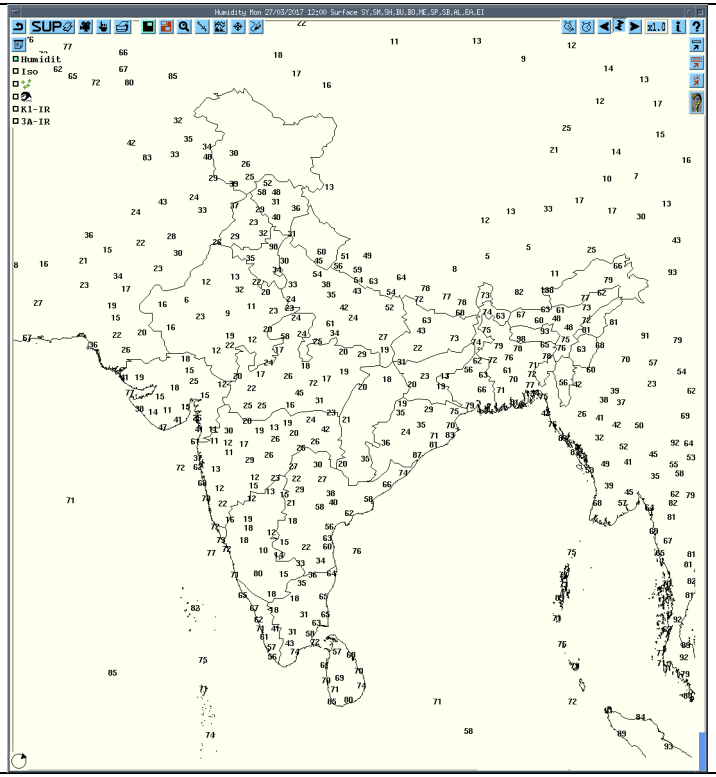


HEM Rainfall

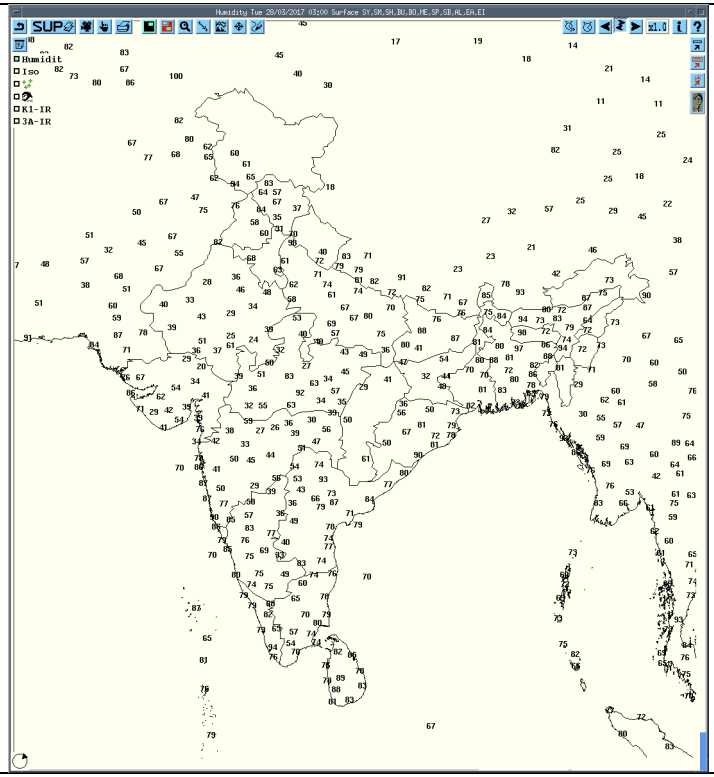









3hourly Past weather at 06, 09, 12, 15, 18, 21 UTC of yesterday and 00 & 03 hrs UTC of today

		
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**
26-03-2017	0600UTC	Nil	Nil	Nil	Nil
26-03-2017	0900UTC	Nil	Nil	Nil	Nil
26-03-2017	1200UTC	Nil	Nil	Nil	Nil
26-03-2017	1500UTC	Nil	Nil	Nil	Nil
26-03-2017	1800UTC	Nil	Nil	Nil	Nil
26-03-2017	2100UTC	Nil	Nil	Nil	Nil
27-03-2017	0000UTC	Purnea	East India	Bihar	Thunderstorm
27-03-2017	0300UTC	Jorhat	Northeast India	Assam	Thunderstorm

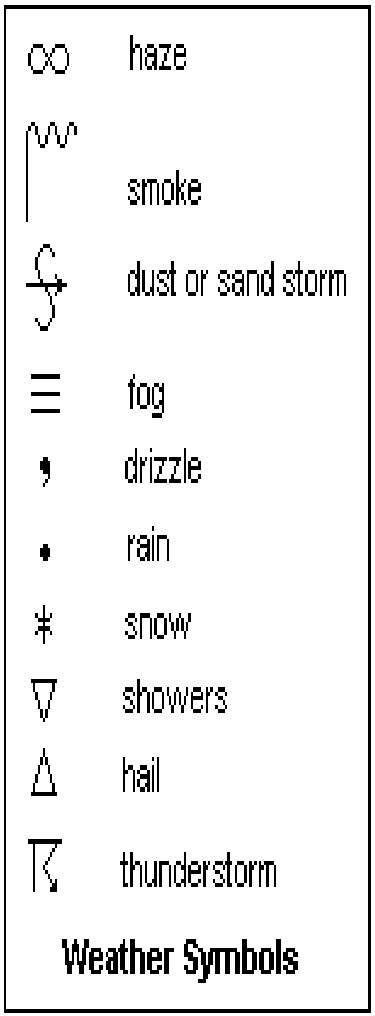
Name of Station Reporting	Sub-Division	STATE	Event	Date	Time of Commencement (IST)	Time of End (IST)
Coochbehar	East India	West Bengal	TSRA	28-03-17	0630	0655
Purnia	East India	Bihar	TSRA	28-03-17	0345	0500
Jorhat	Northeast India	Assam	TS	28-03-17	28/0700	28/0815
Dhubri	Northeast India	Assam	TSRA	28-03-17	28/0606	28/0700

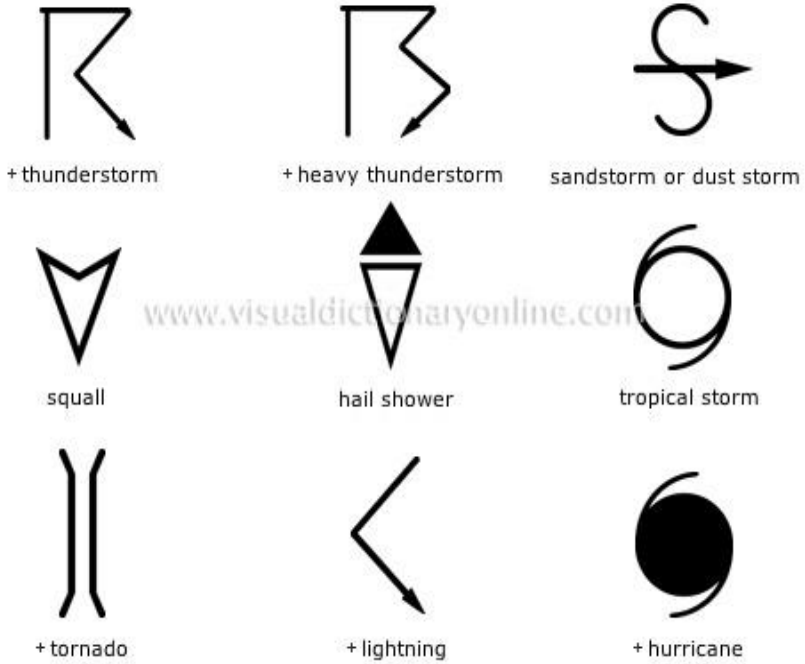
TS Thunderstorm,
TSRA Thunderstorm with Rain

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
DWR KOLKATA	27-03-17	0301-0842	NIL	NIL	NO ECHO	NIL	NIL
	27-03-17	0852-1241	1.Isolated cell with maximum height of 11.82 Km at 0901 UTC and maximum reflectivity of 51.5 dBz at 0901 UTC 2. Regenerated from 1. maximum height of 15.58 Km at 1011 UTC and maximum reflectivity of 59.0 dBz at 1011 UTC 3. Isolated cells with maximum height of 13.17 Km at 1031 UTC and maximum reflectivity of 55.0 dBz at 1031 UTC 4. Isolated cells with maximum height of 11.82 Km at 1141 UTC and maximum reflectivity of 54.0 dBz at 1141 UTC	NNW (220.6km) moving in SSE-ly direction at speed of 28.8 kmph NNW (202.9km) moving in SSE-ly direction at speed of 18.7 kmph NNW (237.2km) moving in E-ly direction at speed of 22.7 kmph NNE (48.3km) moving in SE-ly direction at speed of 8.6 kmph	1.Cell started forming at 0852 UTC at NNW (220.6 Km) from radar. And died down at 0942 UTC to be regenerated at 0951 UTC. 2. Matured and maximum reflectivity between 1011 & 1021 UTC. Died down at 1051 UTC 3.Cell started forming at 1021 UTC at NNW (237.2 Km) from radar. And died down at 1121 UTC 4. Cell started forming at 1011 UTC at NNE (48.3 Km) from radar. And died down at 1241 UTC	Thunderstorm Thunderstorm Thunderstorm Thunderstorm	N/A N/A N/A N/A
DWR Paradeep	28/03/17	0410-0700	Isolated cells with average height of 4 km with maximum reflectivity of 35dBZ	SW(100KM – 150 KM) near and around Puri and almost stationary.	NIL	NIL	NIL
DWR Agartala	28/03/17	271530 - 280100	Multiple Cells with maximum height 13 km and maximum reflectivity 42-46 dBZ	NNW (110 KM) from DWR Agartala moving ENE-wards at around 20 kmph	Multiple Cells at developing at 1530 UTC of 27.03.17 with maximum reflectivity of 42-46 dBZ at 2100 UTC died at 0100 UTC over Bangladesh	NIL	NIL
		271920 – 280300	Multiple Cells with maximum height of 14 km and maximum reflectivity 42-46 dBZ	NNW (250 KM) from DWR Agartala moving SE-wards at around 30 kmph	Multiple Cells developing at 1920 UTC with maximum reflectivity of 42-46 dBZ between 0040 to 0130 UTC expected to dissipate	NIL	Light rain at West Tripura District

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
DWR Mohanbari	27/03/17	0642-1100	Cells type- Isolated Average ht.- 8.2 Km MAX_Z:- 32.5 dbZ	Distance- 150 Km Direction- SE Movement- SEly	Dissipated	No	
	28/03/17	0432-0532	Cells type- Multiple Average ht.- 8.2 Km MAX_Z:- 49.5 dbZ	Distance- 25.5 Km, Direction- S Movement- NEly	Mature	-TSRA	at Mohanbari
DWR Patna	27/03/17	270300 - 271255	NIL	NIL	NIL	NIL	NIL
	27/03/17	271255 - 271321	-	-	RADAR U/S	-	-
	27/03/17	271321 - 272222	NIL	NIL	NIL	NIL	NIL
	28/03/17	272222 - 280200	Multiple Cells. Maximum Reflectivity : 39 dbz Echo Top : 04.5 KM Range : 168.7 KM from DWR Patna	North-East	Warning E-mail and Fax sent to State Disaster management Authority and Concern DMs	TSRA WIND SPEED REACHING UPTO 60 – 70 KMPH	SAHARSA KHAGARIA, MADHEPURA BHAGALPUR, PURNIA AND KATIHAR
	28/03/17	280200 - 280300	NIL	NIL	NIL	NIL	NIL
LUCKNOW	28-03-17	270300-280300	Nil	--	--	--	--
NAGPUR	28-03-17	270300-280300	Nil	--	--	--	--





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