India Meteorological Department

FDP STORM Bulletin No.24 (29-03-2017)

1. CURRENT SYNOPTIC SITUATION at 0300 UTC of 29-03-2017:

SYNOPTIC FEATURES:

A Western Disturbance as an upper air cyclonic circulation lies over North Pakistan & neighbourhood between 3.1 km and 4.5 k above mean sea level. The western disturbance as a trough in mid-tropospheric westerlies now seen in mid & upper-tropospheric westerlies with its axis at 7.6 km above mean sea level roughly along longitude 50.0°E and north of latitude 30.0°N.

The upper air cyclonic circulation over North Interior Karnataka & neighbourhood between 0.9 km and 1.5 km above mean sea level persists.

The upper air cyclonic circulation over south Chhattisgarh & neighbourhood now lies over south Chhattisgarh & adjoining Odisha at 0.9 km above mean sea level.

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

The north-south trough from Sub-Himalayan West Bengal to north Odisha now runs from Sub-Himalayan West Bengal to northwest Bay of Bengal across Gangetic West Bengal between 2.1 km and 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 northeast J & K in association with western disturbance over the area.

Scattered low/medium clouds were seen over rest J & K, Punjab, north Himachal Pradesh, north Uttarakhand, Bihar, Sub Himalayan West Bengal, Sikkim, rest north-eastern states and Tamilnadu.

Scattered low/medium clouds with embedded moderate to intense convection were seen over east Assam Arunachal Pradesh, Nagaland, Manipur, Tripura adjoing Bangladesh. Scattered Low/Med Clouds With embedded isolated weak to Moderate convection were seen over rest Assam and Madhya Maharashtra, adjoing Karnataka and Bay islands.

Arabian Sea:

No significant clouds over the region.

Bengal & Andaman Sea:

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

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

OLR: Upto 340 wm^{-2} was over Rajasthan, Gujarat, Madhya Pradesh, Maharashtra, North Odisha, North Karnataka, Telangana, Andhra Pradesh;

Upto 310 wm^{-2} was over South Uttar Pradesh, South Bihar, Jharkhand and South Odisha.

Upto 300 wm^{-2} was over Haryana, North Uttar Pradesh, West Bengal, South Karnataka, North Kerala.

Upto 290 wm^{-2} was over North Bihar, South Uttarakhand.

Upto 280 wm^{-2} was over Punjab, South Himachal Pradesh, North Uttarakhand South Kerala, Mizoram.

Up to 230 wm^{-2} was over North East states.

Up to 200 wm^{-2} was over J & K.

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 Central India and Saurashtra. 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.

Negative shear tendency observed over India.

Precipitation:

IMR: Rainfall upto 50mm was observed over North Jammu Kashmir. Rainfall upto 20mm was observed over rest J&K and Tripura. Rainfall upto 10mm was observed over North East States except Tripura.

HEM: Rainfall upto 70mm was observed over W Jammu Kashmir and North East States. Rainfall upto 07mm was observed over Extreme North Coastal Karnataka and South Kerala.

RADAR and RAPID observation:

Strong Convection appears to be in progress over Tripura adjoing Bangladesh in DWR composite at 1700 IST and in RAPID Satellite imagery of 1630hrs IST.

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; which is not seen at 00UTC

From Day-3 onwards weak CYCIR over Sea SE of Srilanka

12UTC charts on all days from Day0-2 show Wind discontinuity at 925 hPa: W-E; Maharashtra, Telangana and Odisha

12UTC charts on all days from Day2-4 show Wind discontinuity at 925 hPa: Maharashtra, MP, Chhattisgarh and Odisha

00UTC charts on Day-1-Day-2 show weak CYCIR over Bihar and WB 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.

3. Convergence at 850 hPa: At 12UTC on all days: Strong low level convergence in land all along the west coast and isolated regions seen over Odisha, Only in Day-1 over parts of Assam/Meghalaya and Mainly in Day-4 over Delhi region and parts of Jharkhand and Bihar.

4. Low level Vorticity:-Positive Vorticity (>15 x 10^{-5}/s): at 12UTC on all days over parts of Assam and Meghalaya.

On Day 0, 1& 2: Strong over northern UP & Bihar parts of WB. In Day-3 and Day-4 near Delhi

At 00UTC: on all days along the line of low level confluence. Northern part of UP associated with weak CYCIR.

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, parts of J & K and in NE over Meghalaya, Tripura and Arunachal.
Day-2to4: Isolated location over coastal Maharashtra, Goa, coastal Karnataka, Kerala and TN. Parts of J&K and in NE over Meghalaya, Tripura and Arunachal and over northern UP in Day-3. Over Odisha in Day-4

6. K-Index :> 35[Very Unstable thunderstorm likely]: Day-0: Isolated location over coastal Maharashtra , Goa, Kerala and J&K. Large parts of NE India
Day-1: Isolated location over coastal Maharashtra, Goa, coastal Karnataka, Kerala and parts of Odisha. Parts of NE India
Day-2to4: Isolated location over coastal Maharashtra, parts of TN. Parts of J&K and in NE over Meghalaya, Tripura and Arunachal. over northern UP in Day-3. Over Odisha in Day-4

7. Spatial distribution of TTI: TTI >50 [Scattered Thunderstorms few severe]: Along the coast of Maharashtra and Karnataka in Day-0 to Day-2. Parts of J & K region in Day-2 to Day-4. From Day-2 to Day-4: extending along the line of low level convergence over Maharashtra, MP, Chhattisgarh, Odisha, Bihar and Jharkhand. In Day-3 and Day-4: over parts of northern UP.

8. Rainfall and thunder storm activity:
Day-1: (>4cm/day): 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 analyses shows CYCIR over Bihar and adjoining area, trough extended from this system to costal Odisha through WB which persist during 3 to 4 days and CYSIR also shows over north Karnataka and adjoining area.

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): Mainly along foothill of Himalaya and over east UP, GWB and Odisha during next 4 to 5 days. The Maharashtra region also witnessed vorticity maximum during day 3 to 4 days.
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 isolated place of J & K also show > 400K index value 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 3 to day 5.
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, Jharkhand and Goa & Konkan from Day-1 to Day-5 and Maximum CIN value over Gujarat region during next day 3 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)** dBZ exceeding the threshold value is seen over J & K region in morning 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 value 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 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 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.
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 upper air cyclonic circulation lies over northern parts of West Bengal & neighbourhood and extends upto 1.5 km above mean sea level which may result in Thundersquall and hail activities over Sub Himalayan West Bengal and Sikkim area on Day-1. Due to the system, the area of North Bihar and North GWB may also experience the Thundersquall and hail activities on Day-1. The north-south trough from Sub-Himalayan West Bengal to north Odisha now runs from Sub-Himalayan West Bengal to northwest Bay of Bengal across Gangetic West Bengal between 2.1 km and 3.1 km above mean sea level. However, based on the Model outputs from ECMWF, IMD1534, NCEP Global and Satellite imageries, the Assam, Meghalaya and NMMT will experience rainfall and thunderstorm with squall and hail activities for Day-1 and Day-2.

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

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
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http://www.amsskolkata.gov.in/
ForRAPIDtool:
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Past24hourHEMandIMRrainfall(upto03UTCoftoday)
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Satellite sounder based T-Phi gram
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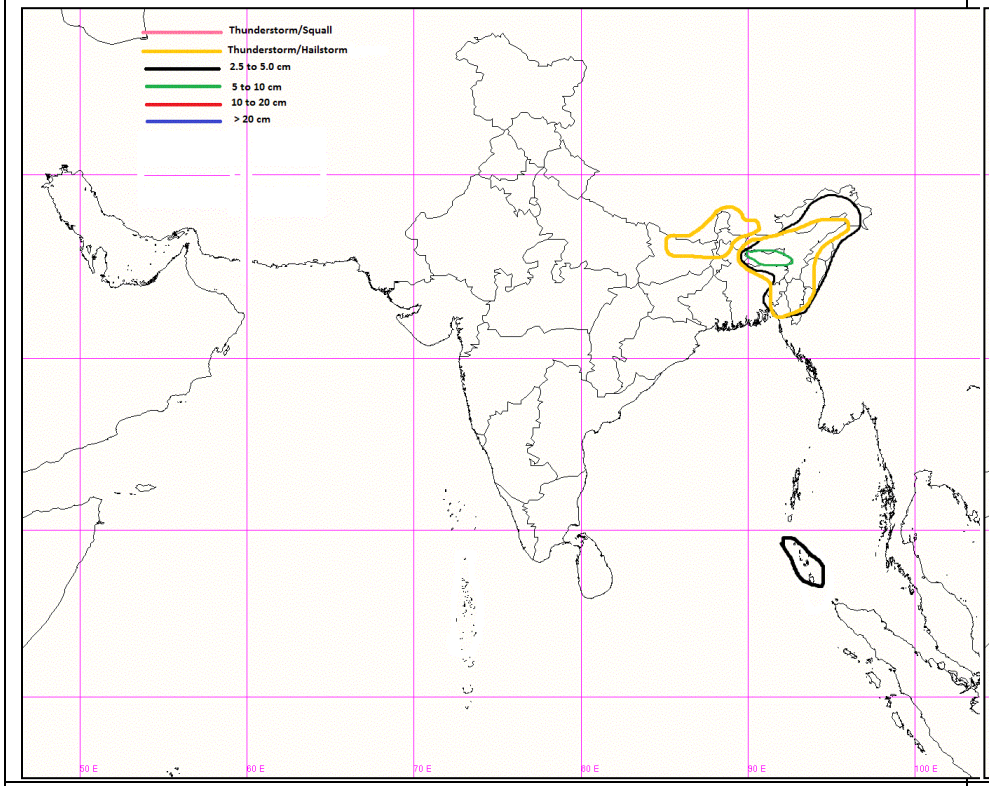
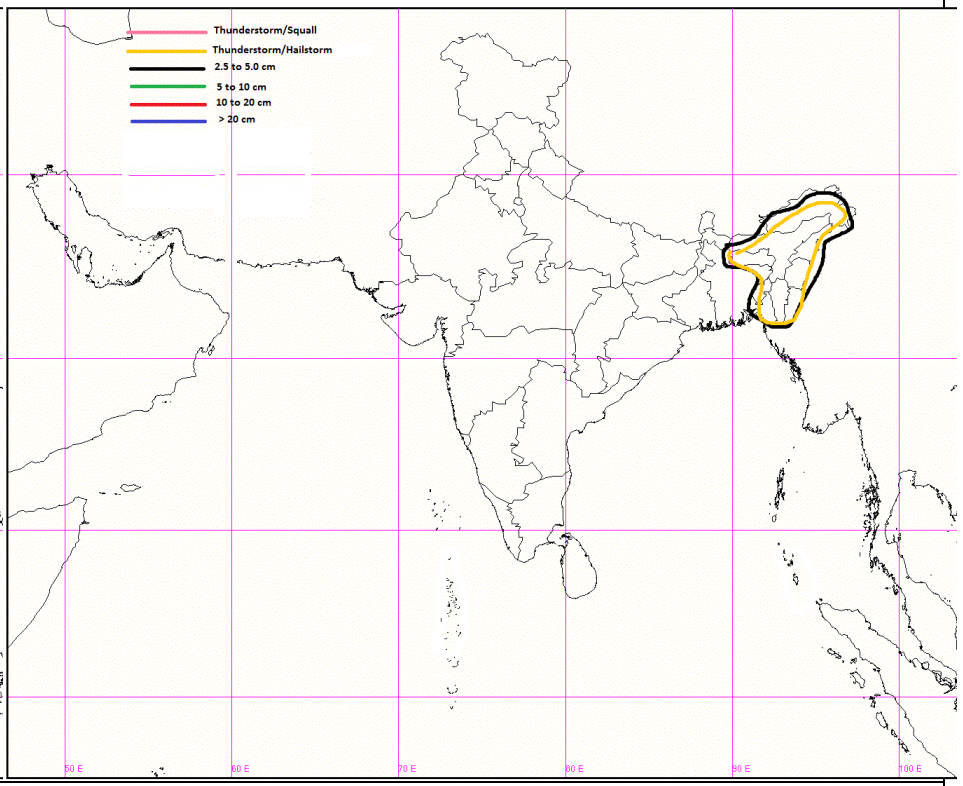
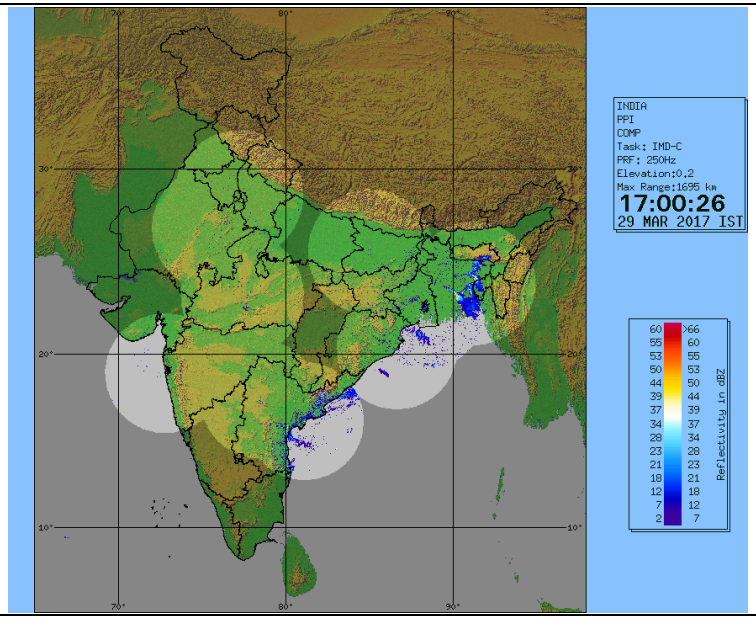
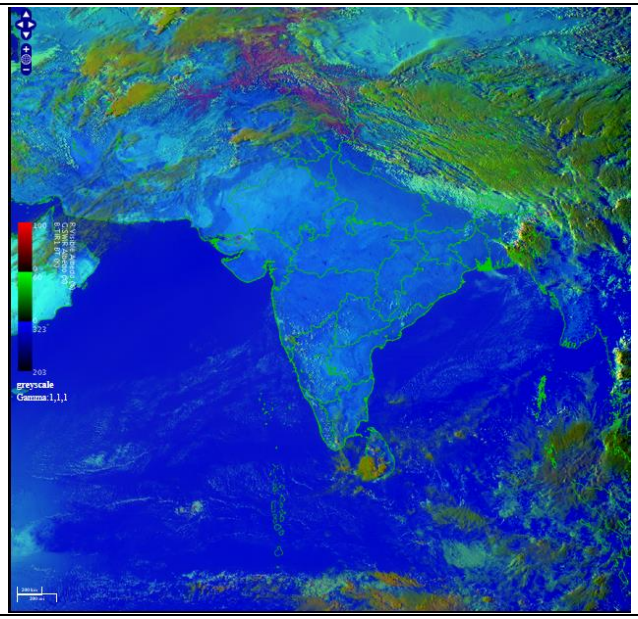
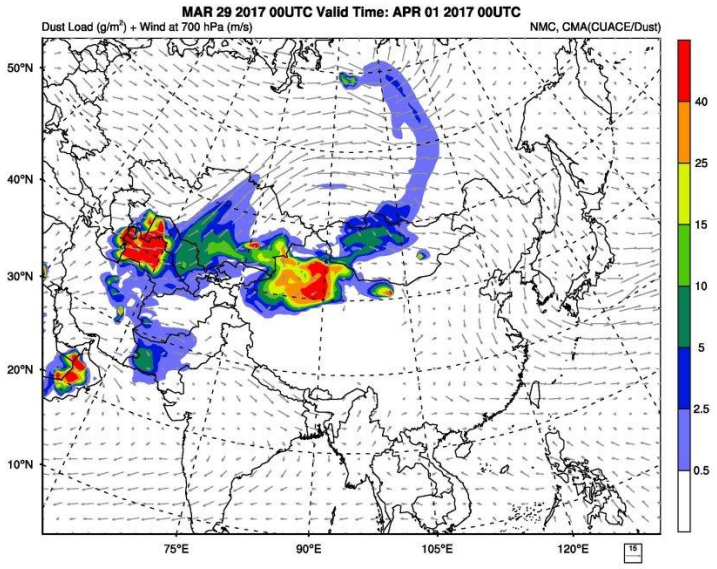


IOP Advisory for 24 hours

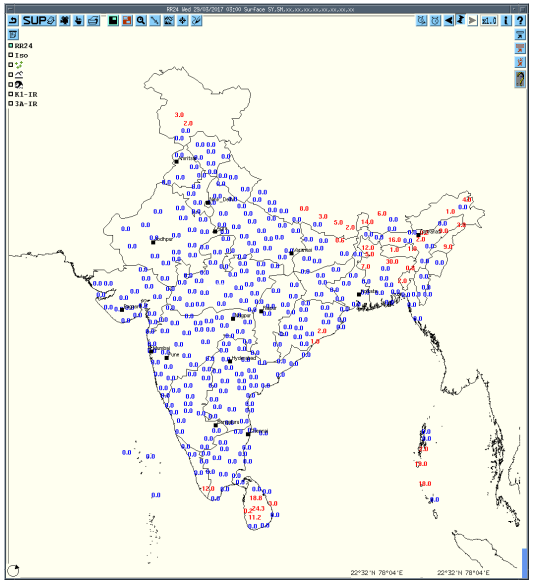


IOP Advisory for 48 hours

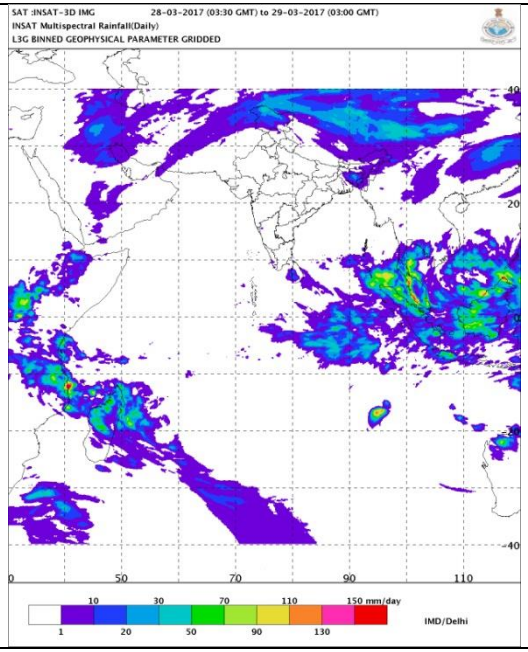
	
DWR Composite at hrs 1700 IST	**RGB Image of INSAT 3D at 1630 hrs IST**



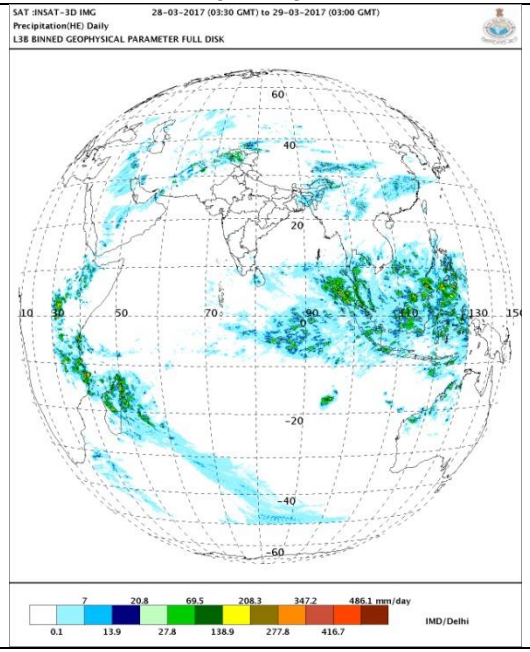
Forecast Dust Concentration at 00 UTC of 01 April



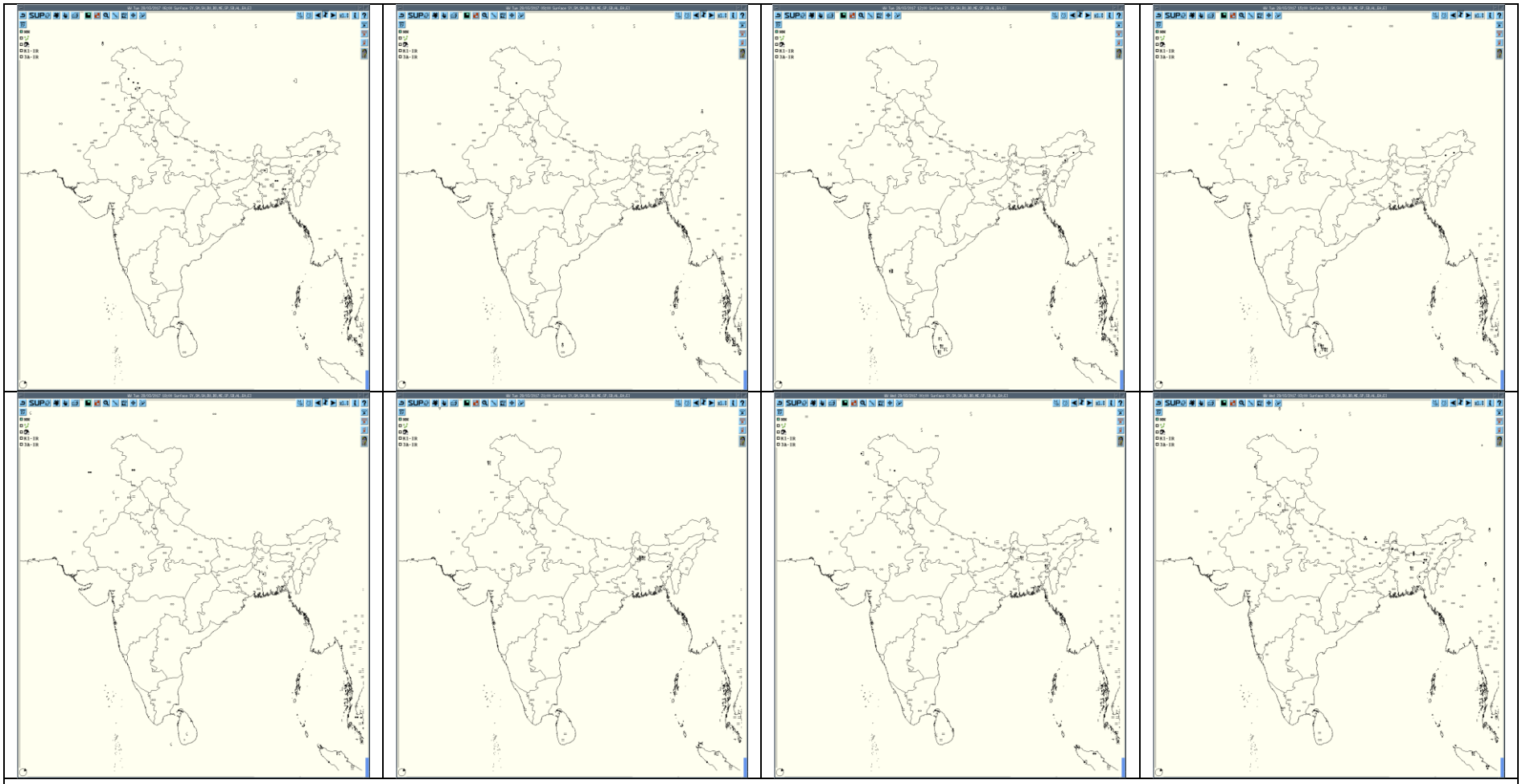
Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today



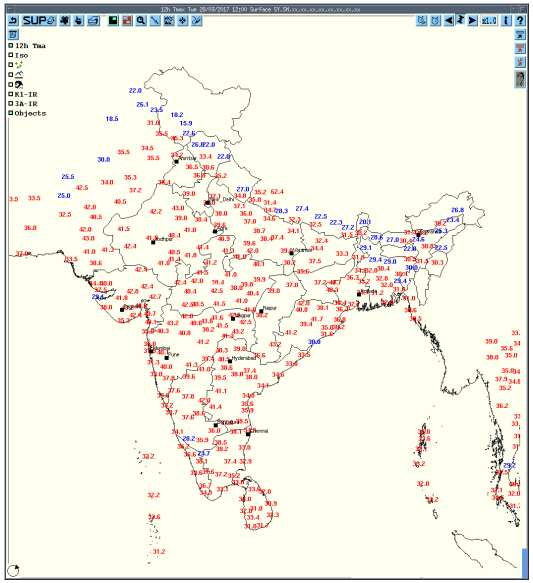
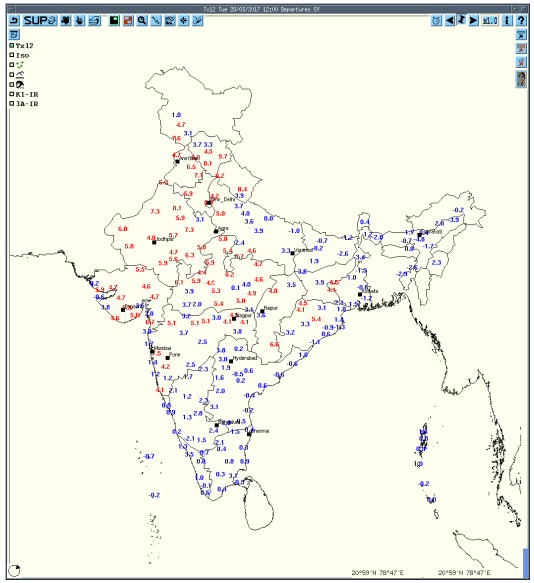
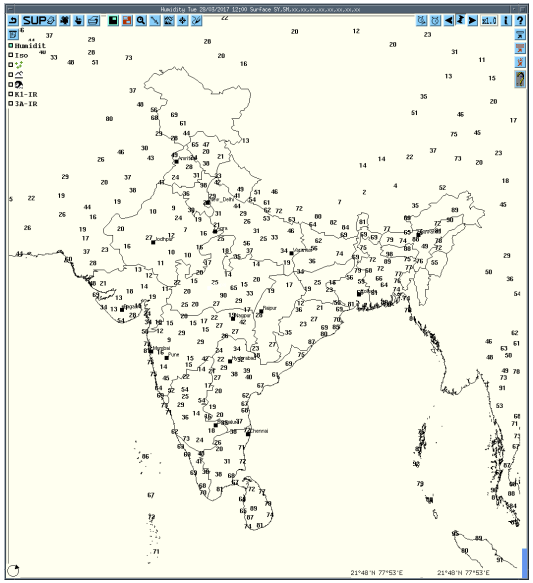
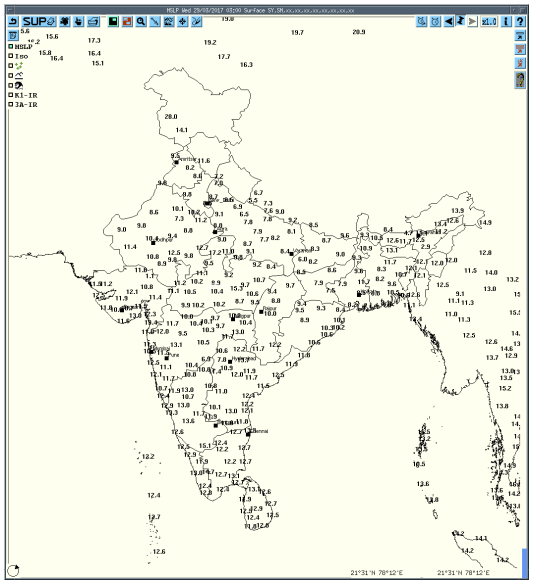
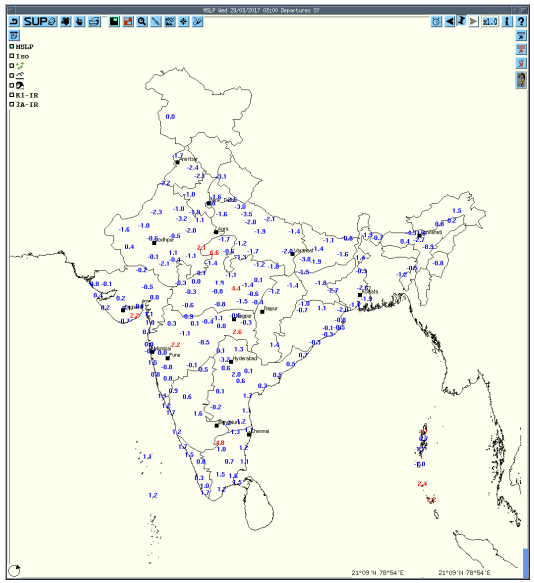
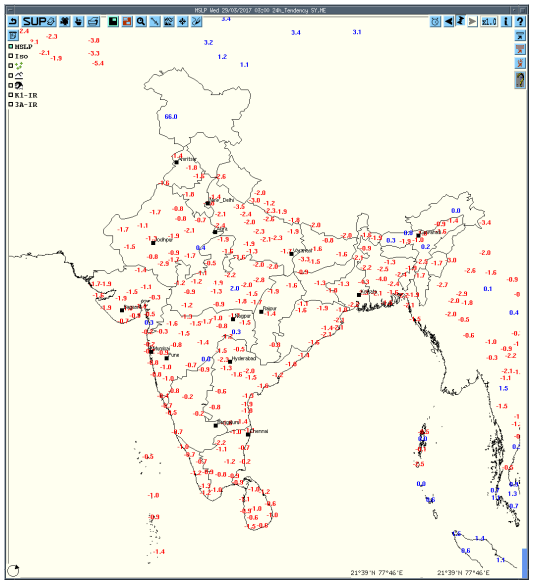
IMR Rainfall



HEM Rainfall



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

		
Tmax	**Departure Tmax**	**Tendency Tmax**
		
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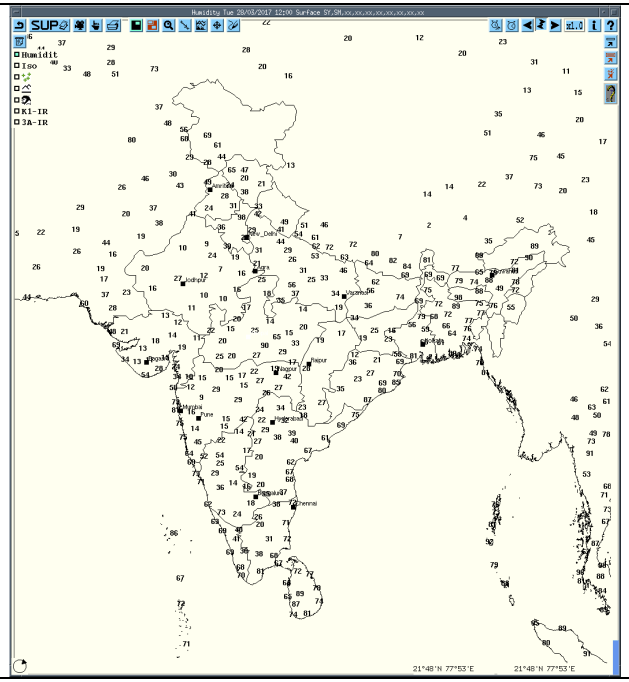
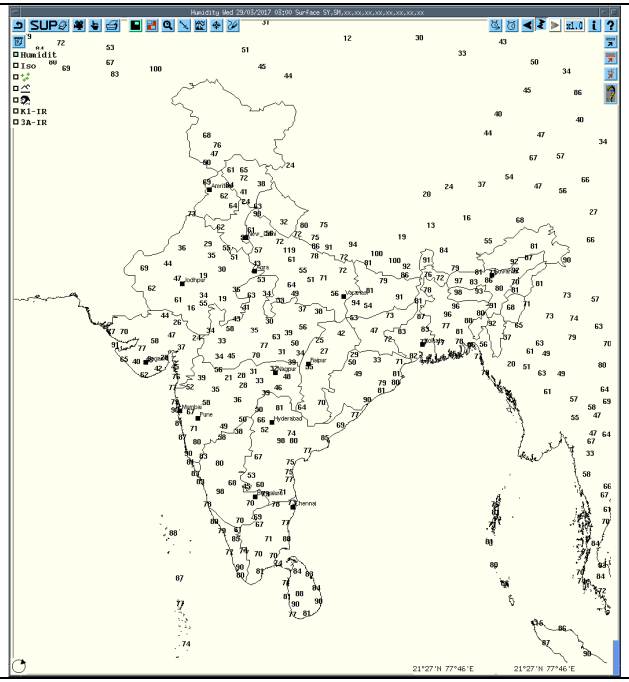
	
RH at 12UTC yesterday	**RH at 03UTC today**

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	Shillong	Northeast India	Meghalaya	Thunderstorm
		Dibrugarh	Northeast India	Assam	Thunderstorm
26-03-2017	0900UTC	Nil	Nil	Nil	Nil
26-03-2017	1200UTC	Dharwad	South India	Karnataka	Thunderstorm
		Trivandrum	South India	Kerala	Thunderstorm
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	Nil	Nil	Nil	Nil
27-03-2017	0300UTC	Nil	Nil	Nil	Nil

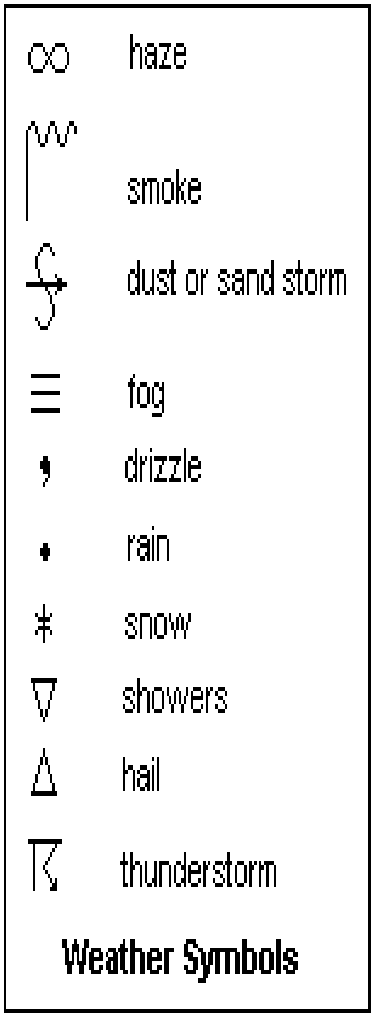
Name of Station Reporting	Sub-Division	STATE	Event	Date	Time of Commencement (IST)	Time of End (IST)
Jorhat	Northeast India	Assam	TS	28-03-17	28/1920	28/2400
Jorhat	Northeast India	Assam	TSRA	29-03-17	29/0000	29/0100
Dibrugarh	Northeast India	Assam	TSRA	28-03-17	28/1055	28/1320
Barapani	Northeast India	Meghalaya	TS	28-03-17	28/1105 28/1201 28/1315	28//1115 28/1240 28/1350
Cherrapunjee	Northeast India	Meghalaya	TSRA	29-03-17	29/0632	29/0710
Shillong	Northeast India	Meghalaya	TS	28-03-17	28/1105	28/1131
CIAL Kochi	South India	Kerala	TSRA	28-03-17	1030	1100
Karipur A P	South India	Kerala	TS	28-03-17	1500	1710
Thiruvananthapuram AP	South India	Kerala	TSRA	28-03-17	1717	1845
Thiruvananthapuram City	South India	Kerala	TSRA	28-03-17	1635	1750

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	28-03-17	0301-0711	NIL	NIL	NO ECHO	NIL	NIL
	28-03-17	1751-1851 UTC	Isolated cell AT 88.417 E/ 24.044 N with average height 8.8 km and 59.5 dBz reflectivity.	ESE	Dissipating Tendency	NIL	NIL
	29/03/17	0000-0300	NIL	NIL	NO ECHO	NIL	NIL
DWR Paradeep	29/03/17	0410-2200 UTC	Isolated cells with average height of 7 km with maximum reflectivity of 40 dBZ	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
DWR Mohanbari	28/03/17	0432-0632 UTC	Cell type- Multiple Avg. ht.- 8.2 Km MAX_Z:- 49.5 dbZ	Distance- 25.5 Km Direction- S Movement- NEly	The system after passing the station moves NE'ly at a speed of about 50km/hr	-TSRA at Mohanbari	Dibrugarh Tinsukia
	29/03/17	0452-0552 UTC	Cell type- Isolated Avg. ht.- 4.7 Km MAX_Z:- 44.5 dbZ	Distance- 40 Km Direction- E & NE Movement- NEly	Cells are forming & moving away towards NE direction from the Station	NIL	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
DWR Agartala	28/03/17	280300 UTC - 280630 UTC	Single Cell with Maximum Meight **14 km** and maximum reflectivity **42 dBZ**	NNW (250 KM) at 1920 UTC of 27.03.17 from DWR Agartala moving SE-wards at around 30 kmph	Cell died at 0630 UTC of 28.03.17 over Tripura without giving any significant weather	NIL	NIL
	28/03/17	280510 UTC – 280830 UTC	Single Cell with Maximum Meight of **14 km** and maximum reflectivity **45 dBZ**	NNE (250 KM) from DWR Agartala moving E-wards at around 15 kmph	Cell died at 0830 UTC of 28.03.17 over Meghalaya and Assam	NIL	N/A
	29/03/17	281820 UTC – 290300 UTC	Multiple Cells with Maximum Height **13 Km** and maximum reflectivity **41 dBZ**	NW (200 KM) at from DWR Agartala moving SE-wards at around 20 kmph	At 0300 UTC of 28.03.17, cells persist over Tripura with maximum reflectivity decreased to less than 40 dBZ	NIL	NIL
DWR Patna	29/03/17	280300 - 280302	NIL	NIL	NIL	NIL	NIL
		280302 - 280649	-	-	RADAR U/S	-	-
		280649 - 290300	NIL	NIL	NIL	NIL	NIL
LUCKNOW	29-03-17	280300-290300	Nil	--	--	--	--
NAGPUR	29-03-17	280300-290300	Nil	--	--	--	--



Weather Symbols