



India Meteorological Department
FDP STORM Bulletin No. 90 (03-06-2017)

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

The Northern Limit of Monsoon (NLM) continues to pass through Lat.10.0°N/Long.60.0°E, Lat.10.0°N/Long.70.0°E, Kochi, Tondi, Lat.14.0°N/ Long.87.0°E, Lat.17°N/ Long.90.0°E, Lat.20.0°N/Long. 91.0°E, Agartala, William Nagar, Kokrajhar and Lat. 27.0°N/Long. 90.0°E.

The upper air cyclonic circulation over east central Arabian sea off south Maharashtra coast now lies over east central Arabian sea off Maharashtra coast between 1.5 km & 3.1 km above mean sea level.

The upper air cyclonic circulation over southeast Bay of Bengal & neighbourhood now lies over southeast Bay of Bengal & adjoining east central Bay of Bengal between 1.5 & 3.1 Km above mean sea level.

A trough at mean sea level runs from northwest Uttar Pradesh to Assam across north Uttar Pradesh & north Bihar.

A western disturbance as a trough in mid-tropospheric westerlies runs roughly along Longitude 57.0°E and north of latitude 32.0°N with its axis at 3.1 km above mean sea level.

The trough in westerlies along Long. 82.0°E to the north of Lat. 26.0°N has become less marked.

The north-south trough from Bihar to north Chhattisgarh has become less marked.

The upper air cyclonic circulation over Vidarbha & neighbourhood has become less marked.

SATELLITE OBSERVATIONS during past 24hrs and current observation:

Current Observation (based on 0300UTC imagery of INSAT 3D):

CONVECTIVE ACTIVITY: - Nil

Western Disturbance (WD): Nil

Cloud Description:

Scattered low/medium clouds with embedded moderate to intense convection were seen over Meghalaya, S Assam, NE Bangladesh, Nicobar Islands and Lakshadweep. Scattered low/medium clouds with embedded isolated weak to moderate convection were seen over rest NE states and Kerala. Scattered low/medium clouds were seen over J & K, Himachal Pradesh, Uttarakhand, S Chhattisgarh, Odisha, Sub Himalayan West Bengal, Sikkim, S Gujarat, Madhya Pradesh, Maharashtra and rest parts of South India..

Arabian Sea:

Scattered low/medium clouds with embedded intense to very intense to very intense convection were seen over central & Southeast Arabian Sea.

Bay of Bengal & Andaman Sea:

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

Past Weather:

Convection:-

Moderate to Intense convection was observed over South Rajasthan Gujarat Maharashtra Chhattisgarh Odisha East Bihar East Jharkhand West Bengal Sikkim North-East States Karnataka Kerala Tamilnadu Telangana & Andhra Pradesh.

OLR:-

Upto **200** wm^{-2} was observed over South Odisha West Bengal.

Upto 230 wm^{-2} was observed over Sikkim North-East States South Gujarat Maharashtra South Chhattisgarh South Interior Karnataka Kerala West Tamilnadu.

Westerly Trough & Jet-Stream:

No Westerly Trough & No Jet Stream observed over India.

Dynamic Features:

Low to Medium wind shear is observed over India.

negative shear tendency is observed over Gujarat Rajasthan and Positive shear tendency is observed over rest parts of India.

A positive Vorticity field is observed over Uttar Pradesh Bihar West Bengal .

Negative low level convergence is observed over Gujarat and Konkan and Positive low level convergence observed over rest parts of India.

Precipitation:

IMR:

Rainfall Up to **130** mm was observed over North Gangetic West Bengal.

Rainfall Up to **70** mm was observed over Meghalaya North-East Jharkhand South-East Bihar South Odisha & North Konkan

Rainfall Up to **50** mm was observed over South Gujarat.

Rainfall Up to **20** mm was observed over South-West Madhya Pradesh West Assam. Rainfall Up to **10** mm was observed over North Madhya Maharashtra Vidarbha South Interior Karnataka Kerala Rayalaseema South Chhattisgarh & Rest North-East States.

HEM:

Rainfall Up to **70** mm was observed over North Konkan South Odisha North Gangetic West Bengal Meghalaya Arunachal Pradesh.

Rainfall Up to **14** mm was observed over Kerala North-West Tamilnadu Rayalaseema South Chhattisgarh Rest North-East States.

Rainfall Up to **07** mm was observed over North Madhya Maharashtra Vidarbha South Interior Karnataka & South Tamilnadu.

RADAR and RAPID Observation:

No significant convection was seen in DWR Composite at 1250hrs IST. DWR Agartala indicated isolated/multiple echoes with dBZ 45-50 and height 10-14km at 1252hrs IST.

RAPID RGB satellite imagery at 1200hrs IST indicated convective clouds at South Assam adjoining Nagaland & Manipur, S Mizoram, Lakshadweep & Minicoy Islands, Kerala and Nicobar Islands.

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

Higher Dust concentration was observed over north Africa and Arab countries . Dust concentration is expected to increase over north India for next five days. High PM10 concentration was observed over Rajasthan and is expected to increase over IGP in next five days.

2. NWP MODEL GUIDANCE:

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

1. Weather Systems:

00 UTC analysis shows the trough along Rajasthan region extending across Madhya Pradesh, Chhattisgarh and WB. The off-shore trough from south Maharashtra coast to Kerala coast is also seen in the analysis and is seen persisting till day 5.

2. Location of jet and jet core at 500 hPa:-500 hPa Jet core (>60kt):

No presence of jet core over the Indian region for the next 5 days.

3. Low level Vorticity:-Positive Vorticity 850hPa ($>12 \times 10^{-1}/s$):

Analysis shows low level positive vorticity ($>-12 \times 10^{-5}/s$) mainly over isolated pockets in Punjab, UP, north eastern states and along the foothills of Himalayas. The high vorticity belts are mainly confined over regions of UP, Haryana, Delhi, Bihar, MP, AP region

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): Forecast shows high threshold values over along coastal region of Odisha, WB and Bihar for the next 2 to 5 days.

Lifted Index (< -2): The areas with index less than -2 lies along Bihar, Chhattisgarh, GWB and major regions of AP along with Gujarat and Rajasthan for the next 2 to 3 days.

Sweat Index (> 400): 00UTC shows significant values over major parts over Bihar, GWB, Odisha and AP and is expected to persist for the next 4 to 5 days.

CAPE (> 1000): Mostly over Bihar, GWB, Odisha, and AP and other regions over the east coast, and over few pocket in Gujarat during the next 3 to 4 days.

CIN (50-150): based on 00 analysis maximum CIN values are found in areas over east UP, Bihar, GWB, Odisha, AP and TN and along with major pockets in the Maharashtra, Gujarat and Rajasthan region for the next 2-3 days

5. Rainfall and thunderstorm activity:

Analysis shows 10-40 mm rainfall over west coast adjoining Kerala region and over the northeast region. Forecast shows rains over Central India and it is persisting till day 5.

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

1. Model Reflectivity (Max. dBz)

15-40 dBZ over isolated pockets in SHWB and the North-East region till day1 and over north-west J&K during day2 and early hours of day3

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

CAPE (> 1000): Mostly along Bihar, GWB, Odisha, AP and along major regions bordering the west coast, along with few pockets in Gujarat, MP and adjoining regions of Central India during next 2 to 3 days.

CIN (50-150): Higher values over Gujrat, Rajasthan, Maharashtra, WB, east coast and Odisha during next three days.

3. Rainfall and thunderstorm activity:

40-70 mm over North-east region, some pockets of Kerala and adjoining west coast of country based on 00 analysis it seen persisting for the next 3 days.

NCMRWF (NCUM Forecasts based on 00 UTC of the day):-

Not Received

3. IOP ADVISORY FOR 24 and 48Hrs:

Summary and Conclusions:

Day-1 & Day-2:

In association with the upper air cyclonic circulation over southeast Bay of Bengal & adjoining east-central Bay of Bengal, and the trough at mean sea level from northwest Uttar Pradesh to Assam, there is wind convergence in the lower levels over Assam and adjoining Meghalaya. This is likely to result in heavy rainfall over the entire North East Indian region on day 1. On day 2, the trough is becoming less marked in the NWP models, and the associated rainfall is likely to decrease over North-east Indian region on day 2. The upper air cyclonic circulation over east-central Arabian Sea persists since yesterday, although it has moved north-eastwards since yesterday. The associated wind convergence and rainfall is expected over Kerala on day 1, which is likely to decrease on day 2. Thunderstorm activity is also expected over Central India on day 1 and day 2.

24 hour Advisory for IOP:

Kerala, Lakshadweep, Coastal Karnataka, South Interior Karnataka, Interior Tamil Nadu
Madhya Maharashtra, Marathawada, Telengana, Coastal Andhra Pradesh
Arunachal Pradesh, Assam and Meghalaya
Tripura, Mizoram, Nagaland, Manipur,
Sikkim and Sub Himalayan West Bengal,
Gangetic West Bengal

48 hour Advisory for IOP:

Kerala, Coastal Karnataka, Interior Tamil Nadu
Arunachal Pradesh, Assam and Meghalaya
Tripura, Mizoram, Nagaland, Manipur,
Sikkim and Sub Himalayan West Bengal,
Madhya Maharashtra, Marathawada, Telengana, Coastal Andhra Pradesh

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

Past24hourHEMandIMRrainfall(upto03UTCoftoday)

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

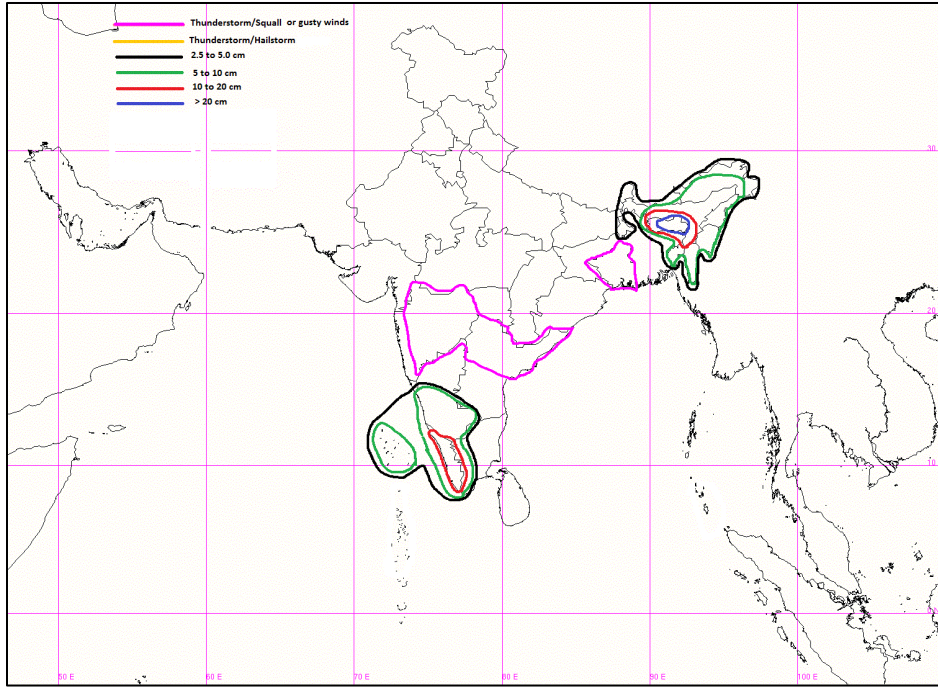
HEM: http://satellite.imd.gov.in/img/3Ddaily_he.jpg

ForRadarimagesofthepast24hoursincludingmosaicofimages:

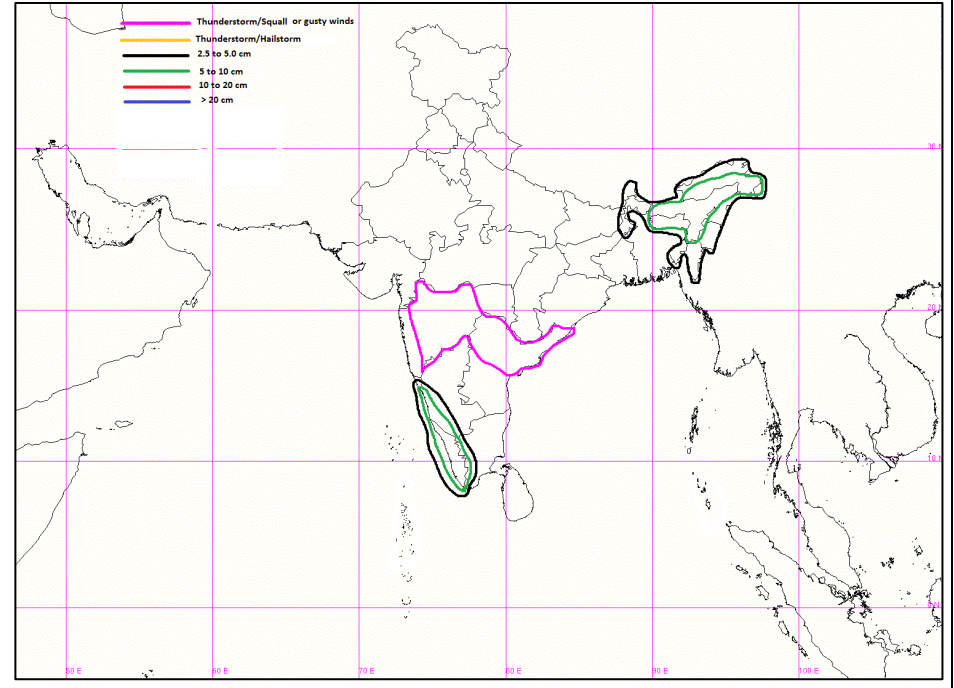
http://ddgmui.imd.gov.in/dwr_img/

Satellite sounder based T- Phigram

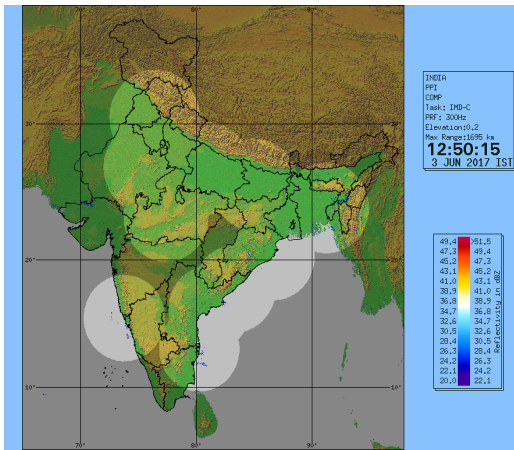
http://satellite.imd.gov.in/map_skm2.html



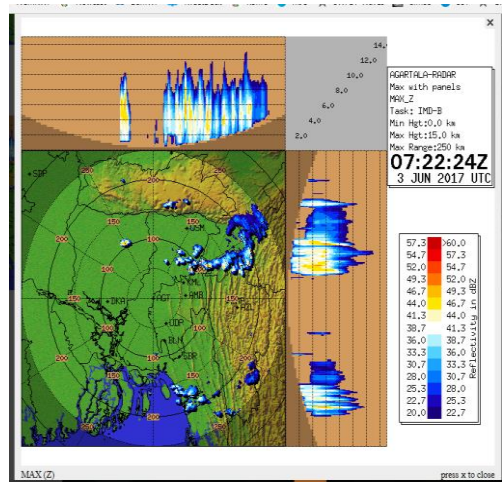
IOP Advisory for 24 hours



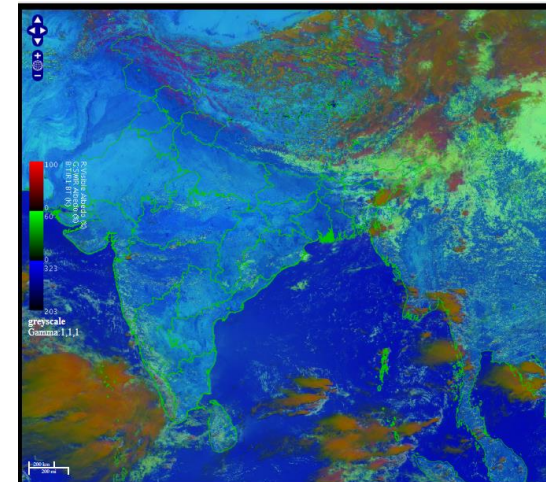
IOP Advisory for 48 hours



DWR composite at 1250hrs IST

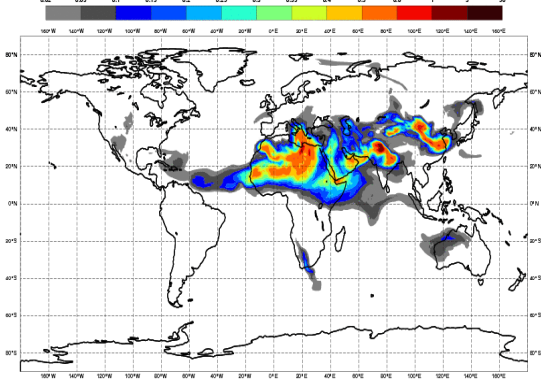


DWR Agartala at 1252hrs IST



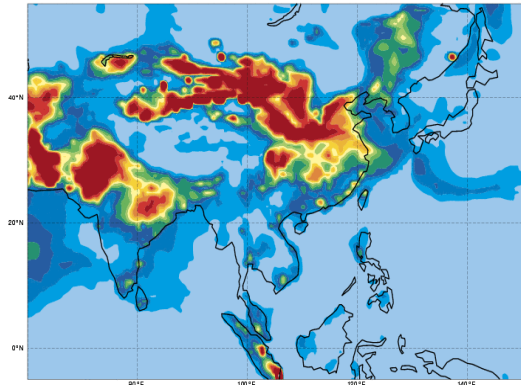
RAPID RGB Satellite Imagery at 1200 hrs IST of today

Friday 02 June 2017 00UTC CAMS Forecast t+120 VT: Wednesday 07 June 2017 00UTC
Dust Aerosols Optical Depth at 550 nm

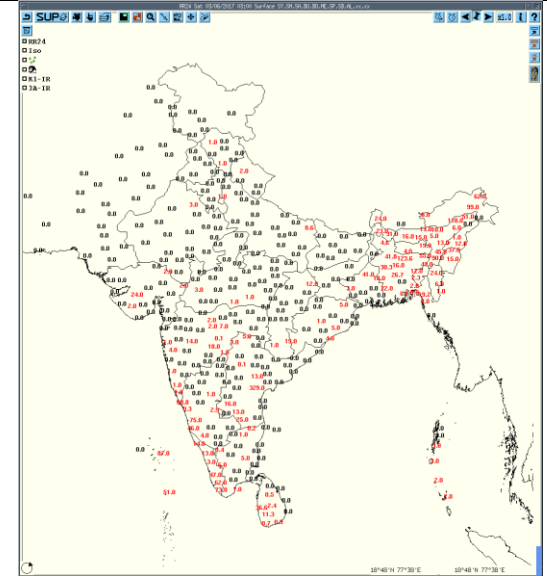


Forecast Dust Concentration for 00UTC of 7th June

Friday 02 June 2017 00UTC CAMS Forecast t+120 VT: Wednesday 07 June 2017 00UTC
Surface PM10 [$\mu\text{g}/\text{m}^3$]

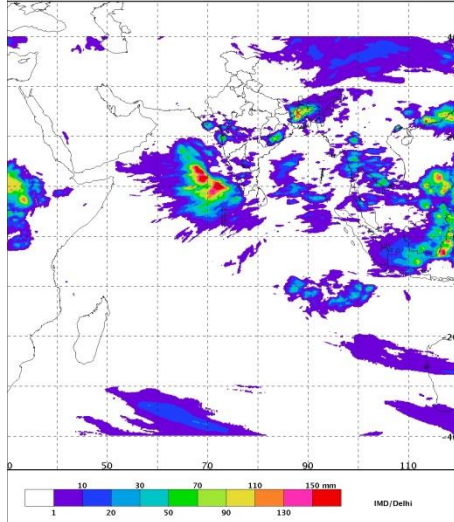


PM10 Forecast for 00UTC of 7th June



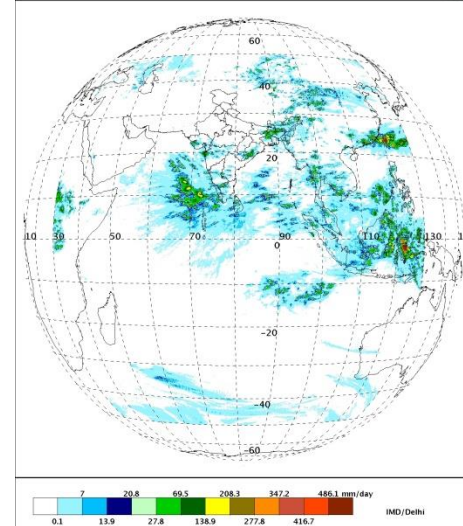
Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today

SAT-3NSAT-3D IMG
INSAT Multispectral Rainfall(Daily)
L3G BINNED GEOPHYSICAL PARAMETER GRIDDED

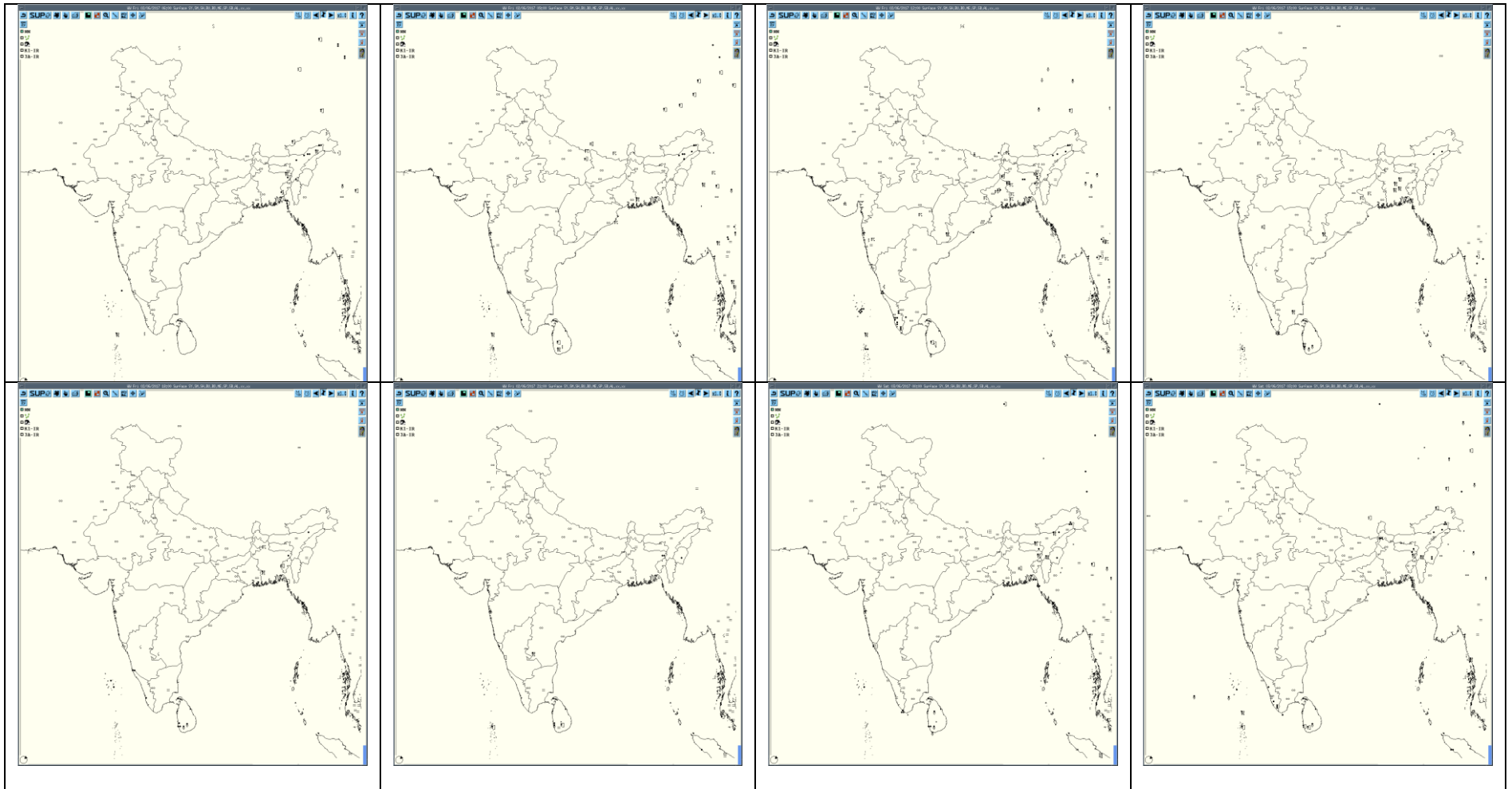


IMR Rainfall

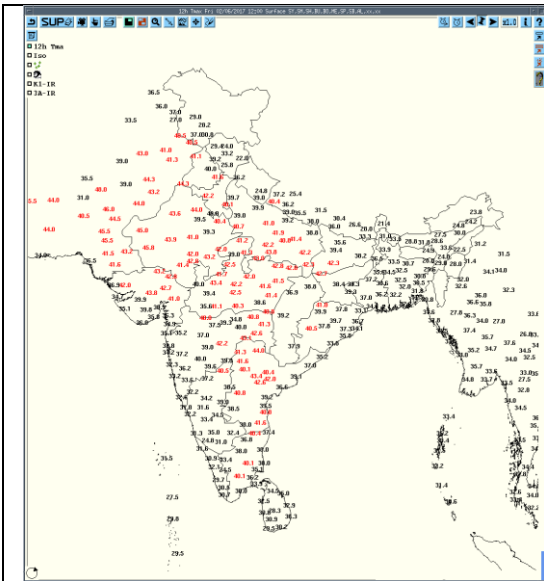
SAT-3NSAT-3D IMG
Precipitation(HE) Daily
L3B BINNED GEOPHYSICAL PARAMETER FULL DISK



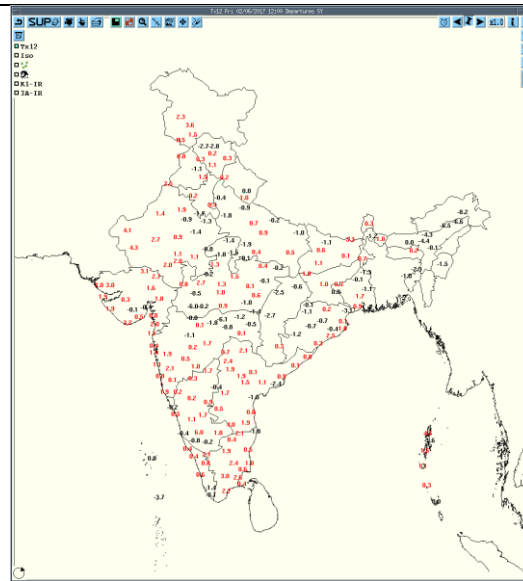
HEM Rainfall



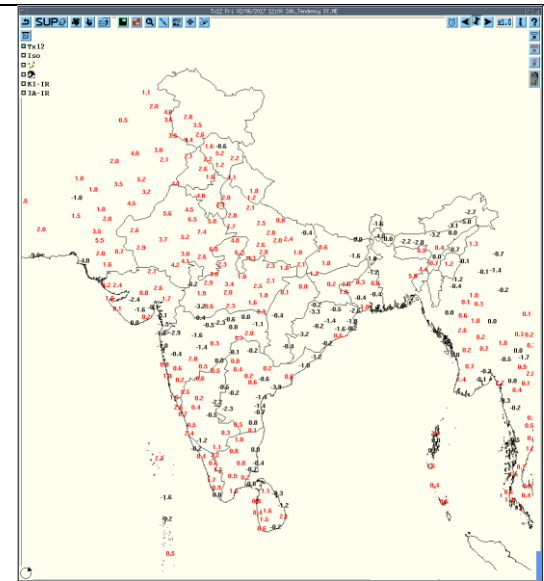
3hourly Past weather at 06,09,12,15,18,21UTC of yesterday and 00 & 03 hrs UTC of today



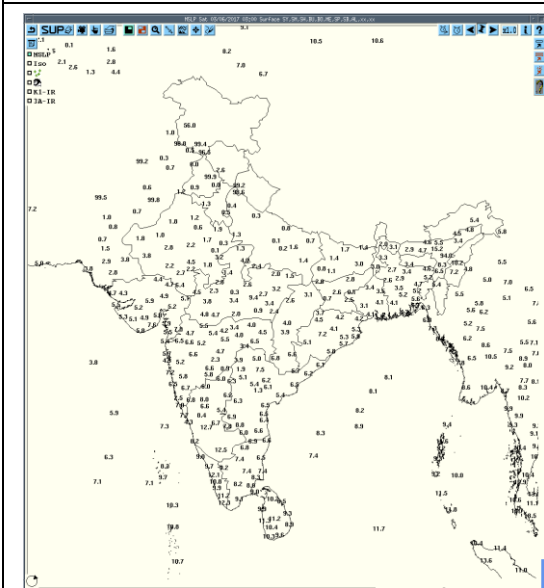
Tmax



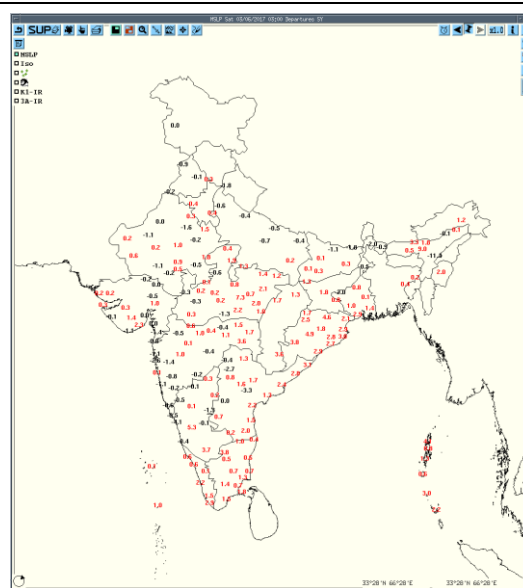
Departure Tmax



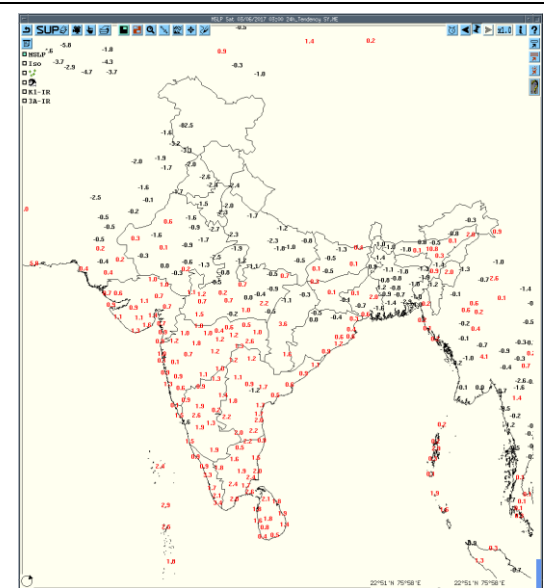
Tendency Tmax



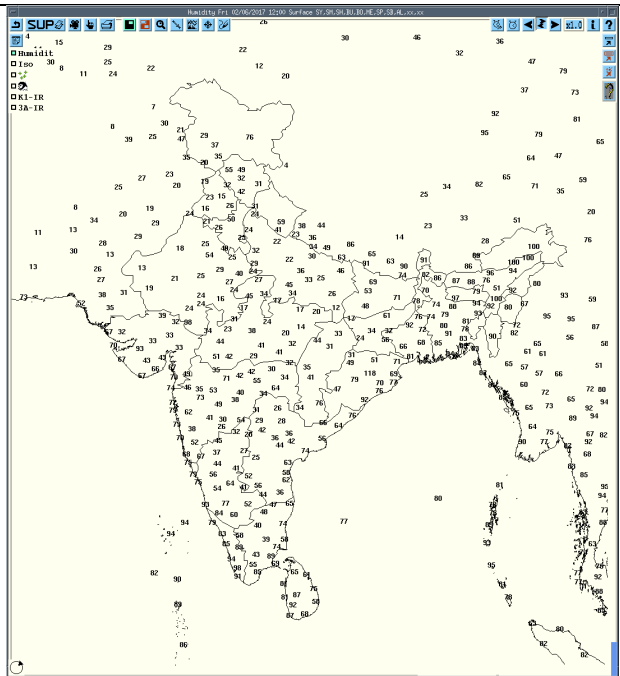
MSLP



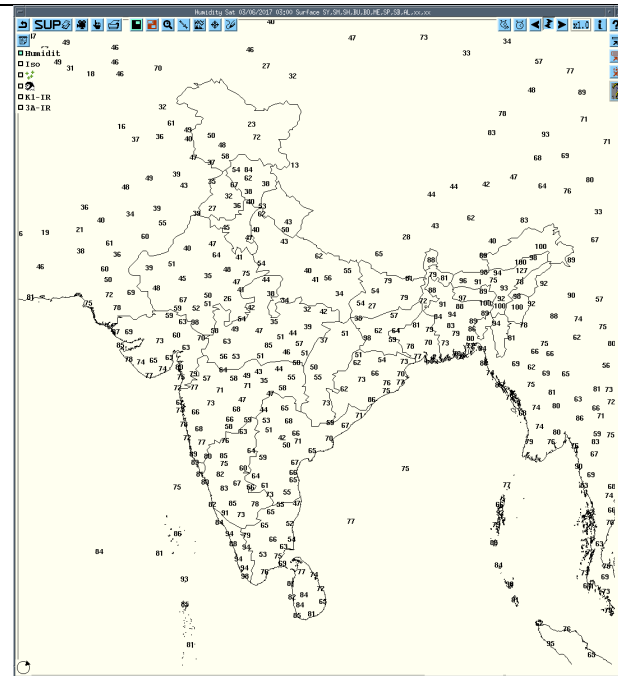
Departure MSLP



Tendency MSLP



RH at 12UTC yesterday



RH at 03UTC today

Realised past 24hrs TS/SQ/HS Data (reported at 0300UTC of the day):

Realized weather past 24hours (Based on SYNERGIE Products)					
Date	Time of Reporting	Name of Station Reporting	Region	STATE	Weather Event
02-06-17	0600UTC	Cherrapunjee	NE India	Meghalaya	Thunderstorm
		Dibrugarh	NE India	Assam	Thunderstorm
		Minicoy	S India	Lakshadweep & Minicoy Islands	Thunderstorm
02-06-17	0900UTC	Gorakhpur	NW India	Uttar Pradesh	Thunderstorm
		Paradeep	E India	Odisha	Thunderstorm
		Minicoy	S India	Lakshadweep & Minicoy Islands	Thunderstorm
02-06-17	1200UTC	Jamshedpur	E India	Jharkhand	Thunderstorm
		Shantiniketan, Panagarh, Malda	E India	West Bengal	Thunderstorm
		Gangtok	E India	Sikkim	Thunderstorm
		Cherrapunjee	NE India	Meghalaya	Thunderstorm
		Rajkot	W India	Gujarat	Thunderstorm with Hail
		Pune	W India	Maharashtra	Thunderstorm
		Nagpur	C India	Maharashtra(Vidarbha)	Thunderstorm
		Jagdalpur	C India	Chhattisgarh	Thunderstorm
		Minicoy	S India	Lakshadweep & Minicoy Islands	Thunderstorm
02-06-17	1500UTC	Churu	NW India	Rajasthan	Thunderstorm
		Rajkot	W India	Gujarat	Lightening
		Jamshedpur	E India	Jharkhand	Thunderstorm
		Bankura	W India	West Bengal	Thunderstorm
		Jagdalpur	C India	Chhattisgarh	Thunderstorm
		Aurangabad	W India	Maharashtra	Thunderstorm
		Belgaum, Gadag	S India	Karnataka	Lightening
		Tiruchirappalli	S India	Tamilnadu	Thunderstorm
		Thiruvananthapuram	S India	Kerala	Thunderstorm
02-06-17	1800UTC	Gadag	S India	Karnataka	Lightening
		Anantapur	S India	Tamilnadu	Lightening
02-06-17	2100UTC	Anantapur	S India	Tamilnadu	Thunderstorm
03-06-17	0000UTC	Itanagar	NE India	Arunachal Pradesh	Thunderstorm
		Guwahati, Silchar	NE India	Assam	Thunderstorm
03-06-17	0300UTC	Minicoy	S India	Lakshadweep & Minicoy Islands	Thunderstorm
		Silchar	NE India	Assam	Thunderstorm

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 maximum reflectivity	Formation w.r.t radar station and Direction of movement	Remarks	Associated severe weather if any	Districts affected
Lucknow	03-06-17	020300-030300	Nil	--	--	--	--
Patna	03-06-17	020300 - 020500	Multi Cell. Maximum Reflectivity : 42 dBZ Echo Top : 11.0 KM	Range: 157 KM from DWR Patna in ENE direction. Movement- Eaterly	Warning E-mail and Fax sent to State Disaster management Authority and Concern DMs	N/A	MADHUBANI, SUPAUL, MADHEPURA, SHARASA & SITAMARHI
		020500-020530	NIL	NIL	N/A	N/A	N/A
		020530 - 021030	Multi Cell. Maximum Reflectivity : 52.50 dBZ Echo Top : 10.0 KM	Range: 064 KM from DWR Patna in SE direction. Movement- Easterly	Warning E-mail and Fax sent to State Disaster management Authority and Concern DMs	N/A	NALANDA, NAWADA, BEGUSARAI, SEIKHPURA, MUNGER, LAKHISARAI, KHAGARIA, BHAGALPUR, BANKA, JAHANABAD, SARAN, PATNA, JAMUI, MUZAFFARPUR, GOPALGANJ, SIWAN
		021030 - 021110	NIL	NIL	N/A	N/A	N/A

		021110 - 021310	Multi Cell. Maximum Reflectivity : 47.50 dBZ Echo Top : 12 KM	Range: 135 KM from DWR Patna in NNE direction. Movement- SE	Warning E-mail and Fax sent to State Disaster management Authority and Concern DMs	N/A	SITAMARHI , MUZAFFAR PUR, MOTIHARI & SHEOHAR
		021310 - 021520	NIL	NIL	N/A	N/A	N/A
		021520 - 021640	Single Cell. Maximum Reflectivity : 45 dBZ Echo Top : 13 KM	Range: 202.5 KM from DWR Patna in NE direction. Movement- Easterly	Warning E-mail and Fax sent to State Disaster management Authority and Concern DMs	N/A	SUPAUL, ARARIYA,M ADHEPURA , KISHANGA NJ, KATIHAR, SHARASA & PURNIYA
		021640 - 022130	NIL	NIL	N/A	N/A	N/A
		022130 - 030030	Single Cell. Maximum Reflectivity : 39.5 dBZ Echo Top : 8.1 KM	Range: 202 KM from DWR Patna in NE direction. Movement- ESE	Warning E-mail and Fax sent to State Disaster management Authority and Concern DMs	N/A	SUPAUL, ARARIYA, MADHEPU RA, KISHANGA NJ, KATIHAR, SHARASA & PURNIYA
		030030 - 030300	NIL	NIL	N/A	N/A	N/A
Patiala	03-06-17	020300- 030300	NO SIGNIFICANT ECHO	-----	-----	-----	-----
Jaipur	03/06/17	020832- 021212	Multiple cells with average height of 3.5 km & maximum reflectivity 46.5 dBZ	Cell develop 0832 to 1212 UTC of 02/06/2017 towards W, SW of jaipur and moved to SW Wards at speed 18-20 km/hr	Cells starts forming from 0832 UTC of 02/06/2017 AT W,SW of Jaipur and reaches maximum reflectivity during 0832- 1142 UTC and died down 1212 UTC.	Thunderstorm/rain at isolated	Nagaur, Ajmer, Bhilwara
		021212- 021932	Multiple cells with average height of 4 km & maximum reflectivity	Cell develop 1212 to 1932 UTC of 02/06/2017 towards N,	Cells starts forming from 1212 UTC of 02/06/2017 AT N, NW, SW of Jaipur	Thunderstorm/rain at isolated	Nagaur, Churu,

			43.5 dBZ	NW, SW of Jaipur and moved to E Wards at speed 30-35 km/hr	and reaches maximum reflectivity during 1212-1532 UTC and died down 1932 UTC.		Sikar, Jaipur, Jhunjhunu
Machilipatnam	03-06-17	020801-020901	Isolated Multiple cells average height of 7.5 km with maximum reflectivity of 57.5 dBZ	W (92KM) and moving Nly direction with average speed of 15.0 kmph	Cell started forming at 0831 UTC, at W (92km) from Radar the maximum reflectivity during 0801 to 0901 UTC and died down at 0911 UTC	Possibility of Thunder storm with rain and winds.	Guntur District.
		020831 - 021051	Isolated Multiple cells average height of 8.5 km with maximum reflectivity of 56.5 dBZ	NE (220KM) and moving NEly direction with average speed of 8.5 kmph	Cells started forming at 0831 UTC at NE (220KM) from Radar the maximum reflectivity during 0831 to 1051 and died at 1101 UTC	Possibility of Thunder storm with rain and winds.	East Godavari, Visakhapatnam and Dantewara Districts.
		020841-021011	Isolated Multiple cells average height of 7.5 km with maximum reflectivity of 53.5 dBZ	SW (170KM) and moving NWly direction with average speed of 30.0 kmph	Cells started forming at 0841 UTC at SW (170KM) from Radar the maximum reflectivity during 0841 to 1011 and died at 1021 UTC	Possibility of Thunder storm with rain and winds.	Prakasam District
		020901-021001	Isolated Multiple cells average height of 7.5 km with maximum reflectivity of 54.5 dBZ	WSW (240KM) and moving NWly direction with average speed of 10.0 kmph	Cells started forming at 0901 UTC at WSW (240KM) from Radar the maximum reflectivity during 0901 to 1001 and died at 1011 UTC	Possibility of Thunder storm with rain and winds.	Prakasam and Kurnool, Districts.
		021121-021311	Isolated Multiple cells average height of 9.5 km with maximum reflectivity of 60.5 dBZ	W (200KM) and moving Nly direction with average speed of 25.0 kmph	Cells started forming at 1121 UTC at W (200KM) from Radar the maximum reflectivity during 1121 to 1311 and died at 1321 UTC	Possibility of Thunder storm with hail and rain with moderate winds.	Prakasam and Guntur Districts.
		021241-021331	Isolated Multiple cells average height of 9.5 km with maximum reflectivity of 63.5 dBZ	SW (236KM) and moving NWly direction with average speed of 15.0 kmph	Cells started forming at 1241 UTC at SW (236KM) from Radar the maximum reflectivity during 1241 to 1331 and died at 1341 UTC	Possibility of Thunder storm with hail and rain with moderate winds.	Nellore and Prakasam Districts.
		020300-030300	020302 -	Multiple cells formed NE, NW OF DWR	Formed 150 km SW of DWR and moves East	Cells dissipated at 0840 UTC over North Mizoram	N/A

		020840	Agartala with Maximum Height 09 km at 0411 UTC and maximum reflectivity 41 dBZ at 0312 UTC	wards with around 50 kmph.	and Assam.		
		020302 - 020622	Multiple Cells SW of DWR Agartala with Maximum Height 08 km at 0332 UTC and maximum reflectivity 40 dBZ at 0312 UTC.	Formed 150 km SW of DWR and moved East wards at around 50 kmph	Cells dissipated at 0622 UTC over South Tripura and B/D..	N/A	N/A
		020900 - 022112	Multiple cell formed with Maximum Height 16 km at 1312 UTC and maximum reflectivity 48 dBZ at 1342 UTC	Formed 390 km NWW of DWR and Move East wards at around 60 kmph. Formed. Squall line at 1312 UTC.	Cells dissipated at 2112 UTC over Mizoram.	N/A	N/A
		021952-030300	Multiple Cells formed NNW of DWR Agartala with Maximum height 16 Km at 1952 UTC and Maximum Reflectivity 43 dbz at 2352 UTC.	Formed 150 km NNW of DWR Agartala and moves East wards with 50 kmph.	persist	N/A	N/A
Karaikal	020300-030300	1.02852-021640	1) Cluster of individual cells at NNW direction at 220-250 km range with max reflectivity of 40 dBz and average height of 10 kms	1. In NE direction almost stationary	Cells started forming at 1420 and dissipated at 2210 IST	N/A	N/A
		2.020942-021612	2. cluster of cells in WNW direction (120-150 KM) with max reflectivity of 53 dBz and Average height of 12 KM	2. Moved to NE Direction	Cells started forming at 1510 and dissipated at 2140 IST		
		3.020942-021522	3. Embedded cells in wsw direction (150-180 KM) with max reflectivity of 40 dBz and Average height of 10 KM	3. Moved to NE Direction	Cells started forming at 1510 IST and dissipated at 2050 IST.		
Paradeep	020300-030300	020650-021250	Convective isolated cells developed after 1210 hrs. IST in WSW sector and	Position:- Lat. 19.4 Deg. N Long. 84.5 deg. E	NIL	TS with slight rain .	Phulbani, Ganjam Baudha,

			<p>later to NW sector around 20 kms to 240 kms of range between AZ 235 Deg. to 325 Deg. from radar station at height starting from 8 kms to 12 kms with reflectivity of 30 dbz to 48 dbz. The convective cells weakened gradually after 1820 HRS IST.</p>	<p>Direction-SSW. Range : 20 kms to 240 kms. AZ : 235 to 325 Movement :SSW ly.</p>			Keonjhar & Angul
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