# IndiaMeteorologicalDepartment

## FDPSTORMBulletinNo.40(14-04-2017)

## 1. CURRENTSYNOPTICSITUATIONat0300UTCofthe Day:

### SYNOPTICFEATURES:

♦ The low pressure area over Southeast Bay of Bengal & neighbourhood has become well marked over the same region and associated upper air cyclonic circulation extends upto mid-tropospheric levels. It is very likely to concentrate into a depression during next 36 hours and intensify further during subsequent 24 hours. The system is very likely to move north-northeastwards during next 72 hours.

♦ The trough from Madhya Maharashtra to south Tamilnadu across Interior Karnataka extending upto 0.9 km above mean sea level persists.

♦ An upper air cyclonic circulation lies over northwest Rajasthan & neighbourhood and extends upto 1.5 km above mean sea level.

♦ A trough runs from the above cyclonic circulation over northwest Rajasthan to Nagaland across Madhya Pradesh, Jharkhand & Gangetic West Bengal and extends upto 0.9 Km above mean sea level with embedded upper air cyclonic circulation over Jharkhand & neighbourhood extending upto 1.5 km above mean sea level.

♦ A trough runs in mid-tropospheric westerlies along longitude 88.0 °E and north of latitude 22.0 °N.

♦ The feeble Western Disturbance as an upper air cyclonic circulation over north Pakistan & adjoining Jammu & Kashmir extending upto 3.1 Km above mean sea level has moved away eastnortheastwards.

♦ The upper air cyclonic circulation over Madhya Maharashtra & neighbourhood extending upto 0.9 km above mean sea level has become less marked.

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

**Convective Activity& cloud Description (based on 0300UTC imagery of INSAT 3D):**

LOW LEVEL CIRCULATION (LLC):-

BKN LOW/MED CLOUDS WITH EMBDD MOD TO INT CONVTN OVER S BAY BET LAT 8.0N TO 13.50N LONG 84.5E TO 93.5E IN ASSW LOW LEVEL CIRCULATION OVER THE AREA (.)

WESTERN DISTURBANCE (WD) :-

SCT M/LAYERED CLOUDS OVER N TIBET ADJ CHINA IN ASSW WD OVER THE AREA (.)

SCT M/LAYERED CLOUDS OVER NW SAUDI ARABIA IRAQ CASPIAN SEA & N/HOOD IN ASSW ANOTHER WD OVER THE AREA (.)

**Convection**

Scattered Low Medium Clouds over J&K, Himachal Pradesh and North Uttarakhand. Scattered Low Medium Clouds over Sikkim and Arunachal Pradesh. Scattered Low Medium Clouds with embedded weak to moderate convection over Kerala, Tamil Nadu, Bay Islands

**Arabian Sea:**

SCT LOW/MED CLOUDS WITH EMBDD MOD TO INT CONVTN OVER SE ARSEA OFF KER COT & COMORIN.

**Bay of Bengal & Andaman Sea:**

BKN LOW/MED CLOUDS WITH EMBDD MOD TO INT CONVTN OVER REST S BAY & C BAY ANDAMAN SEA (.)

**PAST WEATHER**

**Convection:**
Light to moderate convection was observed over J&K, Kerala and Tamilnadu..
**JetStream:**
No Jet stream and trough observed over India.
**DynamicFeatures:**
Positive shear tendency observed over India.
Low wind shear observed over south and weak to moderate wind shear observed over rest India .
A positive Vorticity field is seen over Karnataka, Vidarbha and Odisha adjoining East Madhya Pradesh.
Positive Low Level Convergence observed over India except Negative low level convergence observed over South Coastal Gujarat.
**Precipitation:**
IMR: Rainfall upto 30mm was observed over Kerala. Rainfall upto 20mm was observed over Extreme North J&K. Rainfall upto 10mm was observed over rest North J&K, North East Meghalaya, Sikkim, North West Arunachal Pradesh, North east Tamilnadu and Extreme South Tamilnadu.
HEM:. Rainfall upto 14mm was observed over South Kerala, North East Meghalaya and West Arunachal Pradesh. Rainfall upto 07mm was observed over North West J&K, North East Tamilnadu

**RADAR and RAPID observation:**
Isolated light convection was observed in DWR Agartala at 1330 IST. No other significant convection was seen in DWR Composite of 1630hrs IST.
RAPID RGB Imagery of 1300 hrs IST indicates convective clouds over Meghalaya and Andaman &Nicobar Islands.

**Environmentalcondition(dustetc)anditsforecastbasedon00UTCofdate:**

NOT RECEIVED

## 2. NWP MODEL GUIDANCE:

**NCMRWF (NCUM Forecasts based on 00 UTC of the day):**
**1. Weather Systems:**
12UTC Charts on Day0 show trough in MSLP over J & K extending NW-SE. On rest of the days, the development of Heat Low over Rajasthan and adjoining Pakistan and its extension over IG plains is prominent. Over Bay of Bengal the intensification of the low pressure system and its movemebt towards Myanmar coast from Day0 to 00UTC on Day-3 is evident.
12UTC charts on all days from Day0-4 show wind discontinuity at 925 hPa over two regions:(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.
CYCIR over BoB getting intensified as day progresses moving NE wards towards Myanmar.
**2. Location of jet and jet core at 500hPa:-500hPa Jet core (>60kt):**
500hPa Jet core (>60kt) Weaker core winds at 12 UTC on all days over India
**3.Convergence at 850 hPa:**
At 12UTC on Day-0 to Day-2: High values along the western ghats in Karnataka, Maharashtra and Kerala
Day 3-4 Over coast of Maharashtra

Day0-4: Parts of Odisha and WB along with adjoining Jharkhand and Chattisgarh.

**4. Low level Vorticity:-Positive Vorticity (>15 x $10^{-5}$/s):**

Positive Vorticity (>15 x 10-5/s)

At 12UTC : Scattered isolated values in Day-1 to Day-2. In Day-3 and 4 enhanced magnitude over some isolatred regions of Bihar, Jharkhand, WB, Kerala and TN. High Cyclonic vorticity over BoB due to developing system

At 00UTC on all days: Strong structure over land extending N-S from western part of India

**High Cyclonic vorticity over BoB due to developing system**

**5. Showalter Index: -3 to -4[Very unstable]:**

At 12UTC: Day 0-1: Along west coast, some parts of Bihar, WB

Day-3 and Day-4 High magnitude over UP, Bihar, Jharkhand, WB, Odisha, along west & east coast of India and southern parts of NE states.

At 00UTC on Day-3-5: Large belt of high magnitude extending SW to NE fron NI Karnataka-Telanagana region to Chattis garhs Odisha region.

**Additionally moderate values of index are prominient over large parts of BoB associated with system.**

**6. K-Index :> 35[Very Unstable thunderstorm likely]:**

At 12UTC: Day 0-1: Along west coast, some parts of Bihar, WB

Day-3 and Day-4 High magnitude over UP, Bihar, Jharkhand, WB, Odisha, along west & east coast of India and southern parts of NE states.

**Additionally moderate values of index are prominient over large parts of BoB associated with system**

**7. Spatial distribution of TTI: TTI >50 [Scattered Thunderstorms few severe]**:

At 12UTC : Day0: WB and coastal Odisha, AP, Kerala, Karnataka, some parts of J&K

Day1 High values over coast of Karnataka, Kerala and parts of Tamilnadu, coastal AP and Odisha, and some parts of J&K and Uttarakhand and Arunachal

Day-3&4: Increased values over coast of Maharashtra and Karnataka, UP, parts of Bihar, WB and NE states

At 00UTC on Day-2,3 and 4: Large belt of high magnitude extending SW to NE fron NI Karnataka-Telanagana region to Chattis garhs Odisha region.

**8. Rainfall and thunder storm activity**:

Day1:Light rainfall activity over Kerala

Day2: 2 cm/day Over Assam and Meghalaya

Day3 :Rainfall > 2 cm/day Meghalaya, east Arunachal and adjoining Asam

Day-3 over western part of Assam and some parts of adjoining Meghalaya and Arunachal Pradesh.

Rainfall >4cm/day in Day-3 over Assam Meghalaya and Arunachal.

**Day 3: >16 cm/day Associated with CYCIR over Andaman.**

Day4-5 Heavy rain associated with CYCIR

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

**1. Weather Systems:**

00 UTC analysis shows a low level CYCIR along with north-south trough over south of Marathwada and adjoining north Karnataka region and this CYCIR will persist for the next 2 days.

Analysis also shows a north-south oriented low level trough of low starting from Jharkhand and adjoining Gangetic West Bengal (GWB) regions to central India and this trough of low will persist for the next 2-3 days.
MSLP analysis shows a low pressure area over SE BoB and will move towards Arakan coast during the next 2-3 days.

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

(>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 AP and along the west coast of India. Forecast shows significant 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 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 regions along with parts in south peninsular region and coastal Kerala and Karnataka during the next 5 days

**CINE (50-150):** Maximum CIN 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 isolated pockets in the NE states and also some parts of Kerala regions. Isolated light to moderate rainfall activity over pockets of NE states and Kerala will continue for the next 2-3 days.

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

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

**(>25 dBZ)** Model reflectivity exceeding the threshold value, is forecasted over isolated pockets of NE states and some parts of Karnataka and Kerala on day 1. Model reflectivities exceeding the threshold value are also forecasted over many pockets of NE India in the day-3 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 3 days..

**K-Index (> 35):** Above threshold values is observed over most parts of NE india and over Kerala regions during next 3 days..

**CAPE (> 1000):** Mostly along east coast of India over Jharkhand, GWB, along the east coast of india during next 3 days. Another zone along west coast of India, particularly over coastal Kerala, coastal Karnataka and Konkan & Goa during next 3 days..

**CINE (50-150):** CIN values are mostly small all over 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 parts of Karnataka, Kerala and most parts of NE states and this rainfall activity will start increase from day-3 onwards over most parts of NE states.

## 3.IOPADVISORYFOR24and48Hrs:

### SummaryandConclusions:

**Day 1 & Day 2:**

In association with the well marked low pressure area over Southeast Bay of Bengal & neighbourhood, heavy rainfall is expected over the Andaman Islands on day 1. On account of subsequent intensification of the system in the next 48 hours and movement in a northeasterly direction, the rainfall is likely to increase over this region on day 2.

In association with the trough from Madhya Maharashtra to south Tamilnadu, thunderstorms accompanied by rainfall is likely to persist over Interior TamilNadu, Kerala and Interior Karnataka on day 1. The trough is likely to persist tomorrow and rainfall belt is likely to continue over the same region on day 2 .

In association with the upper air cyclonic circulation lies over northwest Rajasthan & neighbourhood duststorms and dust raising winds are expected over North Rajasthan on day 1 and day 2.

In association with the trough in the mid-tropospheric westerlies along longitude 88.0 °E and north of latitude 22.0 °N, thunderstorms are likely over the region of North East India and parts of East India on day 1. With the likely eastward shifting of the trough, the rainfall as well as region of thunderstorms is likely to expand eastwards.

**24 hour Advisory for IOP:**

Andaman and Nicobar Islands
Interior Tamilnadu
Kerala, South interior Karnataka,
Assam, Meghalaya
Coastal Orissa, Gangetic West Bengal, Sub Himalayan West Bengal and Sikkim, Bihar

**48 hour Advisory for IOP:**

Andaman and Nicobar Islands
Interior Tamilnadu, Kerala, South interior Karnataka,
Sub Himalayan West Bengal and Sikkim
Meghalaya, Assam and Arunachal Pradesh
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
http://satellite.imd.gov.in/archive/INSAT-3D-IMAGER/3D-PRODUCTS/AMV/LLW/MAR_2017/?C=M;O=D
Upperlevelwinds
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Past24hourHEMandIMRrainfall(upto03UTCoftoday)
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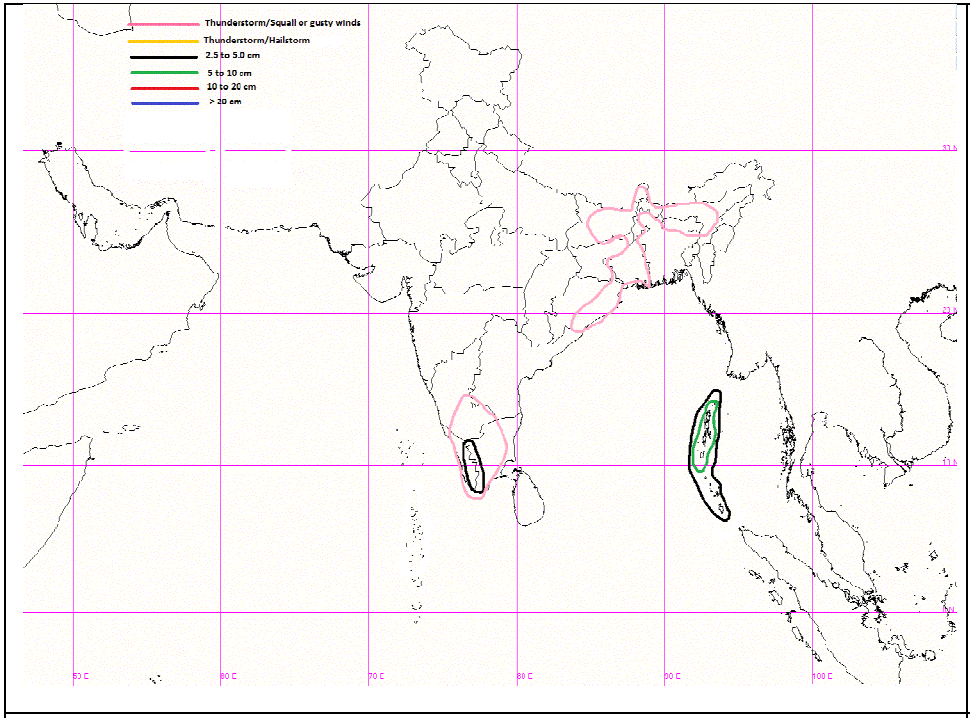
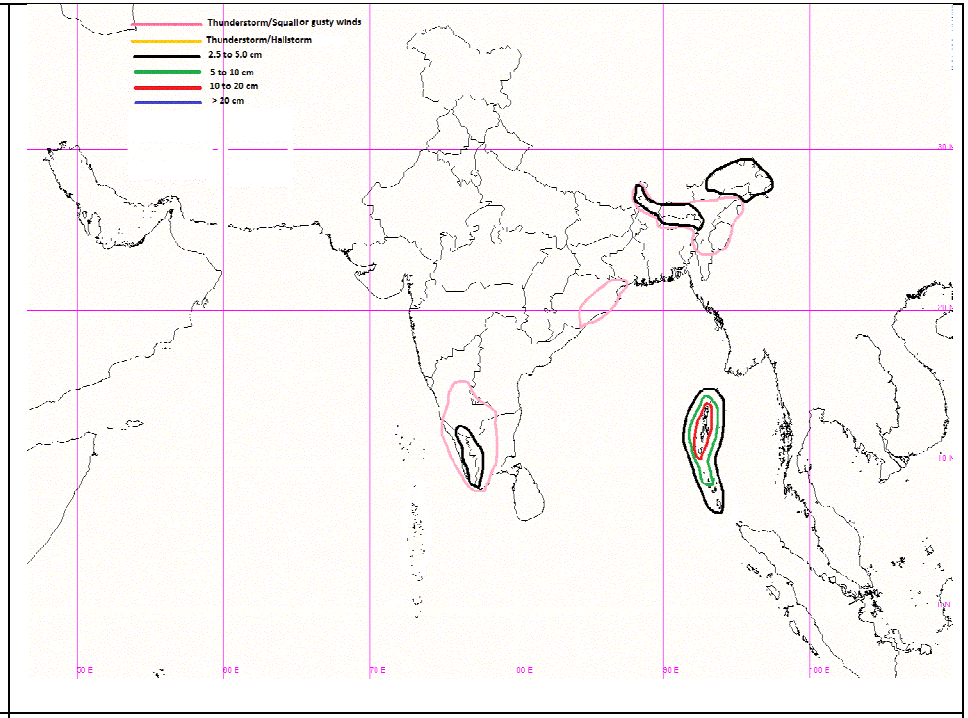



IOPAdvisoryfor24hours

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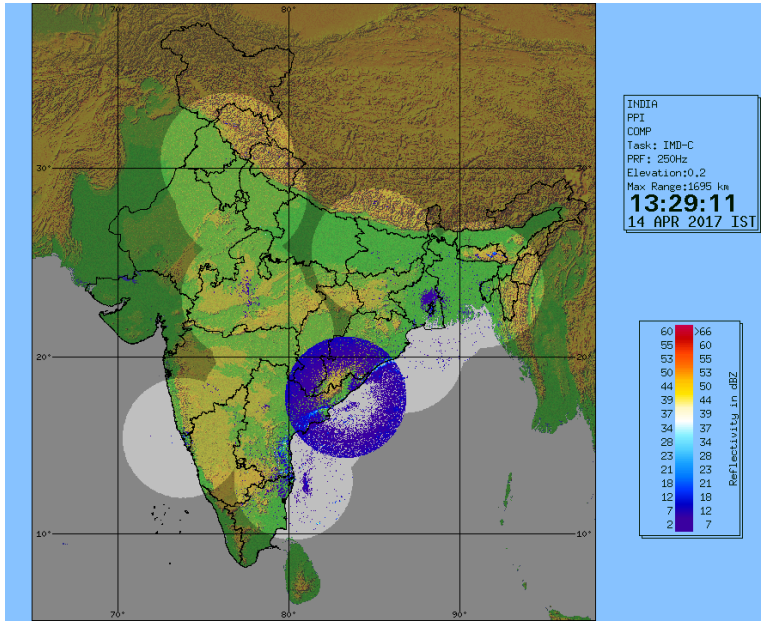
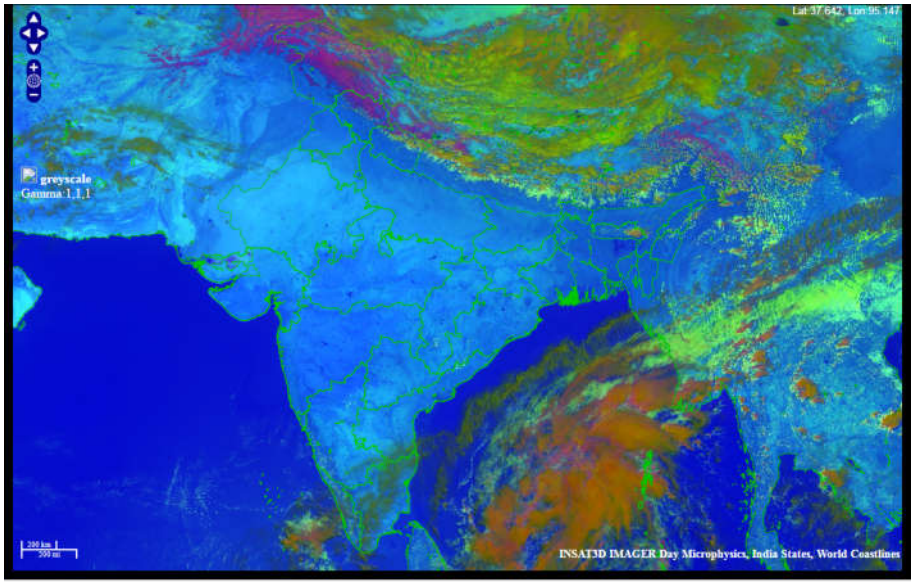



DWR Composite at 1329 hrs IST of today




RAPID RGB Image of INSAT 3D at 1300 hrs IST of today

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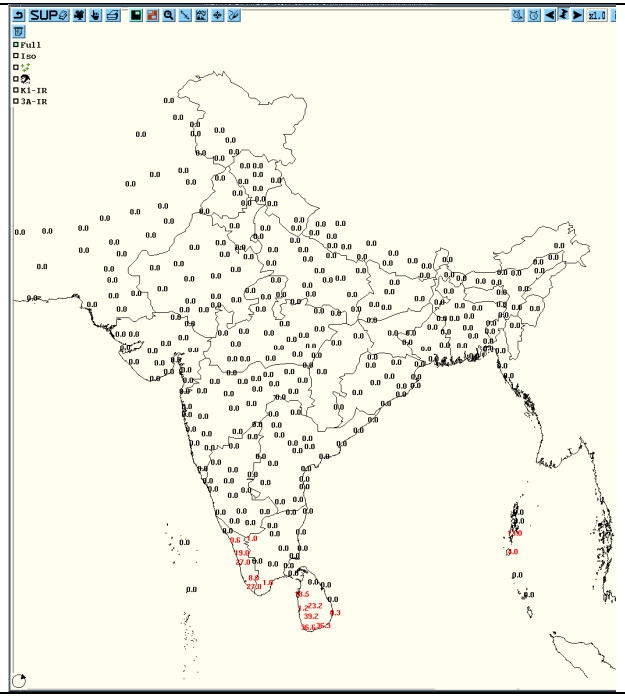
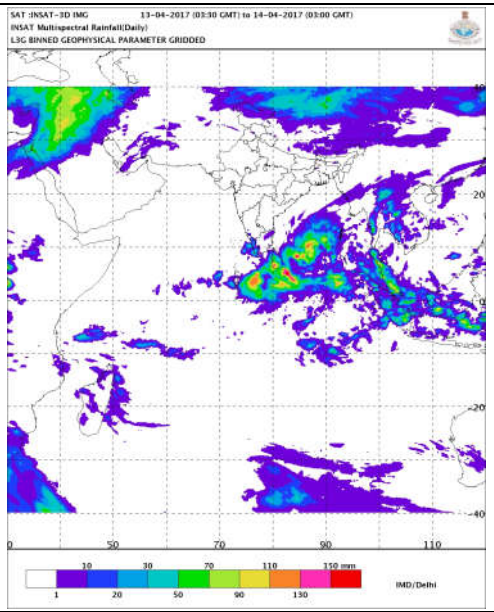
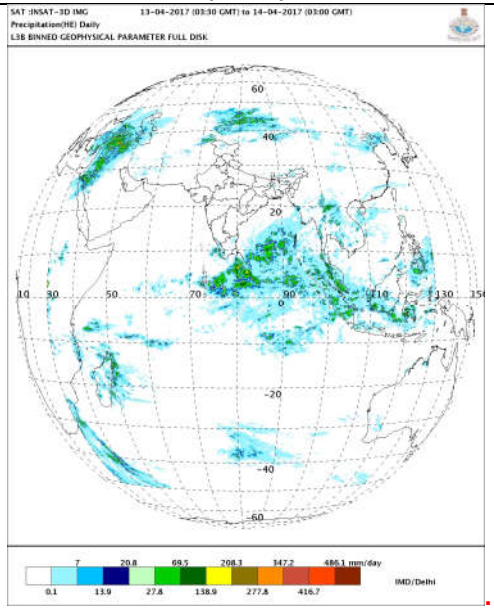
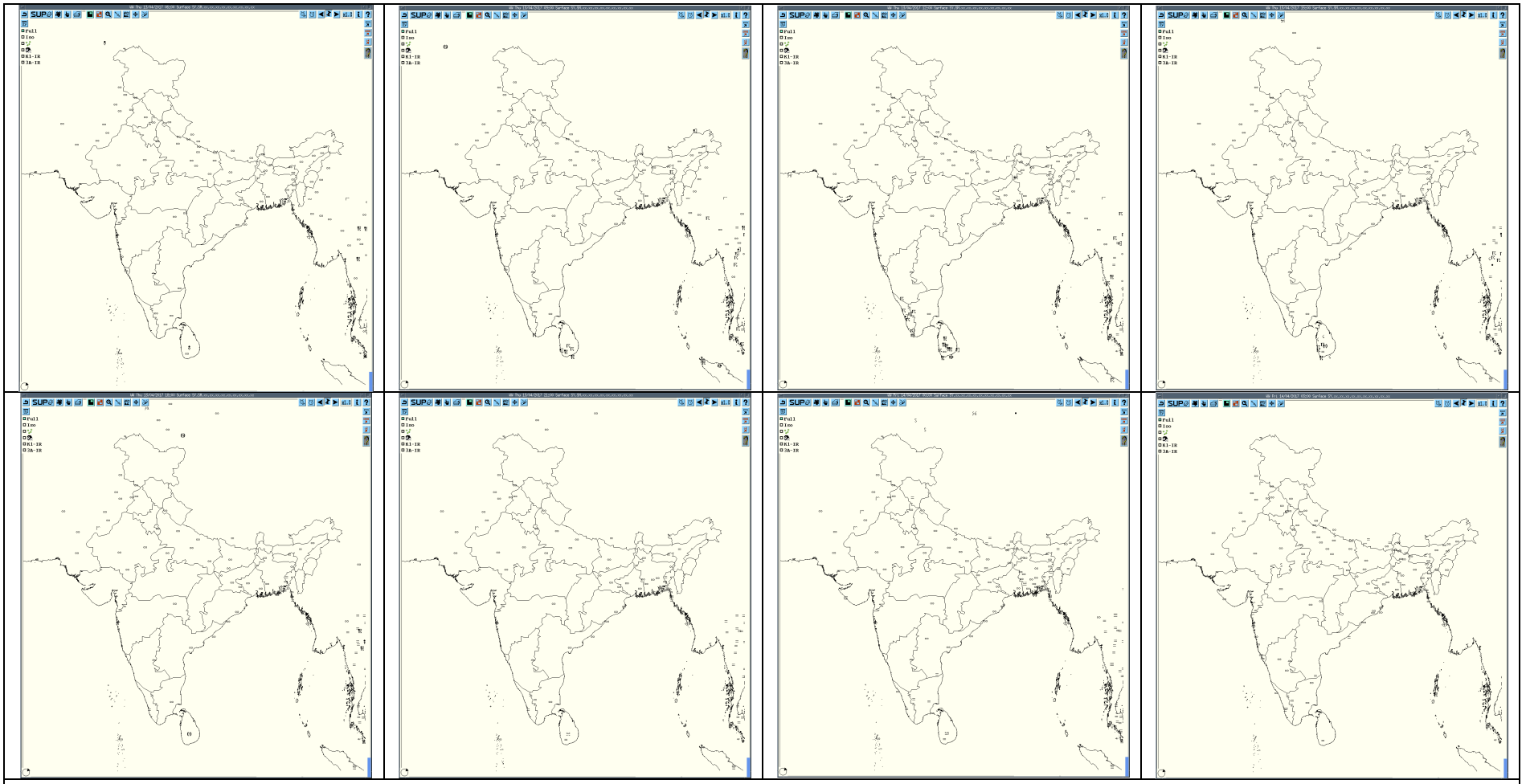
| **Not Received** |  |
| **ForecastDustConcentration for 00UTC of 16th April** | **Accumulated24Hourrainfall(inred)recordedat0300UTCoftoday** |
|  |  |
| **IMRRainfall** | **HEMRainfall** |



3hourlyPastweatherat06,09,12,15,18,21UTCofyesterdayand00&03hrsUTCoftoday

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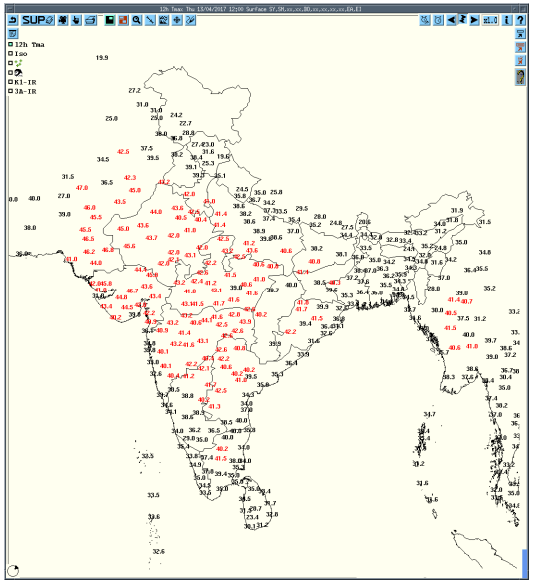
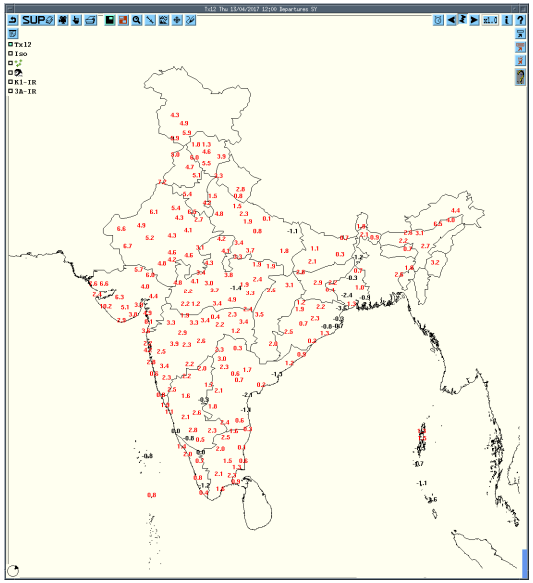
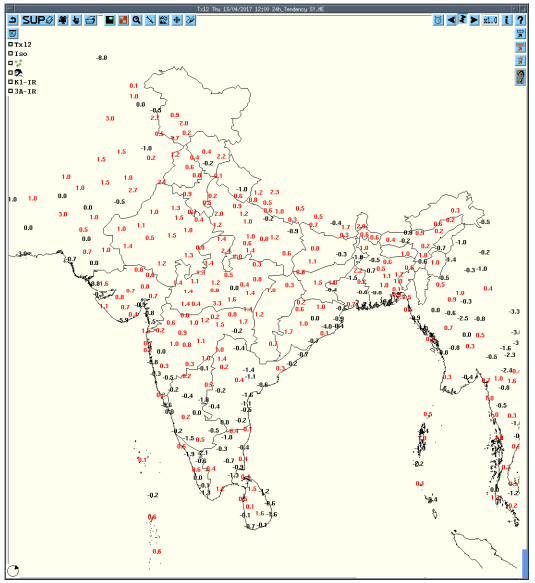
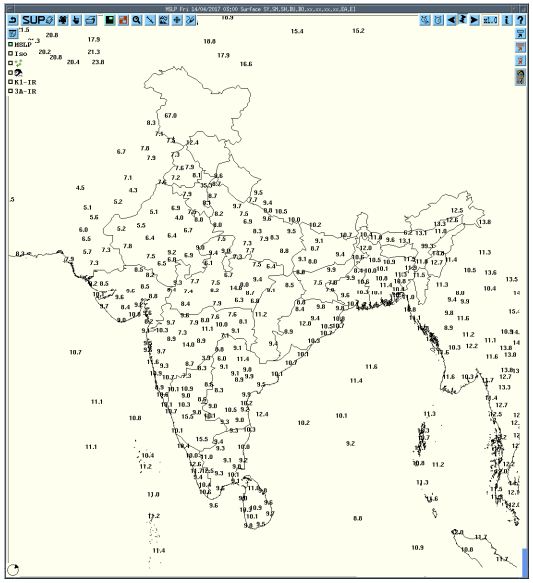
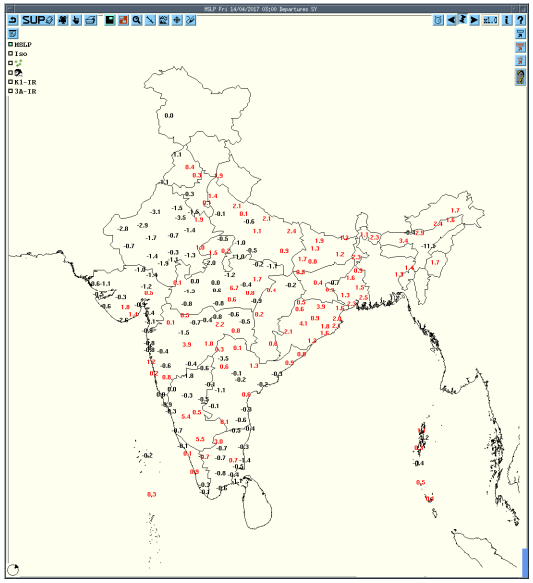
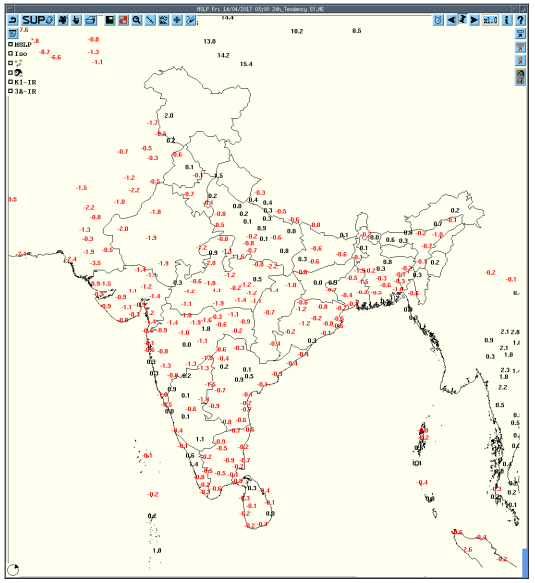
|  |  |  |
| **Tmax** | **DepartureTmax** | **TendencyTmax** |
|  |  |  |
| **MSLP** | **DepartureMSLP** | **TendencyMSLP** |

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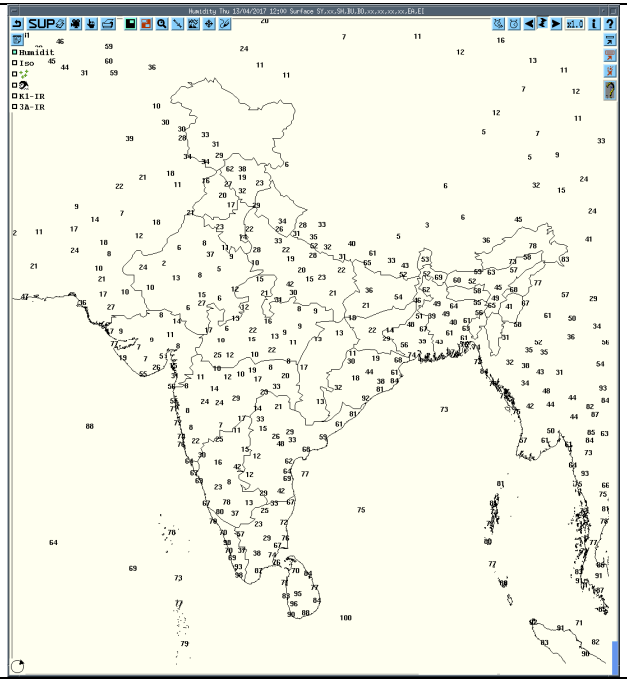
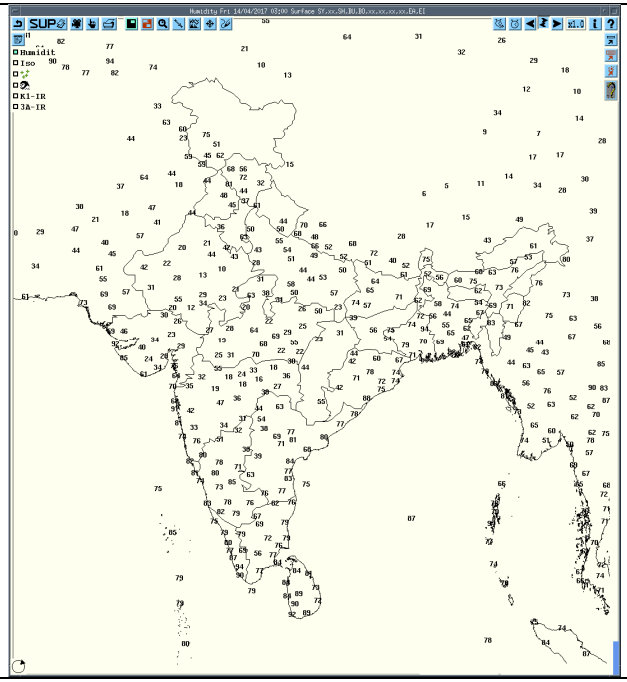
|  |  |
| **RH at 12UTCyesterday** | **RH at 03UTCtoday** |

| Realized weather past 24 hours(Based on SYNERGIE Products) | | | | | |
|---|---|---|---|---|---|
| **Date** | **Time of Reporting** | **Name of Station Reporting** | **Region** | **STATE** | **Weather Event** |
| 12-04-17 | 0600 UTC | Nil | Nil | Nil | Nil |
| 12-04-17 | 0900 UTC | Thiruvananthapuram | South India | Kerala | Thunderstorm |
| 12-04-17 | 1200 UTC | Madikeri | South India | Karnataka | Thunderstorm |
| | | Karipur,Palakkad, Punalur, Thiruvananthapuram | South India | Kerala | Thunderstorm |
| | | Coimbatore | South India | Tamilnadu | Thunderstorm |
| 12-04-17 | 1500 UTC | Nil | Nil | Nil | Nil |
| 12-04-17 | 1800 UTC | Nil | Nil | Nil | Nil |
| 12-04-17 | 2100 UTC | Nil | Nil | Nil | Nil |
| 13-04-17 | 0000 UTC | Nil | Nil | Nil | Nil |
| 13-04-17 | 0300 UTC | Nil | Nil | Nil | Nil |

## Past24hoursDWRReport:

| Radar Station name | Date | Time interval of observation (UTC) | Organization of the cells (Isolated single cells/multiple cells/ convective regions/ squall lines) with height of 20 dBZ echo top and maximum reflectivity | Formation w.r.t radar station and Direction of movement | Remarks | Associated severe weather if any | Districts affected |
|---|---|---|---|---|---|---|---|
| DWR HYDERABAD | 13/14.04 .2017. | NIL | **NIL** | NIL | NIL | NIL | NIL |
| PATNA | 14/04/20 17 | 130300 - 140300 | **NIL** | NIL | N/A | N/A | N/A |
| Patiala | 14/04/20 17 | 13 April 0302 to 14 April 0252 UTC | **Nil** | Nil | No Echoes | Nil | Nil |
| DWR LUCKNOW | 14/04/20 17 | 130300UTC to 140600UTC | **NIL** | NIL | NIL | NIL | NIL |
| DWRVSK | 13/04/17 | 0300 UTC- 0600 UTC | **Multiple cells with average height of 7km with maximum reflectivity 45dBZ** | NE(200KM) moving Sly | Cells start forming and not matured well and start dissipating. | - | - |
| | 13/04/17 13/04/17 | 0600 UTC- 0900 UTC | **Multiple cells with average height of 5km with maximum reflectivity 52dBZ** | NE(140KM) moving SWly | Cells start forming and not well matured and start dissipating. | - | - |

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| | 13/04/17<br><br>13/04/17<br><br>14/04/17 | 0900 UTC-1200 UTC | **Multiple cells with average height of 5km with maximum reflectivity 65dBZ** | SW(2000KM) | Cells start forming and not well matured and start dissipating. | - | - |
| | | 1200 UTC-1500 UTC | **Multiple cells with average height of 6km with maximum reflectivity 55dBZ** | SW(150KM) & NE(100KM) moving SWly | Cells start forming and not well organised and start dissipating. | - | - |
| | | 1500 UTC-1800 UTC | **Multiple cells with average height of 7km with maximum reflectivity 45dBZ** | SW(150KM) & NE(100KM) moving SWly | Cells start forming and not well organised and start dissipating. | - | - |
| | | 1800 UTC-0000 UTC | **Multiple cells with average height of 8km with maximum reflectivity 50dBZ** | SW(150KM) moving SWly | Cells start forming and not well matured and start dissipating. | - | - |
| | | 130000-130300 | **Isolated Cells with height 6kms and Max reflectivity 40 dBZ.** | NW(190 KM) & NE(200 KM) moving SWly | Cells are forming and not matured well and start dissipating. | - | - |
| Nagpur | 13/04/17 | 0802-1022<br><br>0812-0902<br><br>0822-0902<br><br>1322-1602<br><br>1612-2332 | **Single**<br><br>**Single**<br><br>**Single**<br><br>**Single**<br><br>**Group of very small patches** | 35 km NE, moving S'ly<br><br>150 km NE, nearly standstill<br><br>120 km SSE,nearly standstill<br><br>10 km NE, moving NE'ly<br><br>Distributed from 10 km to 30 km SW, moving NW'ly | < 10 dBZ<br><br>< 10 dBZ<br><br>< 10 dBZ<br><br>< 10 dBZ<br><br>< 7 dBZ | | |
| Srinagar | 14/04/2017 | 13April 03Z to 14April 3Z(24hrs) | **NIL** | NIL | NIL | NIL | NIL |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| DWR KOLKATA | 13-04-2017 | 0301-0751 UTC | **NIL** | NIL | NO ECHO | NIL | NIL |
| | 13-04-2017 | 0801-1251 UTC | **1.Isolated single cell with maximum height of 12.90 Km at 1012 UTC and maximum reflectivity of 56.0 dBz at 1041 UTC** | NNW (236.1 km) and initially almost no movement then moved S-ly at speed of 25.6 kmph.<br><br>NW (209.2 km) moving in SE-ly direction at a speed of 16.6 kmph. | Cell started forming at 0801 UTC at NNW (236.1 Km) from radar. Matured, dissipated at 1251 UTC in NNW at a distance of 209.2 km from Radar. | Thunderstorm /Rain | N/A |
| | 13-04-2017 | | **2. Isolated single cell with maximum height of 11.73 Km at 0941 UTC and maximum reflectivity of 56.0 dBz at 0941 UTC** | | Cells started forming at 0911 UTC at NW (209.2 Km) from radar. d Matured, dissipated at 1121 UTC in NW at a distance of 185.6 km from Radar | Thunderstorm /Rain | N/A |
| | 14-04-2017 | 1301-2351 UTC | **NIL** | NIL | NO ECHO | NIL | NIL |
| | | 0001-0301 UTC | **NIL** | NIL | NO ECHO | NIL | NIL |
| Machilipatnam | 03Z of 13/04/17 to 03Z of 14/04/17 | NIL | **NIL** | NIL | NIL | NIL | NIL |
| AGARTALA | 14/04/17 | 130640 – 131130 | **Multiple Cells with Maximum Height 15km and maximum reflectivity 47 dBZ (at 0900 UTC over Meghalaya-180 KM North of DWR Agartala)** | NNW (210 KM) from DWR Agartala at 0640 UTC of 13.04.17 moving Eastwards at around 40 kmph | Cells dissipated at 1130 UTC of 13.04.17 over Meghalaya and adjoining Assam | TS at Cherrapunjee | East Khasi Hills District of Meghalaya |

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