



India Meteorological Department
FDP STORM Bulletin No. 04 (09-03-2017)

S. No.	STORM area of interest (All India)	
1.	CURRENT SYNOPTIC SITUATION at 03 UTC of 09-03-2017	<p>SYNOPTIC FEATURES:</p> <p>The Western Disturbance as an upper air cyclonic circulation over north Pakistan & adjoining Jammu & Kashmir now lies over north Jammu & Kashmir and neighbourhood and extends upto 3.1 km above mean sea level. The induced upper air cyclonic circulation over Haryana and adjoining areas of northeast Rajasthan now lies over Haryana and neighbourhood and extends upto 1.5 km above mean sea level.</p> <p>The trough in mid-tropospheric westerlies roughly along Longitude 65.0° E and north of Latitude 32.0° N now runs roughly along longitude 70.0° E and north of latitude 30.0° N.</p> <p>Another Western Disturbance as an upper air cyclonic circulation over western parts of Afghanistan & adjoining Iran now lies over southwest Afghanistan and adjoining Pakistan and extends upto 3.1 km above mean sea level.</p> <p>An upper air cyclonic circulation lies over north Chhattisgarh and neighbourhood and extends upto 0.9 km above mean sea level.</p> <p>The upper air cyclonic circulation over Bangladesh and neighbourhood now lies over Assam & neighbourhood and extends upto 1.5 km above mean sea level.</p> <p>The upper air cyclonic circulation over North Interior Karnataka & neighbourhood now lies over Telangana and neighbourhood and extends upto 0.9 km above mean sea level.</p> <p>SATELLITE OBSERVATIONS during past 24 hrs and current observation (Based on 0300 UTC Imagery of INSAT -3D):</p> <p>Clouds (based on 0300 UTC imagery):</p> <p>Scattered low/medium layered clouds over J & K, Himachal Pradesh, East Punjab, adjoining Haryana and Uttarakhand in association with western disturbance over the area.</p> <p>Scattered low/med clouds over East Uttar Pradesh, northwest Rajasthan, Madhya Pradesh, Odisha, Bihar, East Jharkhand, Gangetic west Bengal, Meghalaya, extreme west & east Assam, Sikkim, north eastern states and south coastal Tamilnadu,</p> <p>Arabian Sea:</p> <p>Isolated low/medium clouds with embedded moderate to intense convection over southeast Arabian Sea.</p> <p>Bay of Bengal & Andaman Sea:</p> <p>Scattered low/medium clouds over north Bay and south Andaman Sea.</p> <p>Low Level Circulation/Vortex:- Strong convection (CTT reaching up to 210° K in some places) over the northern states of J & K, HP, UTRKND, Punjab and parts of Haryana, N Rajasthan, NW and Southern UP was observed. OLR less than 200 wm^{-2} was observed over J & K, HP, Uttarakhand for last 24 hrs.</p> <p>Moderate convection was observed over the states of Arunachal Pradesh, NMMT and WB with CTT < 240° K at some places. OLR within 210 - 240 wm^{-2} was observed over this region for last 24 hrs.</p> <p>Strong convection with CTT reaching less than 220° K was observed over isolated places in Odisha, Andhra Pradesh,</p>

Tamilnadu, Kerala and South of Lakshadweep

Trough at middle level based on WV imagery and upper level winds:-

Trough in westerly in upper levels runs along longitude 70°E to the north of 30°N. It has moved towards east by about 2° in last 24 hours.

An anti-cyclonic circulation is observed over B Of Bengal causing advection of moisture in the states of Chhattisgarh, Northern Orissa and WB resulting in the clouding over the region. Widespread convection over Kerala was observed.

Jet stream has become less marked over India and currently lies along 21 N from 88° E to 90° E in the head Bay.

Dynamic Features: A positive vorticity field is seen over most of the country and coastal region with maximum over UP - Bihar. Area of positive convergence lies over the Punjab – Haryana and in the Jharkhand - WB. A strong wind shear is present over entire northern part of country (North of 25 N). Positive shear tendency is observed over Gujarat region and negative shear tendency was observed over East MP, Chhattisgarh, Odisha, and WB. Higher water vapour content over isolated places in WB and TN suggests possible development of the convection associated with thunderstorm over this region.

TPWV Distribution: Rainfall: IMR: Up to 50 mm of rainfall was obtained over the states of J & K, Kerala and up to 20mm of rainfall was obtained over Himachal Pradesh and Uttarakhand and up to 10 mm of rainfall was obtained over North Punjab Arunachal Pradesh, Nagaland, Manipur, North Mizoram, Tripura and Coastal Andhra Pradesh.

HEM: Up to 14 mm of rainfall was obtained over the states of J&K, Kerala, Coastal Andhra Pradesh, Tamil Nadu and up to 7mm of rainfall was obtained over Himachal Pradesh Punjab Uttarakhand West Bengal East Jharkhand Odisha Assam Nagaland, Manipur, Mizoram Tripura

RADAR observation during past 24 hrs and current observation based on 0600 UTC

Convection appears to be in progress over Punjab, West Bengal, Bihar and coastal Odisha with reflectivity more than 30 dBz.

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

No significant dust concentration observed over Arabian Peninsula and west Rajasthan. No significant change in dust concentration expected.

2.	NWP MODEL GUIDANCE	<p>NCMRWF (NCUM Forecasts based on 00 UTC of 9th Mar 2017):</p> <p>1. Weather Systems: Weak CYCIR (850hPa) over NW India in Day-0 to Day-1 forecasts. Feeble trough in forecasts Day-0 to Day-2 and again Day-3 to Day-5 at MSLP over J&K.</p> <p>NS Trough over central India-peninsula in 00UTC Day0 to Day2. Wind discontinuity at 925 and 850 hPa extends from parts of AP, Maharashtra, Odisha, Chhattisgarh and parts of Bihar Day-0 to Day-2. WD W of J&K in Day-1 to Day-2</p> <p>2. Location of jet and jet core at 500 hPa:- 500hPa Jet core (>60kt) Over most parts of NE on all Days up to Day-3, Over Rajasthan, Gujarat and MP in Day0 to Day-3, extending to large parts of central India in Day2 and 3</p> <p>3. Convergence at 850 hPa: Weak noisy low level convergence at several places over India</p> <p>4. Low level Vorticity:- Positive Vorticity (>15 x 10⁻⁵/s) over parts of UP and MP in Day-1, isolated locations over NE on all days. Over different parts along the NS trough in the 00UTC</p> <p>5. Showalter Index: -3 to -4[Very Unstable]:- Day-0: Mainly the TN and AP and parts of NW India Day-1: TN,AP Odisha, WB, Bangladesh and adjoining Indian states; in N India parts of Delhi and neighbourhood. Day-2: Bihar, WB, Bangladesh and adjoining Indian states; in N India parts of Delhi and neighbourhood. Day-3-4: Parts of TN and in NE isolated places.</p> <p>6. K-Index: >35 [Very Unstable thunderstorm likely]:- Day-0: Mainly the TN and AP and parts of NW India Day-1: TN,AP Odisha, WB, Bangladesh and adjoining Indian states; in N India parts of Delhi and neighbourhood. Day-2: Bihar, WB, Bangladesh and adjoining Indian states; in N India parts of Delhi and neighbourhood. Day-3-4: Parts of TN and in NE isolated places.</p> <p>7. TTI:- TTI >50 [Scattered Numerous Thunderstorms] : Large parts of North and NW India in Day-0 to Day-2. Spreading SE wards in day-1 and Day-1.</p> <p>8. Rainfall and thunderstorm activity:- Day-1: (2-4cm/day)Parts of Punjab, HP, J & K Arunachal and some places in Kerala. Day-2-4: JK, HP Uttarakhand, parts of AP (2-4cm), Arunachal, Tripura-Mizoram (>2cm/day) Day-3: Rainfall > 16cm/day Meghalaya-Bangladesh region.</p> <p>.</p> <p>IMD GFS(T1534) based on 00UTC of 9th March, 2017:</p> <p>1. Weather systems:- The CYCIR at 850 hPa over Panjab and adjoining areas persists and a trough extends from this system to north-eastern states during Day-1 to Day-2 forecasts. A feeble trough extends from east UP to Tamilnadu during Day-1 to Day-2 forecasts. Anticyclonic flow over Bay of Bengal and Arabian Sea persists during next 3 days. Contour at 500 hPa shows approaching of a WD over the northern parts of the India during Day-1 to Day-2 forecasts.</p> <p>2. Location of jet and jet core at 500 hPa:- 500hPa Jet core (>60kt): A Jet at 500 hPa would establish over India along around 25 deg. N latitude during next 3 days</p> <p>3. Spatial distribution of Low level Vorticity:- 850hPa Positive Vorticity (>12 x 10⁻¹/s): Over NW India and along the trough at 850 hPa from Day-1 to Day-2 and along foot hill of Himalaya during Day-3 to Day-5.</p>
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4. Spatial distribution of T-storm Initiation Index, Lifted Index, Total Total Index, CAPE, SIN and Sweat Index(High potential for thunderstorm):- [High potential for thunderstorm]:-

T-Storm Initiation Index (> 4): Less than the threshold value all over the country during next 5 days.

Lifted Index (< -2): Less than threshold value along east coast from Gangetic West Bengal to south peninsula during next 2 days, over the Gangetic plain during 06-12 UTC of 11.03.2017.

Total Total Index (> 50) : Above threshold value over Maharashtra, Gujarat and adjoining south Rajasthan at 12 UTC of 12.03.2017 and over the most parts of central India at 12 UTC of 13.03.2017.

Sweat Index (> 300): Mostly along east coast, Gangetic West Bengal, northwest India and over the Gangetic plain during next 3 days.

CAPE (> 1000): Mostly along east coast during next 3 days and over Andhra Pradesh and Tamilnadu coast during Day-4 to Day-5.

CIN (50-150): Over Andhra Pradesh, Telengana, Odisha, Gangetic West Bengal during next 2 days, along east coast from Day-3 to Day-5 and over the Gangetic plain during next 3 days.

5. Rainfall activity: - 10-40 mm rainfall over extreme south peninsula during next 3 days, over J&K, HP during next 2 days, over Delhi and east UP on Day-2 and over NE states on Day-4, 20-130 mm over NE states from Day-2 to Day-3.

IMD WRF(9km) (based on 00UTC of 9th March):

1. Weather Systems: The CYCIR at 850 hPa over Panjab and adjoining areas persists and a trough extends from this system to south peninsula through central parts of India on Day-1. The trough extends from this system to north-eastern states on Day-2 forecasts. A feeble trough extends from east UP to Tamilnadu on Day-2 forecasts. Anticyclonic flow over Bay of Bengal and Arabian Sea persists during next 3 days. Contour at 500 hPa shows approaching of a WD over the northern parts of the India during Day-1 to Day-3 forecasts.

2. Location of jet and jet core at 500 hPa:- 500hPa Jet core (>60kt): A Jet at 500 hPa would establish over India along around 25 deg. N latitude from Day-1 to Day-3

3. Spatial distribution of Low level Vorticity- 850hPa Positive Vorticity (>12 x 10⁻¹/s): 850hPa Positive Vorticity (>12 x 10⁻¹/s): Over the most parts of India at 850 hPa during next 3 days.

4. Model reflectivity (Max dBZ): 5-10 dBz over isolated parts of south peninsula, Gujarat region and eastern parts of India during next 3 days. 20-30 dBz over parts of Uttarakhand, UP and Bihar during next 2 days and NE states during next 3 days

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

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

K-Index (> 35): Less than threshold value over the India during next 3 days.

CAPE (> 1000): Mostly over south peninsula, Tamilnadu, AP, Telengana and NW India during next 24 hours and along Tamilnadu, AP and Odisha coast on Day-2 & Day-3.

CIN (50-150): More than -200 over most parts of the India during next 3 days.

5. Rainfall activity:- 20-70 mm over Gangetic West Bengal and adjoining Odisha during next 3 days.

20-40 mm over J&K, Panjab on Day-1 & Day-2, over Delhi & Haryana on Day-2, over UP, Bihar on Day-3 and over extreme

south peninsula on Day-1 & Day-2.

ECMWF (based on 0000 UTC of 9th March):

Mean sea level:

No significant systems over Indian region till 13th March 2017.

Lower Level Winds (925 hpa & 850 hpa)

An induced upper air cyclonic circulation is seen over central Pakistan and adjoining Punjab on 9th; seen over Punjab and adjoining northwest Rajasthan on 10th and seen over northeast Rajasthan and adjoining Haryana and northwest Madhya Pradesh on 11th; seen over west Uttar Pradesh and adjoining Haryana on 12th and become less marked thereafter.

An upper air cyclonic circulation is seen over Telangana and neighbourhood on 9th March and become less marked thereafter. Another upper air cyclonic circulation is seen over Jarkhand and neighbourhood on 9th March.

Western Disturbance (700 hpa & 500 hpa)

A western disturbance as an upper cyclonic circulation seen over Afghanistan and neighbourhood on 9th March; seen over north Pakistan and neighbourhood on 10th; over north Pakistan and adjoining Jammu & Kashmir on 11th and become less marked thereafter.

3.	IOP ADVISORY FOR 24 Hrs	<p>Summary and Conclusions:</p> <p>Synopsis based on synoptic conditions, NWP models and satellite imageries areas follow:</p> <p>Day1 & Day2:</p> <p>The wind field in the analysis charts indicates that the south-westerly wind flow into the induced cyclonic circulation over Haryana and neighbourhood is above 700 hPa. This south westerly wind flow is likely to intensify on day 2 (according to IMD GFS) as the induced cyclonic circulation moves eastwards, but will not descend to lower levels. Hence the main rainfall zone will be confined to Jammu and Kashmir, Himachal Pradesh today and will be likely to increase and additionally affect North Punjab and Uttarakhand regions.</p> <p>The wind field in the analysis charts indicates that a trough line extends from the cyclonic circulation over North Chhattisgarh to the cyclonic circulation over Assam and neighbourhood. According to IMD GFS model, the eastward movement of the trough is likely increase the south westerly wind convergence over the east and north east Indian regions resulting in increased thunderstorm activity over the region on day 2 with respect to day 1.</p> <p>24 hour Advisory for IOP</p> <ul style="list-style-type: none"> • Jammu and Kashmir ,Himachal Pradesh • Uttarakhand, Punjab, Haryana, East Rajasthan, West Uttar Pradesh, • Assam, Arunachal Pradesh • North Coastal Orissa, South Gangetic West Bengal, Coastal Andhra Pradesh, Telangana, South Interior Tamil Nadu and South Kerala <p>48 hour Advisory for IOP</p> <ul style="list-style-type: none"> • Jammu and Kashmir ,Himachal Pradesh, Uttarakhand • Punjab, Haryana, East Rajasthan, Uttar Pradesh, Bihar, Jharkhand, Sub Himalayan West Bengal, Gangetic West Bengal, Assam, Meghalaya, Mizoram, Tripura, Coastal Orissa, Coastal Andhra Pradesh, Kerala, Interior Tamil Nadu
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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 RAPID tool:

<http://rapid.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

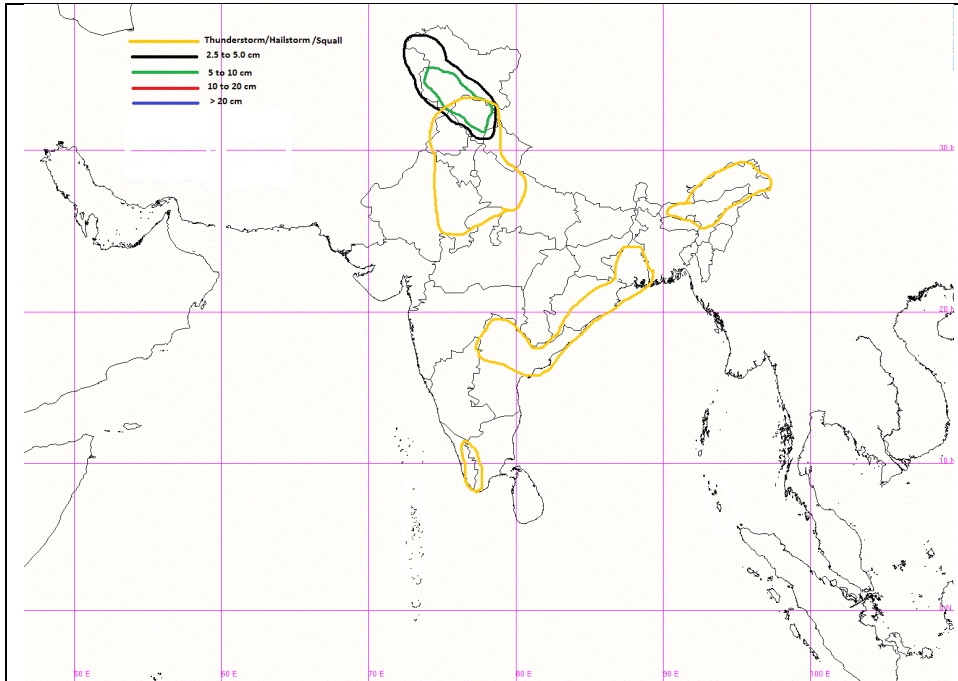
Past 24 hour HEM and IMR rainfall (upto 03 UTC of today)

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

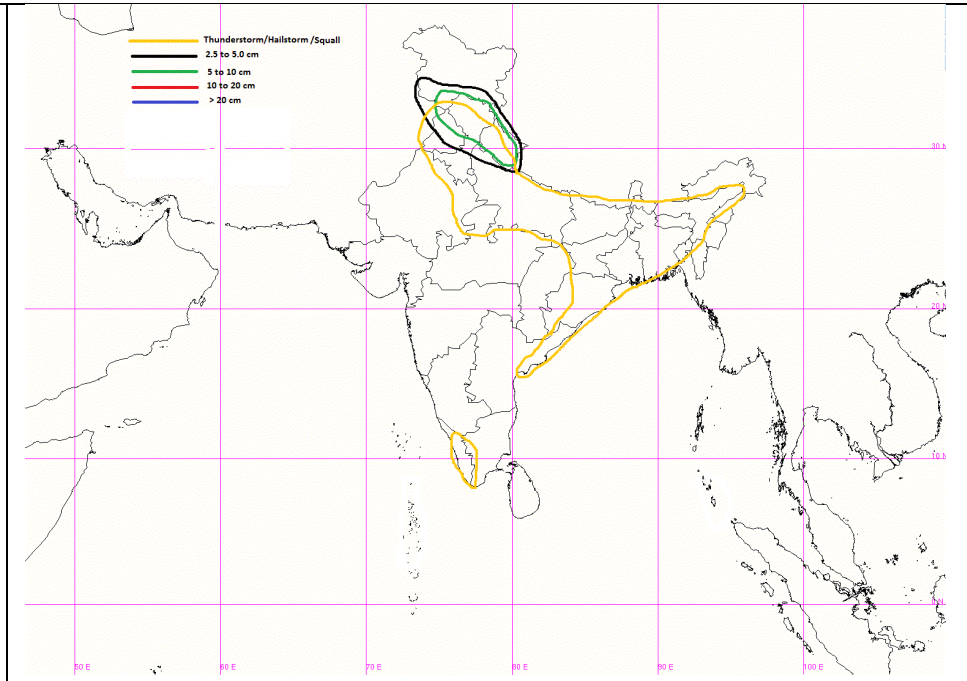
HEM: http://satellite.imd.gov.in/img/3Ddaily_he.jpg

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

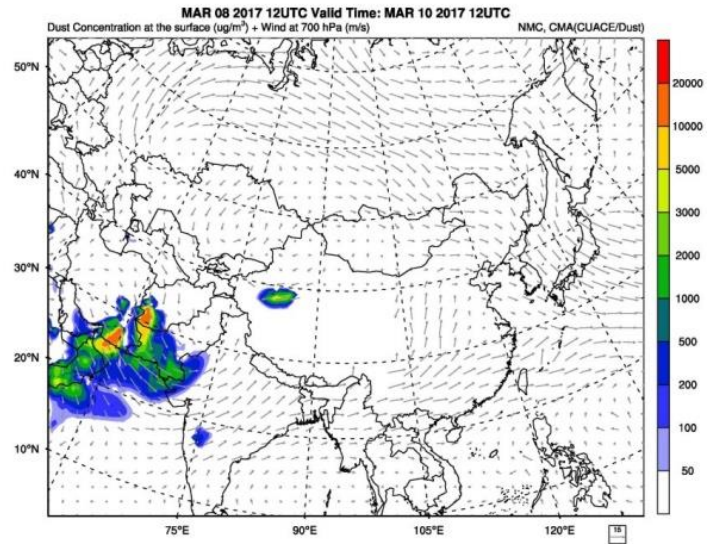
http://ddgmui.imd.gov.in/dwr_img/



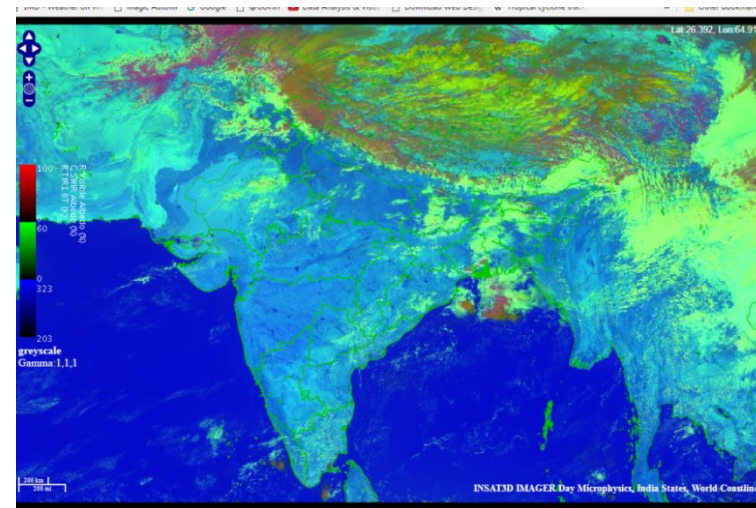
IOP Advisory for 24 hours



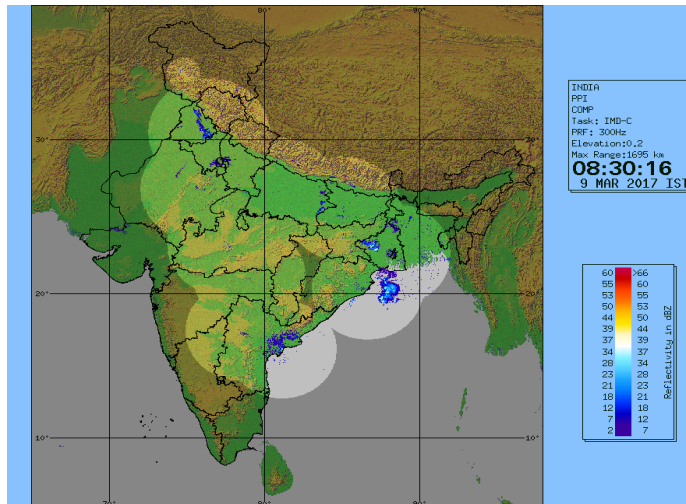
IOP Advisory for 48 hours



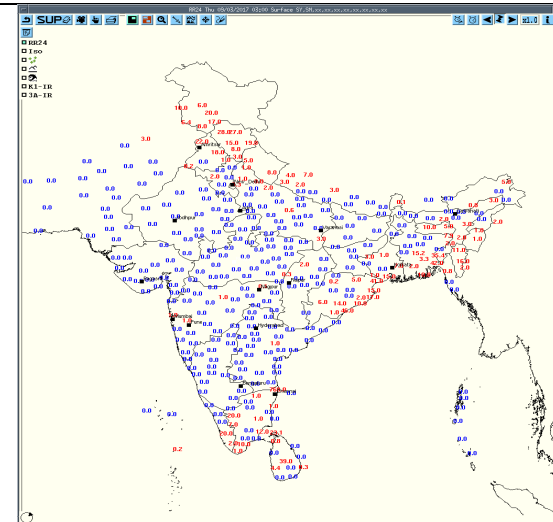
Forecast Dust Concentration for 12UTC of 10th March



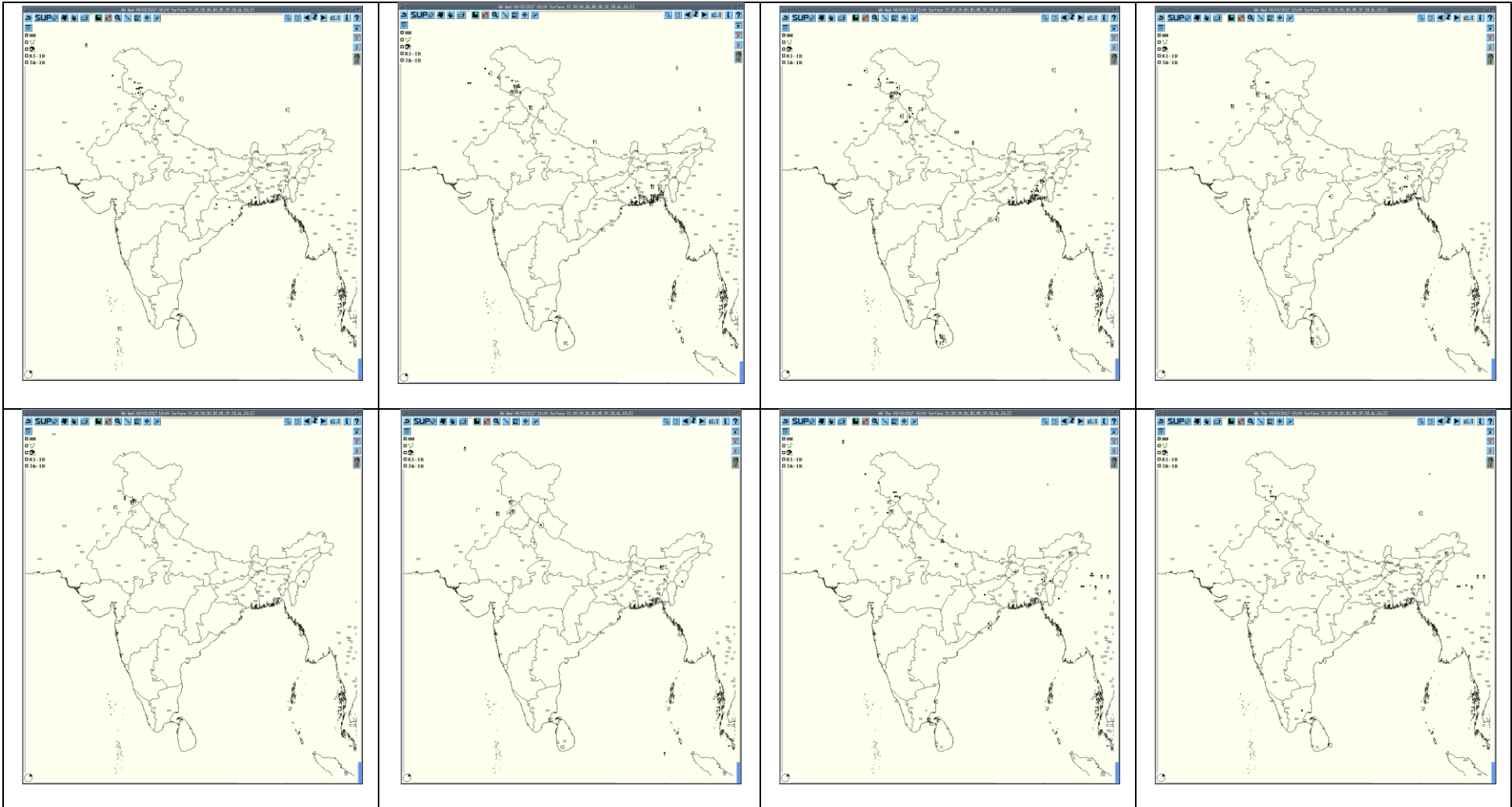
RGB Image of INSAT 3D at 0600UTC



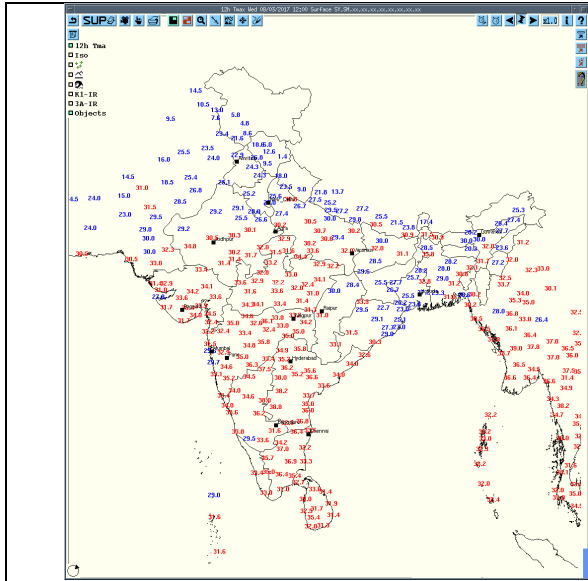
DWR Composite at 1050 IST of today



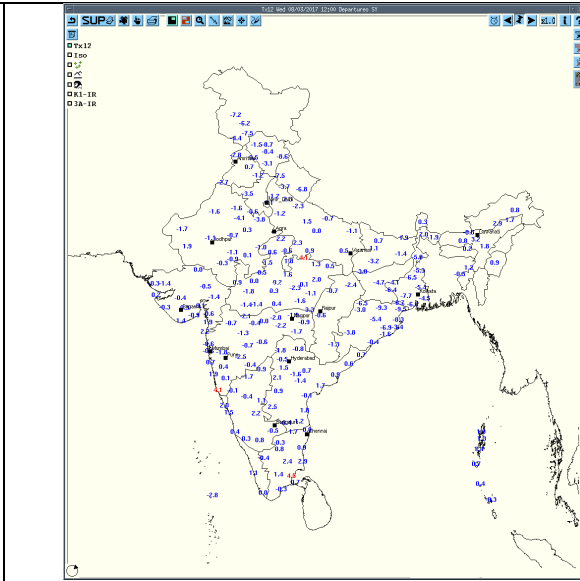
Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today



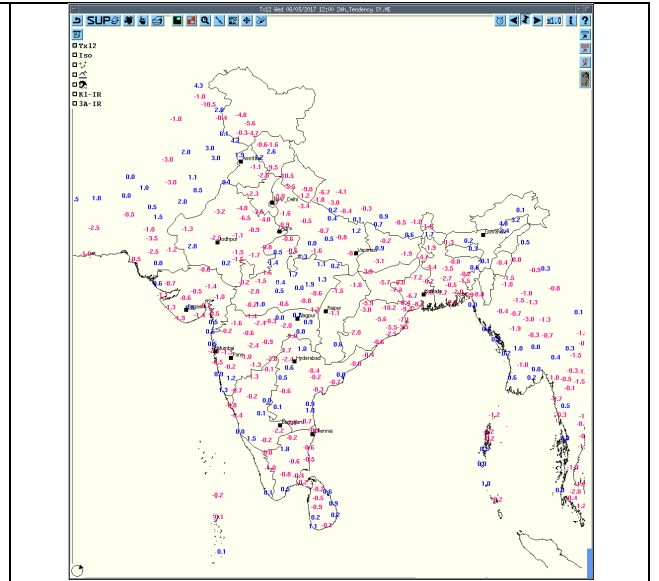
3 hourly Past weather at 06, 09, 12, 15, 18, 06 UTC of yesterday and 00 & 03 hrs UTC of today



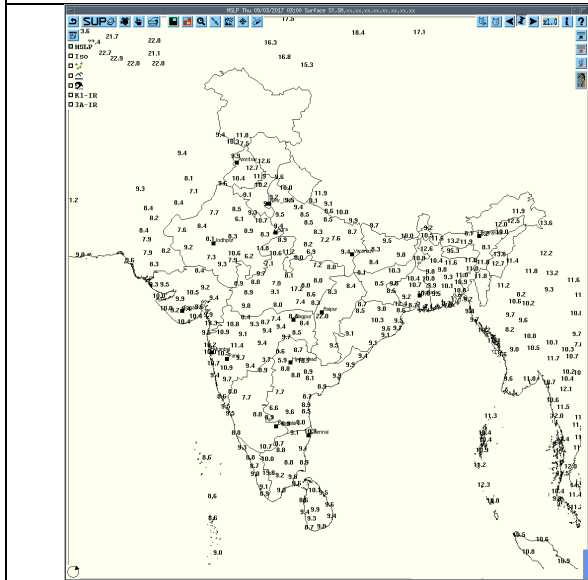
Tmax



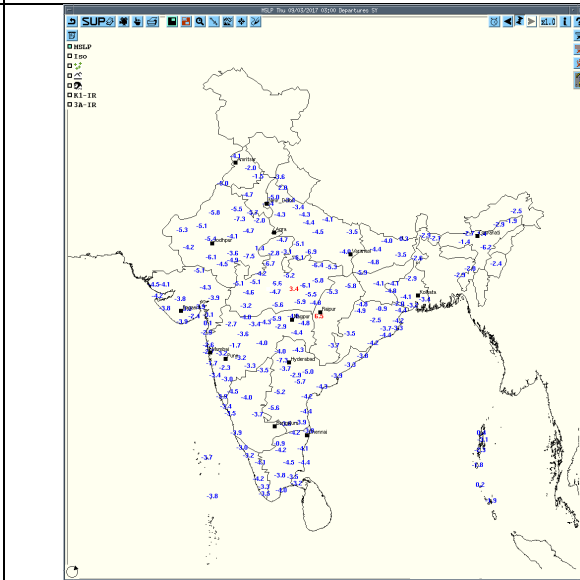
Departure Tmax



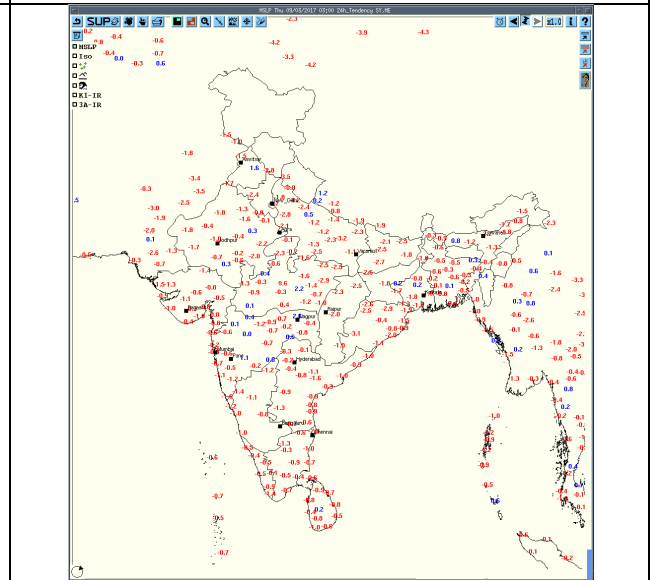
Tendency Tmax



MSLP



Departure MSLP






















Tendency MSLP

Realizedweatherpast24hours

Date	TimeofReporting	Name of Station Reporting	Region	STATE	WeatherEvent
08-03-17	0600 UTC	Dhubri	NE India	Assam	Suspended dust
08-03-17	0900 UTC	Banihal	NW India	Jammu & Kashmir	Thunderstorm
		Katra	NW India	Jammu & Kashmir	Thunderstorm
		Sunder Nagar	NW India	Himachal Pradesh	Thunderstorm
		Gopalpur	East India	Odisha	Thunderstorm
08-03-17	1200 UTC	Batote	NW India	Jammu & Kashmir	Thunderstorm
		Katra	NW India	Jammu & Kashmir	Thunderstorm
		Jammu	NW India	Jammu & Kashmir	Thunderstorm
		Sunder Nagar	NW India	Himachal Pradesh	Thunderstorm
		Ludhiana	NW India	Punjab	Thunderstorm
		Nellore	South India	Andhra Pradesh	Thunderstorm
08-03-17	1500UTC	Coimbatore	South India	Tamil Nadu	Thunderstorm
08-03-17	1800 UTC	Jammu	NW India	J & K	Thunderstorm
08-03-17	2100 UTC	Amritsar	NW India	Punjab	Thunderstorm
		Guwahati	NE India	Assam	Thunderstorm
		Tondi	South India	Tamil Nadu	Thunderstorm
09-03-17	0000 UTC	Amritsar	NW India	Punjab	Thunderstorm
		Sultanpur	NW India	Uttar Pradesh	Thunderstorm
		Dibrugarh	NE India	Assam	Thunderstorm
09-03-17	0300 UTC	Dibrugarh	NE India	Assam	Thunderstorm

Severe Weather warning based on DWR observation	
Name of issuing radar station	DWR HYDERABAD
Geo-coordinates of issuing Station(Lat, Long, Alt)	17.2562o N / 78.7656o E
Date and time of issue in UTC(yyyyMMddhhmm)	0635 UTC of 09/03/2017
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
Date and time of issue in UTC(yyyyMMddhhmm)	201703090602 UTC
Nature of severe weather expected	Thunderstorm with moderate rain
Districts/Taluks/Mandals/Blocks likely to be impacted	Kolkata, Howrah, Hoogly, North 24 Parganas, Purba Medinipur, South 24 Parganas
Name of issuing radar station	DWR KARAIKAL
Geo-coordinates of issuing Station(Lat, Long, Alt)	Lat: 10.91381 N, Long: 79.84141 E/Alt: 25 m amsl
Date and time of issue in UTC(yyyyMMddhhmm)	DWR U/S
Nature of severe weather expected	--
Name of issuing radar station	DWR MUMBAI
Geo-coordinates of issuing Station(Lat, Long, Alt)	Lat – 18° 54'04", Long-72° 48'32" Height AMSL – 3.22 meters
Date and time of issue in UTC(yyyyMMddhhmm)	201703090700 UTC
Nature of severe weather expected	No Severe weather

	haze
	smoke
	dust or sand storm
	fog
	drizzle
	rain
	snow
	showers
	hail
	thunderstorm
Weather Symbols	

		
+ thunderstorm	+ heavy thunderstorm	sandstorm or dust storm
		
squall	hail shower	tropical storm
		
+ tornado	+ lightning	+ hurricane

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