# India Meteorological Department

## FDP STORM Bulletin No.44 (18-04-2017)

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

### SYNOPTICFEATURES:

The upper air cyclonic circulation over north Telangana & neighbourhood now lies over North Interior Karnataka & neighbourhood and extends upto 0.9 km above mean sea level. A trough extends from this system to Lakshadweep area upto 0.9 km above mean sea level.

An upper air cyclonic circulation lies over Odisha & neighbourhood at 1.5 km above mean sea level. A trough extends from this system to Comorin area at 1.5 km above mean sea level with an embedded upper air cyclonic circulation over south Coastal Andhra Pradesh & neighbourhood at 1.5 km above mean sea level.

An upper air cyclonic circulation lies over north Haryana & neighbourhood and extends upto 0.9 km above mean sea level. A trough extends from this system to Vidarbha upto 0.9 km above mean sea level with an embedded upper air cyclonic circulation over Vidarbha extending upto 0.9 km above mean sea level.

An upper air cyclonic circulation lies over south Pakistan and adjoining southwest Rajasthan and Saurashtra & Kutch between 1.5 km and 3.1 km above mean sea level.

An upper air cyclonic circulation lies over northeast Uttar Pradesh & neighbourhood at 1.5 km above mean sea level.

The trough from South Interior Karnataka to south Tamilnadu extending upto 0.9 km above mean sea level has become less marked.

The upper air cyclonic circulation over north Odisha & adjoining Jharkhand & Chhattisgarh extending upto 1.5 km above mean sea level has become less marked. The trough from this system to Coastal Karnataka across Andhra Pradesh at 1.5 km above mean sea level has also become less marked.

A fresh western disturbance likely to affect western Himalayan region from tomorrow onwards

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

**Current Observation (based on 0900UTC imagery of INSAT 3D):**

**Convective Activity & Cloud Description:**

| Cell No. | Date/Time | Area/Location | CTBT (minus $^0$C) | Movement | Remarks |
|---|---|---|---|---|---|
| 1 | 18/0900 | N coastal Andhra Pradesh adjoining S Odisha | 66 | --- | Developing |

Scattered low/medium clouds with embedded moderate to intense convection were seen over north coastal Andhra Pradesh and south Odisha. Scattered low/medium clouds with embedded isolated weak convection over Bay Islands. Scattered low/medium clouds were seen over J & K, Uttarakhand, north Sikkim, north-eastern states, rest Andhra Pradesh and Kerala.

**Arabian Sea:**

No significant clouds over the region.

**Bay of Bengal & Andaman Sea:**

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

## Past Weather:

**Convection:**

Moderate to Intense convection was observed over South Interior Karnataka & Tamilnadu.

**OLR**:

Up to 270 $wm^{-2}$ was over J&K, HP , Uttarakhand  North East States South Interior Karnataka Kerala & North-west Tamilnadu.
Up to 310 $wm^{-2}$ was over Bihar West Bengal Coastal Andhra Pradesh  & Coastal Tamilnadu.
Up to 340 $wm^{-2}$ was over rest parts of India.

**Jet Stream:**

No Jet stream and trough observed over India.

**Dynamic Features:**

Positive shear tendency observed over S Bihar Uttar Pradesh C Rajasthan and negative shear tendency observed over rest parts of India.

A low wind shear is observed over Rajasthan Uttar Pradesh, N Bihar, Punjab, Haryana, Himachal Pradesh, Uttarakhand while high wind shear is observed over rest parts of India.

A positive Vorticity field is seen over South Interior Karnataka, Rayalaseema Telangana Jharkhand & north Gujarat.

Negative low level convergence observed over J&K Konkan.

Positive Low Level Convergence observed over rest parts of India

**Precipitation**:

**IMR**:  Rainfall upto 1**0**mm was observed over South Interior Karnataka & North-West Tamilnadu.

**HEM**: Rainfall upto 14 mm was observed over South Interior Karnataka North-West Tamilnadu & South-East Manipur

## RADAR and RAPID observation:

Multiple moderate echoes (dBZ around 50 and height around 10-15km) were seen in DWR Vishakhapatnam at 1111UTC. Isolated echoes were also seen in DWR Chennai (dBZ 45-50 & height around 10km), DWR Machilipatnam (dBZ around 45 & height 8km) and DWR Paradeep (dBZ around 40 & height 10km) at 1111UTC. DWR Composite at 1100 UTC (1630IST) indicated convective cells over Andhra Pradesh, Odisha, south Chhattisgarh and near Tamilnadu coast.

RAPID RGB imagery of 1600hrs IST indicates convective cells over Andhra Pradesh, Odisha, south Chhattisgarh, Karnataka, and Nicobar Islands.

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

Dust concentration was observed over Arabian Peninsula. Dust concentration is expected to increase over western India for next five days.

High PM10 concentration was observed over Rajasthan. PM10 concentration is expected increase over north India for next five days

## 2. NWP MODEL GUIDANCE:

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

**1. Weather Systems:**
12UTC Charts of all the days from day-1 to Day-4 show feeble trough over J & K.
12UTC Charts of all the days show Heat Low over Rajasthan and adjoining Pakistan and its extension over IG plains is prominent. The MSLP values are well below 994 hPa over a large area from Day 1.
12UTC charts on all days from Day0-4 show two zones of wind discontinuity at 925 hPa: (i) SW-NE extending from northern Karnataka-Telangana region to Odisha-WB region. (ii)S-N extending from southern parts of TN to northern parts of Karnataka-Telangana region.
00UTC of Day 1-4 show a trough over southern peninsula extending from Maharashtra, Karnataka to Tamilnadu.
**2. Location of jet and jet core at 500hPa**:-**500hPa Jet core (>60kt)**:
Weaker core winds at 12 UTC on all days over India.
**3. Convergence at 850 hPa:**
At 12UTC on all Days: Along the west coast prominently over Maharashtra. Over isolated locations of Odisha, adjoining Chhattisgarh and Jharkhand on all days. Day 4: Higher values over Punjab.
**4. Low level Vorticity:-Positive Vorticity (>15 x $10^{-5}$/s):**
At 12UTC on Day-1-4: Isolated locations over Eastern UP, Bihar, Odisha, Chhattisgarh and Jharkhand and Assam.
At 00UTC on all days: Strong structure over land extending N-S from western part of India
**5. Showalter Index: -3 to -4[Very unstable]:**
At 12UTC: Day 0: Along east and west coast
Day-1,3 and Day-4 High magnitude over east UP, Bihar, Jharkhand, WB, Odisha, along west & east coast of India and southern parts of NE states.
Day2: Along the east coast, Telangana and NE states
At 00UTC on Day-3: Very low values (<-6) over Telangana.
**6. K-Index :> 35[Very Unstable thunderstorm likely]:**
At 12UTC: Day 0: Along coast of Kerala and some parts of TN. In Eastern India over WB, and Jharkhand with adjoining Odisha and Chhattisgarh.
At 12UTC: Day 1: Along coast Kerala and some parts of TN. In Eastern India over WB, and Jharkhand with adjoining Odisha and Chhattisgarh. Entire NE India.
Day-3 and Day-4 High magnitude over some parts of Telangana, Tamilnadu, most parts of J&K and NE India
**7. Spatial distribution of TTI: TTI >50 [Scattered Thunderstorms few severe]**:
At 12UTC : Day0: Coastal Maharashtra, WB and coastal Odisha, and large parts of NE India.
At 12UTC : Day1-2 Same as in Day-0 with enhanced magnitude over J & K region and extends over Telangana & Jharkhand.
At 12UTC :Day-2: J & K region, Odisha and Chhattisgarh WB, Bihar and Jharkhand.
Day-3&4: Increased values over J & K widespread over eastern India covering parts of MP UP, parts of Bihar, WB.
**8. Rainfall and thunder storm activity**:
>8 cm/day in Day-3 & 4 over Assam and Meghalaya

>16cm/day in Day 5 over Assam and Meghalaya.
>2cm in Day 4 & 5 over J&K

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

**1. Weather Systems:**
00 UTC analyses shows a north-south oriented low level trough of low starting from Jharkhand and adjoining Gangetic West Bengal (GWB) regions to Marathwada and adjoining north Karnataka region and this trough of low will persist for the next 2 days.
Analyses also shows a low level CYCIR over NE India and this CYCIR will persist for the next 2 days.
**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 x $10^{-1}$/s):**
Analysis shows low level positive vorticity **(>12 x $10^{-5}$/s)** mainly over the foothills of Himalaya, along the west coast of India, SHWB, Jharkhand, GWB and isolated pockets of NE states.
Forecast shows vorticity core zones mainly along the foothills of Himalaya, west coast of India, and isolated pockets of GWB and NE states, Marathwada, interior parts of Karnataka and few pockets along the east coast bordering Odisha and SHWB along with few regions of the north eastern states for the next 3 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 Jharkhand, GWB, along the east of India and few pockets in NE india and along the west coast of India. Forecast shows significantly high threshold values over west coast of India, GWB and eastern coast for the next 3 days.
**Lifted Index (< -2):** The areas with index less than -2 lies along east coast regions, GWB, Odisha, coastal AP, and along the west coast of India and Kerala coast with gradually the LI areas with less than -2 mainly extended towards southern coastal regions.
**Sweat Index (> 400):** 00UTC shows significant values over major parts along with the east coast extending up to coastal TN and also over west coast of India and few isolated pockets in the NE states. The significant zones are confined along east coast of India over GWB, Odisha, Bangladesh and adjoining regions and high value of SI observed over GWB and south AP coastal regions and NE region for next 5 days and also over few pockets in the south west region.
**Total Total Index (> 50):** Analysis shows significant values over few pockets in Gujarat, MP and adjoining areas. Above threshold value in most regions of central and western India and adjoining northern parts of India along with areas bordering north west India for the next 2-3 days.
**CAPE (> 1000):** Mostly along east coast of India over GWB, Odisha and adjoining AP regions along with parts in south peninsular region and coastal Kerala and Karnataka during the next 5 days.
**CINE (50-150):** Maximum CINE values are found in some areas of GWB and along east coast over Odisha, coastal AP and Tamil Nadu and also along the west coast of India for the next 2-3 days..
**5. Rainfall and thunderstorm activity:**
10-40 mm rainfall is forecasted tomorrow over some parts of the NE states and also some parts of J&K, Kerala regions. Rainfall activity over J&K and NE states will increase from day-2 onwards and light to moderate rainfall will continue over Kerala for the next 2-3 days.

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

**1. Model Reflectivity (Max.dBz): (>25 dBZ) )**

Model reflectivity exceeding the threshold value, is forecasted over most parts of NE states, J&K and some parts of coastal Karnataka and Kerala on day 1. Model reflectivity exceeding the threshold value are also forecasted over most parts of NE states, J&K regions and some isolated pockets of Kerala in the day-2 forecast.

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

**Total Total Index (> 50)** Above threshold values is observed over most parts of NE India during next 24 hour .

**K-Index (> 35):** Above threshold values is observed over most parts of NE India and over Kerala regions during the next 24 hour.

**CAPE (> 1000):** Mostly along east coast of India over GWB, along the east coast and west coast of India during next 1-2 days. Another zone along west coast of India, particularly over coastal Kerala, coastal Karnataka and Konkan & Goa during next 2 days.

**CINE (50-150):** CINE values are mostly small all over coastal regions of India during all three days of forecasts except some areas over Odisha, GWB, Eastern UP, Bihar, Jharkhand, coastal AP, coastal Karnataka and Konkan-Goa during next 3 days.

**3. Rainfall and thunderstorm activity:**

Rainfall activity (~ 10-40 mm) is expected to persist till next 2 days over some parts of Karnataka and Kerala and most parts of NE states and J&K and this rainfall activity will start increase from day-2 onwards over most parts of NE states.

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

### Summary and Conclusions:

**Day 1 & Day 2:**

Presently, the upper air cyclonic circulation lies over North Interior Karnataka & neighbourhood and extends upto 0.9 km above mean sea level. A trough extends from this system to Lakshadweep area upto 0.9 km above mean sea level, due to this system entire Karnataka and interiors Tamilnadu, coastal Andhra Pradesh including Kerala will experience thunderstorm with gusty winds on Day-1.

An upper air cyclonic circulation lies over Orissa & neighbourhood at 1.5 km above mean sea level. A trough extends from this system to Comorin area at 1.5 km above mean sea level with an embedded upper air cyclonic circulation over south Coastal Andhra Pradesh & neighbourhood at 1.5 km above mean sea level. Due to that on Day-1, Orissa will experience thunder squall with hail.

Due to the system, on Day-2, similar activities will be there over Karnataka and interiors Tamilnadu, coastal Andhra Pradesh including Kerala

**24 hour Advisory for IOP:**

Orissa
South and North Interior Karnataka
Kerala and Interior Tamilnadu, Eastern Parts of Telangana
GWB
West Assam, Meghalaya and Nagaland, Manipur, Mizoram and Tripura
Coastal Andhra Pradesh

**48 hour Advisory for IOP:**

Kerala and Interior Tamilnadu
South Interior Karnataka, Eastern Parts of Telangana
Sub Himalayan West Bengal, Bihar, GWB
Assam, Meghalaya and 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
http://amssdelhi.gov.in/
http://www.amsskolkata.gov.in/
ForRAPIDtool:
http://rapid.imd.gov.in/
LowLevelWinds
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Upperlevelwinds
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Past24hourHEMandIMRrainfall(upto03UTCoftoday)
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HEM:http://satellite.imd.gov.in/img/3Ddaily_he.jpg
ForRadarimagesofthepast24hoursincludingmosaicofimages:
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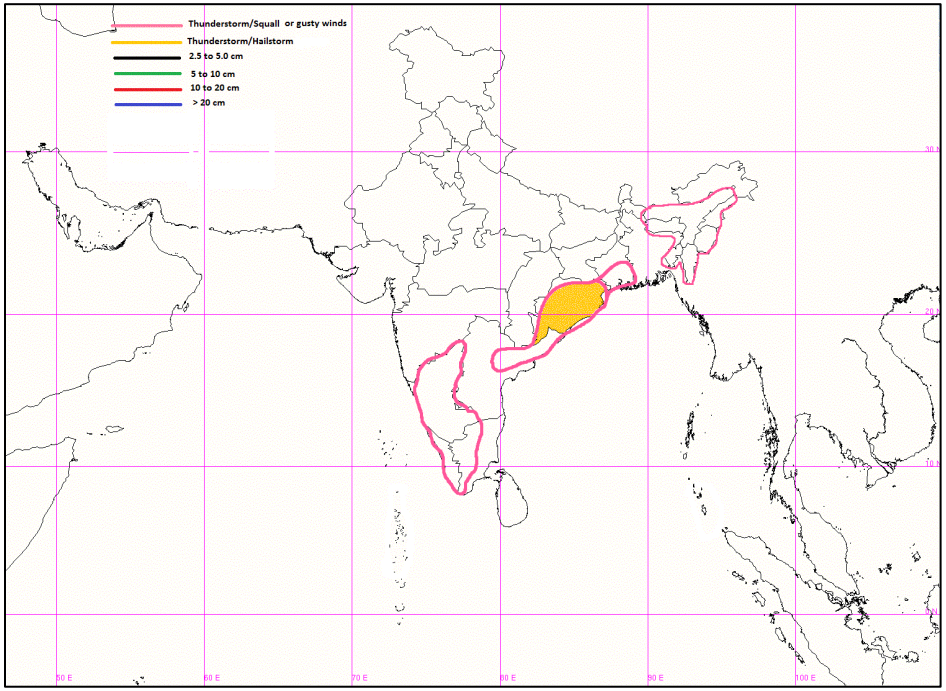
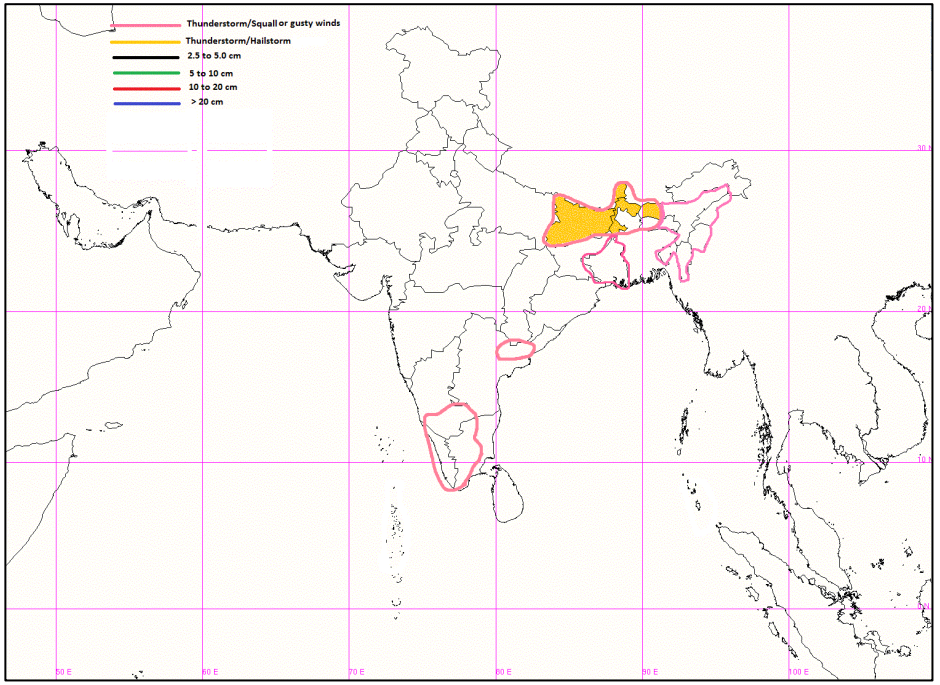



**IOP Advisory for 24hours**




**IOP Advisory for 48hours**

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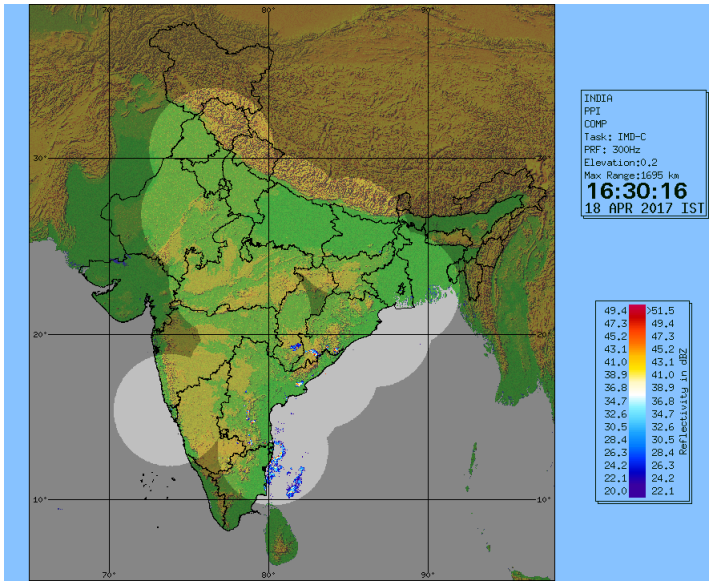
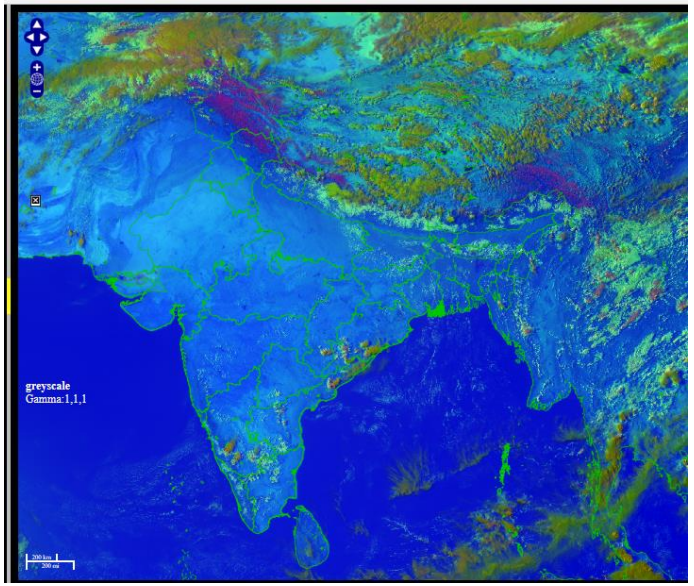
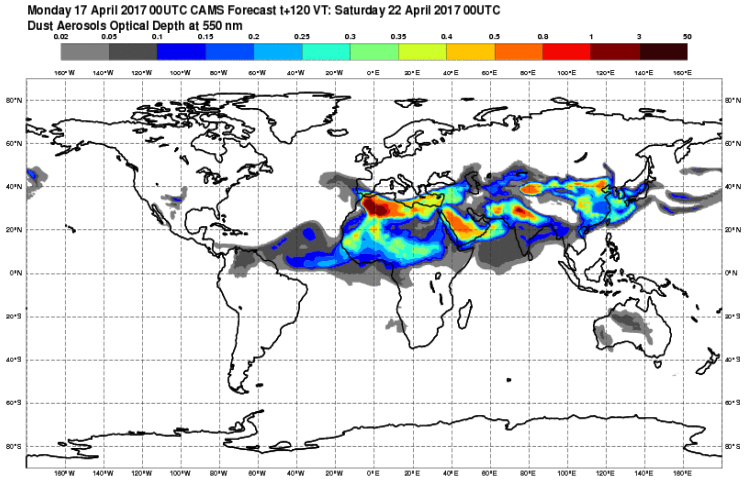
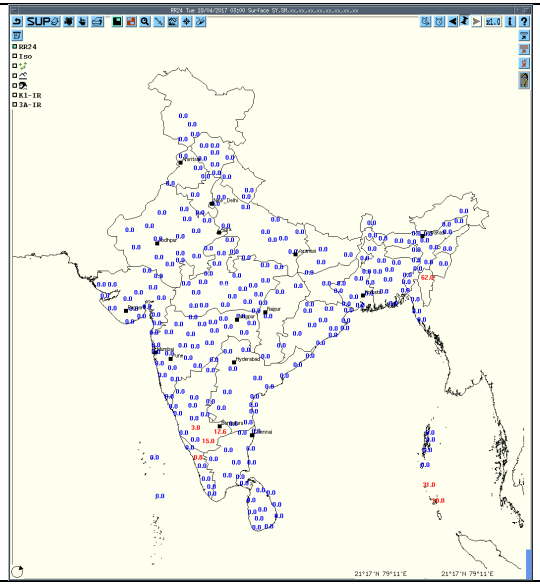
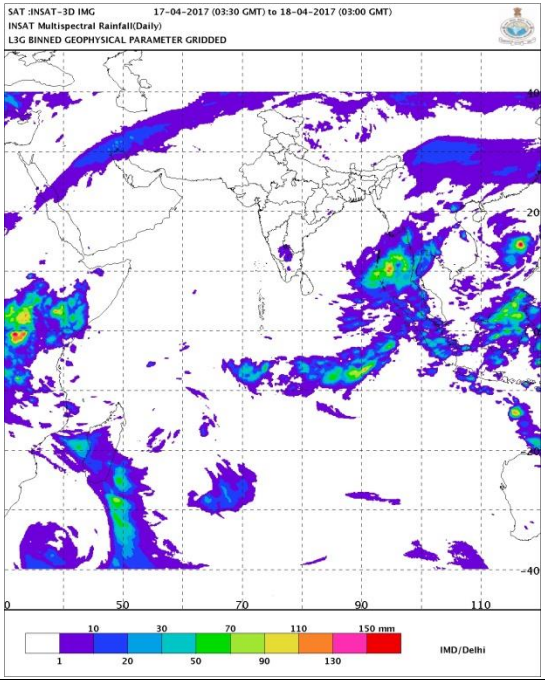
|  |  |
| **DWR Composite at 1630 hrs IST of today** | **RAPID RGB Image of INSAT 3D at 1600 hrs IST of today** |



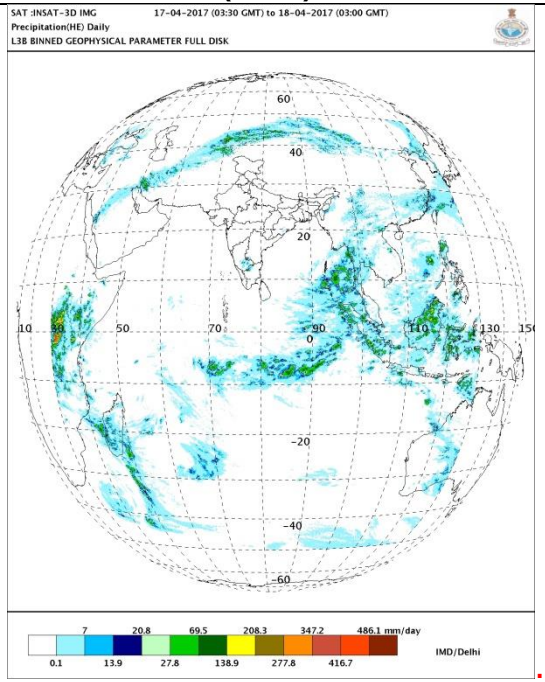

**Forecast Dust Concentration for 00UTC of 22th April**



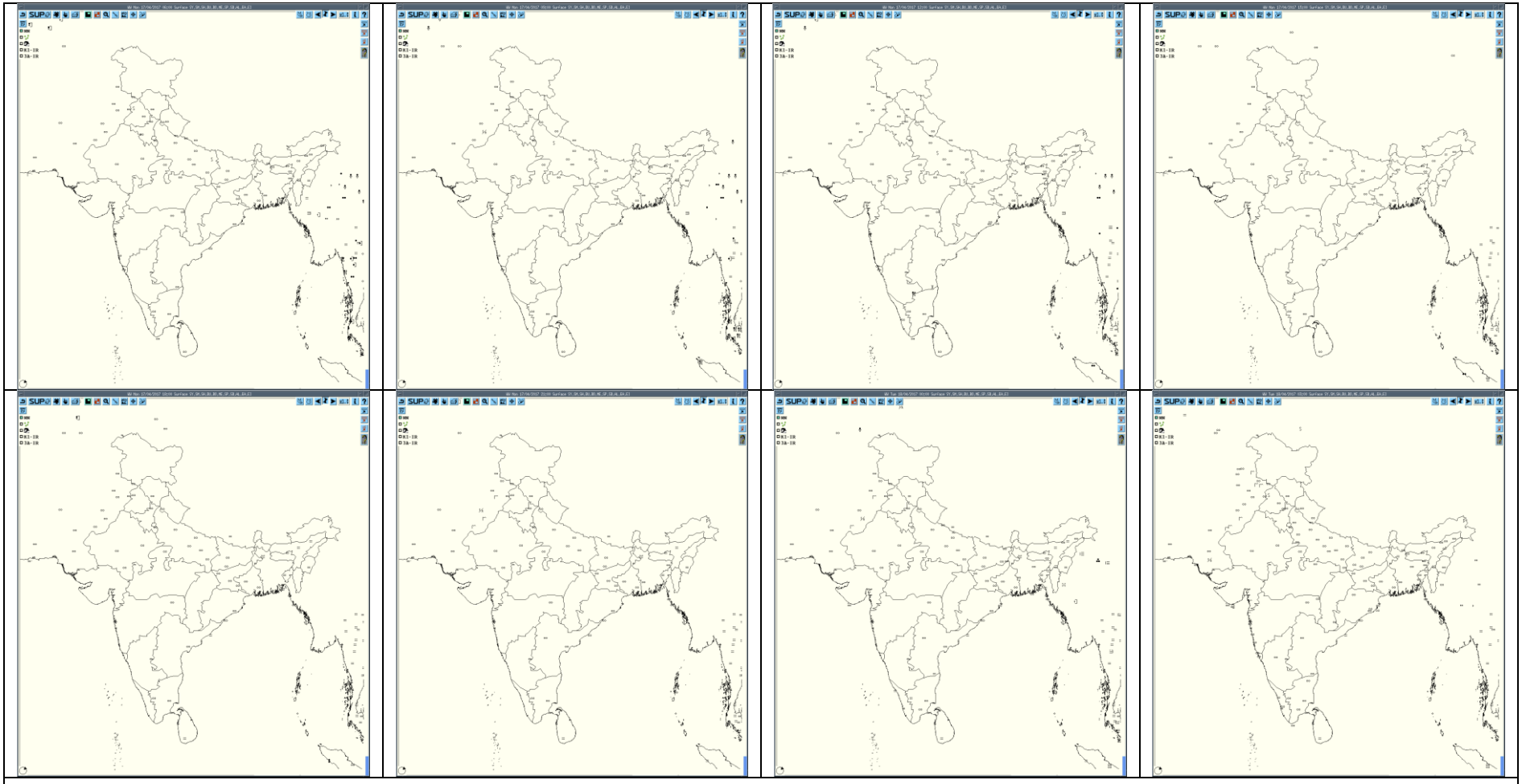
**Accumulated 24 Hour rainfall (in red) recorded at 0300 UTC of today**




**IMR Rainfall**




**HEM Rainfall**



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

| | | |
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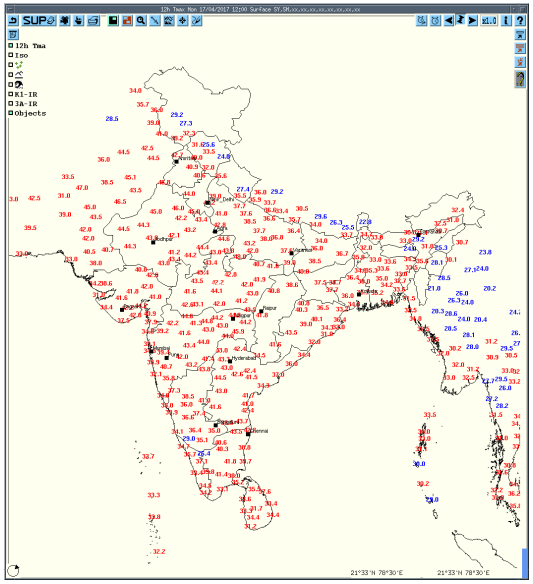
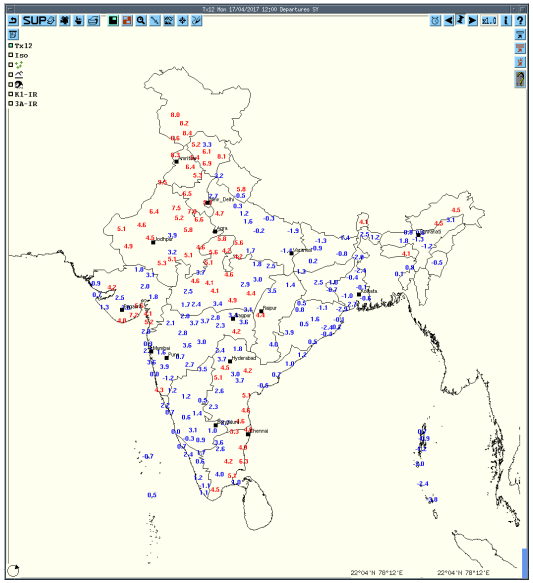
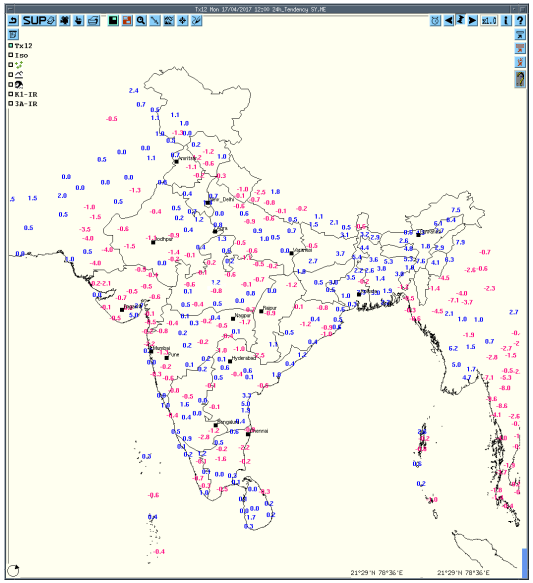
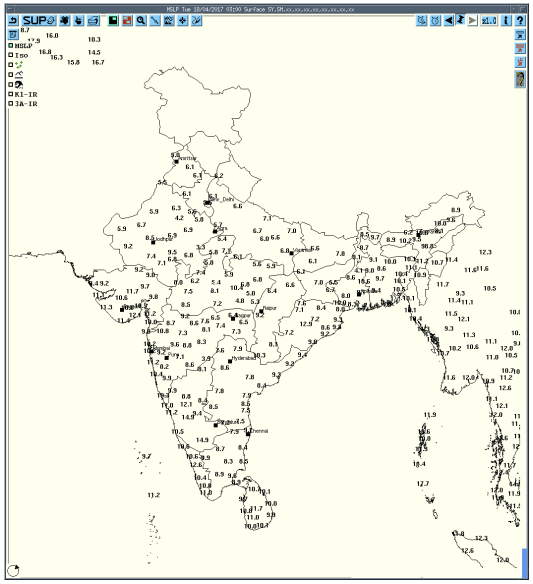
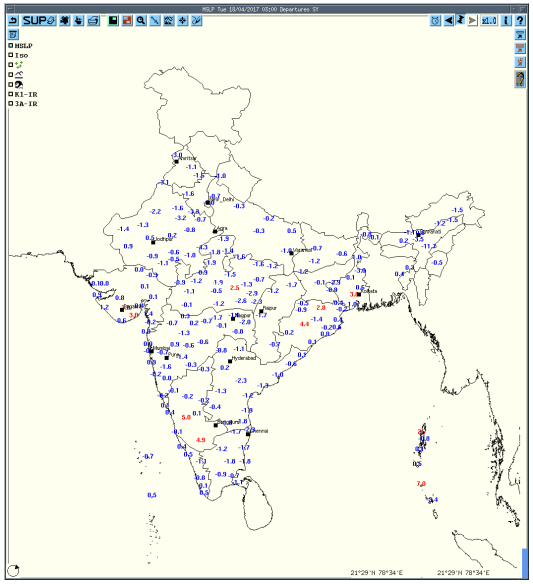
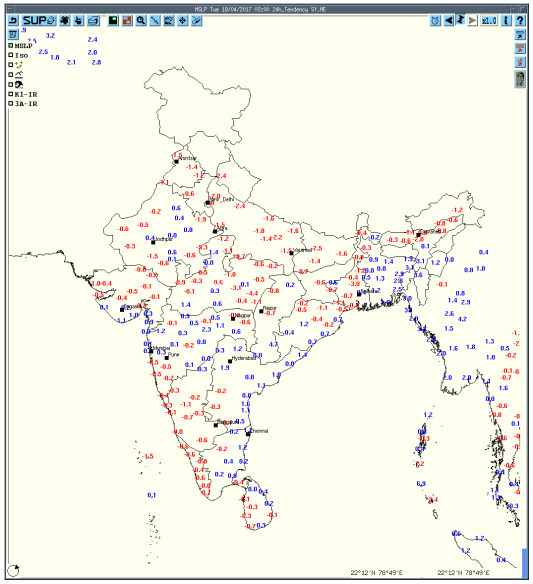
|  |  |  |
| **Tmax** | **Departure Tmax** | **Tendency Tmax** |
|  |  |  |
| **MSLP** | **Departure MSLP** | **Tendency MSLP** |

| | |
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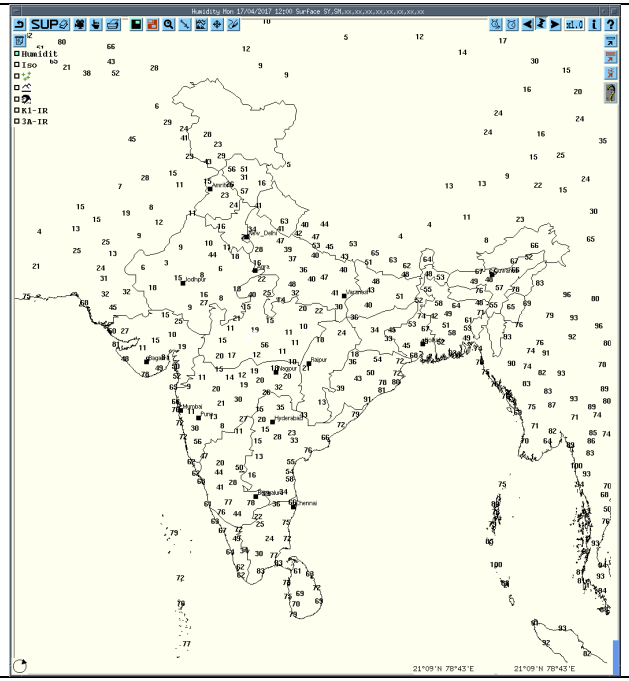
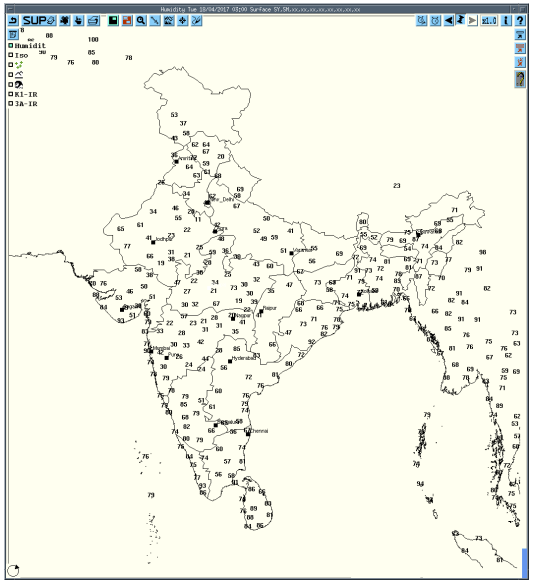
|  |  |
| **RH at 12UTC yesterday** | **RH at 03UTC today** |

| Realized weather past 24 hours (Based on SYNERGIE Products) | | | | | |
|---|---|---|---|---|---|
| **Date** | **Time of Reporting** | **Name of Station Reporting** | **Region** | **STATE** | **Weather Event** |
| 17-04-17 | 0600 UTC | Nil | Nil | Nil | Nil |
| 17-04-17 | 0900 UTC | Nil | Nil | Nil | Nil |
| 17-04-17 | 1200 UTC | Bengaluru | South India | Karnataka | Thunderstorm |
| 17-04-17 | 1500 UTC | Nil | Nil | Nil | Nil |
| 17-04-17 | 1800 UTC | Nil | Nil | Nil | Nil |
| 17-04-17 | 2100 UTC | Nil | Nil | Nil | Nil |
| 18-04-17 | 0000 UTC | Nil | Nil | Nil | Nil |
| 18-04-17 | 0300 UTC | Nil | Nil | Nil | Nil |

| Realised TS/HS/SQ during past 24 hours ending at 0300UTC of today(received from RMCs/MCs) | | | | | | |
|---|---|---|---|---|---|---|
| **Name of Station Reporting** | **Region** | **STATE** | **Weather Event (TS/Hail/Squall)** | **Date** | **Time of Commencement (IST)** | **Time of end (IST)** |
| Yelahanka IAF | South India | Karnataka | Thunderstorm | 17-04-17 | 1700 | 1830 |
| Bengaluru City | South India | Karnataka | Thunderstorm | 17-04-17 | 1705 | 1730 |
| **Bengaluru City** | **South India** | **Karnataka** | **Hailstorm (Diameter-0.3 cm)** | **17-04-17** | **1710** | **1715** |
| AMS Bangalore | South India | Karnataka | Thunderstorm | 17-04-17 | 1605 | 1820 |
| **AMS Bangalore** | **South India** | **Karnataka** | **Thunder with Squall Max speed: 52 Kmph Direction: WSW** | **17-04-17** | **1625** | **1626** |
| Tirupathi AP | South India | Andhra Pradesh | Thunderstorm | 17-04-17 | 1550 | 1900 |

## 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 |
|---|---|---|---|---|---|---|---|
| Jaipur | 18-04-17 | 170300-180300 | Nil | Nil | Nil | Nil | Nil |
| Patiala | 18-04-17 | 170302-180252 | Nil | Nil | Nil | Nil | Nil |
| Agartala | 18-04-17 | 170300-180300 | Nil | Nil | Nil | Nil | Nil |
| Nagpur | 18-04-17 | 170302-172352 | Nil | Nil | Nil | Nil | Nil |
| | | 180302-180312 | Single | 125 km E | < 10 dBZ | | |
| Lucknow | 18-04-17 | 170300-180300 | Nil | Nil | Nil | Nil | Nil |
| Hyderabad | 18-04-17 | 170852 –17 1152 | Isolated cells with an average height of 10.6 Km with a max reflectivity of 53.5 dBZ | SSE (180 Kms) moving in Southerly Direction at a speed of 15 Kmph. | Cells started forming at 0852 UTC at SSE (180 Kms) from radar, Matured in size. Max reflectivity was between 0942 and 1012 UTC and dissipated at 1152 UTC. | Thunderstorm with or without rain | NE of Nalgonda district. |
| | | 0852 – 1152 UTC | Isolated cells with an average height of 10.6 Km with a max reflectivity of 53.5 dBZ | SSE (180 Kms) moving in Southerly Direction at a speed of 15 Kmph. | Cells started forming at 0852 UTC at SSE (180 Kms) from radar, Matured in size. Max reflectivity was between 0942 and 1012 UTC and dissipated at 1152 UTC. | Thunderstorm with or without rain | NE of Nalgonda district. |
| Patna | 18-04-17 | 170300-180300 | Nil | Nil | Nil | Nil | Nil |
| Srinagar | 18-04-17 | 170300-180300 | Nil | Nil | Nil | Nil | Nil |
| Paradeep | 18-04-17 | 170300-171800 | Two Isolated single cells seen to develop around 1200 UTC having | Position: Cell 1: Lat:21.71 N | Cells seen to dissipate within two hours. | TS with light Rain. | Sundergarh, Debagarh, Angul, |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | maximum reflectivity of 42 dBZ and heights exceeding 14 kms. | Lon: 85.43 E Cell 2: Lat:20.23 N Lon:84.32 E Movement is NWly and Ely respectively. | | | Sudergarh, Kandhamal, Nayagarh. |
| Machilipatnam | | 0741 to 0831 UTC | Isolated cell with average height of 9.6 km with maximum reflectivity of 55.5 dBZ | NE(249KM) , moving SW ly direction average speed of 12.0kmph | Cells started forming at 0741UTC at NE(249km) from radar. Maximum reflectivity during 0741 to 0821 and died down at 0831UTC | Possibility of Thunder storm and rain with light winds. | Visakhapatnam District (82.655Lon/17.885Lat) |
| | | 0851 to 1051 UTC | Isolated cell with average height of 10.5km with maximum reflectivity of 60.5 dBZ | NW(218KM) moving SE ly direction average speed of 15.7kmph | Cells started forming at0851UTC at NW(218km) from radar. Maximum reflectivity during 0901 to 1041 and died down at 1051 UTC | Possibility of Thunder storm and rain with light winds. | Khammam District near Mahabubabad (80.094Lon/17.610Lat) |
| | | 0901 to 1131 UTC | Isolated cell with average height of 11.6km with maximum reflectivity of 60.5 dBZ | NW(199.4KM) moving SE ly direction average speed of 18.5kmph | Cells started forming at 0901UTC at NW(199.4km) from radar. Maximum reflectivity during 0911 to 1131 and died down at 1131 UTC | Possibility of Thunder storm and rain with light winds. | Khammam district (80.156Lon/17.677Lat) |
| | | 1031 to 1401 UTC | Isolated cell with average height of10 km with maximum reflectivity of 60.5 dBZ | SW(173.1KM) moving SW ly direction average speed of 20.14kmph | Cells started forming at 1031UTC at SW(173.1km) from radar. Maximum | Possibility of Thunder storm and rain with light winds. | Prakasam district (79.555Lon/15.077Lat) |

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| | | | | | reflectivity during 1031 to1321 and died down at 1401 UTC | | |
| | | 1101 to 1201 UTC | Isolated cell with average height of11.88 km with maximum reflectivity of 58 dBZ | NW(99.7KM) moving SW ly direction average speed of 6.6kmph | Cells started forming at 1101UTC at NW(99.7km) from radar. Maximum reflectivity during 1111 to1151 and died down at 1201 UTC | Possibility of Thunder storm and rain with light winds. | Krishna district near Nandigama (80.561Lon/16.838Lat) |
| Kolkata | 18-04-17 | 170311-180300 | Nil | Nil | Nil | Nil | Nil |
| Vishakhapatnam | 18-04-17 | 170900 | Isolated single cell in NNW with average ht of 10 km and max reflectivity of 47 dBZ.<br><br>Isolated multiple cells in NNe with average ht of 12 km and max reflectivity of 55dBZ | NNW at 72 kms .<br><br>NNE at 233 kms. | Moving in SSE Direction and getting intensified | - | - |
| | | 171200 | Isolated multiple cells in NE direction with average ht of 10 km and max reflectivity of 53dBZ | NEly at about 185 kms | Moving in NE Direction and dissipated. | - | - |