India Meteorological Department

FDP STORM Bulletin No.94 (07-06-2017)

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

The well marked low pressure area over west central Arabian sea with associated upper air cyclonic circulation extending upto mid tropospheric levels persists. It is likely to move towards Oman coast during next 24 hours.
The shear zone now runs roughly along Lat.14 .0°N between 3.1 & 5.8 Km above mean sea level.
The upper air cyclonic circulation over east central Bay of Bengal and adjoining north Andaman Sea at 5.8 Km above mean sea level persists.
The upper air cyclonic circulation over central Pakistan & neighbourhood extending upto 2.1 Km above mean sea level persists.
The upper air cyclonic circulation over north Andhra Pradesh coast & south Odisha and adjoining west central Bay of Bengal between 3.1 & 3.6 Km above mean sea level persists.
The upper air cyclonic circulation over Jharkhand & neighbourhood persists and now seen at 1.5 Km above mean sea level.
The western disturbance as an upper air cyclonic circulation over north Pakistan and neighbourhood, now lies over north Pakistan and adjoining Jammu & Kashmir between 3.1 Km & 3.6 Km above mean sea level.
An upper air cyclonic circulation lies over southeast Uttar Pradesh & neighbourhood and extends upto 0.9 Km above mean sea level.
The trough at mean sea level from northern parts of Punjab to north Coastal Odisha across Uttar Pradesh & Jharkhand extending upto 0.9 km above mean sea level has become less marked.
The upper air cyclonic circulation over eastern parts of Assam & Meghalaya and neighbourhood extending upto 2.1 km above mean sea level 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
08	07/0000 0100 0200 0300	PJB ADJ HP DO PJB HP N HARY E PJB HP N HARY UTRKND	77 65 55 50	-	DEVELOPING
02	07/0000 0100	SE AP ADJ TN DO	73 -	-	DEVELOPING SHIFTED TO BAY

VORTEX:
Vortex lies over WC Arabian Sea within half a degree of LAT 18.5N/60.0E. Intensity T1.0 associated broken low/medium clouds with embedded intense to very intense convection over WC Arabian Sea between Lat 15.0N to 20.0N Long 55.0E TO 60.0E (MINIMUM CTT MINUS 87 DEG C).

WESTERN DISTURBANCE (WD):
Scattered multi-layered clouds were seen over J & K adjoining Pakistan and over area between Lat 37.0N to 50.0N Long 76.0E to 90.0E in association with WD over the area.

Cloud Description:
Scattered low /medium clouds with embedded isolated moderate to intense convection were seen over West Bihar, Lakshadweep and Bay Islands.
Scattered low/medium clouds with embedded isolated weak to moderate convection were seen over Himachal Pradesh, Punjab, Haryana, Delhi, Uttarakhand, Uttar Pradesh, Odisha, rest Bihar, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Kerala and Tamilnadu.
Scattered low/medium clouds were seen over Rajasthan, Gujarat and parts of East India.

Arabian Sea:
Scattered low/medium clouds with embedded moderate to intense convection were seen over SE adjoining Arabian Sea between Lat 10.0N to 16.0N East of Long 70.0E.

Bay of Bengal & Andaman Sea:
Scattered low/medium clouds with embedded intense to very intense convection were seen over WC EC adjoining Southwest Bay.
Scattered low /medium clouds with embedded isolated moderate to intense convection were seen over Andaman Sea Gulf of MATRABAN.

Past Weather:

Convection:- Moderate to Intense convection was observed over J&K Himachal Pradesh Punjab Haryana Uttarakhand Uttar Pradesh Madhya Pradesh Maharashtra Chhattisgarh Odisha Bihar Jharkhand Mizoram Telangana Andhra Pradesh. Karnataka Kerala & Tamilnadu

OLR:-
Upto **200** wm^{-2} was observed over North J&K Jharkhand Andhra Pradesh Telangana Karnataka Kerala North Tamilnadu.
Upto **230** wm^{-2} was observed over rest J&K Himachal Pradesh East Uttar Pradesh Bihar Chhattisgarh Madhya Pradesh Odisha rest Maharashtra rest Tamilnadu.
Upto **250** wm^{-2} was observed over West Bengal Mizoram.

Westerly Trough & Jet-Stream: No Westerly Trough & 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 Uttar Pradesh Bihar West Bengal North Odisha North East Andhra Pradesh South Chhattisgarh.
Negative low level convergence is observed over Coastal Maharashtra goa Coastal Karnataka North East Andhra Pradesh and Positive low level convergence observed over rest parts of India,

Precipitation:

IMR:
Rainfall Up to **90** mm was observed over Jharkhand.
Rainfall Up to **70** mm was observed over North Tamilnadu
Rainfall Up to **50** mm was observed over East Uttar Pradesh North-East Madhya Pradesh South Telangana Coastal Andhra Pradesh.
Rainfall Up to **30** mm was observed over North Uttarakhand North Interior Karnataka .
Rainfall Up to **20** mm was observed over South-west J&K Punjab Himachal Pradesh Marathwada North Telangana Rayalseema Kerala.
Rainfall Up to **10** mm was observed over rest J&K rest Uttarakhand West Uttar Pradesh West Bihar Gangetic West Bengal Mizora Odisha Chhattisgarh Rest Madhya Pradesh rest Maharastra rest Karnataka rest Tamilnadu.

HEM:
Rainfall Up to **208** mm was observed over Central Jharkhand.
Rainfall Up to **70** mm was observed over South-west J&K Himachal Pradesh North Uttarakhand Central Madhya Pradesh Marathwada North Odisha Karnataka Telangana Rayalaseema North Tamilnadu.
Rainfall Up to **14** mm was observed over Punjab South Chhattisgarh South-West Odisha Kerala.
Rainfall Up to **07** mm was observed over rest J&K North Haryana rest Uttar Pradesh Bihar Rest Jharkhand West Bengal Mizoram East Meghalaya Rest Madhya Pradesh rest Maharashtra rest Chhattisgarh rest Andhra Pradesh rest Tamilnadu

RADAR and RAPID Observation:

DWR Composite at 1220hrs IST indicated significant convection over East Uttar Pradesh, Northwest Madhya Pradesh and South Odisha and in RAPID RGB Satellite imagery at 1100hrs IST also including Lakshadweep and Nicobar Islands.

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

Higher Dust concentration was observed over north Africa , Arab countries and IGP region of India. Dust concentration is expected to decrease over north India for next five days. High PM10 concentration was observed over Rajasthan and IGP. it is expected to decrease in the next five days.

2. NWP MODEL GUIDANCE:

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

1. Weather Systems: The analysis based on 00 UTC show a low level trough extends from CYCIR over north Pakistan to Gangetic West Bengal through CYCIR over Jharkhand and adjoining areas. Forecasts show that the eastern part of the trough would shift southwards and a CYCIR would develop over off Odisha coast on day3. Forecasts also show northward movement of the trough thereafter and formation of a CYCIR over off Gujarat and Maharashtra coast on day6.
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): The high vorticity belts are mainly over the Gangetic plains
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): Less than threshold value over the country.
Lifted Index (< -2): Less than threshold value over most parts of the country except J&K and south peninsula.
Total Total Index (> 50) : Less than threshold value all over the country.
Sweat Index (> 300): Higher than threshold value all over the country.
CAPE (> 1000): Mostly over parts of Rajasthan and adjoining Gujarat, Sub-Himalayan West Bengal, parts of AP and NE states during next 48 hours.
CIN (50-150): Mostly all over the country except Gujarat and northwest India during next 48 hours.
5. Rainfall and thunderstorm activity: 10-40 mm rainfall over NE states during next five days.
10-40 mm: rainfall over parts of NE states during next five days.
10-70 mm: rainfall over west coast and parts of Andhra Pradesh during next 48 hours.
10-40 mm: rainfall over Sub- Himalayan West Bengal on day2 and day3.
70-200 mm: rainfall over west coast, coastal Maharashtra and adjoining Karnataka during day3 to day8.

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

1. Model Reflectivity (Max. dBz): 15-35 dBZ Model reflectivity over south peninsula, parts of Bihar, Sub-Himalayan West Bengal and parts of central India during next 24 hours.
15-20 dBZ: over parts of Maharashtra and Andhra Pradesh on day2.

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

Total Total Index (> 50): Above threshold value over northwest and central parts of India during next 72 hour and south peninsula on day3.
K-Index (> 35): Less than threshold value over the country during the next 72 hour.
CAPE (> 1000): Mostly over Rajasthan, Bihar, West Bengal and NE states during next 3 days, over Gangetic plain and parts of central India.
CIN (50-150): Over North West parts of India, Gangetic plain and south peninsula during next three days.

Rainfall and thunderstorm activity:

20-70 mm: over parts of east UP, Bihar, Jharkhand, Chhattisgarh, West Bengal, NE states and west coast during next 3 days.
20-40 mm: over parts of south peninsula on day1 and over parts of central India on day2 and day3.

3. IOP ADVISORY FOR 24 and 48Hrs:

Summary and Conclusions:

Day-1 & Day-2:

Presently, the upper air cyclonic circulation over east central Bay of Bengal and adjoining north Andaman Sea at 5.8 Km above mean sea level persists which will give rise to rainfall activity over Andaman and Nicobar Island on Day-1.

The upper air cyclonic circulation over central Pakistan & neighborhood extending upto 2.1 Km above mean sea level persists which will give rise to thunderstorm with hail possibility over J&K, Himachal Pradesh and Uttrakhand on Day-1.

The upper air cyclonic circulation over Jharkhand & neighbourhood persists and now seen at 1.5 Km above mean sea level. Due to this system, Bihar, Jharkhand, Chhattisgarh and Orissa may experience the thunderstorm with gusty winds possibility on Day-1.

24 hour Advisory for IOP:
J&K, Himachal Pradesh, Uttrakhand, West UP, Punjab, Haryana
Kerala, Lakshadweep, Coastal Karnataka, Konkan and Goa
Jharkhand, GWB
Bihar, Orissa, Vidarbha, Chhattisgarh
Andaman and Nicobar Islands

48 hour Advisory for IOP:
Himachal Pradesh, Uttrakhand, West UP, Punjab, Haryana
Kerala, Coastal Karnataka
Chhattisgarh
East and West Rajasthan

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
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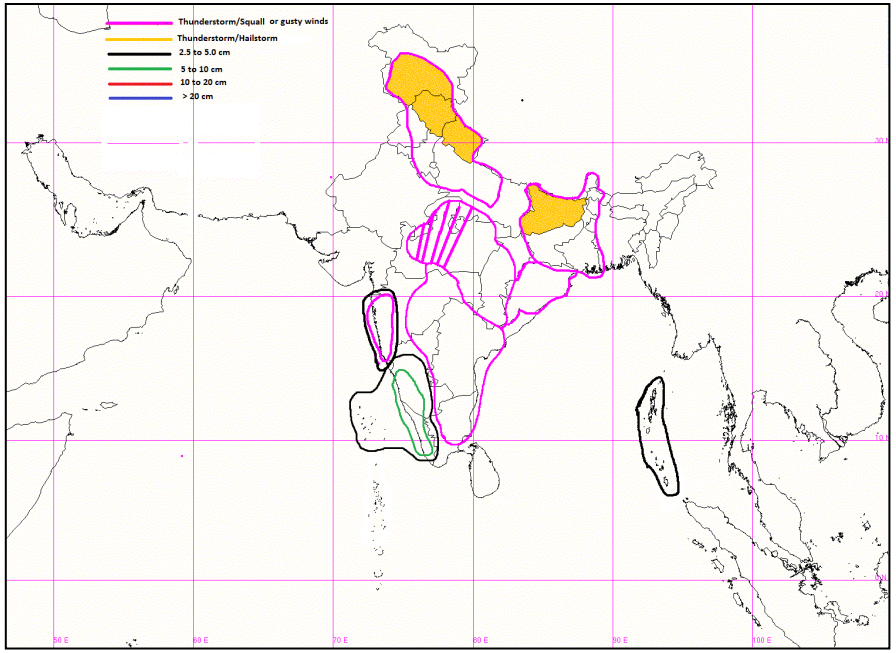
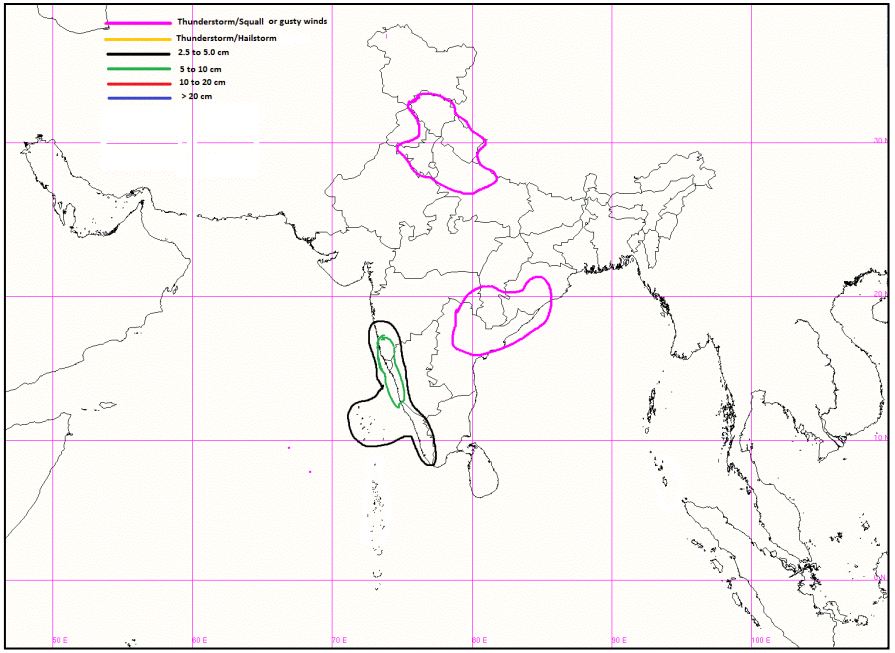
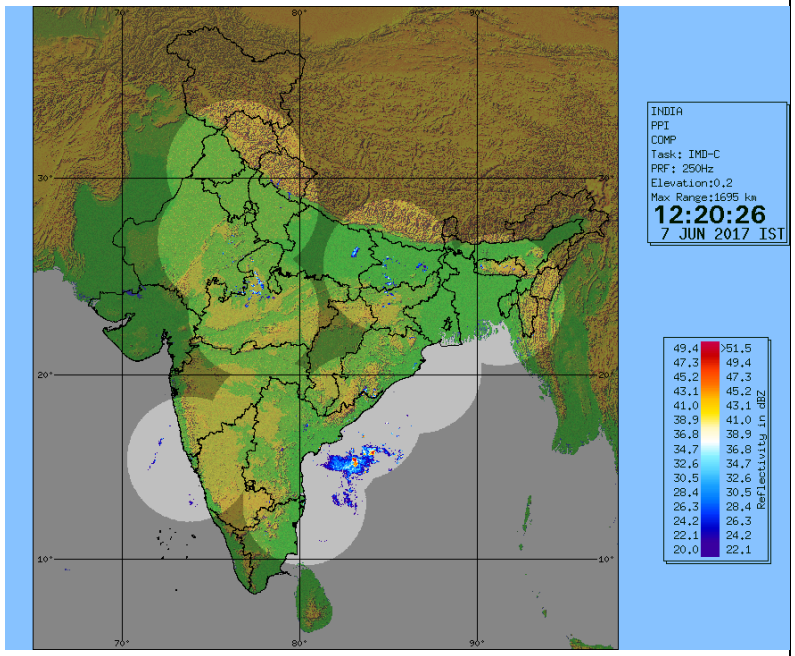
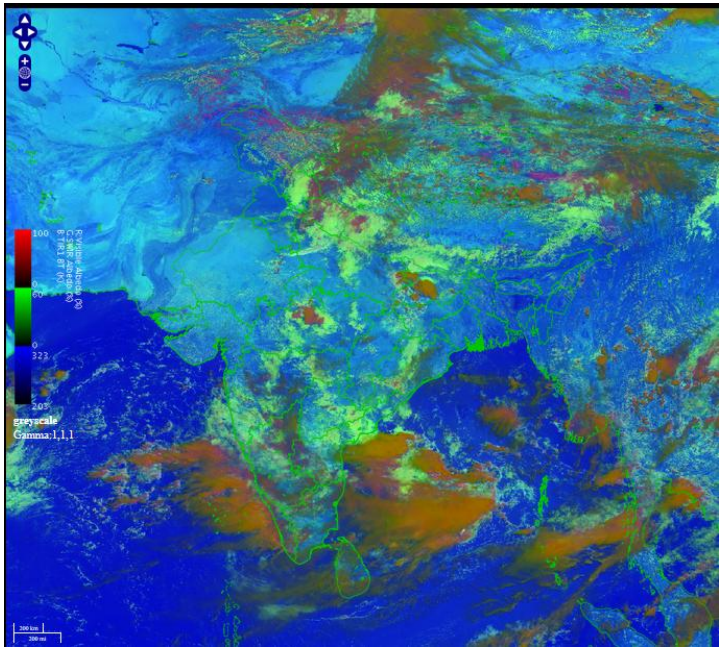
http://satellite.imd.gov.in/map skm2.html

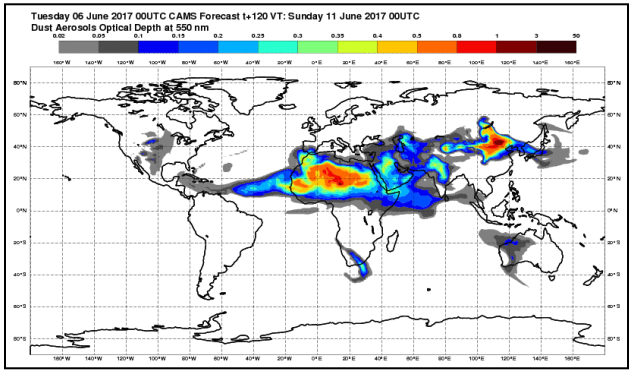


IOP Advisory for 24 hours

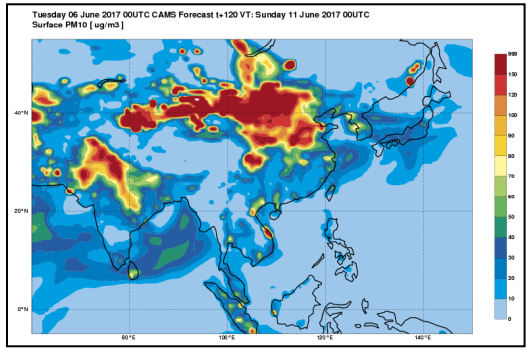


IOP Advisory for 48 hours

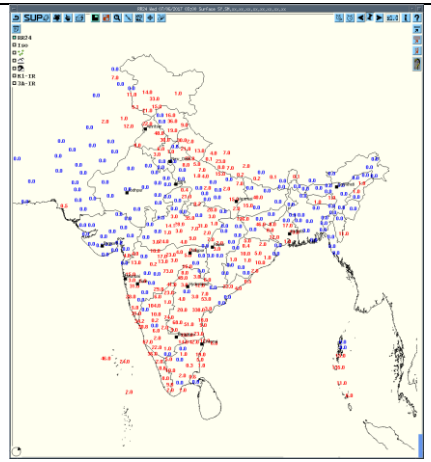
	
DWR composite at 1220 hrs IST	**RAPID RGB Satellite Imagery at 1230 hrs IST of today**



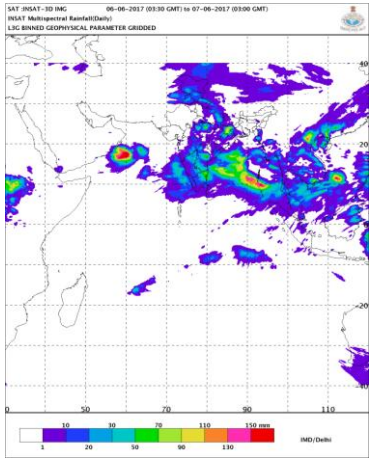
Forecast Dust Concentration for 00UTC of 11th June



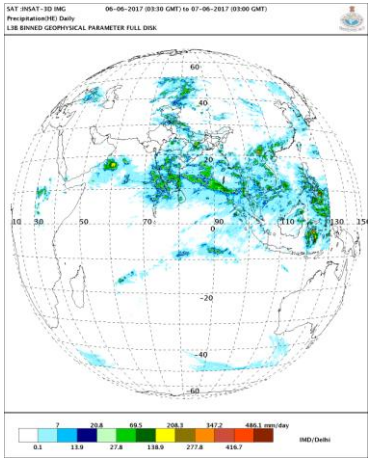
PM10 Forecast for 00UTC of 11th June



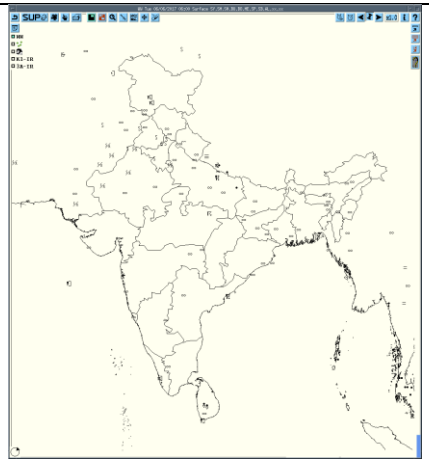
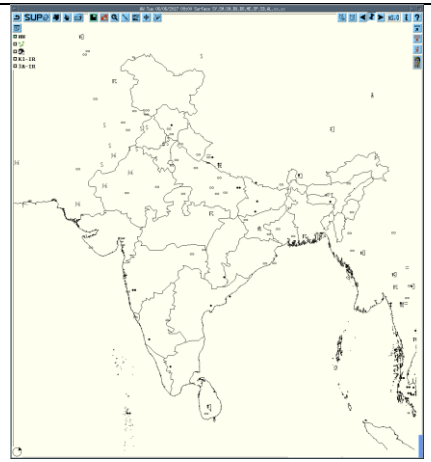
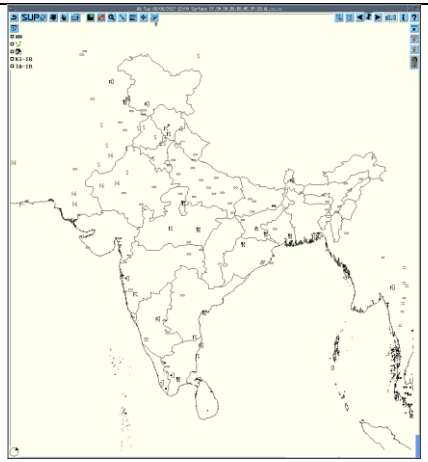
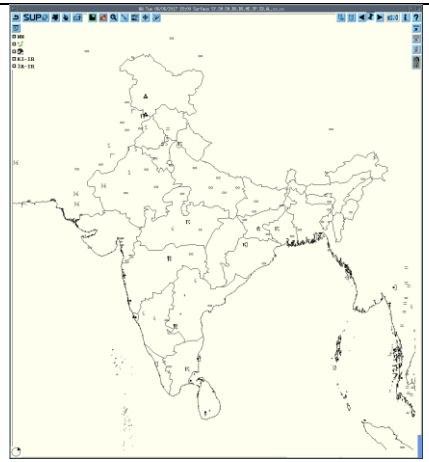
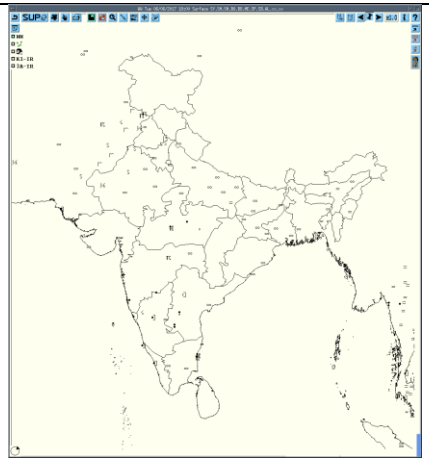
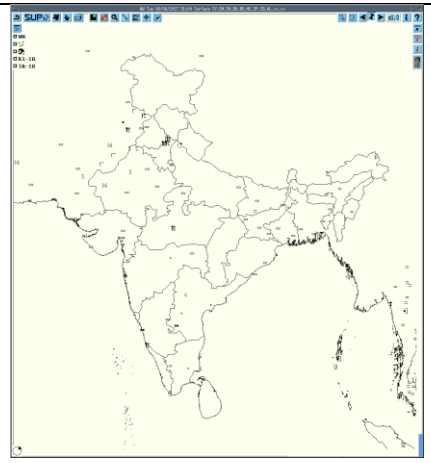
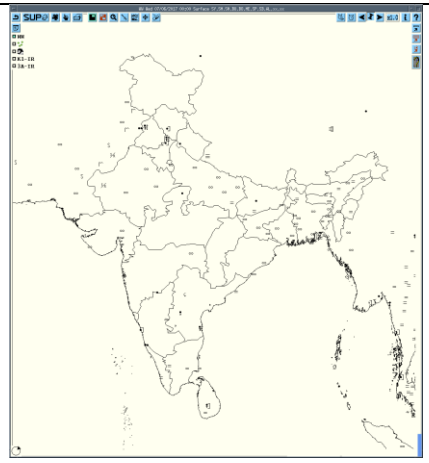
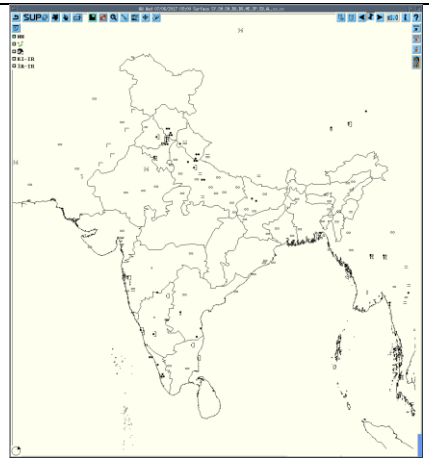
Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today



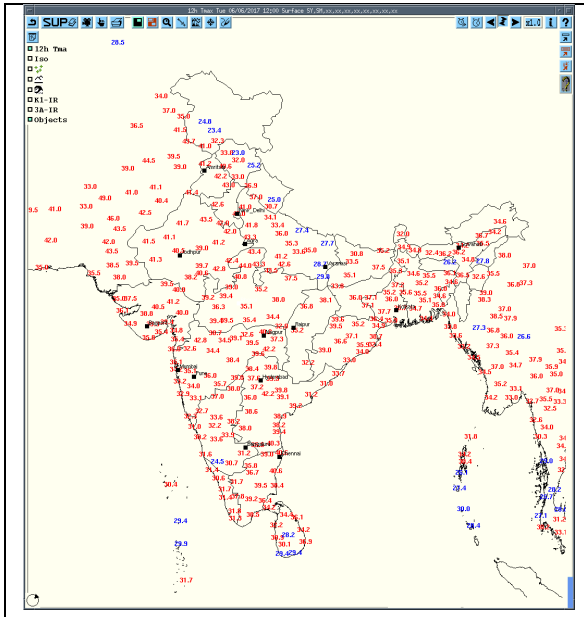
IMR Rainfall



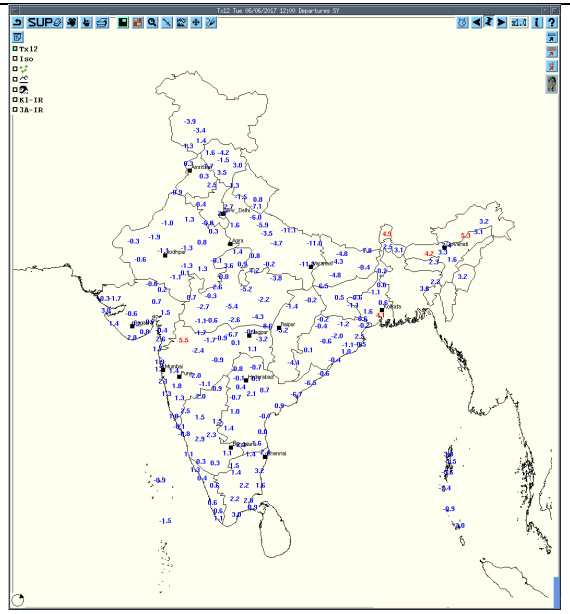
HEM Rainfall

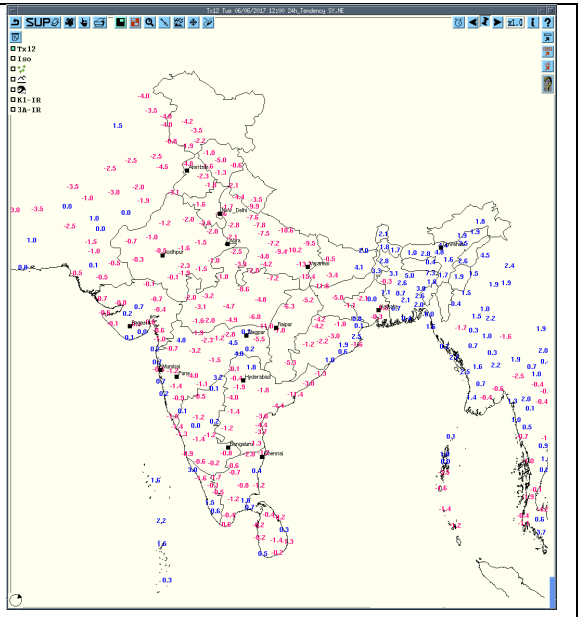
3hourly Past weather at 06,09,12,15,18,21UTC of yesterday and 00 & 03 hrs UTC of today



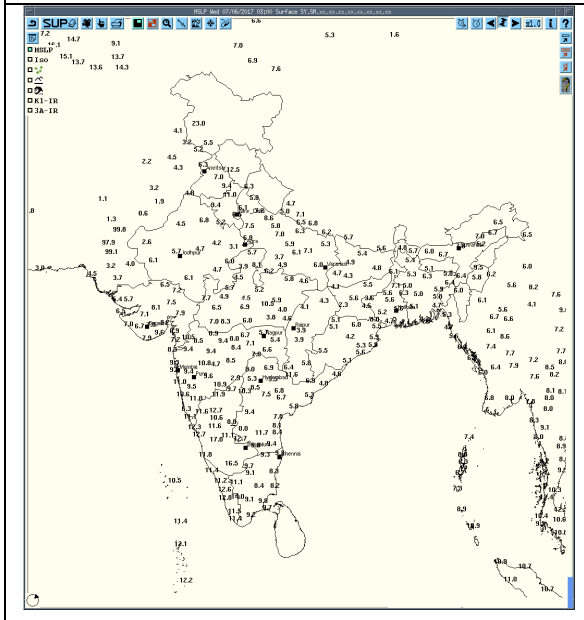
Tmax



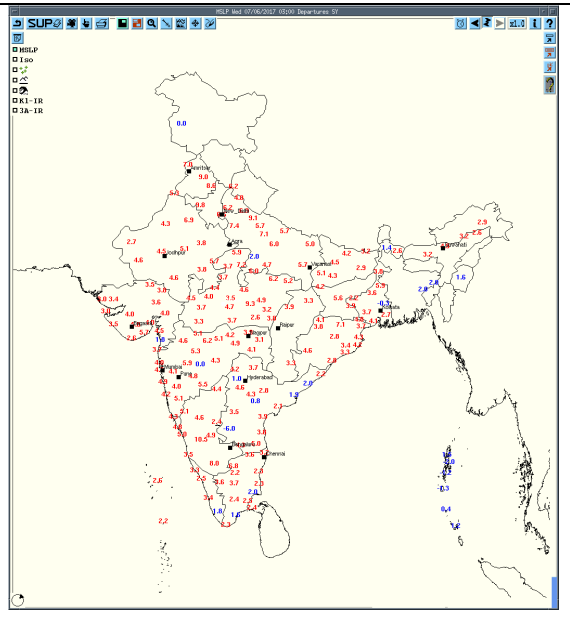
Departure Tmax



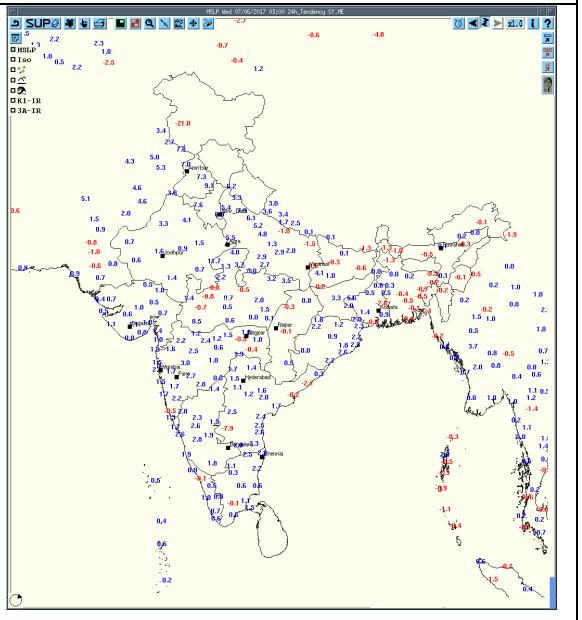
Tendency Tmax



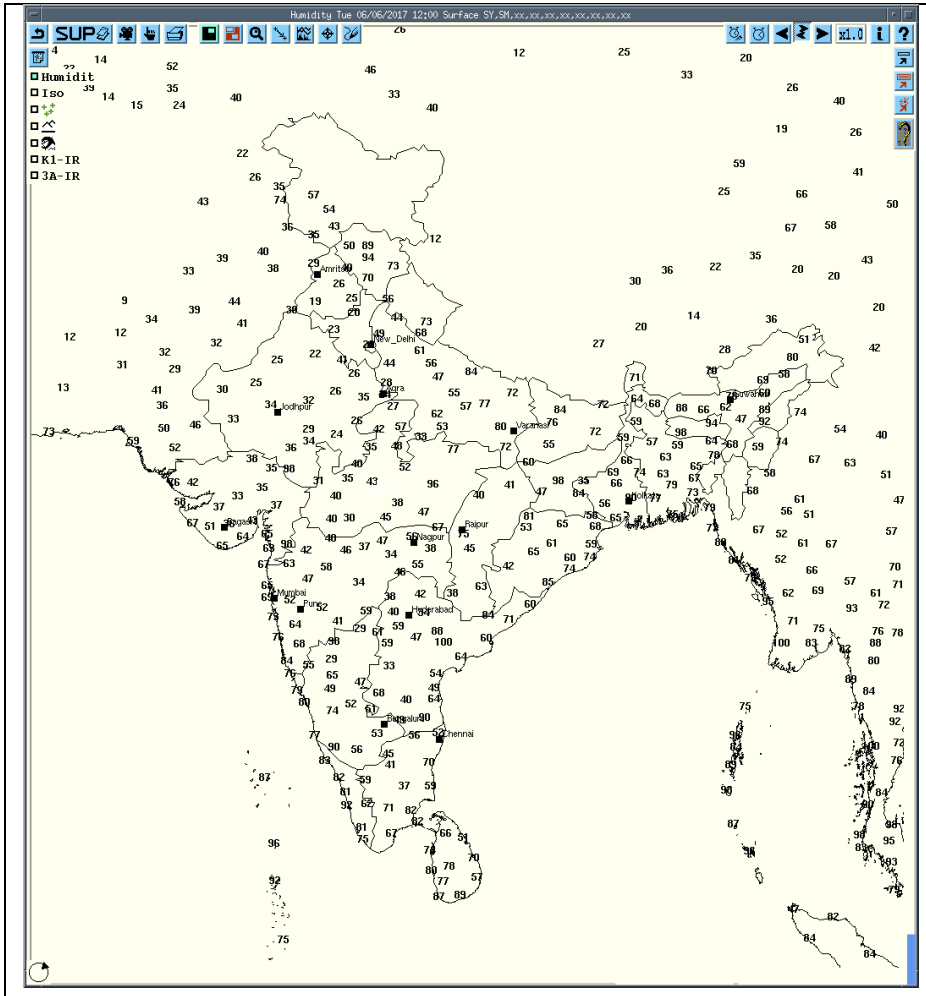
MSLP



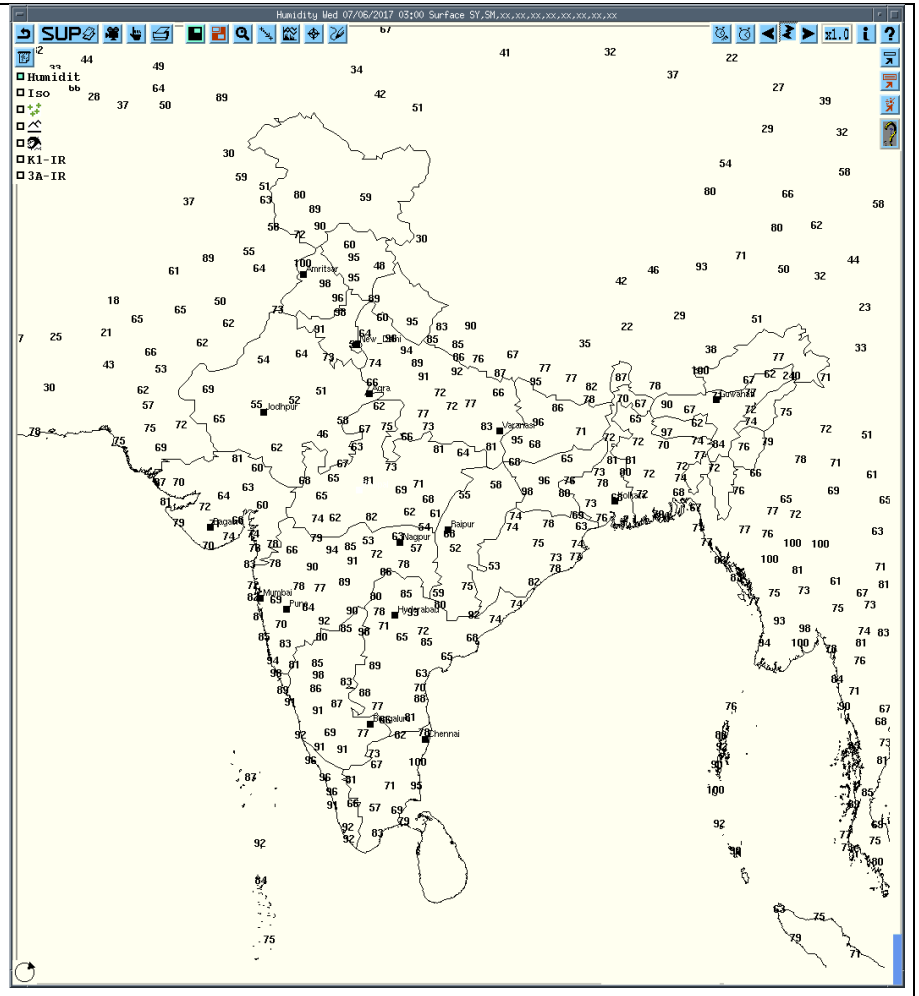
Departure MSLP



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**
06-06-17	0600UTC	Pahalgam, Kukernag/ Bahraich	Northwest India	J & K/ Uttar Pradesh	Thunderstorm
		Satna	Central India	Madhya Pradesh	Thunderstorm
		Tuni/ Kochi	South India	Andhra Pradesh/ Kerala	Thunderstorm
06-06-17	0900UTC	Satna	Central India	Madhya Pradesh	Thunderstorm
		Ranchi	East India	Jharkhand	Thunderstorm
06-06-17	1200UTC	Banihal	Northwest India	J & K	Thunderstorm
		Sundernagar, Shimla/ Jhansi	Northwest India	Himachal Pradesh/ Uttar Pradesh	Thunderstorm
		Gangtok/ Kolkata/Jharsuguda	East India	Sikkim/ West Bengal/Odisha	Thunderstorm
		Bhopal, Jabalpur	Central India	Madhya Pradesh	Thunderstorm
		Ranchi, Jamshedpur	East India	Jharkhand	Thunderstorm
		Satara	West India	Maharashtra	Thunderstorm
		Koppal/ Bapatla, Tirupathi	South India	Karnataka/ Andhra Pradesh	Thunderstorm
		Chennai, Cuddalore, Madurai	South India	Tamilnadu	Thunderstorm
06-06-17 06-06-17	1500UTC	Dehradun	Northwest India	Uttarakhand	Thunderstorm
		Sagar/Akola	Central India	Madhya Pradesh/Vidarbha	Thunderstorm
		Ranchi/Bankura/Jharsuguda	East India	Jharkhand / West Bengal /Odisha	Thunderstorm
		Anantapur/Tiruchchirappalli	South India	Andhra Pradesh/ Tamilnadu	Thunderstorm
06-06-17	1800UTC	Jammu	Northwest India	J & K	Thunderstorm
		Bhopal/Akola	Central India	Madhya Pradesh/ Vidarbha	Thunderstorm
		Cuddalore	South India	Tamilnadu	Thunderstorm
06-06-17	2100UTC	Ambala, Chandigarh/Patiala	Northwest India	Haryana/Punjab	Thunderstorm
		Bhopal	Central India	Madhya Pradesh	Thunderstorm
		Baje	South India	Karnataka	Thunderstorm
07-06-17	0000UTC	Chandigarh/Amritsar	Northwest India	Haryana/Punjab	Thunderstorm
		Nellore	South India	Andhra Pradesh	Thunderstorm
07-06-17	0300UTC	Hissar/Amritsar	Northwest India	Haryana/Punjab	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
Patiala	07-06-2017	06/0300 – 06/0600	NO ECHO	----------	-------	----------	----------
		06/0600 - 06/0900	Multiple cells Max=48.5 Ht.=7-8km	NE SECTOR MOVEMENT SE WARDS	--------	----------	Bdam, Bhuntar
		06/0900- 06/1200	Multiple cells Max=57.5 Ht.=10-12km	NE SECTOR MOVEMENT ESE WARDS		RA/TS	Dalhousie, Palampur, Bhuntar, Mandi, Rampur
		06/1200- 06/1500	Multiple cells Max=54.0 Ht.=10-11km	NE SECTOR MOVEMENT SE WARDS	----------		Solan, Shimla, Mussorie, Uttarkashi, Gangotri
		06/1500- 06/1800	Multiple cells Max=54.5 Ht.=10-13km	NW & NE SECTOR MOVEMENT SE WARDS	----------	----------	Haridwar, Rishikesh, Amritsar, Uttarkashi, Hoshiarpur, Nangal
		06/1800- 06/2100	Multiple cells Max=59.5 Ht.=10-13km	SW, SE, NW & NE SECTOR MOVEMENT SE WARDS	----------	TS AT PTL	Hoshiarpur, Nangal, Mandi, Bilaspur, Chd, Ludhiana, Nahan, Kalsi, Ptl, Sangrur
		06/2100- 07/0000	Multiple cells Max=55.5 Ht.=10-12km	SW, SE, NW & NE SECTOR MOVEMENT SE WARDS	----------	----------	Muktsar, Abohar, Faridkot, Ferozpur
		07/0000- 07/0300	Multiple cells Max=52.0 Ht.=9-11 km	SW, SE, NW & NE SECTOR MOVEMENT SE WARDS	----------	----------	Ludhiana, Chd, Barnala, Ambala, Nabha, Sangrur

Radar Station Name	Date	Time Interval of Observation (UTC)	Organisation of 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
Karaikal	06.06.17	1. 0800-1012 2. 1000-1430	1)Isol cell at NW direction at 100 km range with max reflectivity of 93dBz and average height of 11 kms 2)Cluster of cells in SW direction at 200 km range with max reflectivity of 55dBz and Average height of 10KM	1.Remained almost stationary upto 143 0Z Started moving in SEly direction from 1530Z with a speed of 18 kmph 2. Remained almost stationary	1.Cells started forming at 0740Z and intensity reduced at1100Z 2. Cells started forming at. 1000Z and dissipated at 1452Z	Station experienced TSRA activity from 2100Z to 2330Z	Karaikal
	07.06.17	1.0000Z-0300Z	1. Cluster of cells in SE direction at 150km range with max 90 dBz average height 10km.	1. Remained almost stationary		Drizzle at station	Karaikal

Radar Station Name	Date	Time Interval of Observation (UTC)	Organisation of 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
Kolkata	06-06-2017	0301-0711	NIL	NIL	NO ECHO	NIL	NIL
		0851-1011 UTC	1. Isolated single cell, developed with maximum reflectivity of 56.0 dBz at 0911 UTC and maximum height 8.15 km at 0921 UTC	1.WEST(102km) near about stationary	1. Isolated single cell developed at West at a distance of 102 km from Radar at 0851 UTC. Matured and dissipated at 1011 UTC in West.	Thunderstorm / Hailstorm / Squall /Rain	N/A
		0851-1302 UTC	2. Isolated single cell, developed in big cell with maximum reflectivity of 59.5 dBz at 1051 UTC and maximum height 12.72 km at 1051 UTC	2.NW(91km) moving slightly towards NW-ly	2. Isolated single cell developed at NW at a distance of 91 km from Radar at 0851 UTC, later transformed into a multi cell system and merged with cell no. 3 at 1231 UTC and dissipated at 1302 UTC in NNW at a distance 72.4 km from radar.	Thunderstorm / Hailstorm / Squall /Rain	N/A
		1032-1302 UTC	3. Isolated single cell, developed in a multi system cells with maximum reflectivity of 60.0 dBz at 1121 UTC and maximum height 7.89 km at 1121 UTC	3.NNW(9km) moving slightly towards NNW-ly	3. Isolated single cell developed at NNW at a distance of 9 km from Radar at 1032 UTC, transformed into a multicelled system, Merged with cell no. 2 at 1231 UTC and dissipated at 1302 UTC in NNW at a distance 72.4 km from radar.	Thunderstorm / Hailstorm / Squall /Rain	N/A
	06-06-2017	1041-1641 UTC	4. Large number of small single cells with maximum reflectivity of 55.5 dBz at 1241 UTC and maximum height 9 km at 1241UTC	4.WSW to WNW (235 km) moving towards E-ly / SE-ly at	4. Large number of small single cells started developing/coming between 1041 UTC in between WSW and WNW between 235 km from Radar. Matured and Dissipated at 1641 UTC in NW at a distance of 143.2 km from radar.	Thunderstorm / Hailstorm / Squall /Rain	N/A
		1511-1631 UTC	1. Isolated single cell, developed with maximum reflectivity of 57.5 dBz at 1601 UTC and maximum height 7.44 km at 1541 UTC	1.NNW (80.4km) moving NNE at a speed of 20 kmph	1. Isolated single cell developed at NNW at a distance of 80.4 km from Radar at 1511 UTC. Matured and dissipated at 1631 UTC in NNW at a distance of 91.3 km from radar.	Thunderstorm / Hailstorm / Squall /Rain	N/A
		1650-2351	NIL	NIL	NO ECHO	NIL	NIL
	07-06-2017	0002-0301	NIL	NIL	NO ECHO	NIL	NIL