India Meteorological Department

FDP STORM Bulletin No. 16 (22-03-2018)

1. CURRENT SYNOPTIC SITUATION:

NWFC INFERENCE (0300UTC of the Day):

♦ The Western Disturbance as an upper air cyclonic circulation over Jammu & Kashmir and neighbourhood persists and now extends between 3.1 & 7.6 km above mean sea level.

♦ A cyclonic circulation extending between 3.1 & 5.8 km above mean sea level lies over north Pakistan & adjoining Punjab.

♦ A trough runs from Bihar to interior Tamilnadu across southeast Uttar Pradesh, East Madhya Pradesh, Vidarbha, Telangana & Rayalaseema and extends upto 0.9 km above mean sea level.

♦ A cyclonic circulation extending between 1.5 & 2.1 km above mean sea level lies over southwest Bay of Bengal off Sri Lanka Coast.

SATELLITE OBSERVATIONS during past 24hrs and current observation:

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

Western Disturbance (WD):

Scattered multi-layered clouds seen over Jammu & Kashmir, Himachal Pradesh, Uttarakhand adjoining Nepal, China and Tibet in association with WD over the area.

Clouds description within India:
Scattered low/medium clouds with embedded isolated weak to moderate convection seen over Sikkim and Arunachal Pradesh. Scattered low/medium clouds were seen over Jharkhand, Chhattisgarh, Odisha, Nagaland and Meghalaya. Isolated low/medium clouds were seen over North Punjab, Northeast Rajasthan, Karnataka, Kerala and Tamilnadu.

Arabian Sea: Scattered low/medium clouds with embedded isolated weak to moderate convection seen over South Arabian Sea south of lat 7.0ºN and Long 60.0ºE to 69.0ºE.

Bay of Bengal & Andaman Sea: No significant clouds over the region.

Past Weather:

Convection (during last 24 hrs):
Weak to moderate convection was observed over J&K Himachal Pradesh Uttarakhand Punjab north Rajasthan Sikkim Arunachal Pradesh.
OLR:
Upto 150 wm^{-2} was observer over North J&K
Upto 230 wm^{-2} was observed over rest J&K Himachal Pradesh north Uttarakhand north Punjab.
Dynamic Features:
Negative shear tendency is observed over Himachal Pradesh & N/Hood and Positive shear tendency over rest parts of India.
Medium to high wind shear is observed over North & Central India and low wind shear over South Peninsula region.
A positive Vorticity field is observed over North East Punjab.
Negative low level convergence is observed over Gujarat Maharashtra Bihar and Positive Low Level Convergence over rest parts of India.
Precipitation:
IMR: Rainfall upto 50-70 mm observed over north J & K.
Rainfall upto 02-50 mm observed over Northeast J&K, North Himachal Pradesh and North Uttarakhand
10-20mm north & south J & K, rest Himachal Pradesh, rest Uttrakhand and South Kerala.
0-10mm rest J & K, Himachal Pradesh, Uttrakhand, North Rajasthan, West Haryana, North and East Uttar Pradesh and South Karnataka.
HEM: Rainfall upto 70mm observed over Himachal Pradesh, North Uttarakhand
Rainfall upto 7mm over South J &K Punjab, rest Himachal, North Rajasthan & East Haryana.

RADAR and RAPID RGB Observation:

Isolated light echoes are seen was seen on DWR Srinagar, Delhi, Kochi and Thiruvananthapuram. Isolated/multiple light echoes was seen on DWR Patiala (dBZ around 45 & height 10km) domains at around 1530 IST.
RAPID RGB Satellite imagery at 1530IST indicates significant convection over eastern parts of Jammu & Kashmir, South Himachal Pradesh, Uttarakhand and Sikkim.

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

Higher Dust concentration was observed over Arab countries and northern part of Africa. Dust concentration is expected to decrease over north-western part of India for next five days. PM10 concentration is expected to increase over IGP in next five days.
Particulate matter concentration is expected to remain in moderate to poor category for next 2 days in Delhi.

Delhi – SAFAR analysis & Forecast	21.03.2018	22.03.2018
PM10 (micro-g/m^3)	161	145
PM2.5 (micro-g/m^3)	93	84

2. NWP MODEL GUIDANCE:

NCMRWF (NCUM forecast based on 000UTC of the day):

1. Weather Systems:

Low level CYCIRS, Troughs:
12 UTC of Day 0-3: 850 hPa trough over Bangladesh and adjoining parts of NE India moving eastwards
00 UTC of Day 1: 850 hPa N-S feeble trough from UP region to Telangana

Confluence & Wind Discontinuity Regions:
12 UTC of Day 0-2: at 850 hPa SW-NE wind discontinuity over east coast of India

Synoptic Systems:
12 UTC of Day 1-3: At 500 hPa WD and associated cyclonic circulation over Punjab and adjoin areas of J & K, HP

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

12 UTC of Day 0-4: Weaker core in all the days except in Day 3 and 4 over eastern India.

3. Convergence at 850 hPa:

Day/Index: Subdivisions with Lower Level Convergence > 15 x 10^-5 /s
Day0: Jharkhand, Odisha, Coastal AP, Tamilnadu Puducherry, SI Karnataka,
Day1: Jharkhand, Odisha, Coastal AP, Rayalaseema, Tamilnadu Puducherry, SI Karnataka, Kerala,
Day2: Odisha, East MP, Madhya Maharashtra, Coastal AP, Coastal Karnataka, SI Karnataka, Kerala,
Day3: Odisha, Madhya Maharashtra, Coastal Karnataka, NI Karnataka, SI Karnataka, Kerala,
Day4: Arunachal Pradesh, Assam, Meghalaya, NE NMMT, Gangetic WB, Jharkhand, Odisha, East MP, Madhya Maharashtra, Chhattisgarh, Coastal AP, Coastal Karnataka, NI Karnataka, SI Karnataka.

4. Low level Vorticity:-Positive Vorticity:

Day/Index: Subdivisions with Lower Level Vortex > 15 x 10^-5 /s
Day0: Assam, Meghalaya, Uttarakhand,
Day1: Arunachal Pradesh, Assam, Meghalaya, NE NMMT,
Day2: Arunachal Pradesh, Assam, Meghalaya, Sub Himalayan WB, Gangetic WB, Himachal Pradesh, Odisha,
Day3: Arunachal Pradesh, Assam, Meghalaya, NE NMMT, Sub Himalayan WB, Gangetic WB, Uttarakhand, Odisha, Coastal Karnataka, SI Karnataka,
Day4: Arunachal Pradesh, Assam, Meghalaya, NE NMMT, Sub Himalayan WB, Bihar, Uttarakhand, Himachal Pradesh, Odisha, Coastal Karnataka, SI Karnataka, Kerala.

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

Day/Index: Subdivisions with Showalter Index < -4
Day0: Arunachal Pradesh, Sub Himalayan WB, Bihar,
Day1: Arunachal Pradesh, Assam, Meghalaya, NE NMMT, Sub Himalayan WB,
Day2: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Punjab, Himachal Pradesh, Jammu Kashmir,
Day3: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh,
Day4: Arunachal Pradesh, Assam, Meghalaya, NE NMMT, Sub Himalayan WB.

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

Day/Index: Subdivisions with K Index > 40
Day0: Sub Himalayan WB, Coastal AP, Rayalaseema, Tamilnadu Puducherry, SI Karnataka, Kerala,
Day1: Assam, Meghalaya, Sub Himalayan WB, Coastal AP, Tamilnadu Puducherry, Kerala,
Day2: Arunachal Pradesh, Sub Himalayan WB, Tamilnadu Puducherry, Kerala,
Day3: Arunachal Pradesh, Sub Himalayan WB, Coastal AP,
Day4: Arunachal Pradesh, Assam, Meghalaya, NE NMMT.

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

Day/Index: Subdivision with Total Totals Index > 52
Day0: Arunachal Pradesh, Assam, Meghalaya, Sub Himalayan WB, Gangetic WB, Jharkhand, Bihar, East UP, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, Odisha,
Day1: Arunachal Pradesh, Assam, Meghalaya, NE NMMT, Sub Himalayan WB, Uttarakhand, Haryana, Chandigarh, Delhi, Himachal Pradesh, Jammu Kashmir,
Day2: Arunachal Pradesh, Sub Himalayan WB, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir, West RJ,
Day3: Arunachal Pradesh, Sub Himalayan WB, West UP, Uttarakhand, Haryana, Chandigarh, Delhi, Punjab, Himachal Pradesh, Jammu Kashmir,
Day4: Arunachal Pradesh, Assam, Meghalaya, NE NMMT, Sub Himalayan WB.

8. Rainfall and thunder storm activity:

Day/Index: Subdivisions with Precipitation > 2 cm
Day1: Arunachal Pradesh, Jammu Kashmir,
Day2: Arunachal Pradesh, Assam, Meghalaya,
Day3: Arunachal Pradesh, Assam, Meghalaya,
Day4: Arunachal Pradesh,
Day5: Arunachal Pradesh, Assam, Meghalaya, Sub Himalayan WB.

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

1. Synoptic Systems:

The analysis based on 00 UTC shows a cyclonic circulation in lower troposphere over Punjab and adjoining areas and one feeble cyclonic circulation over west Uttar Pradesh and adjoining area. Analysis also shows a trough extends from south Andhra Pradesh to south Tamil Nadu. Forecast shows the cyclonic circulation over Punjab moves eastward and lies over Uttarakhand and adjoining west Uttar Pradesh on day 1 and becomes less marked thereafter. An East-West trough runs from Sikkim to Nagaland on day 1 and day 2. Another cyclonic circulation lies over Telangana and adjoining areas on day 1 and day 2 and a trough extends from this cyclonic circulation to extreme south peninsula during next 48 hours.

2. Location of Jet and Jet Core (>60kt) at 500hPa:

Although the presence of strong westerlies is found but no jet core over the Indian region for the next 3 days.

3. Low Level Vorticity {850hPa Positive Vorticity (>12 x 10^{-1}/s)}:

Mostly along the north eastern states on all 3 days and along the trough from Telangana region to extreme south peninsular India on all 3 days; over east Uttar Pradesh and adjoing area, parts of central India up to Telangana..

4. Spatial distribution of T-storm Initiation Index, Lifted Index, Total Total Index, CAPE, CIN and Sweat Index [High potential for thunderstorm]:

T-Storm Initiation Index (> 3): Higher than a value 3 over parts of Gujarat coastal areas of Gangetic West Bengal, Orissa, Andhra Pradesh, Telangana, Kerala, Karnataka, Tamil Nadu, coastal Maharashtra, Konkan & Goa, coastal areas along the east coast and west coast extreme south peninsular India on all 3 days. Maximum value of index is seen along the east coast GWB and adjoining coastal Orissa, Andhra Pradesh and Tamil Nadu during all 3 days and along the west coast on day 3.

Lifted Index (< -2): The threshold value of the is below -2 over parts of Gujarat, southern part of west coast, coastal areas along the east coast, coastal Orissa, Andhra Pradesh, coastal Karnataka, Kerala and Tamil Nadu, GWB, Tripura and adjoining area, Konkan and Goa on all 3 days; some parts of Bihar, Jharkhand and east Uttar Pradesh on day 1; maximum negative value of the index can be seen over coastal area along east coast and southern part of west coast, GWB, Orissa, Kerala, Andhra Pradesh and Tamil Nadu during all 3 days.

Total Total Index (> 50): Above threshold value over parts Chhattisgarh, East Madhya Pradesh adjoining East Uttar Pradesh, Madhya Maharashtra, Marathawada, Vidarbha and coastal Maharashtra on day 1; over parts of East Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Bihar, Jharkhand, Orissa, Andhra Pradesh, Karnataka, Telangana, coastal Maharashtra, Madhya Maharashtra and Marathawada and Vidarbha on day 2 and 3; on day 3 over some parts of Gujarat and GWB.

Sweat Index (> 300): Parts of Gujarat, NE states**,** GWB, Peninsular India, Konkan & Goa, Bihar, Jharkhand, Orissa, J&K and Himachal Pradesh, Uttarakhand coastal areas of south and east coast during all 3 days. Over parts of Punjab, Haryana, Uttar Pradesh and East Madhya Pradesh on day 1; Maximum value of the index can be seen over GWB adjoining Jharkhand, coastal Orissa and adjoining area on day 2 and 3.

CAPE (> 1000): Mostly along coastal areas of southern peninsular India along west coast and over east coast and coastal areas of GWB and adjoining Bihar, Jharkhand and Orissa and Andhra Pradesh and some parts of Gujarat during all 3 days. Maximum value can be seen on day 1 and 2 over coastal Orissa and GWB.

CIN (50-150): Mostly over parts of Gujarat, along east coast along west coast from Saurashtra & Kutch to coastal Karnataka, Konkan and Goa, coastal Orissa, Telangana, Rayalaseema, Andhra Pradesh and GWB and NE states, Bihar, Jharkhand and adjoining area during all 3 days. Over parts of Punjab, Haryana, North west Rajasthan, East Uttar Pradesh and Madhya Pradesh on day 1. Maximum value of the index is seen over northern parts of coastal Maharashtra on day 2.

5. Rainfall Activity:

10- 40 mm rainfall: On day 1 over parts of Himachal Pradesh, Uttarakhand, Arunachal Pradesh and adjoining area and Kerala; on day 2 over parts of Arunachal Pradesh, Tripura and adjoining area and Kerala ; on day 3 over some parts of Tripura.

Up to10 mm rainfall: Over parts of J&K, Uttarakhand, Foothills of Himalaya, NE states, GWB, south Peninsular India during all 3 days. Over parts of Haryana, Punjab, Bihar on day 1; over parts of Jharkhand, Chhattisgarh, Orissa, Telangana, Andhra Pradesh on day 1 and 2; on day 3 over some parts of Madhya Maharashtra, Vidarbha, coastal Maharashtra and Karnataka..

IMD WRF (9km based on 00UTC of the day):

1. Model Reflectivity (Max. dBz):

> 25 dBZ Model Reflectivity: On day 1 over parts of J & K, Arunachal Pradesh and adjoining area; over parts of Assam, Meghalaya, Tripura, Mizoram, Arunachal Pradesh and adjoining area on day 2 and 3

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

Total Total Index (> 50): Above threshold value is observed over most parts of the country except south peninsula, along east and west coast and north-eastern states, Gujarat and North west Rajasthan on day 1; On day 2 above threshold value are observed over most parts of the country except south peninsula, along east and west coast and some parts of Gujarat and NE states and on day 3 over south Peninsular India, coastal areas of east coast, southern part of west coast and NE states; The maximum values are found over North west Rajasthan and J&K on day 3; over Jharkhand, East Madhya Pradesh, Chhattisgarh and adjoining Orissa on day 1and 2.

K-Index (> 35): Less than threshold value is observed over the country during the next 3 days except over parts Karnataka, southern Peninsular India, Andhra Pradesh, Karnataka, Orissa and adjoining area and NE states.

CAPE (> 1000): Greater than threshold value over J&K, Gujarat, coastal areas of southern part of west coast, coastal areas along the east coast, coastal Orissa, GWB, Assam and adjoining areas, parts of Tamil Nadu, Kerala, Andhra Pradesh on day 1 and 2. On day 3 over parts of Punjab, Haryana, North West Rajasthan and some parts of Himachal Pradesh Bihar Jharkhand, Orissa, GWB, NE states, coastal areas of the east coast and southern part of west coast, Konkan and Goa. Maximum value greater than 3000 is seen over the parts of Orissa and its coastal areas and coastal Tamil Nadu on day 1; on day 2 over coastal Orissa, GWB, extreme southern part of west coast, coastal and Tamil Nadu; along the southern part of west coast on day 3.

CIN (50-150): Over most of the parts of Gujarat, Saurashtra region, Rajasthan, J&K, Punjab, Himachal Pradesh, Uttarakhand, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Orissa, coastal areas along east coast and west coast, Konkan and Goa, southern parts of peninsular India, GWB and NE states during all 3 days . Maximum value of the index is seen over coastal Andhra Pradesh, some parts of Jharkhand, Orissa on day 1; over some parts of Gujarat, Orissa, GWB & Kolkata on day 2; on day 3 over some parts of Gujarat, some parts of west Rajasthan, northern parts of Coastal Maharashtra and some parts of Orissa.

3. Rainfall and Thunderstorm Activity:

70 -130 mm rainfall: Over some parts of Arunachal Pradesh on day 2.

40 -70mm rainfall: Over some parts of Arunachal Pradesh during all 3 days.

10- 40 mm rainfall: Over parts of Kerala, J&K, Arunachal Pradesh, Assam, Meghalaya, Tripura and adjoining area during all 3 days; over parts of Tamil Nadu on day 1 and 2; over parts of Himachal Pradesh and Uttarakhand on day 1.

Up to10 mm rainfall: Over parts of J&K, Himachal Pradesh, Uttarakhand, NE states, places along Foothills of Himalaya, parts of Orissa, Jharkhand, GWB, Andhra Pradesh, Kerala and Tamil Nadu on all 3 days; some parts of Punjab and Haryana on day 1; some parts of Madhya Maharashtra, Marathwada and adjoining Vidharbha on day 3; some parts of Telangana on day 2.

3. IOP ADVISORY FOR 24 and 48Hrs:

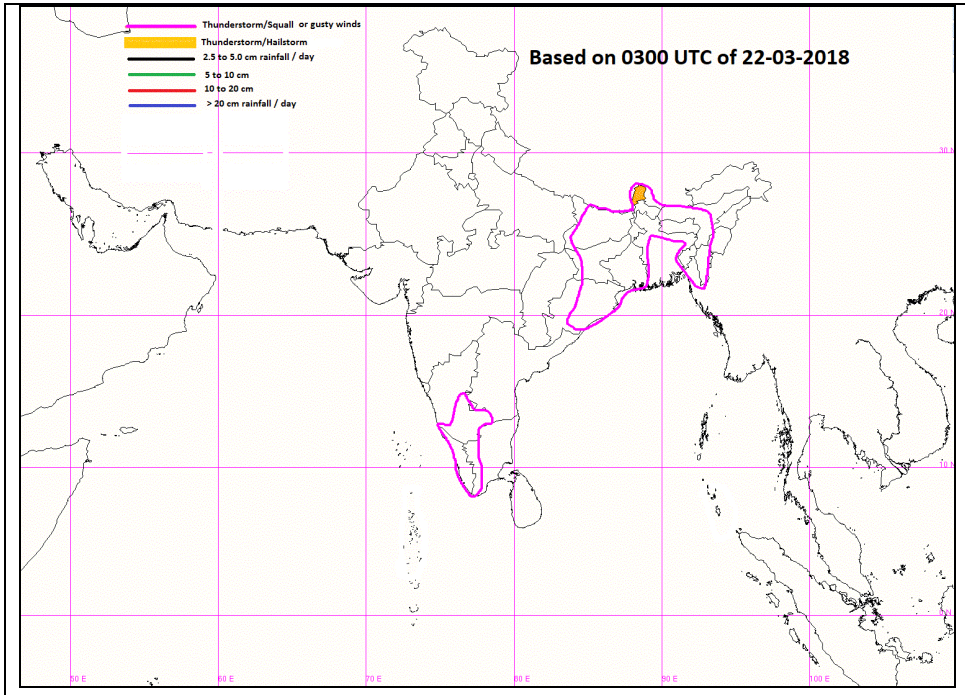
Summary and Conclusions:

o Synoptic analysis as well as the ECMWF and IMD GFS deterministic models indicate that there is presently a north-south oriented trough from Bihar to interior Tamilnadu along the interior east peninsular coast of India in the lower levels. Associated with this trough and the anticyclone located over central Bay of Bengal, there is likely to be moisture incursion from the Bay of Bengal into eastern India today. Thunderstorms are expected in the afternoon hours over eastern and north-eastern India on day 1. On day 2, the trough is likely to move eastwards and the region to the east (and including) West Bengal is likely to be affected by thunderstorms with squall winds.

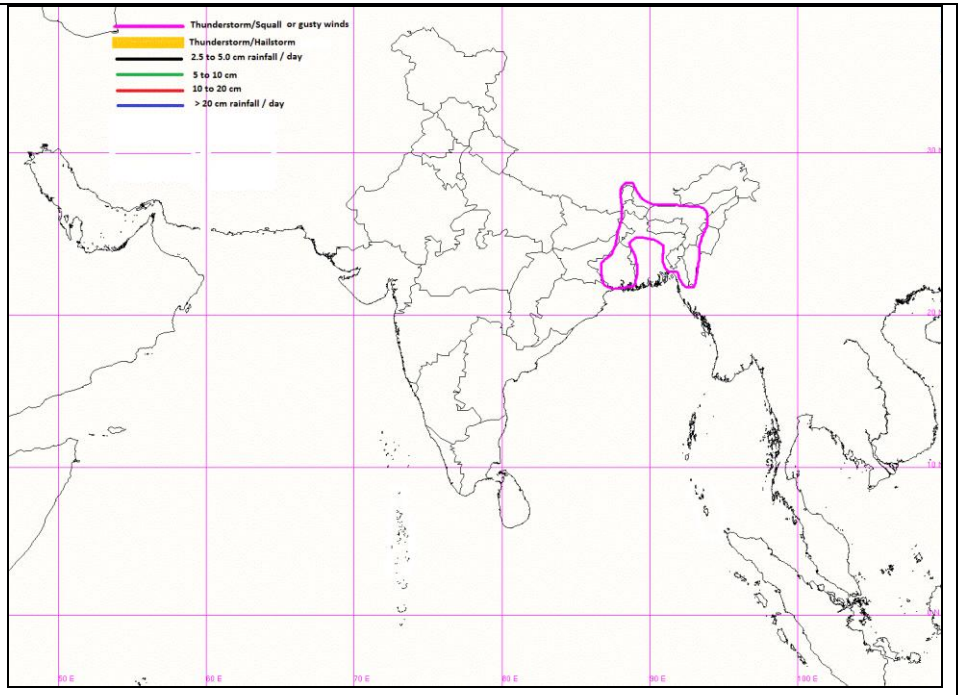
Day-1 & Day-2:

24 hour Advisory for IOP:	**48 hour Advisory for IOP:**
Rainfall: Nil	**Rainfall:** Nil
Thunderstorm with associated phenomenon: Odisha, Jharkhand, Bihar, Gangetic West Bengal, Sub Himalayan West Bengal, Sikkim Assam, Meghalaya, Mizoram, Tripura South Interior Karnataka, Kerala, Interior Tamilnadu	**Thunderstorm with associated phenomenon:** Gangetic West Bengal, Sub Himalayan West Bengal, Sikkim Assam, Meghalaya, Mizoram, Tripura

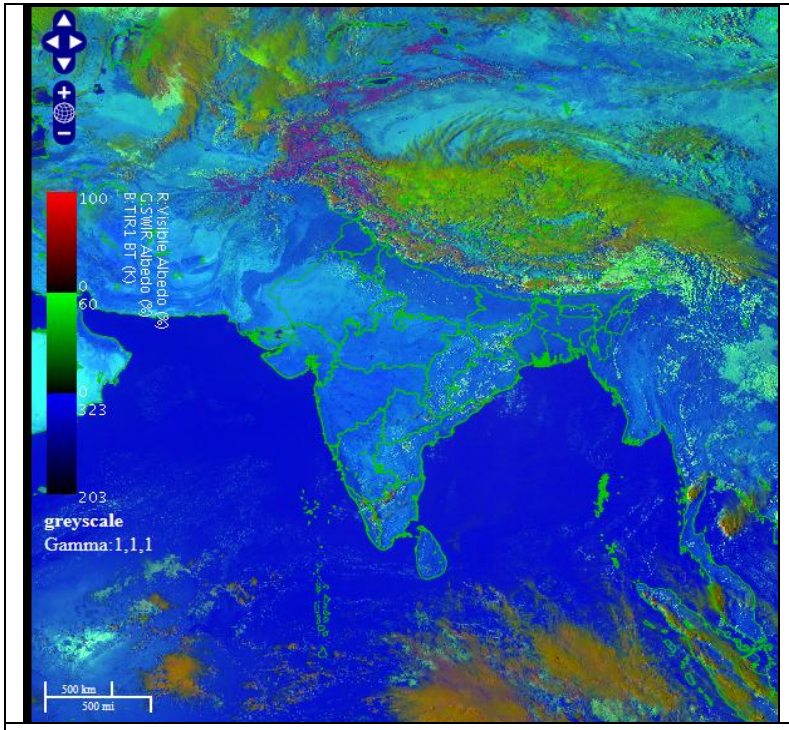
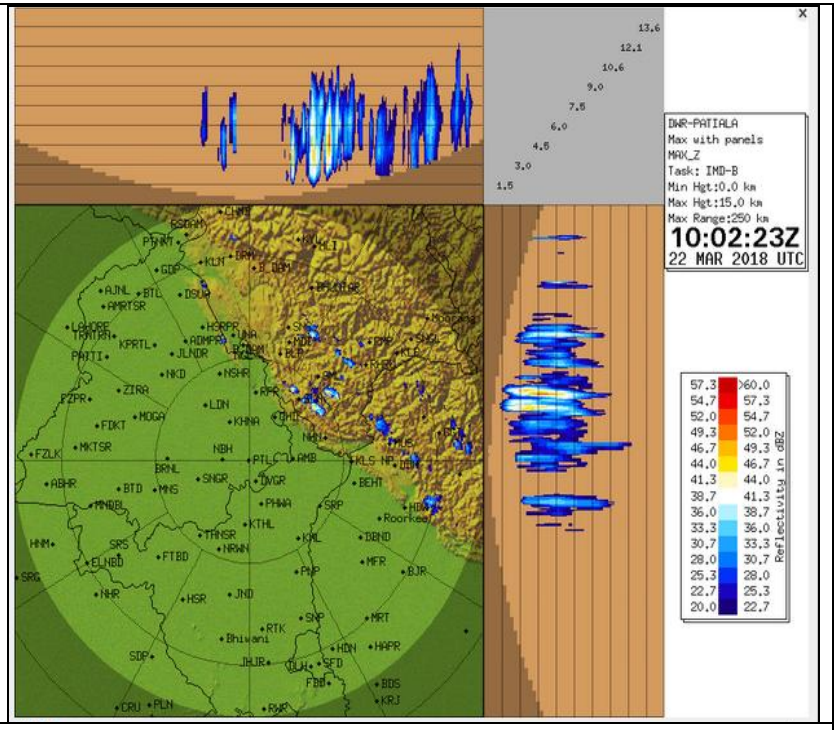
Graphical Presentation of Potential Areas for Severe Weather:

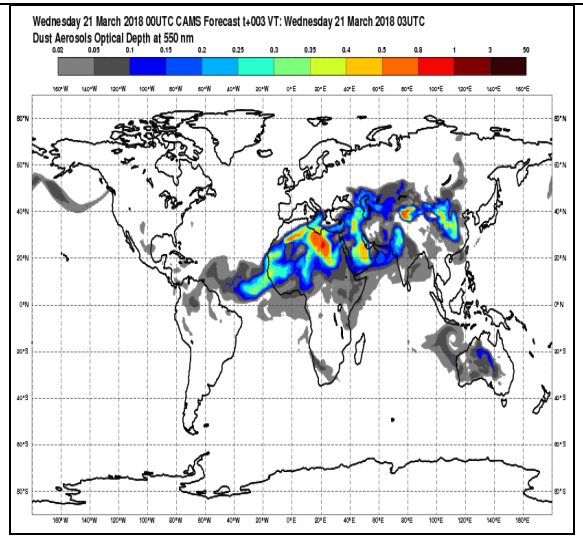


IOP Advisory for 24 hours

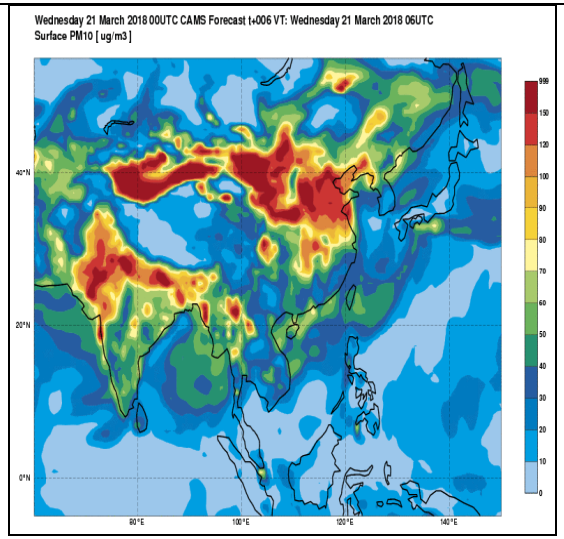


IOP Advisory for 48 hours

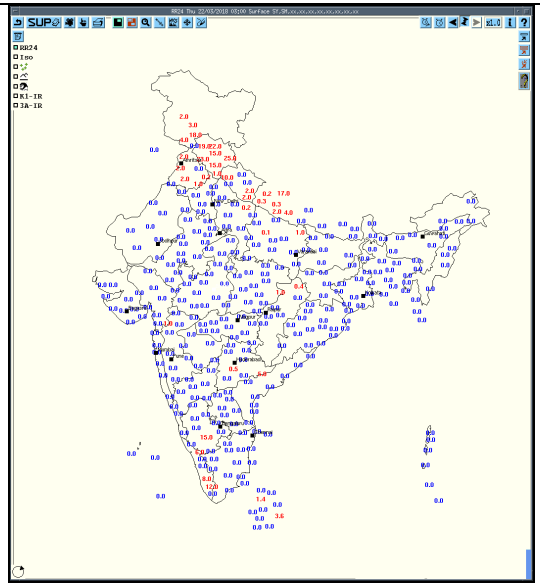
	
RAPID RGB Imagery at 1530 IST of the Day	**DWR Composite at 1530 IST of the Day**



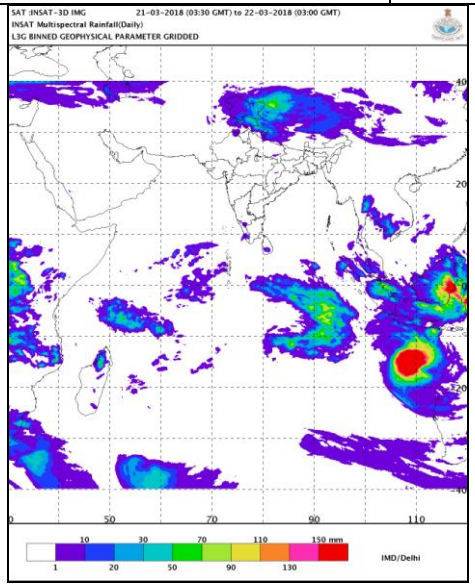
Forecast Dust Concentration



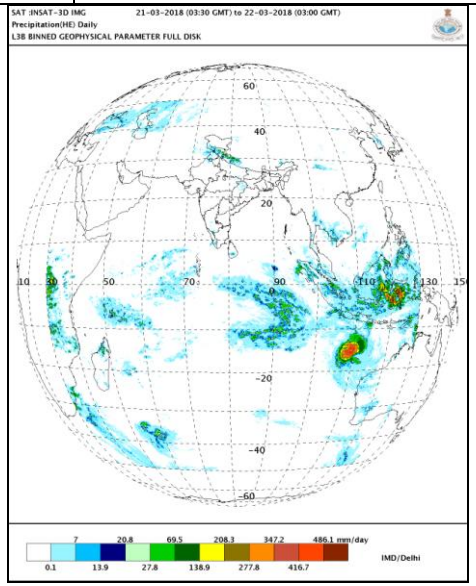
PM10 Forecast



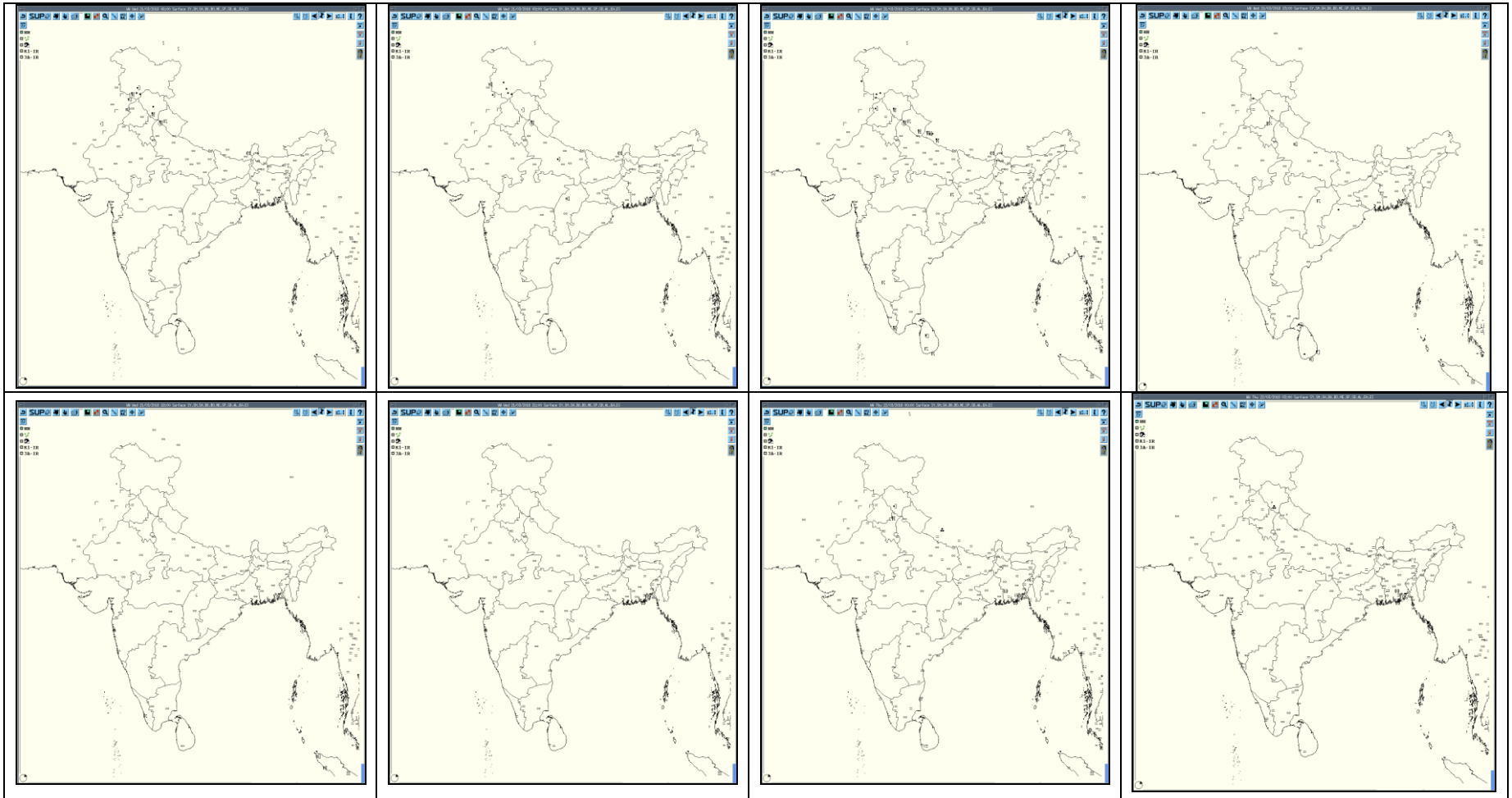
Accumulated 24 Hour rainfall (in red) recorded at 0300UTC of today



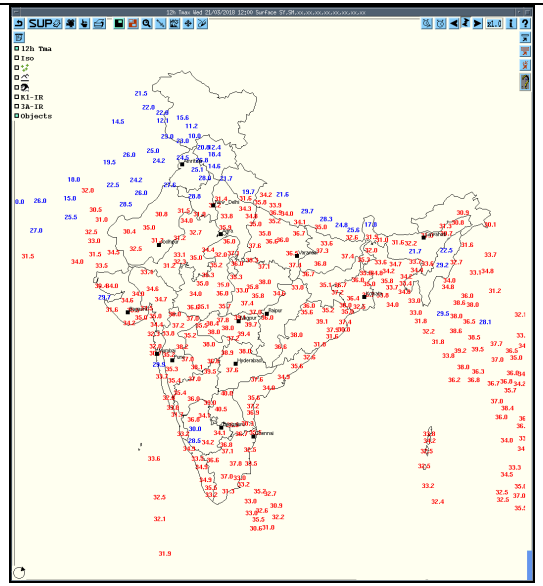
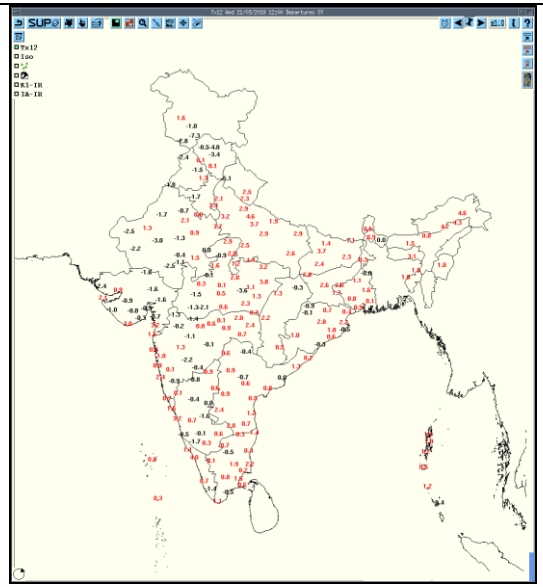
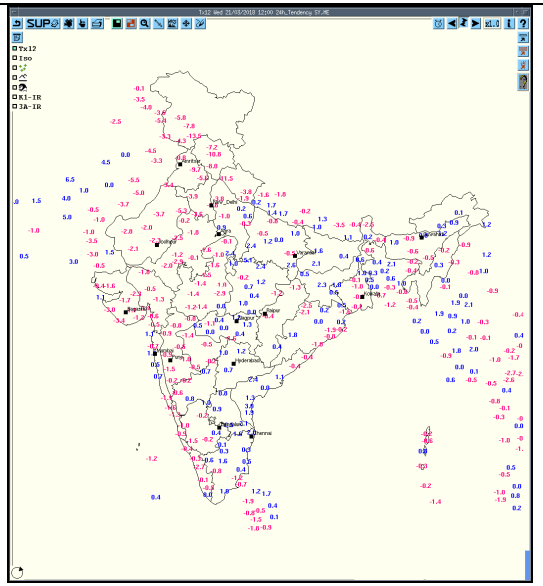
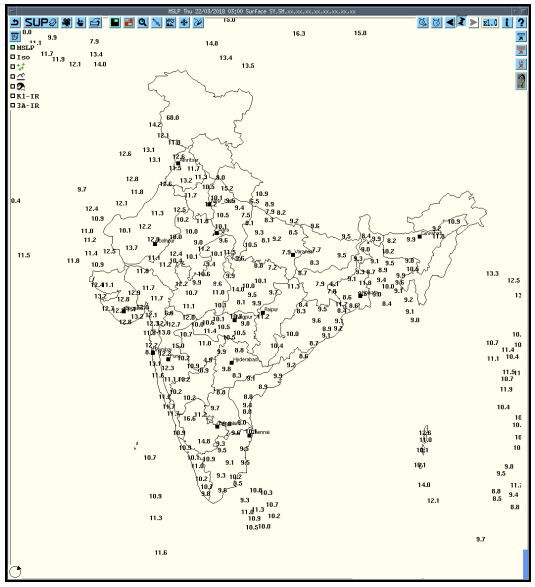
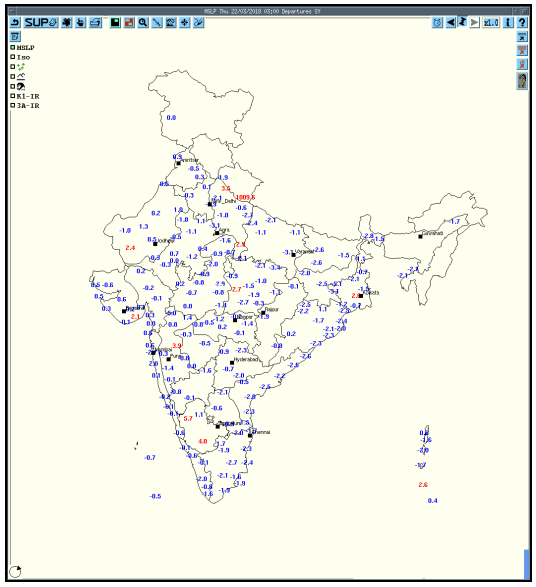
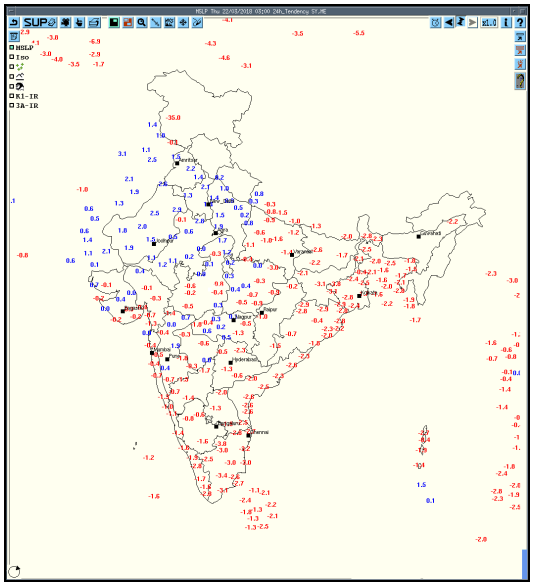
IMR

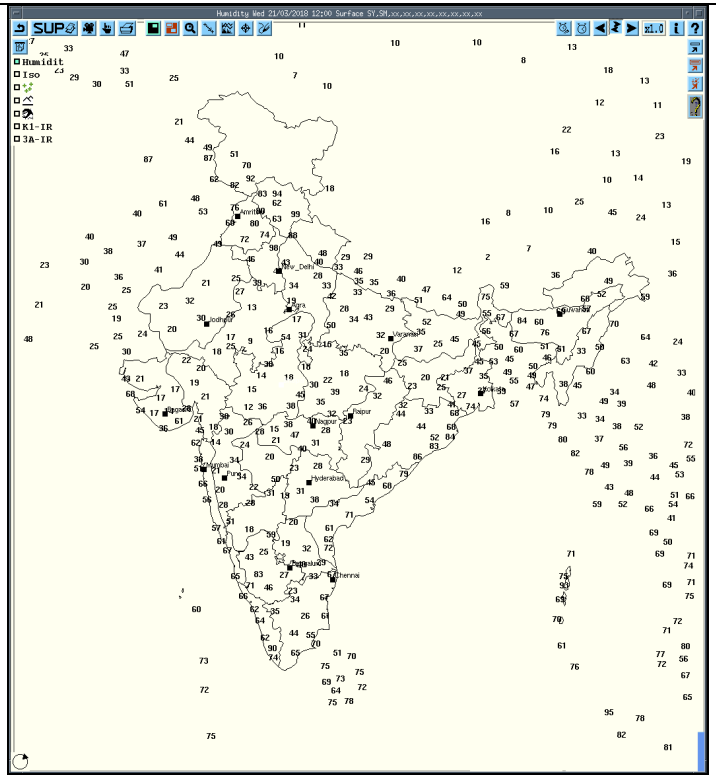


HEM

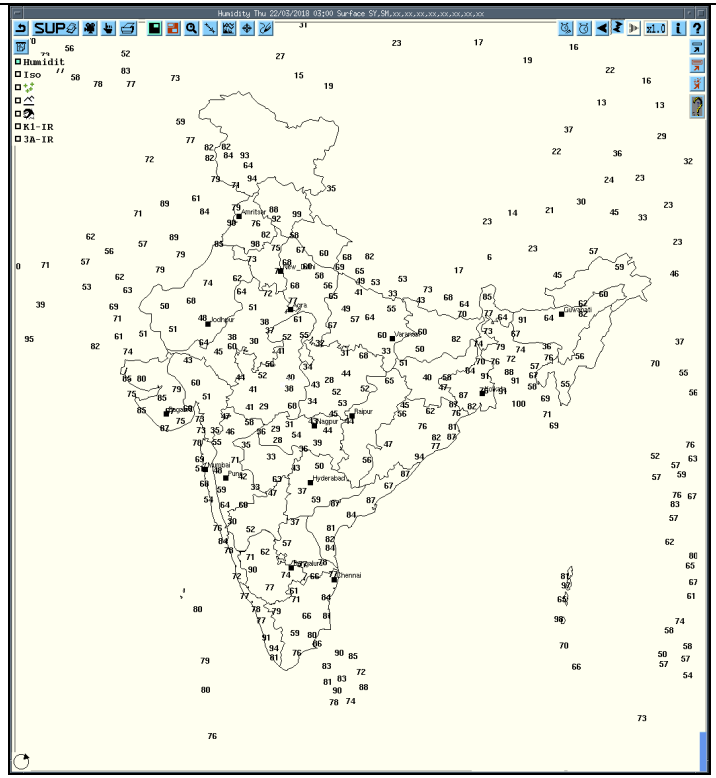


3hourly Past weather at 06, 09, 12, 15, 18, 21 UTC of yesterday and 00 & 03 hrs UTC of today

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



RH at 12UTC yesterday



RH at 03UTC today

Past 24 hours DWR Report:

DWR Station Name	Date of Report	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
Jaipur	22-03-18	210300-220300	Nil	Nil	Nil	Nil	Nil
Patiala	22-03-18	210300 - 210600	Multiple echoes dBz =54.5 ht 12-14 km	Formation in NW,SW,SE,NE Sectors .Movement towards N Direction	--	RA/TS	Amritsar, Jalandhar, Firozpur, Ludhiana, Hoshiarpur, Dehradun, Behat, Karnal, Bilaspur
		210600 -210900	Multiple echoes dBz =58.0 ht 13-14 km	Formation in NW,SW,SE,NE Sectors .Movement towards N Direction	--	RA/TS	Faridkot, Muktsar, Jalandhar, Kapurthala, Dehradun, Shimla, Una
		210900- 211200	Multiple echoes dBz =56.0 ht 11-14 km	Formation in NW,NE Sectors .Movement towards N Direction	--	RA/TS	Nalagarh, Bilaspur, Mussoorie, Adampur, Hoshiarpur.
		211200 - 211500	Multiple echoes dBz =50.0 ht 11-13 km	Formation in NW,NE Sectors .Movement towards N Direction	--	RA/DZ	Adampur, Hoshiarpur, Hamirpur
		211500 -211800	Multiple echoes dBz =63.0 ht 9-10 km	Formation in NW, Sectors .Movement towards N Direction	--	TS/RA	Garhshanker, B Dam, Hoshiarpur, Una. N dam, Hamirpur, Mandi, Rupnagar, Chandigarh, Patiala
		211800 - 212100	Multiple echoes dBz =50.0 ht 8-10 km	Formation in NE,SE,NE Sectors .Movement towards NE Direction	--	RA/DZ	Mussoorie, Ludhiana, Nawanshahr, B Dam. Una, Bilaspur, Hamirpur,
		212100- 220000	Multiple echoes dBz =48.5 ht 06-07 km	Formation in NE,SE Sectors .Movement towards NE Direction	--	RA/DZ	Chandigarh, Nalagarh, Solan, Shimla, Mandi, Sundernagar.
		220000-220252	Multiple echoes dBz =40.0 ht 06-07 km	Formation in NE Sectors .Movement towards NE Direction	--	RA/DZ	Sundernagar, Mandi, Shimla, Bilaspur, Bhunter.

DWR Station Name	Date of Report	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
Lucknow	22-03-18	210542- 210852	Single cell with average height of 7.0KM with Maximum Reflectivity of 49 dBZ.	WSW(75KM) moving in NE'ly Direction at speed of 43 km/hr.	Multiple cells started forming at 06:12 UTC at SW(70KM) to WNW (110KM) with avg. ht.of 6.5KM ,moved in NE'ly direction ,did not intensified much and weakened at 08:42 UTC.	TSRA	Hardoi, Sitapur, Lucknow, Unnao
		210842-211032	Single cell with average height of 9.5KM with Maximum Reflectivity of 47 dBZ.	N(150KM) moving in ENE'ly Direction at speed of 46 km/hr.	Multiple cells started forming at 0902 UTC one at N(150KM) with avg. ht. of 9.5KM with Max Ref. 47 dBZ and second cell at N(85KM) with avg. ht. of 6.5KM with Max Ref. 40 dBZ moved in NE'ly direction and dissipated at 10:32 UTC.	TSRA	Sitapur, Lakhimpur Kheri
		210952- 211212	Single cell with average height of 9.5KM with Maximum Reflectivity of 47 dBZ.	SSE(200KM) moving in E'ly Direction at speed of 46 km/hr.	The cell started forming at 0942 UTC one at SSE(200KM) moved in E'ly direction and intensified at 10:52 UTC and dissipated at 1212UTC at SE(240KM).	TSRA	Allahabad, Mirzapur
		211112-211412	Multiple cells with average height of 11.5KM with Maximum Reflectivity of 58.5 dBZ.	NW(140KM-200KM) moving in NE'ly Direction at speed of 46 km/hr.	Multiple cells started forming one at 11:12 UTC at NW(200KM), moving in NE'ly Direcction and broken into two cells at 1222UTC at NW(200KM) these both cells weakened at 1412UTC and remained stable.The second cell at 1132UTC at WNW(150KM) moving in NE'ly Dir.and dissipated at 1232UTC.	HS,TS, RAIN	Budaun, Shahjahanpur, Bareilly, Pilibhit
		211412- 211922	Multiple cells with average height of 10.0KM with Maximum Reflectivity of 53.5 dBZ.	NNW(100KM-250KM) moving in NE'ly Direction at speed of 36 km/hr.	The stable cells at 1412UTC along with other formed multiple cells moved in NE'ly Direction and dissipated at 1922 UTC .	HS,TS, RAIN	Sahjahanpur, Pilibhit, Bareilly, Lakhimpur Kheri, Sitapur
		211612-211952	Multiple cells with average height of 08.0KM with Maximum Reflectivity of 51 dBZ.	ENE(100KM) moving in ENE'ly Direction at speed of 46 km/hr.	-	TSRA	Gonda, Balrampur, Siddharthnagar
		211932- 212352	Multiple cells with average height of 9 KM with Maximum Reflectivity of 54 dBZ.	NE(95KM) moving in NE'ly Direction at speed of 50 km/hr.	-	TSRA	Barabanki, Baharaich, Gonda, Balrampur, Shravasti
		212352- 220202	Single cell with average height of 7.5KM with Maximum Reflectivity of 46.5 dBZ.	NE(140KM) moving in NE'ly Direction at speed of 46 km/hr.	-	TSRA	Baharaich, Shravasti

DWR Station Name	Date of Report	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	22-03-18	210300-220301	Nil	Nil	No Significant Echo	Nil	Nil
Visakhapatnam	22-03-18	211200-211500	Isolated single cell of reflectivity 39dBz with height of 5 km.	NW(215 KMS) moving Ely	Dissipating	NIL	NIL
		211500-211800	Isolated single cell of maximum reflectivity 47dBz with height of 7 km.	N(157 KMS) moving Ely	Dissipating	NIL	NIL
		211800-220000	Convective region reflectivity of 52dBzwith average height of 4.5 km	SE(135 KM)	Dissipating	NIL	NIL
Patna	22-03-18	210300-212100	NIL	N/A	N/A	N/A	N/A
		212100-212230	Multiple Cells Maximum Reflectivity : 37.0 dBZ Echo Top : 8.8 KM	Range : 135 KM from DWR Patna in North-West Movement WEST TO EAST	Warning Issued	N/A	Siwan, Gopalganj, West Champaran, East Champaran, Sheohar
		212230-220110	NIL	N/A	N/A	N/A	N/A
		220110-220150	Single Cell Maximum Reflectivity : 37.0 dBZ Echo Top : 9.0 KM	Range : 143 KM from DWR Patna in North-North-West Movement WEST TO EAST	N/A	N/A	West Champaran, East Champaran, Sheohar
		220150-220300	NIL	N/A	N/A	N/A	N/A

Realised past 24hrs TS/SQ/HS Data:

Realised TS/HS/SQ during past 24 hours ending at 0300UTC of today(received from RMCs/MCs)						
Name of Station Reporting	**Region**	**State/Sub Division**	**Weather Event (TS/Hail/Squall)**	**Date**	**Time of Commencement (IST)**	**Time of end (IST)**
Ambala	Northwest India	Haryana	Thunderstorm	22-03-18	0445	0530
Patiala	Northwest India	Punjab	Thunderstorm	21-03-18	2015	2055
Amritsar	Northwest India	Punjab	Thunderstorm	21-03-18	0845	1030
Ludhiana	Northwest India	Punjab	Thunderstorm	21/22-03-18	During Night	
Chandigarh	Northwest India	Chandigarh	Thunderstorm	21-03-18	2125	2225
Sundernagar	Northwest India	Himachal Pradesh	Thunderstorm	21/22-03-18	210903 211205 211607 212207 220000	210953 211223 211732 212400 220010
Shimla	Northwest India	Himachal Pradesh	Thunderstorm	21/22-03-18	0805 1115	0835 1135
Varanasi (AP)	Northwest India	East Uttar Pradesh	Thunderstorm	21-03-18	1745	1910
Varanasi (BHU)	Northwest India	East Uttar Pradesh	Thunderstorm	21-03-18	1815	1825
Lucknow (AP)	Northwest India	East Uttar Pradesh	Thunderstorm	21-03-18	1320	1350
Kheri	Northwest India	East Uttar Pradesh	Thunderstorm	21-03-18	1400	1500
Bareilly	Northwest India	West Uttar Pradesh	Thunderstorm	21-03-18	1845	1955
Nazibabad	Northwest India	West Uttar Pradesh	Thunderstorm	21-03-18	1200	1230
Banihal	Northwest India	Jammu & Kashmir	Thunderstorm	21-03-18	1205	1255
Tehri	Northwest India	Uttarakhand	Thunderstorm	21-03-18	0850	2310
			Thunderstorm with Hail	**21-03-18**	**1205 1525**	**1215 1540**
Dehradun	Northwest India	Uttarakhand	Thunderstorm	21/22-03-18	210830 212345	211735 220020
			Thunderstorm with Hail	**21-03-18**	**1225**	**1240**
Mukteshwar	Northwest India	Uttarakhand	Thunderstorm	21-03-18	1255 1450 1655	1320 1510 1740
Pant Nagar	Northwest India	Uttarakhand	Thunderstorm	21-03-18	1150 1440	1240 1500
Ambikapur	Central India	Chhattisgarh	Thunderstorm	21-03-18	1615 1730	2130 2215
Pendra Road	Central India	Chhattisgarh	Thunderstorm	21-03-18	1410 1830 2300	1415 1945 2400
Bilaspur	Central India	Chhattisgarh	Thunderstorm	21-03-18	2145	2215

IMPORTANT LINKS:

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 RANDHRA PRADESHID tool:
http://rAndhra_Pradeshid.imd.gov.in/
Low Level Winds
http://satellite.imd.gov.in/archive/INSAT-3D-IMAGER/3D-PRODUCTS/AMV/LLW/MAR_2017/?C=M;O=D
Upper level winds
http://satellite.imd.gov.in/archive/INSAT-3D-IMAGER/3D-PRODUCTS/AMV/HLW/MAR_2017/?C=M;O=D
Past24hourHEMandIMRrainfall(upto03UTCoftoday)
IMR: http://satellite.imd.gov.in/img/3Ddaily_imr.jpg
HEM: http://satellite.imd.gov.in/img/3Ddaily_he.jpg
ForRadarimagesofthepast24hoursincludingmosaicofimages:
http://ddgmui.imd.gov.in/dwr_img/
Satellite sounder based T- Phigram
http://satellite.imd.gov.in/mAndhra_Pradesh_skm2.html

WEATHER SYMBOLS: