



**India Meteorological Department**  
**FDP STORM Bulletin No.88 (01-06-2017)**

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

The Northern Limit of Monsoon (NLM) continues to pass through 10.0°N/60.0°E, 10.0°N/70.0°E, Kochi, Tondi, 14.0°N/ 87.0°E, 17°N/ 90.0°E, 20.0°N/ 91.0°E, Aizwal, Kohima & Deomali.

The trough roughly along Long. 82.0°E to the north of Lat. 22.0°N, now runs roughly along Long. 82.0°E to the north of Lat. 26.0°N between 3.1 km and 5.8 km above mean sea level.

The off-shore trough at mean sea level now runs from south Maharashtra coast to north Kerala coast.

The upper air cyclonic circulation over central Pakistan & neighbourhood, now lies over Southwest Rajasthan & neighbourhood and extends upto 1.5 km above mean sea level. The upper air cyclonic circulation over south Madhya Maharashtra & neighbourhood, now lies over south Konkan & Goa & neighbourhood between 3.1 km & 3.6 km above mean sea level.

An upper air cyclonic circulation lies over southeast Bay of Bengal & neighbourhood between 1.5 & 4.5 Km above mean sea level.

The trough from West Rajasthan to Nagaland, now runs from West Rajasthan to Bihar across south Uttar Pradesh and extends upto 0.9 km above mean sea level.

The trough at mean sea level from West Rajasthan to westcentral Bay of Bengal off coastal Andhra Pradesh has become less marked.

**SATELLITE OBSERVATIONS during past 24hrs and current observation:**

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

**CONVECTIVE ACTIVITY: -**

Cell No	Date/time (UTC)	Location/Area	MIN CTT (-DEG C)	Movement	Remarks
1	01/0100	NW RAJ	66		DEVELOPING
	0200	DO	61		
	0300	DO	52		DISSIPATING

**Western Disturbance (WD):-**

Scattered multi-layered clouds were seen over North J&K and over area between Lat 37.0°N TO 48.0N Long 76.0°E to 90.0°E in association with WD over the region.

**Cloud Description:**

Scattered low/medium clouds were seen over J & K, Haryana, Delhi, Uttarakhand, East Uttar Pradesh, Madhya Pradesh and Maharashtra. Scattered low/medium clouds with embedded moderate to intense convection were seen over Meghalaya, Northwest Rajasthan, Lakshadweep and Bay Islands.

Scattered low/medium clouds with embedded weak to moderate convection were seen over Southwest Uttar Pradesh, rest Northeast states and Northeast Rajasthan.

**Arabian Sea:**

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

**Bay of Bengal & Andaman Sea:**

Scattered low/medium clouds with embedded intense to very intense convection were seen over SE Bay moderate to intense convection was seen over Andaman Sea.

**Past Weather:****Convection:-**

Moderate to Intense convection was observed over J&K Himachal Pradesh Punjab Uttarakhand Haryana Delhi Uttar Pradesh Rajasthan Madhya Pradesh Maharashtra Jharkhand Odisha West Bengal Meghalaya North East States.

**OLR:-**

Upto **200**  $\text{wm}^{-2}$  was observed over North J&K South West Bengal South Assam Mizoram Tripura.

Upto **230**  $\text{wm}^{-2}$  was observed over Rest J&K Himachal Pradesh North Uttarakhand North East Rajasthan Jharkhand Odisha Meghalaya Nagaland Manipur North Kerala East Arunachal Pradesh.

Upto **250**  $\text{wm}^{-2}$  was observed over Sikkim Rest Assam Rest Arunachal Pradesh South Interior Karnataka South Kerala North Tamilnadu.

**Westerly Trough & Jet-Stream:**

Trough in westerlies runs roughly along 80.0E North of Lat 22.0N.

& No Jet Stream Observed Over India.

**Dynamic Features:**

Low to Medium wind shear is observed over India.

Positive shear tendency is observed over the India.

A positive Vorticity field is observed over Central Karnataka Rayalaseema Telangana West Bengal.

Negative low level convergence is observed over Vidarbha East Uttar Pradesh and Positive low level convergence observed over rest parts of India,

**Precipitation:**

**IMR:** Rainfall Up to **90** mm was observed over North East Odisha.

Rainfall Up to **50** mm was observed over Coastal Odisha Meghalaya South Assam Tripura. Rainfall Up to **30** mm was observed over North East Rajasthan North Madhya. Maharashtra. Rainfall Up to **10** mm was observed over J&K Himachal Pradesh South Haryana Delhi South West Uttar Pradesh East Rajasthan West Madhya Pradesh Vidarbha South Interior Karnataka North Kerala Rest Odisha Central Assam Nagaland Manipur Mizoram.

**HEM:** Rainfall Up to **70** mm was observed over South East West Bengal North East Odisha, South Konkan, Meghalaya, Arunachal Pradesh, Nagaland, Manipur and Mizoram.

Rainfall Up to **14** mm was observed over North East Rajasthan North Madhya Maharashtra West Madhya Pradesh Meghalaya Nagaland Manipur Mizoram.

Rainfall Up to **07** mm was observed over South West J&K South Himachal Pradesh South Haryana Uttar Pradesh Chhattisgarh Rest Odisha West Jharkhand South Interior Karnataka.

### RADAR and RAPID Observation:

DWR Composite at 1230hrs IST indicated significant convection over Odisha and in RAPID RGB Satellite imagery of 1200hrs IST indicated significant convective clouds over South Assam, Nagaland, Manipur, Mizoram, Tripura and Lakshadweep.

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

Not available

## **2. NWP MODEL GUIDANCE:**

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

**1. Weather Systems:** 00 UTC analysis shows the trough from Rajasthan to north-east region across Madhya Pradesh, Chhattisgarh and WB and the off-shore trough from south Maharashtra coast to Kerala coast the forecasting shows this will persist day 4 to 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 except J & K.

**3. Low level Vorticity:-Positive Vorticity 850hPa (>12 x 10<sup>-1</sup>/s):** Analysis shows low level positive vorticity (>-12 x 10<sup>-5</sup>/s) mainly over isolated pockets in J & K, Haryana, some pocket over central part of country and west coastal region and over the north eastern region. The high vorticity belts are mainly confined over regions of UP, Haryana, Delhi, Bihar, MP, AP and south peninsular region during next 2 to 4 days.

**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 threshold values are noticed over Gujarat and Rajasthan in the analysis. 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 2 to 3 days.

**CAPE (> 1000):** Mostly over Bihar, GWB, Odisha, and AP and other regions over the east coast, Gujarat, Rajasthan, Maharashtra and along with major regions bordering the west coast during the next 3 to 4 days.

**CINE (50-150):** based on 00 analysis maximum CIN values are found in areas over some packets over 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:** 00 analysis shows 10-40 mm rainfall northeast region and along west coast of country and it will persist up to day 5 and over some pockets of Maharashtra on day 2 to day 4.

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

**1. Model Reflectivity (Max. dBz):** 15-40 dBZ over regions of the North-East region of country and isolated pockets of the southern coast region during next 3 days

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

**CAPE (> 1000):** Mostly along WB, Odisha, AP and along major regions bordering the west coast, Gujarat and West MP during next 2 to 3 days.

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

**Rainfall and thunderstorm activity:**

40-70 mm over North-east region, some pockets of WB and west coast of country based on 00 analyses it will persist for next 3 days.

### **3. IOP ADVISORY FOR 24 and 48Hrs:**

#### **Summary and Conclusions:**

##### **Day-1 & Day-2:**

In association with the off-shore trough at mean sea level from south Maharashtra coast to north Kerala coast and the upper air cyclonic circulation over south Konkan & Goa, the main rainfall belt over the west coast is likely to shift northwards along the west coast of India and is likely to concentrate on South Konkan and Goa and Coastal Karnataka on day 1. On day 2, the rainfall belt on the west coast is likely to shift southwards again to over Kerala. Thunderstorm activity is expected over Madhya Maharashtra on day 1 and 2.

In association with the trough from West Rajasthan to Bihar, and the upper air cyclonic circulation over southeast Bay of Bengal & neighbourhood, there is a wind convergence over Jharkhand region. This is likely to cause thunderstorm activity over entire East India on day 1. Also, in association with the above upper air cyclonic circulation, winds are southwesterly over Head Bay of Bengal into the region of Tripura and Mizoram. This is likely to result in widespread rainfall activity over Northeast India on day 1 and 2 with isolated occurrences of heavy to very heavy rainfall activity.

##### **24 hour Advisory for IOP:**

Coastal Karnataka, South Konkan and Goa,  
Arunachal Pradesh, Assam and Meghalaya  
Tripura, Mizoram, Nagaland, Manipur,  
Madhya Maharashtra,  
Sub Himalayan West Bengal, Gangetic West Bengal  
Orissa, Bihar and Jharkhand  
North Rajasthan  
Andaman Islands

##### **48 hour Advisory for IOP:**

Assam Meghalaya  
Tripura, Nagaland, Manipur, Mizoram, Arunachal Pradesh  
Coastal Karnataka, Kerala, Lakshadweep,  
Andaman Islands  
Madhya Maharashtra,  
Sub Himalayan West Bengal

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](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](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](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](http://satellite.imd.gov.in/img/3Ddaily_imr.jpg)

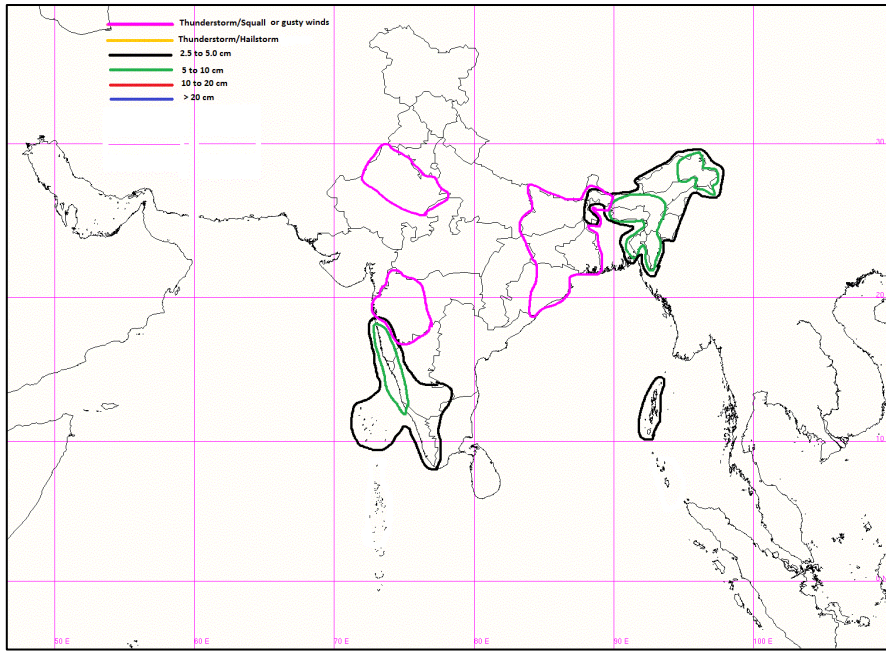
HEM: [http://satellite.imd.gov.in/img/3Ddaily\\_he.jpg](http://satellite.imd.gov.in/img/3Ddaily_he.jpg)

ForRadarimagesofthepast24hoursincludingmosaicofimages:

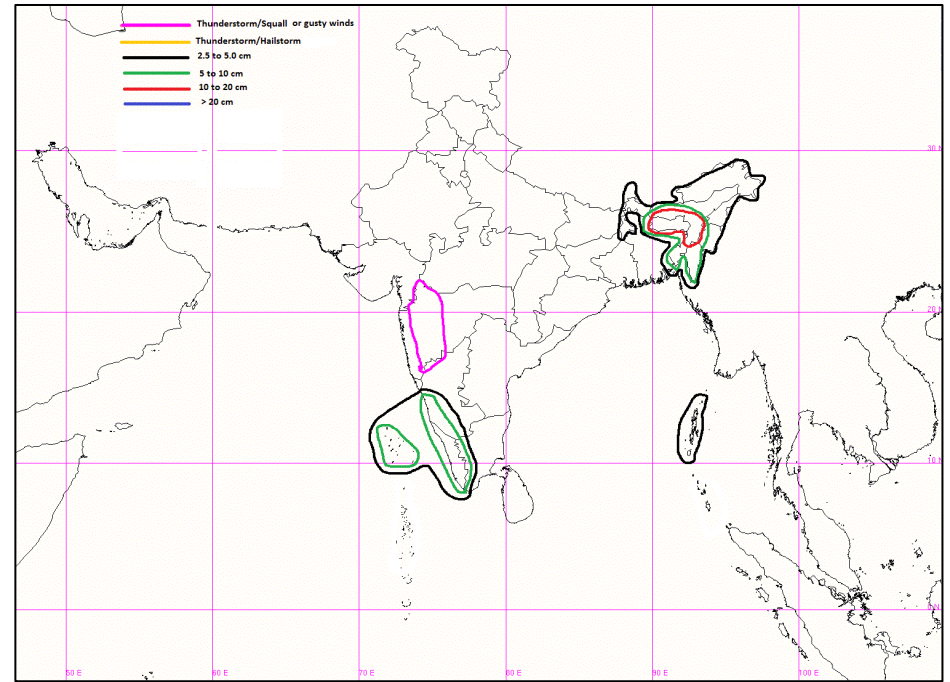
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Satellite sounder based T- Phigram

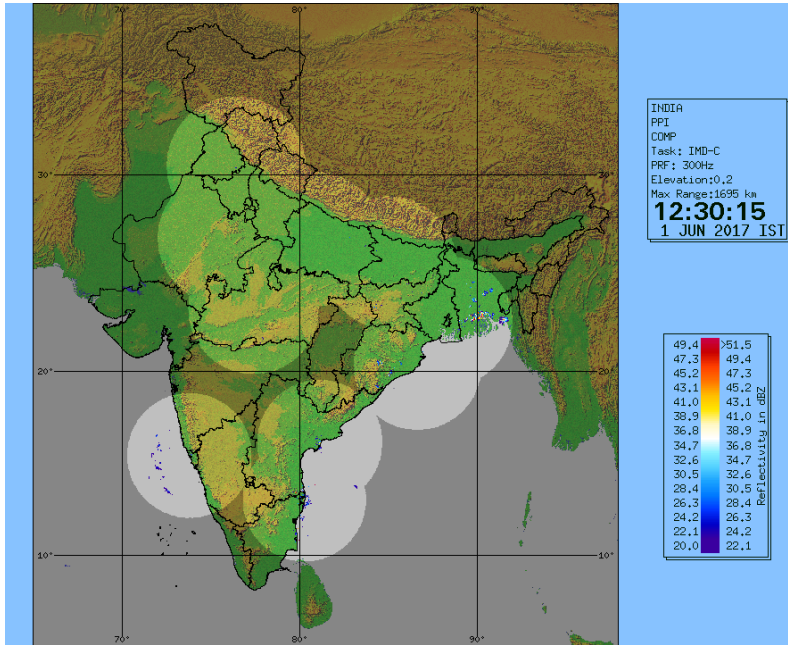
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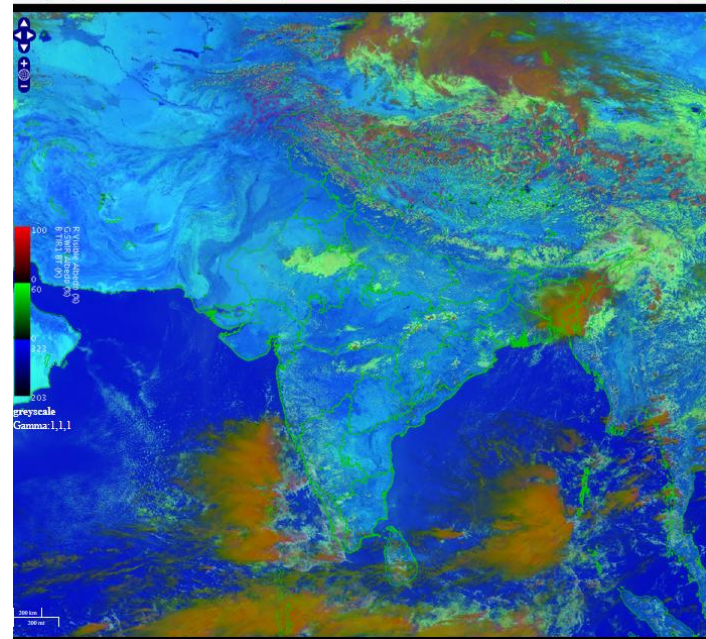
**IOP Advisory for 24 hours**



**IOP Advisory for 48 hours**



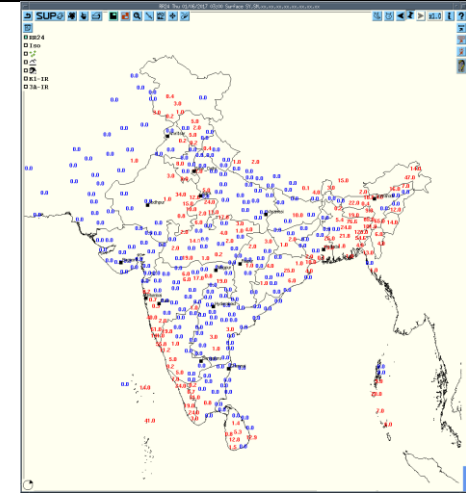
**DWR composite at 1230hrs IST**



**RAPID RGB Satellite Imagery at 1200 hrs IST of today**

Not Available

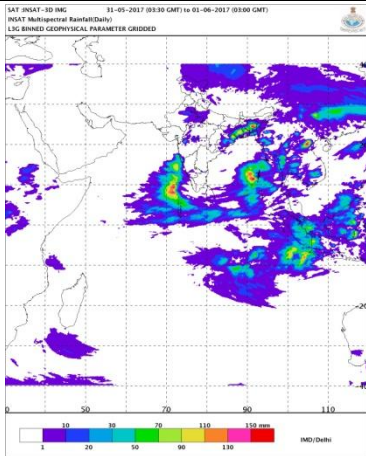
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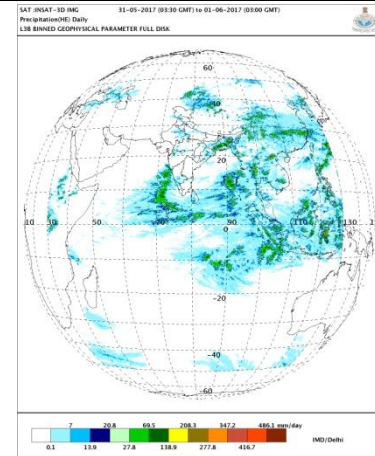
Forecast Dust Concentration

PM10 Forecast

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

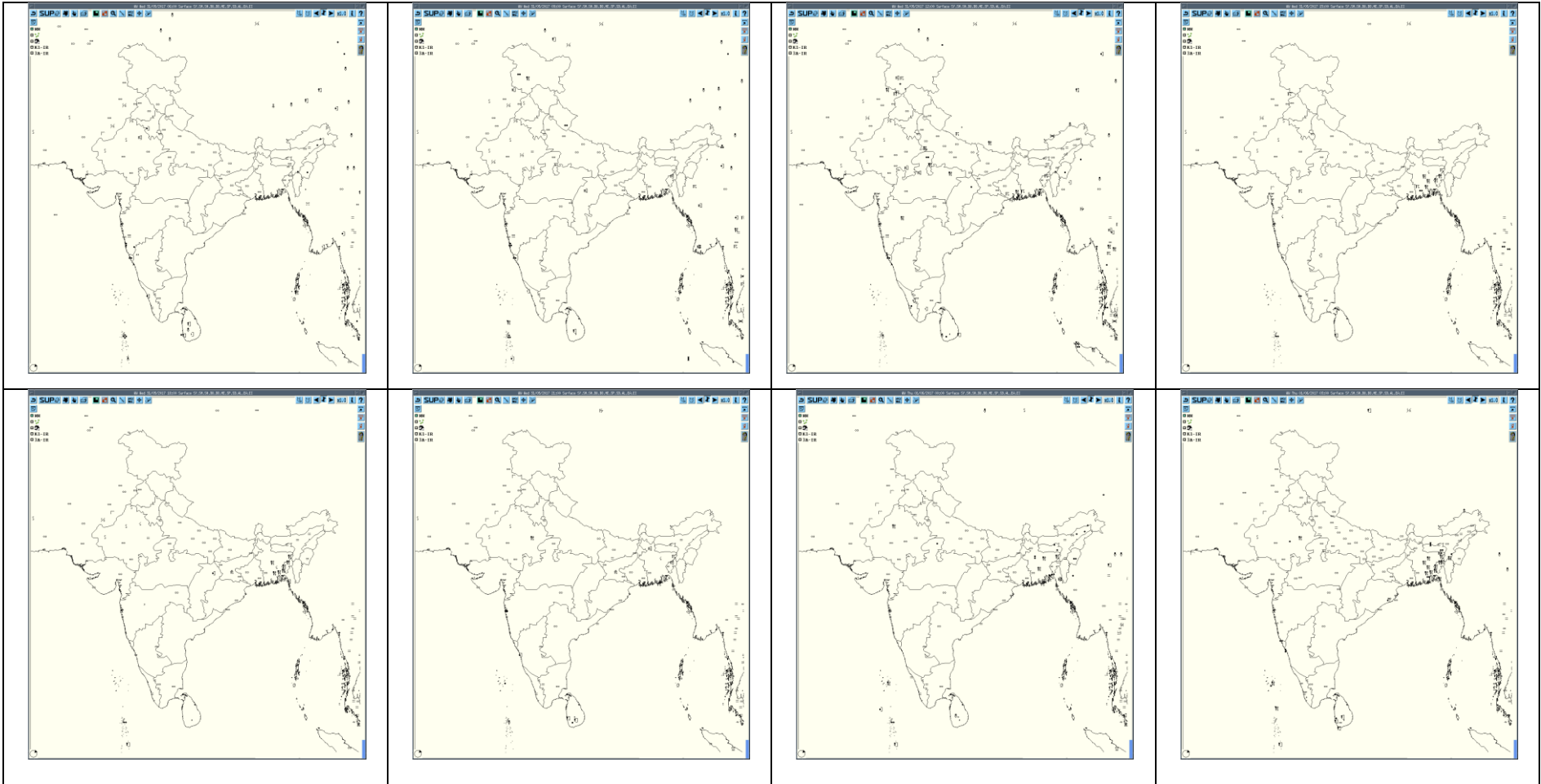


IMR Rainfall

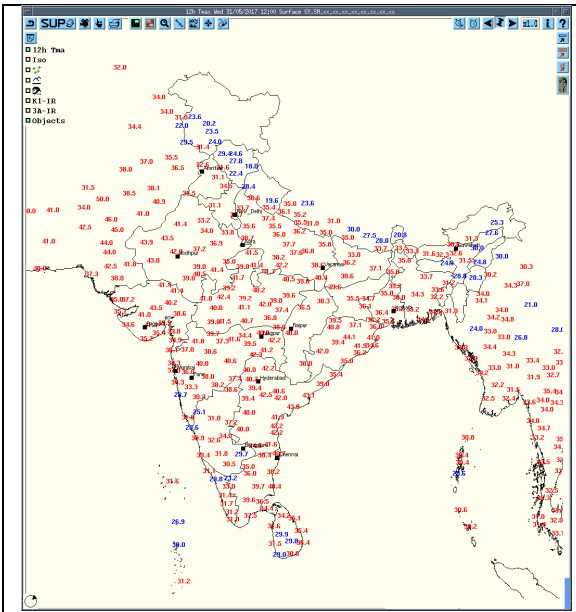


HEM Rainfall

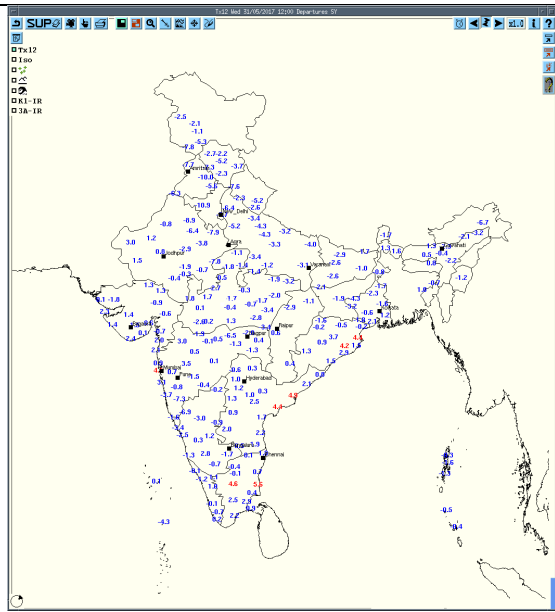




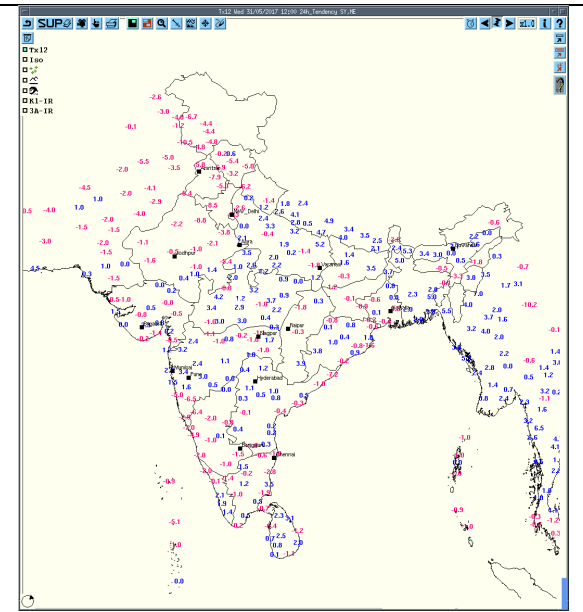
3hourly Past weather at 06,09,12,15,18,21UTC of yesterday and 00 & 03 hrs UTC of today



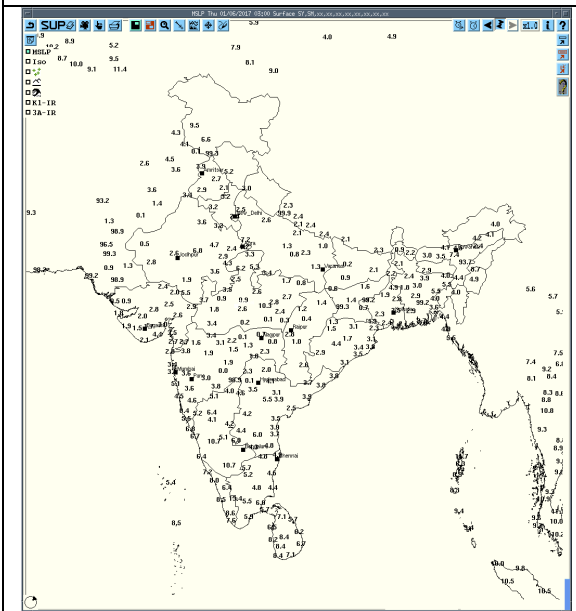
T<sub>max</sub>



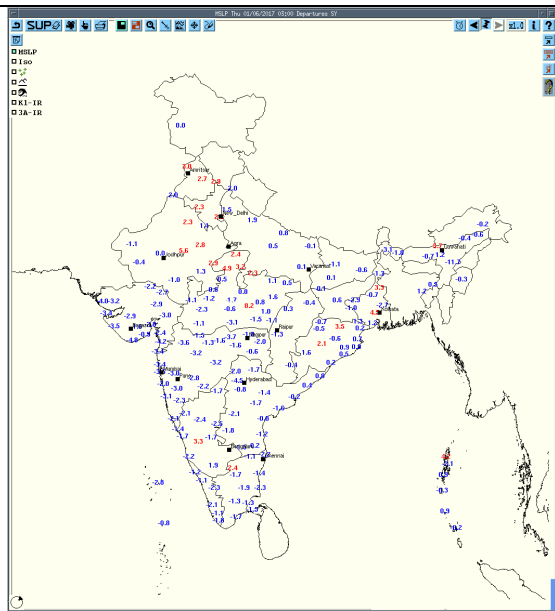
Departure T<sub>max</sub>



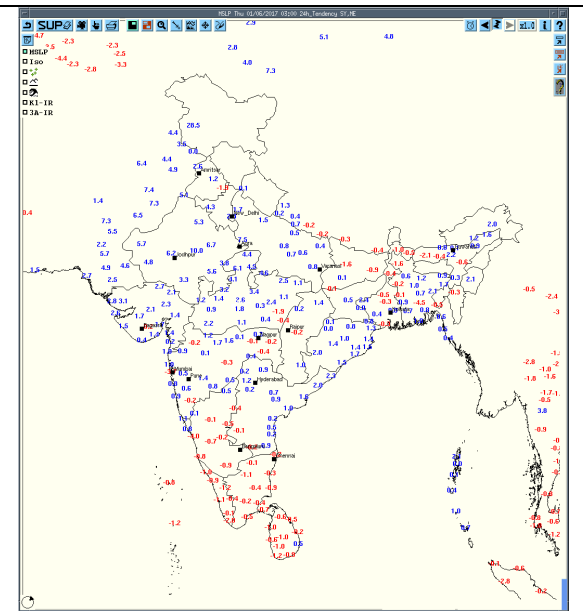
Tendency T<sub>max</sub>



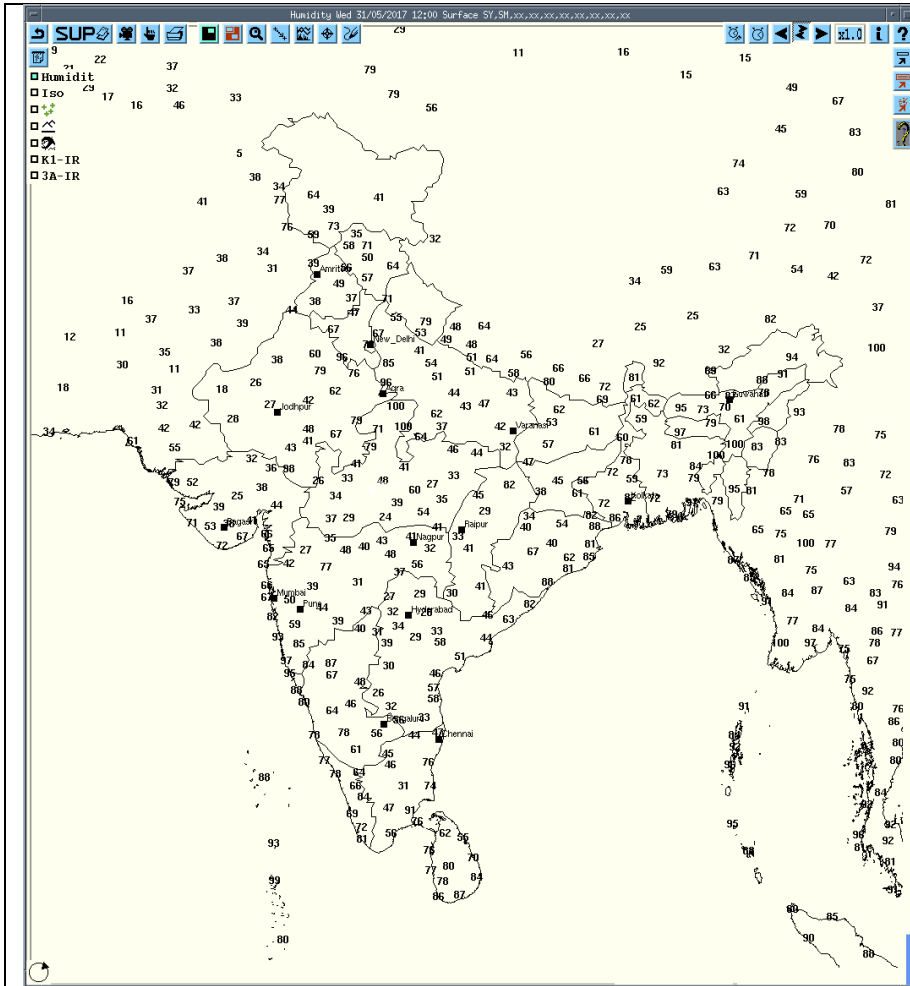
MSLP



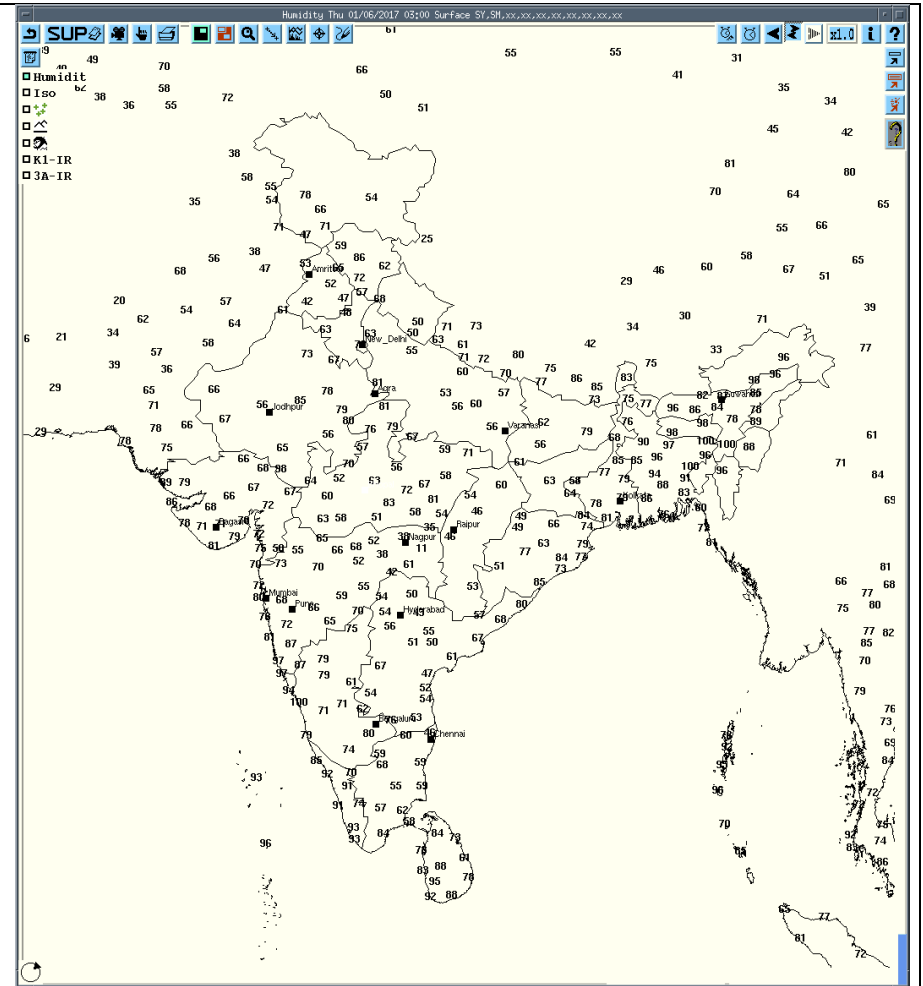
Departure MSLP



Tendency MSLP



RH at 12UTC yesterday



RH at 03UTC today

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

<b>Realized weather past 24hours (Based on SYNERGIE Products)</b>					
<b>Date</b>	<b>Time of Reporting</b>	<b>Name of Station Reporting</b>	<b>Region</b>	<b>STATE</b>	<b>Weather Event</b>
31-05-17	0600UTC	Churu	NW India	Rajasthan	Thunderstorm
31-05-17	0900UTC	Pahalgam	NW India	J & K	Thunderstorm
		Pendra Road	Central India	Chhattisgarh	Thunderstorm
		Minicoy	South India	Minicoy Island	Thunderstorm
31-05-17	1200UTC	Srinagar, Pahalgam, Jammu	NW India	J & K	Thunderstorm
		Kota	NW India	Rajasthan	Thunderstorm
		Agra, Jhansi	NW India	J & K	Thunderstorm
		Guna, Satna	Central India	Madhya Pradesh	Thunderstorm
		Aurangabad	West India	Maharashtra	Thunderstorm
		Midnapur, Digha, Haldia, Canning	East India	West Bengal	Thunderstorm
		Kolkata AP	East India	West Bengal	Thunderstorm
31-05-17	1500UTC	Indore	Central India	Madhya Pradesh	Thunderstorm
		Nasik	West India	Maharashtra	Lightening
		Agartala	NE India	Tripura	Thunderstorm
31-05-17	1800UTC	Churu	NW India	Rajasthan	Lightening
		Ranchi	East India	Jharkhand	Thunderstorm/Hail
		Agartala	NE India	Tripura	Thunderstorm
31-05-17	2100UTC	Jaipur	NW India	Rajasthan	Thunderstorm
		Ranchi	East India	Jharkhand	Thunderstorm/Hail
01-06-17	0000UTC	Jaipur	NW India	Rajasthan	Thunderstorm
		Amini	South India	Amini Island	Thunderstorm
01-06-17	0300UTC	Jaipur	NW India	Rajasthan	Thunderstorm
		Silchar,	NE India	Assam	Thunderstorm
		Cherrapunji	NE India	Meghalaya	Thunderstorm
		Agartala, Kailasahar	NE India	Tripura	Thunderstorm

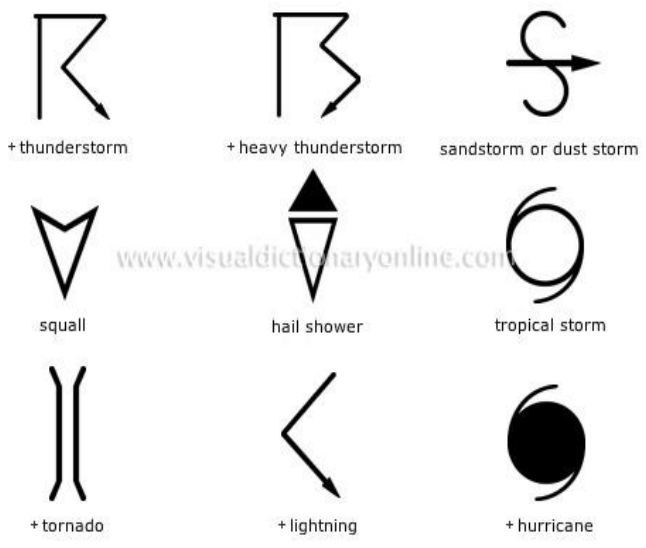
## Past 24 hours DWR Report:

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	Associate d severe weather if any	Districts affected	
Patiala	01-06-17	<b>31 MAY 0302 UTC to 0600 UTC</b>	Multiple cells Max dbz =47.0 Ht 8-10 km	Formed in S,SW and NW dir Movement ENE dir	--	-	Patti, Amritsar, Kapurthala, Mohindergarh, Bhiwani Rewari, Faridabad	
		<b>31 MAY 0600 UTC to 0900 UTC</b>	Multiple cells Max dbz =47.0 Ht 6-8 km	Formed in S and NW dir Movement ENE dir	---	---	Halwara, Ludhiana, Sonapat Delhi Faridabad	
		<b>31 MAY 0900 UTC to 1500 UTC</b>	NO ECHO/NO SIGNIFICANT ECHOS					
		<b>31 MAY 1500 UTC to 1800 UTC</b>	Multiple cells Max dbz =50.0 Ht 10-12 km	Formed in SW and NW dir Movement ENE dir/E direction			Amritsar, Hoshiarpur, Rewari, Piani	
		<b>31 MAY 1800 UTC to 2100 UTC</b>	Multiple cells Max dbz =46.5 Ht 8-10 km	Formed in NE and NW dir Movement IN NE wards direction			Hoshiarpur, Panipat	
		<b>31 MAY 2100 UTC to 0000UTC</b>	Multiple cells Max dbz =44 Ht 8-9 km	Formed in NE and NW dir Movement IN NE wards direction			Mandi	
		<b>01 JUNE 0000 UTC to 0252 UTC</b>	NO ECHO/NO SIGNIFICANT ECHOS	---	---	---	---	---
Lucknow	01-06-17	<b>310300-010300</b>	Nil	Nil	Nil	Nil	Nil	
Srinagar	01/06/17	31MAY 03Z to 01JUNE03Z(24hrs)	Multiple cells developed in SW direction of DWR Srinagar around 1220 hrs	Moved ESE direction and dissipated around 2210 hrs in the east of DWR	Thunderstorm observed at Pahalgam and Srinagar	Light to moderate rain at most places	all	

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
Paradeep	31/05/17	0700-1200 UTC	Isolated cells seen developing in Dhenkanal, Keonjhar & Mayurbhanj at 1250 IST with reflectivity values ranging between 25-40 dBZ and heights exceeding 10kms..	Position: Lat:20.7 degree N Lon:85.9 degree E Movement: Wly	NIL	TS with rain	Dhenkanal, Cuttack, Keonjhar, Mayurbhanj & Balasore.
		1200-2400 UTC	Isolated cells seen developing in Kandhamal at 1730 IST with reflectivity values ranging between 20-45 dBZ and with average heights of 8kms.	Position: Lat:20.3 degree N Lon:84.5 degree E Movement: SWly	These cells later transform into convective regions gradually.	TS with rain	Kandhamal, Boudh, Nayagarh, Angul, Cuttack & Dhenkanal.
	01-06-2017	0000-0300 UTC	Isolated single cell seen to develop in the W SECTOR of the RADAR with maximum reflectivity of 40 dBZ and with average height of 6 km.	Position: Lat:20.5 degree N Lon:85.3 degree E Movement: Wly	Nil	TS with rain.	Boudh, Nayagarh & Khorda.

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 20dBZ echo top and maximum reflectivity	Formation w.r.t radar station and Direction of movement	Remarks	Associated severe weather if any	Districts affected
DWR Machilipatnam	03Z of 31.05.2017 to 03Z of 01.06.2017	0941 to 1521 UTC	Isolated Multiple cells average height of 3.8 km with maximum reflectivity of 53.0dBZ	NW(129KM) and moving NE ly direction with average speed of 35.0kmph	Cell started forming at 0821UTC, at WNW (141km) from Radar the maximum reflectivity during 0931 to 1001 UTC and died down at 1521UTC	Possibility of Thunder storm with rain and winds.	Guntur, Krishna and Bhadradi-Kothagudem Districts.
		1101 to 1331UTC	Isolated Multiple cells average height of 5.0km with maximum reflectivity of 53.0 dBZ	NE (220KM) and moving NEy direction with average speed of 23.0kmph	Cells started forming at 0951UTC at NNE (141KM ) from Radar the maximum reflectivity during 1101 to 1131 and died Down at 1331UTC	Possibility of Thunder storm with hail and light winds.	East Godavari, Bhadradi Kotha-gudem and Dantewara Districts

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
Jaipur	01/06/17	0402-0632 UTC	Multiple cells with average height of 6 km & maximum reflectivity 45.5 dBZ	Cell develop 0402 to 0822 UTC of 31/05/17 towards NW of Jaipur and moved to SE Wards at speed 30-35 km/hr	Cells starts forming from 0402 UTC of 31/05/2017 AT NW of Jaipur and reaches maximum reflectivity during 0530-0632 UTC.	Thunderstorm/ rain at isolated	Jaipur, Churu, Jhunjhunu, Sikar, Pilani, Alwar, Sawai Madhopur
		1012-1452 UTC	Multiple cells with average height of 6.5km & maximum reflectivity 55.5 dBZ	Cell develop 1012 to 1452 UTC of 31/05/17 towards NW of Jaipur and moved to SE at speed 30-34 km/hr	Cells starts forming from 1012 UTC of 31/05/2017 in NW of Jaipur and maximum reflectivity during 1012-1452 UTC died down 1452 UTC.	Thunderstorm/ rain at isolated places	Tonk, Nagaur, Sikar, Alwar, Bharatpur Ajmer,
		1632-0252 UTC	Multiple cells with height of 4.5 km & maximum reflectivity 54 dBZ	Cell developed 1632 to 0252 UTC of 31/05/17 towards N W of Jaipur and moved SE at speed 22-26 km/hr	Cell starts forming from 1632 UTC of 31/05/2017 N W of Jaipur and maximum reflectivity during 2230-0155 UTC and continuous	Thunderstorm /rain at isolated places	Nagaur, Kota, Jhalawar, Bharatpur Bundi, Ajmer, Tonk, Sikar, Jaipur, Sawai Madhopur
Patna	01/06/2017	310300 - 311700	NIL	NIL	N/A	N/A	N/A
		311700 - 312000	Multi Cell. Maximum Reflectivity : 50.5 dBZ Echo Top : 10.5 KM	Range: 125.3 KM from DWR Patna in SSE direction. Movement-ENE	Warning E-mail and Fax sent to State Disaster management Authority and Concern DMs	THUNDER-STORM WITH RAIN,GUSTY WIND, HAIL.	Banka, Jamui, Seikhpura, Munger, Lakhisarai, Nawada, Nalanda, Gaya
		312000 - 010300	NIL	NIL	N/A	N/A	N/A



∞	haze
☁	smoke
☁	dust or sand storm
☁	fog
☔	drizzle
•	rain
✪	snow
☾	showers
⚡	hail
☁	thunderstorm
<b>Weather Symbols</b>	