Brief Report on Thunderstorm occurred over Punjab and Haryana on 18 April 2025

Thunderstorm with strong gusty winds travelled across Punjab and Haryana on 18 April 2025. One cell originated over Pakistan and moved towards Punjab over Tarn-Taran district at 0852 UTC (shown in Fig 1.a). Cell had maximum reflectivity of 55-60 dBZ and dissipated over Tarn-Taran district.

Main cell developed over Firozpur at 0902 UTC (Fig 1.b) , intensified by 1000 UTC with reflectivity of 55-60 dBZ and moved across Punjab and Northern parts of Haryana (shown in fig 1.a to 1.k). This cell originated over Firozpur, travelled through Faridkot, Moga, Barnala, Sangrur, Patiala, Ambala, Kurukshetra, Yamunanagar and covered distance of 301 km with average wind speed of 54.7 KMPH. It started weakening over Patiala and weakened over the time. Another cell , developed , south of main cell over Sangrur and travelled towards Kaithal with reflectivity in the range of 50-60 dBZ and covered distance of 135 km with average movement speed of 38.57 KMPH.Many other small cells developed over Hisar, Jind and Bathinda but comparatively of less intensity.

Thunderstorm track path based on observed reflectivity of DWR Patiala on 18th April 2025 is shown in fig 2.

Brief Details of Main cell:

Time (UTC)	District	Reflectivity (dBZ)	Height (KM)
0922	Ferozpur	40-45	12-13
0952	Ferozpur-faridkot	50-55	12-13
1022	Moga	55-60	13-14
1102	Moga-Barnala	55-60	13-14
1132	Barnala	55-60	13-14
1202	Sangrur	>60	13-14
1232	Sangru-Patiala	55-60	12-13
1302	Patiala	50-55	12-13
1332	Ambala	50-55	12-13
1402	Yamunanagar	45-50	10-11

AWS Observed Gusty Winds:

AWS Station	Time (UTC)	Maximum Gusty Wind Speed(KT)	Maximum average Wind Speed(KT)
Ferozpur	0930	32	06
Faridkot	0915	32	15
Moga	0930	37	10
Sangrur	1230	57	35
Fatehgarh Sahib	1230	31	10
Yamunanagar	1430	23	05
Panipat	1500	34	17
Sonipat	1600	19	08

Radar Max(Z) Images:

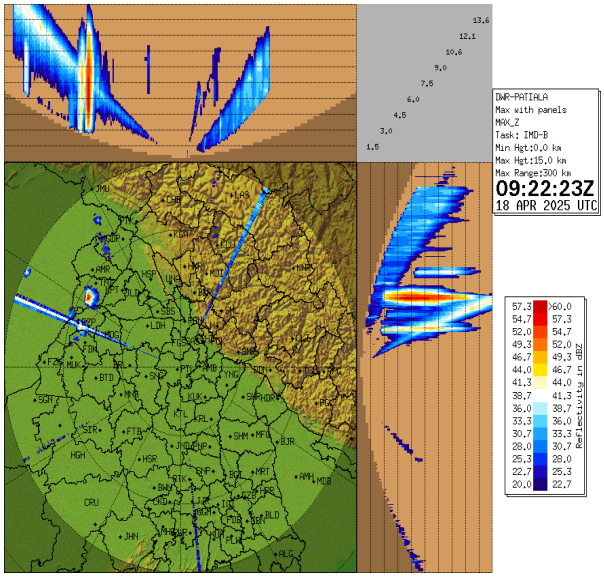


Fig 1.a

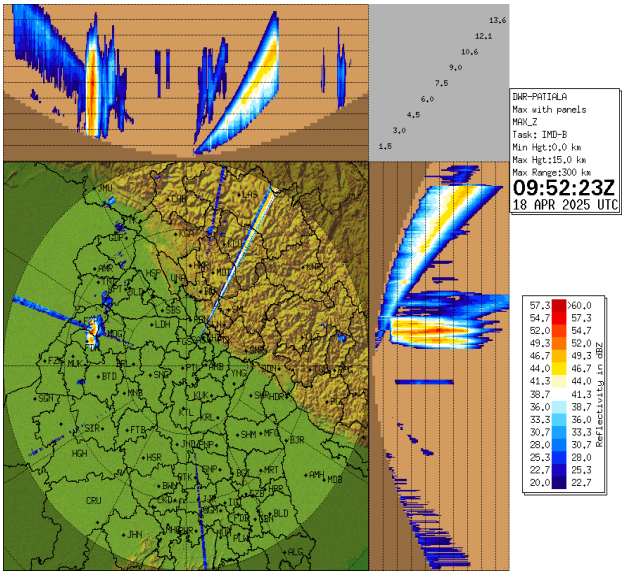


Fig 1.b

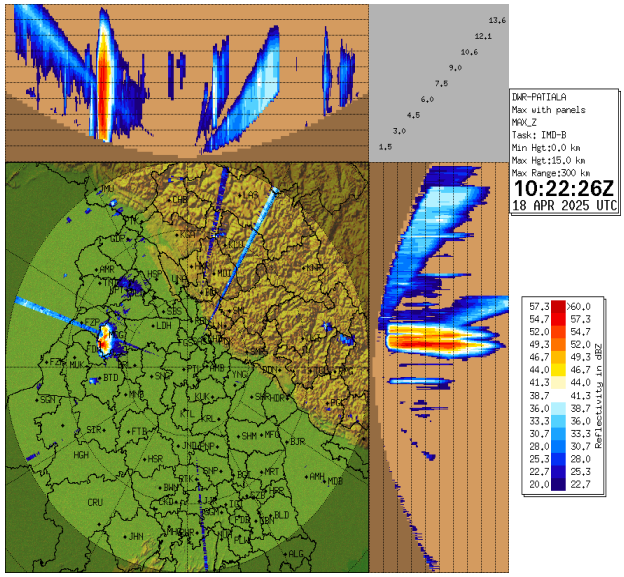


Fig 1.c

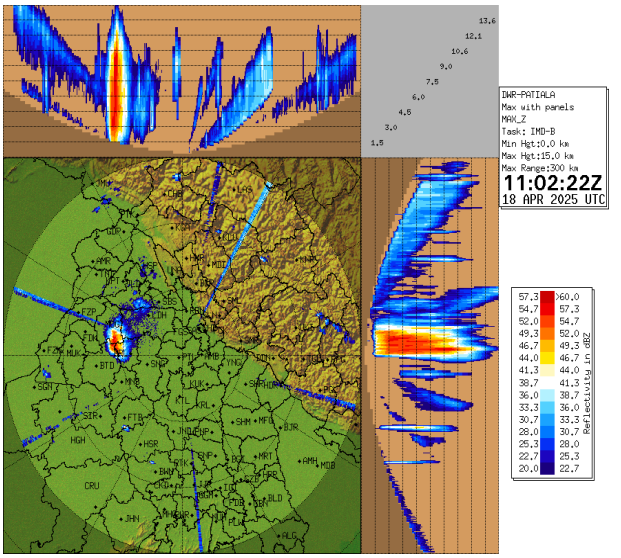


Fig 1.d

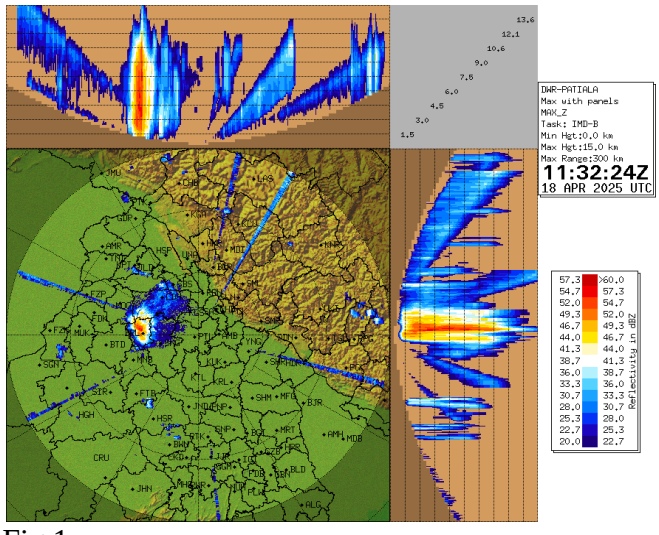


Fig 1.e

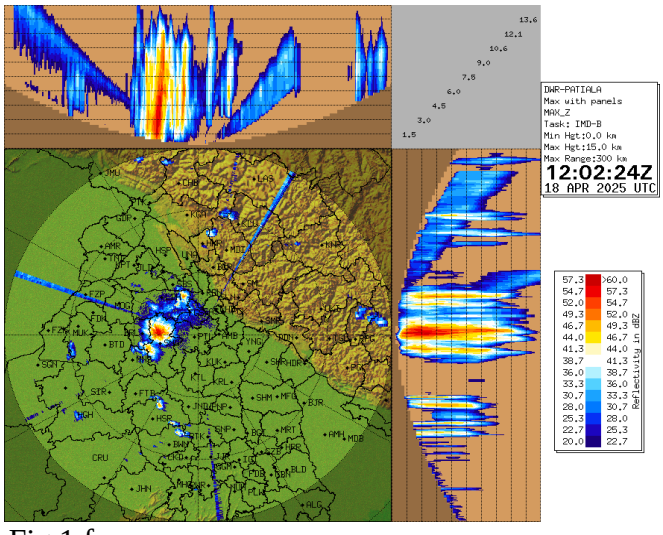


Fig 1.f

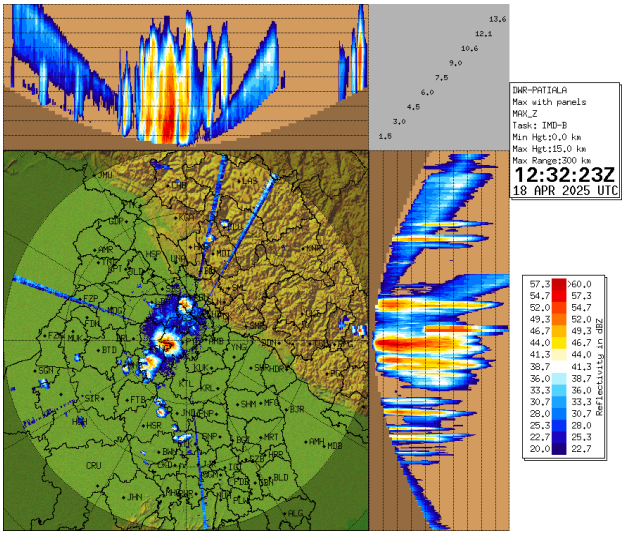


Fig 1.g

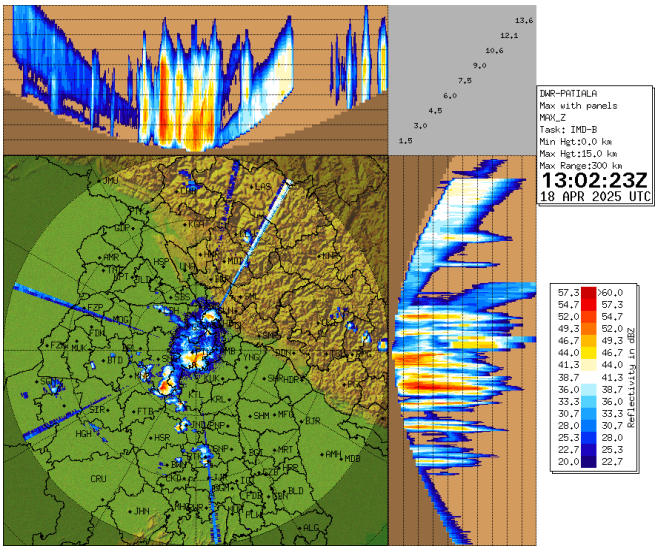


Fig 1.h

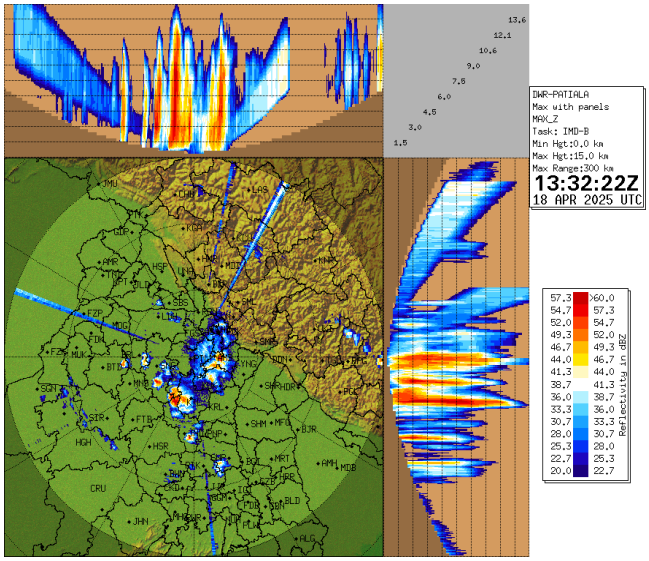


Fig 1.i

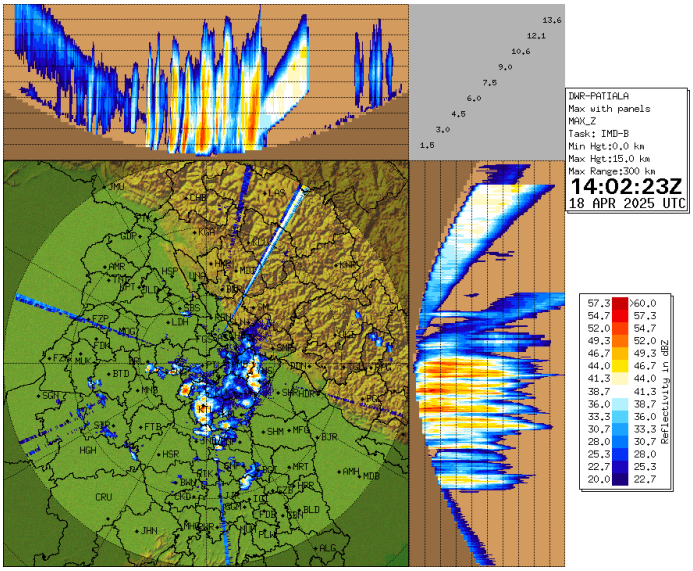
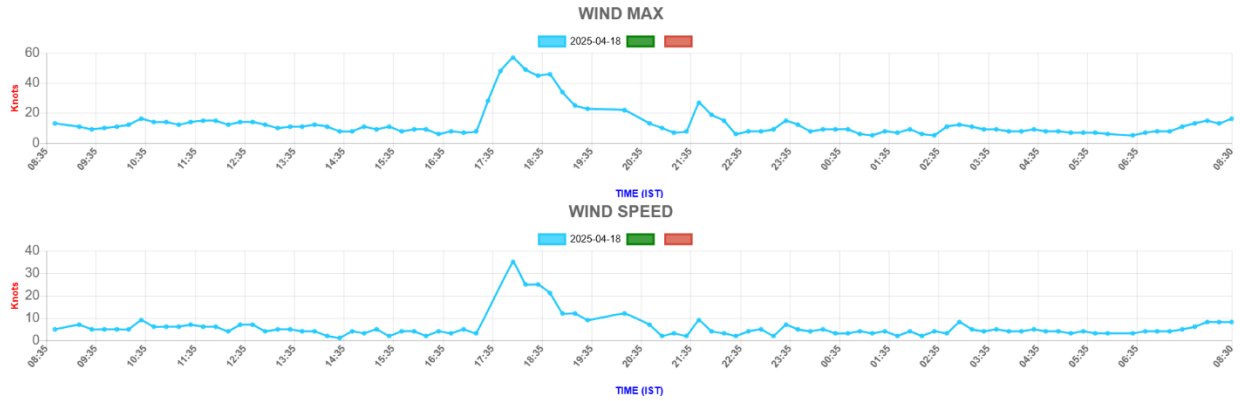


Fig 1.k

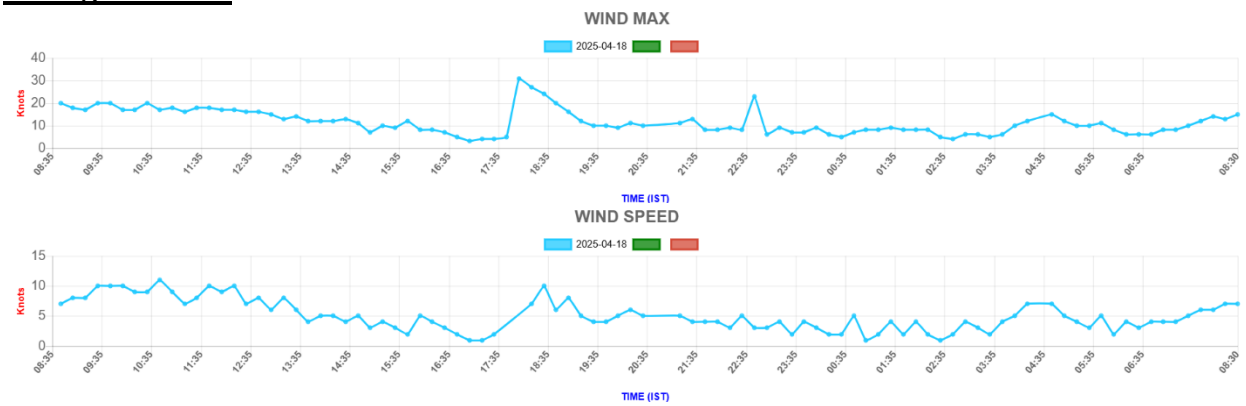
Fig 1: Radar Max(Z) Images showing the track of thunderstorm occurred over Punjab & Haryana on 18th April 2025

AWS Reported Wind Speed Plot:

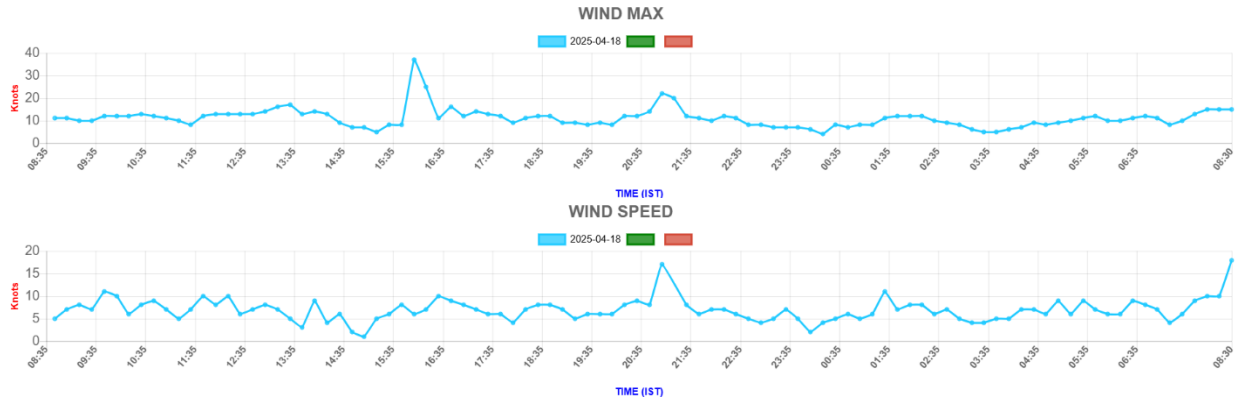
Sangrur:



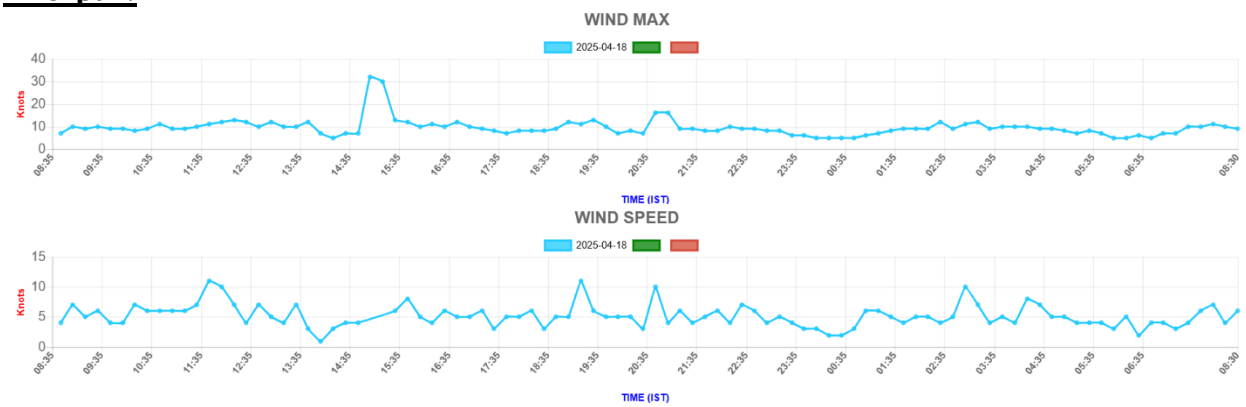
Fatehgarh Sahib:



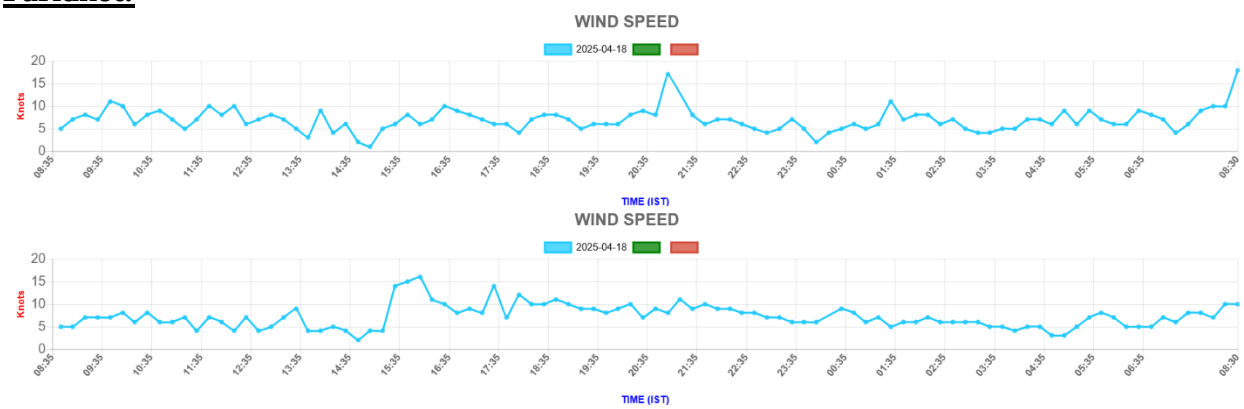
Moga



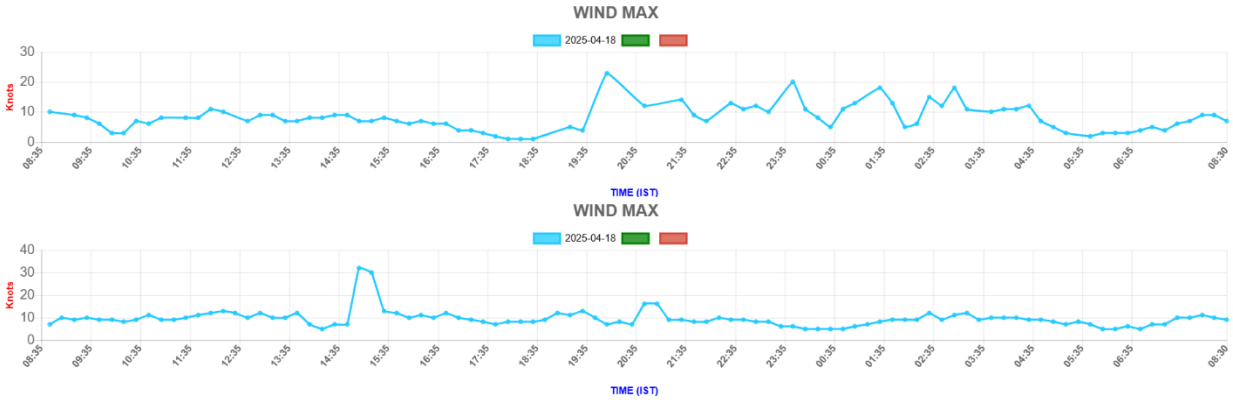
Firozpur:



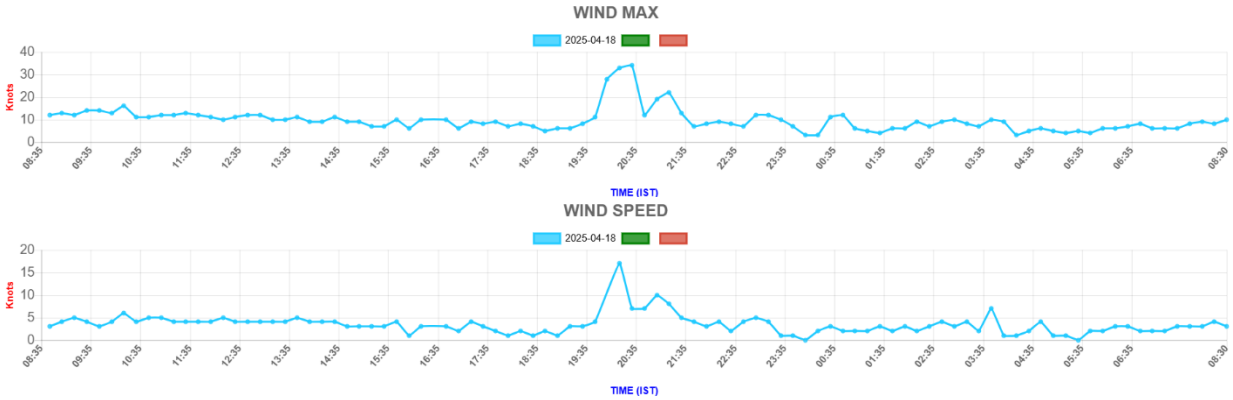
Faridkot:



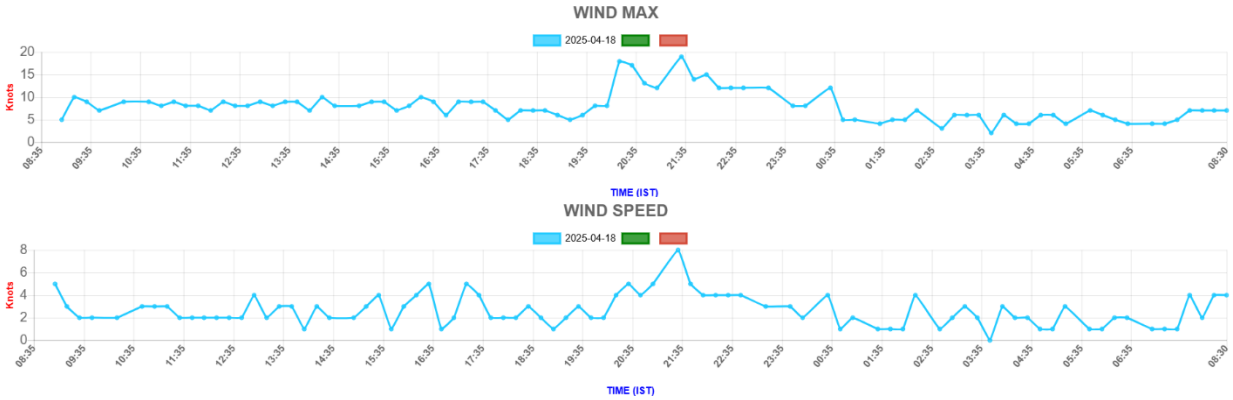
Yamunanagar:



Panipat:



Sonipat:



Track of Thunderstorm Cell on 18 April 2025 based on Reflectivity Observed in Radar

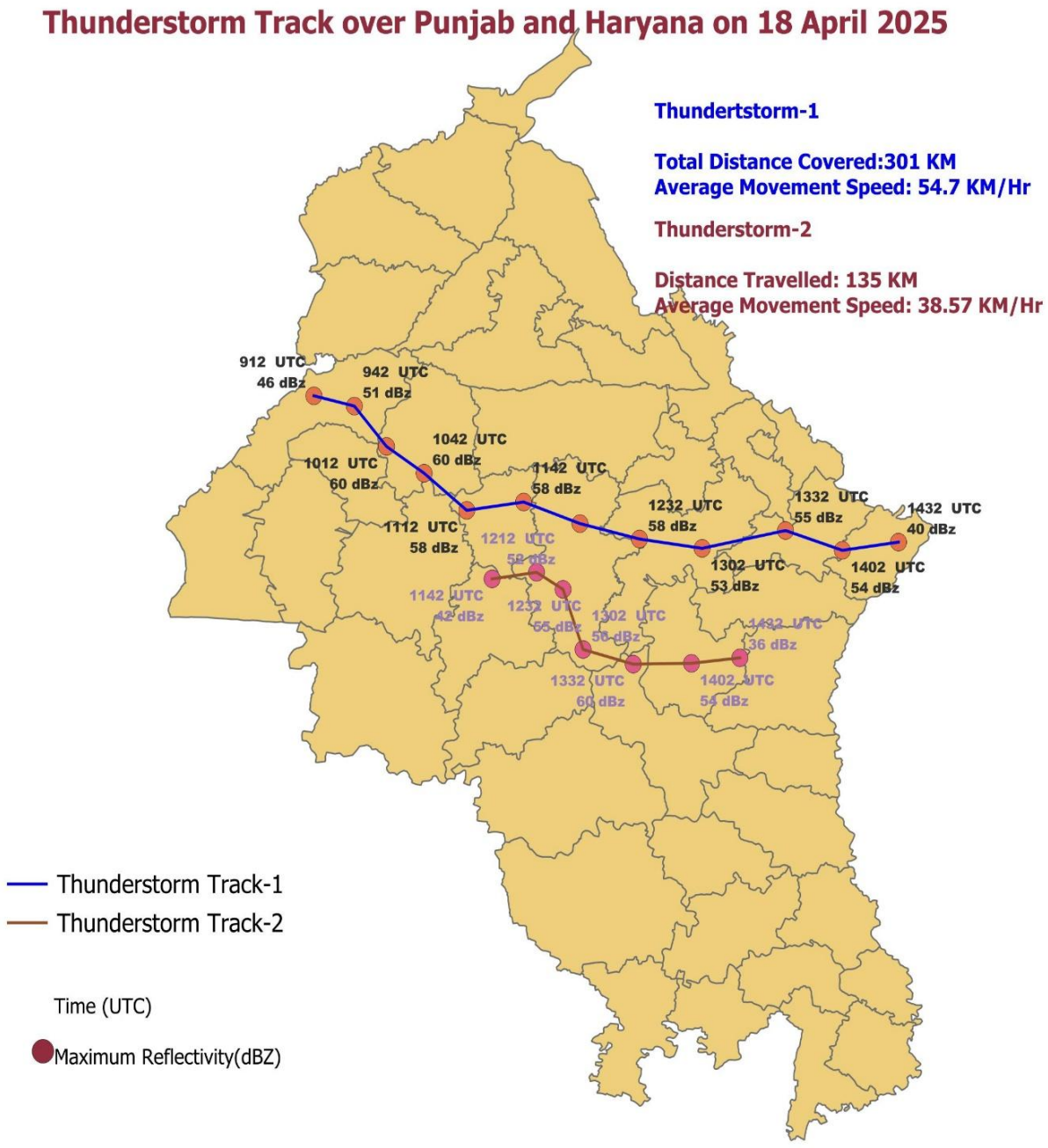


Fig 2 showing the track path of Thunderstorm occurred on 18th April 2025.

Synoptic features:

Three Synoptic features observed during the day 18.04.2025:

1. The Western Disturbance as a cyclonic circulation over northern parts of Iran & neighborhood over Northeast Iran & adjoining Afghanistan and extends between 3.1 & 9.6 km above mean sea levels.

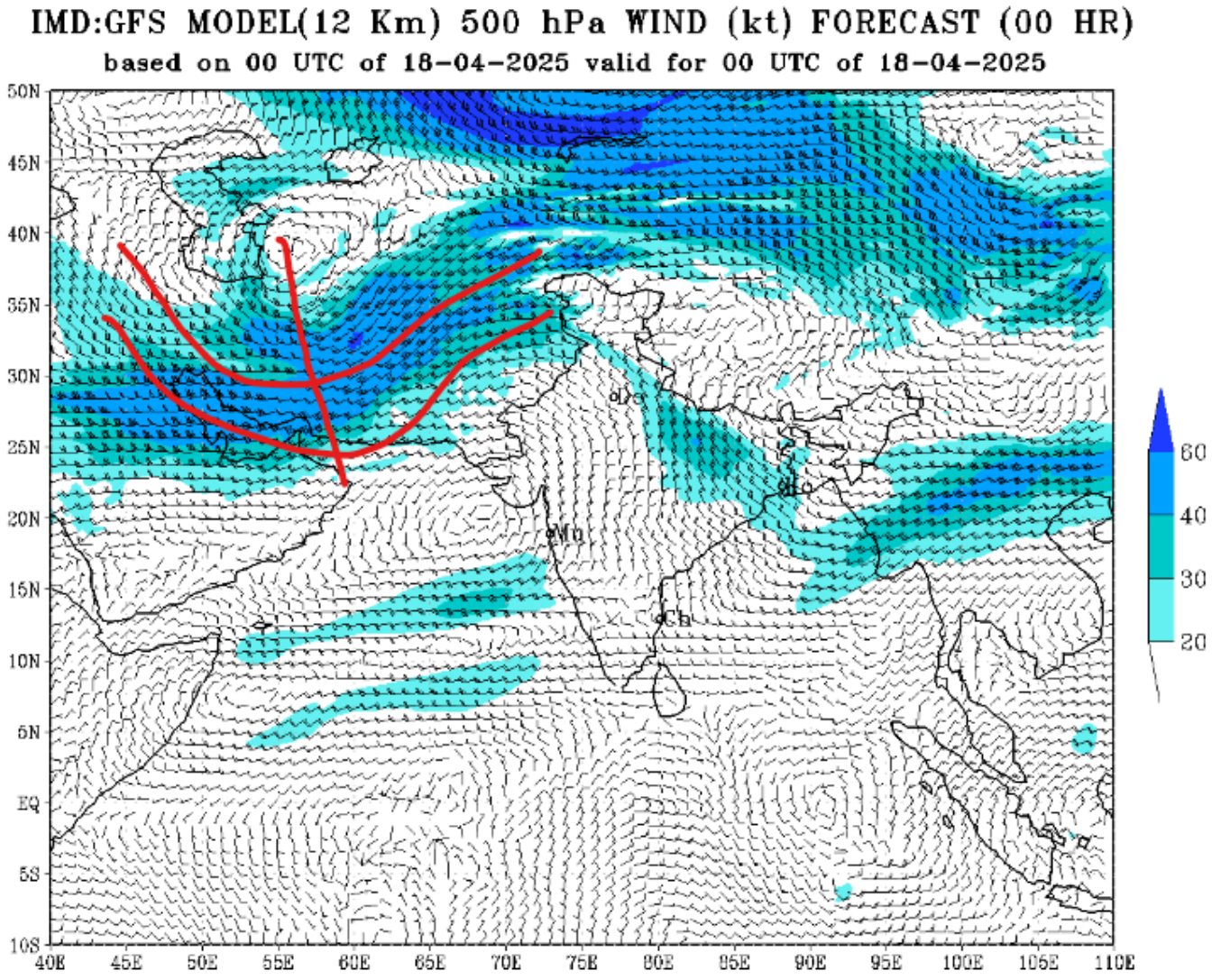


Fig3.a: IMD GFS showing western disturbance as cyclonic circulation at 500 hPa.

2. The upper air cyclonic circulation over South Punjab & neighborhood at 1.5 km above mean sea level.
3. The trough from cyclonic circulation over South Punjab & neighborhood to Jharkhand across Haryana. Another cyclonic circulation over central parts of south Uttar Pradesh at 1.5 km above mean sea level.

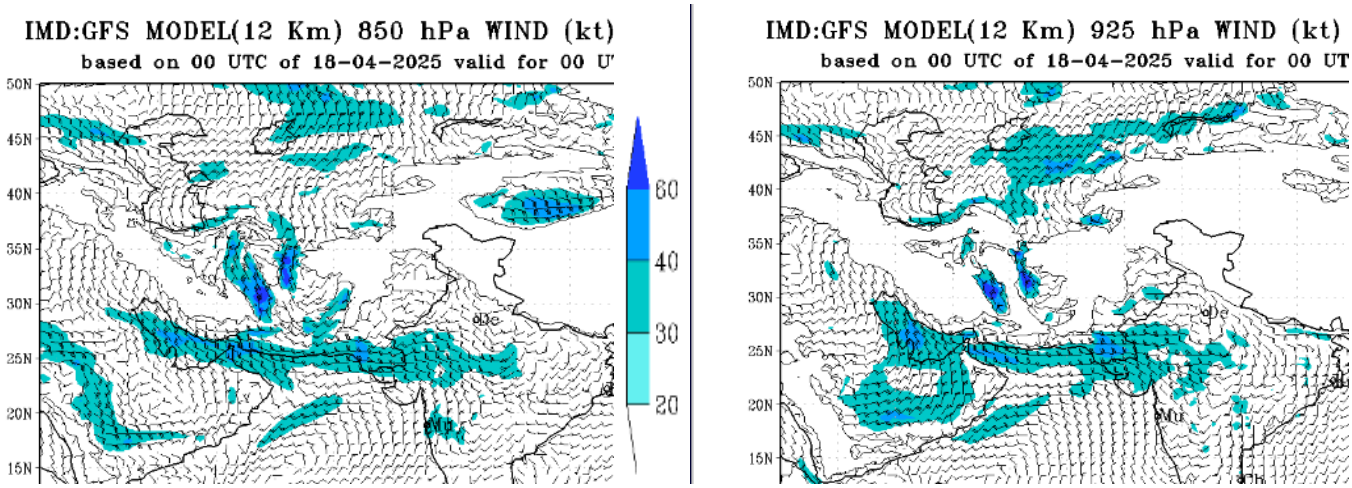


Fig 3.b: IMD GFS showing the cyclonic circulation at 850hPA & trough from it at 925hPa.

Model Guidances:

None of the models (including ECMWF, GFS & NCMRWF) were able to predict the weather event that occurred on 18.04.2025 in Punjab and Haryana. On 17.04.2025, all the models were expecting the weather event only in the northern belt of Punjab and Haryana. But on 18.04.2025 only GFS (IMD) gave indication of weather event in South Punjab and central Haryana. Some screenshots of models also attached for the reference.

Like the other model, NCMRWF also predicted the weather for the second day on 17.04.2025 for the Northern parts only, but no weather was predicted on 18.04.2025

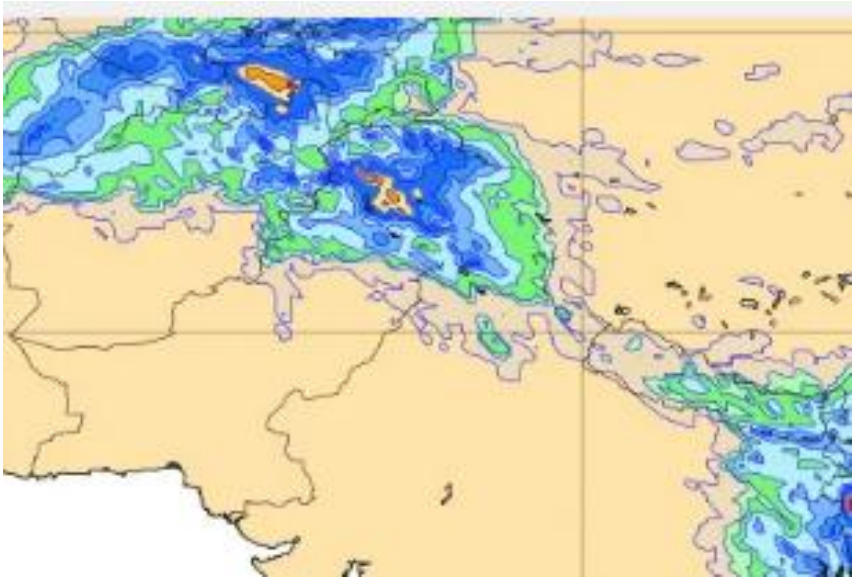


Fig 4.a: ECMWF showing the rainfall over Punjab & Haryana at 00UTC of 18 April 2025.

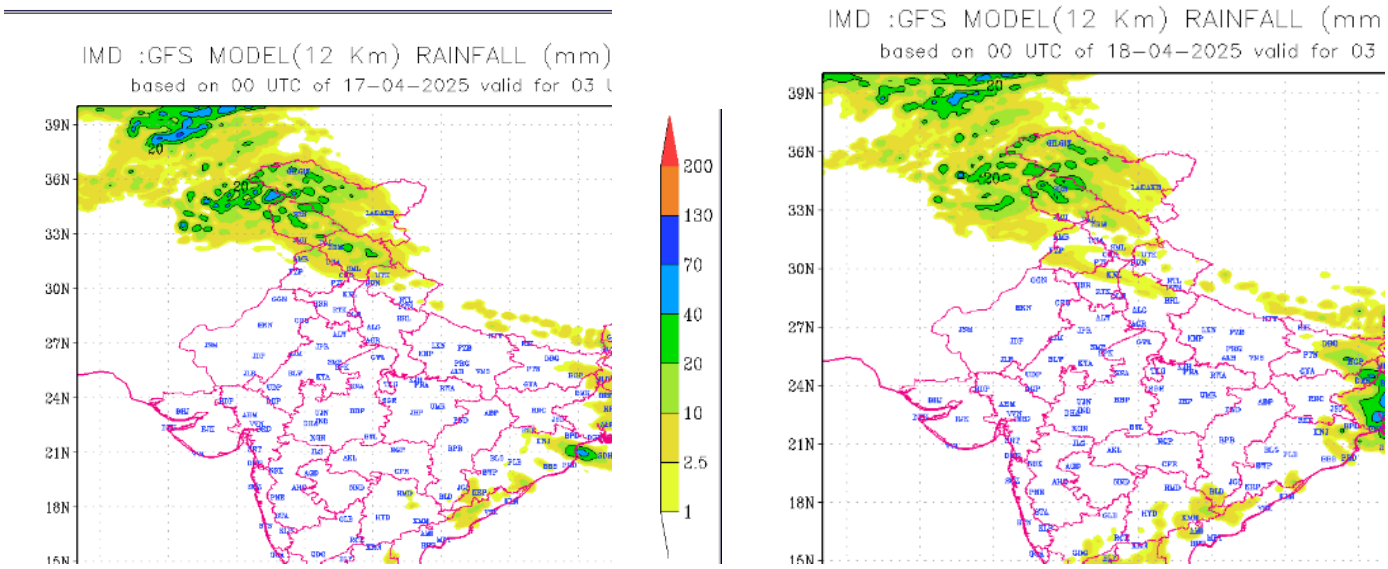


Fig 4.b: GFS (IMD) model showing rainfall for 18th April run on 17.04.2025 & 18.04.2025.

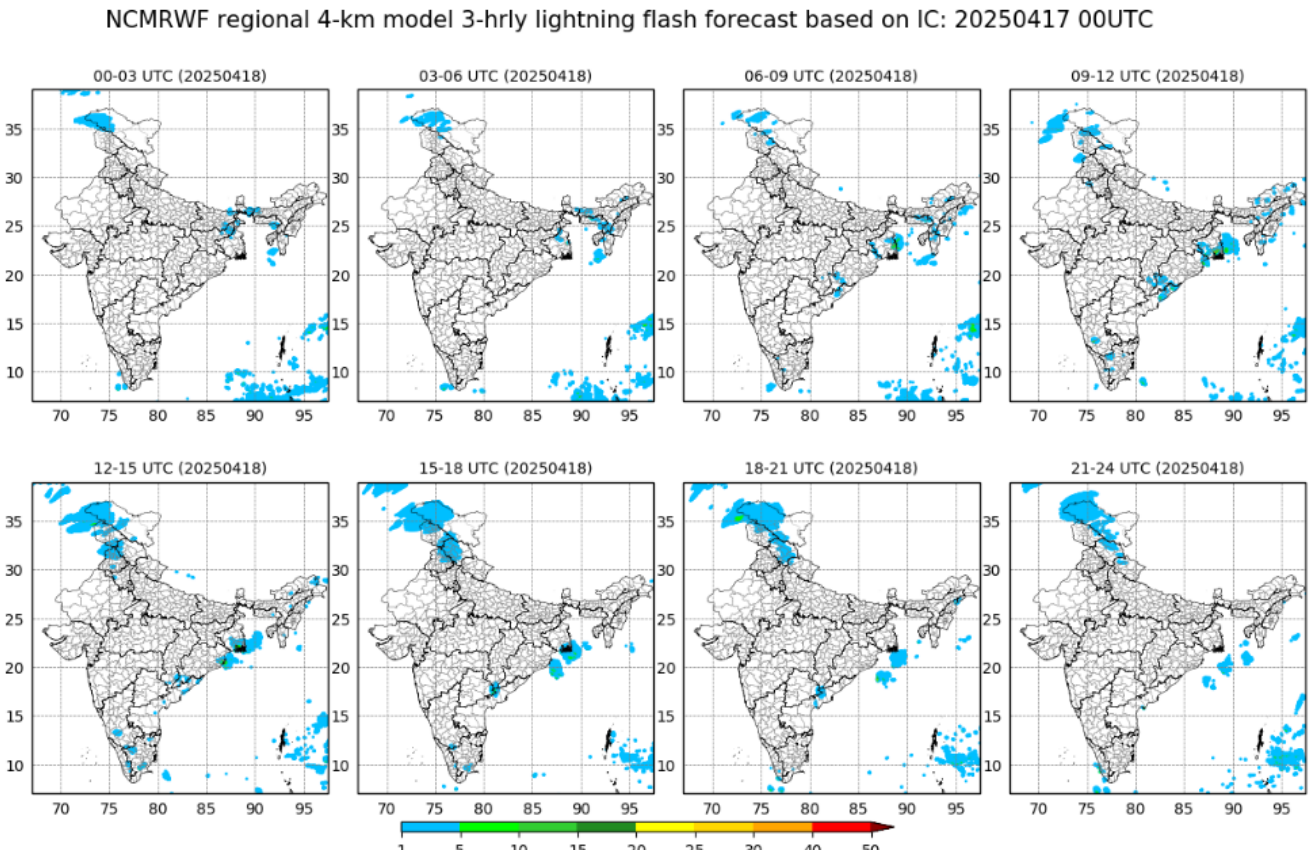


Fig 4.c:NCMRWF model showing activity for 18th April run on 17.04.2025.

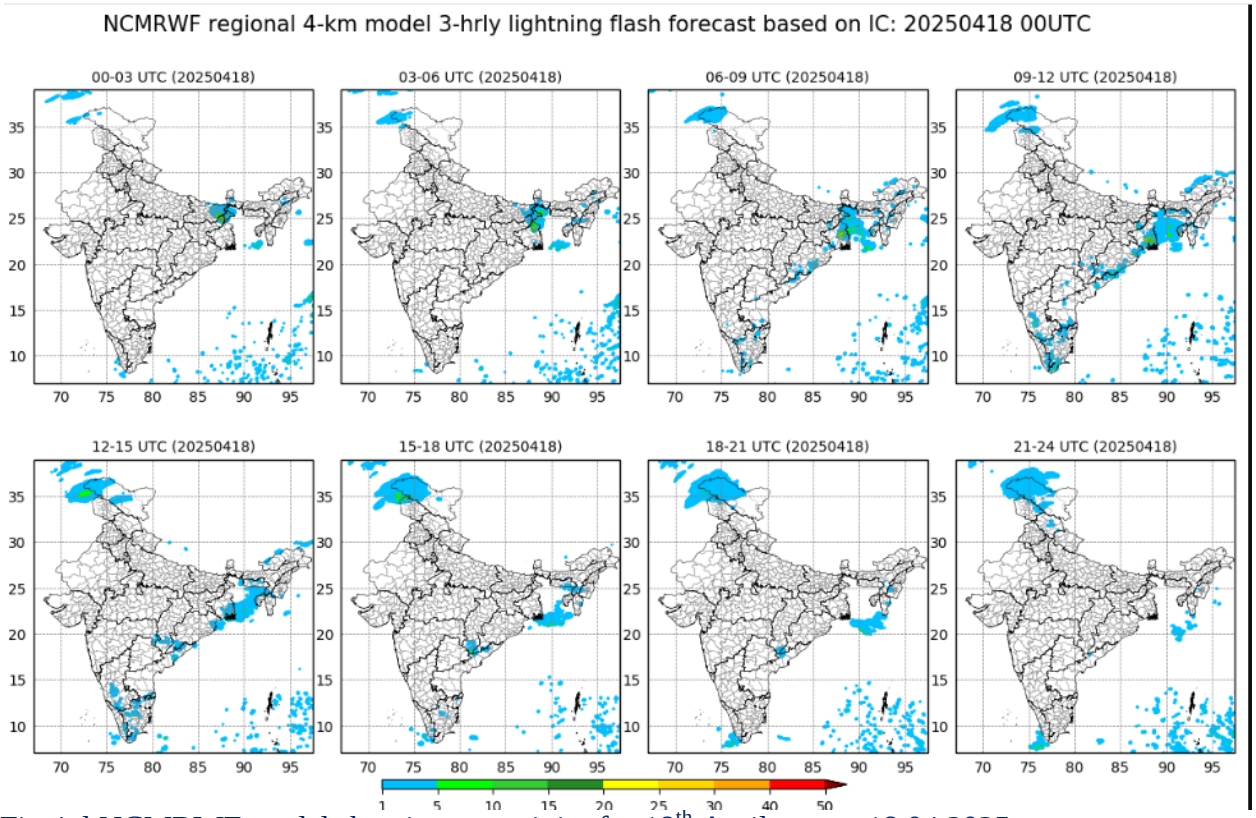


Fig 4.d:NCMRWF model showing no activity for 18th April run on 18.04.2025.

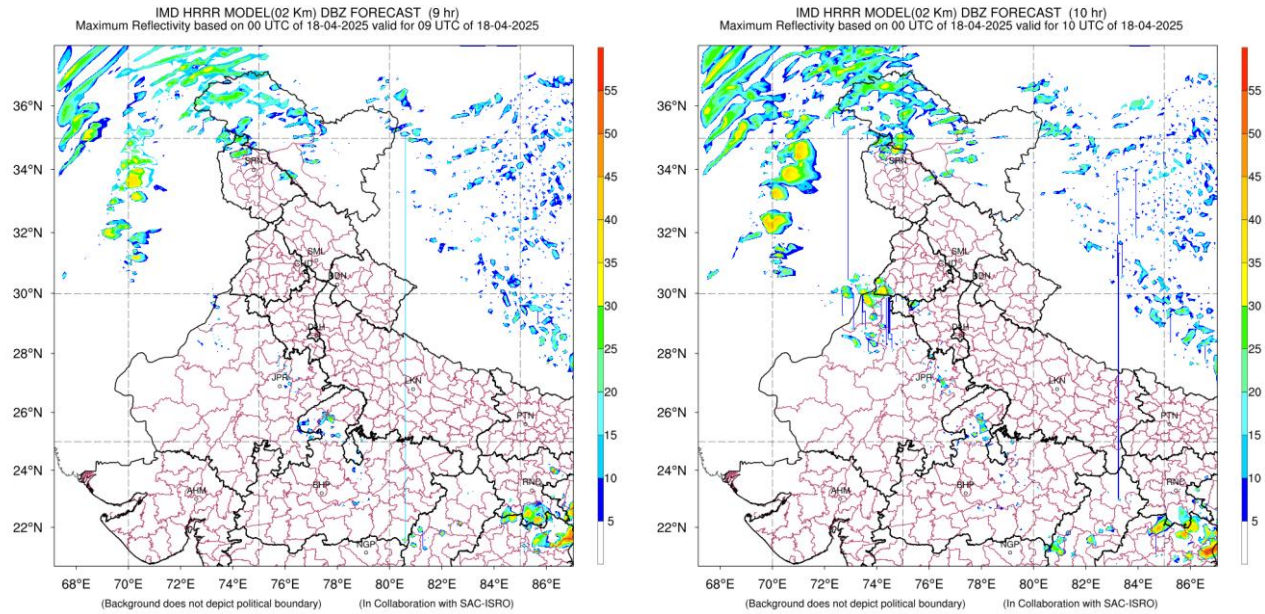


Fig 4.e: IMD HRRR model showing activity after 09UTC for 18th April run on 18.04.2025.

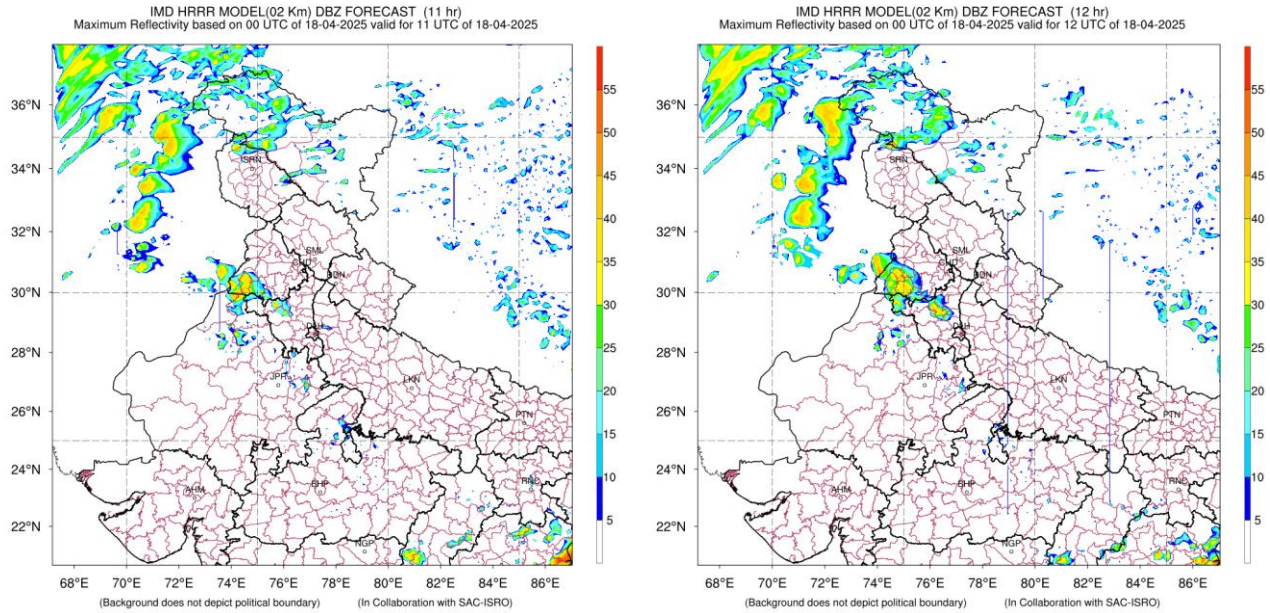


Fig 4.f: IMD HRRR model showing activity for 18th April run on 18.04.2025.

According to observations, Cell from Pakistan reached Punjab around 08:02Z with DBZ range between 34-38 and intensified over Tarn Taran district of Punjab around 08:52Z. Another cell developed over Firozpur-Faridkot border during 09:32Z and moved towards Faridkot at 10:02Z and further moved towards Moga-Bathinda. During the event different cells form and dissipate and moved eastward during the day.

Weather Forecast & Weather Warnings issued on 18.04.2025 :

With the development of the system over Pakistan - Punjab border an updated weather forecast and weather warning were reissued for Haryana(refer Fig 5c) & Punjab (refer Fig 5d) on 18.04.2025.

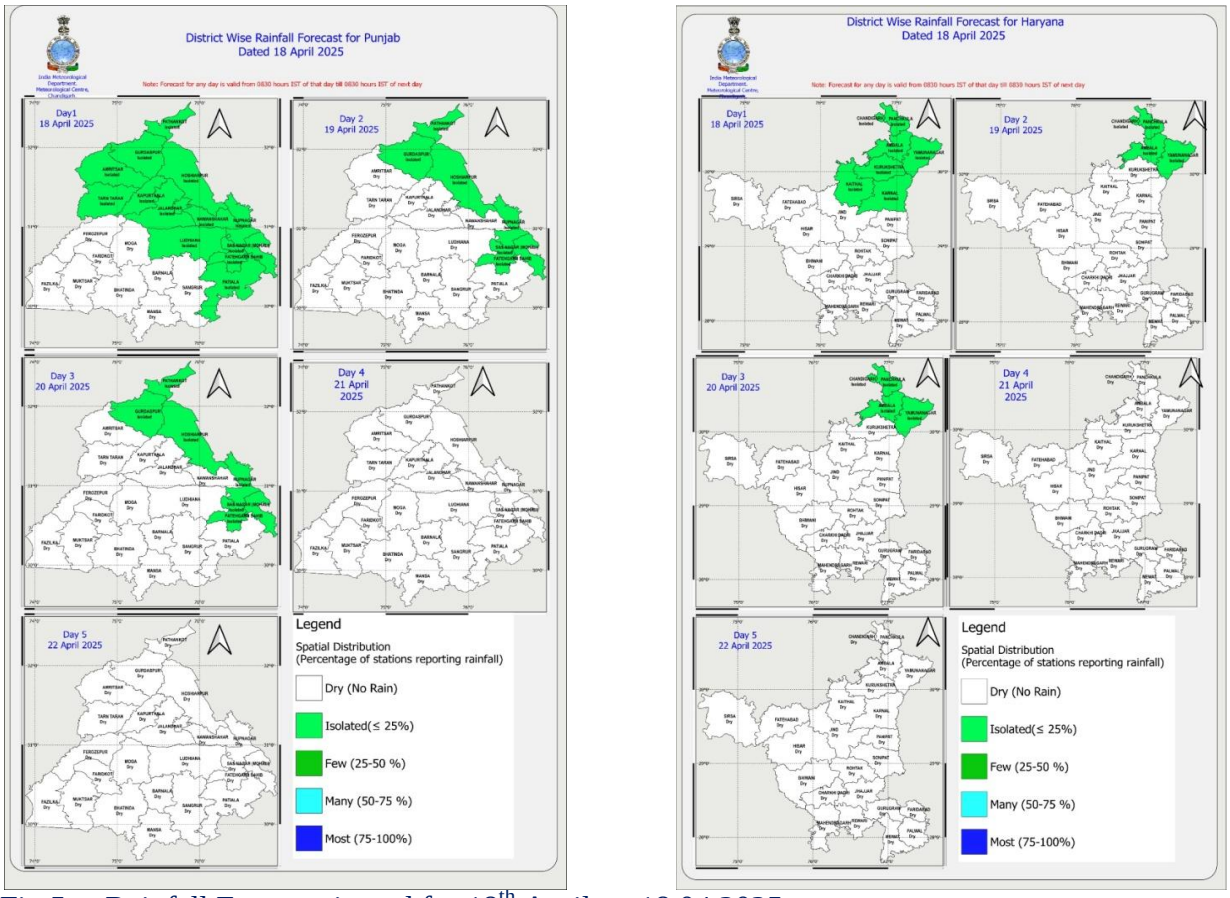


Fig 5.a: Rainfall Forecast issued for 18th April on 18.04.2025.

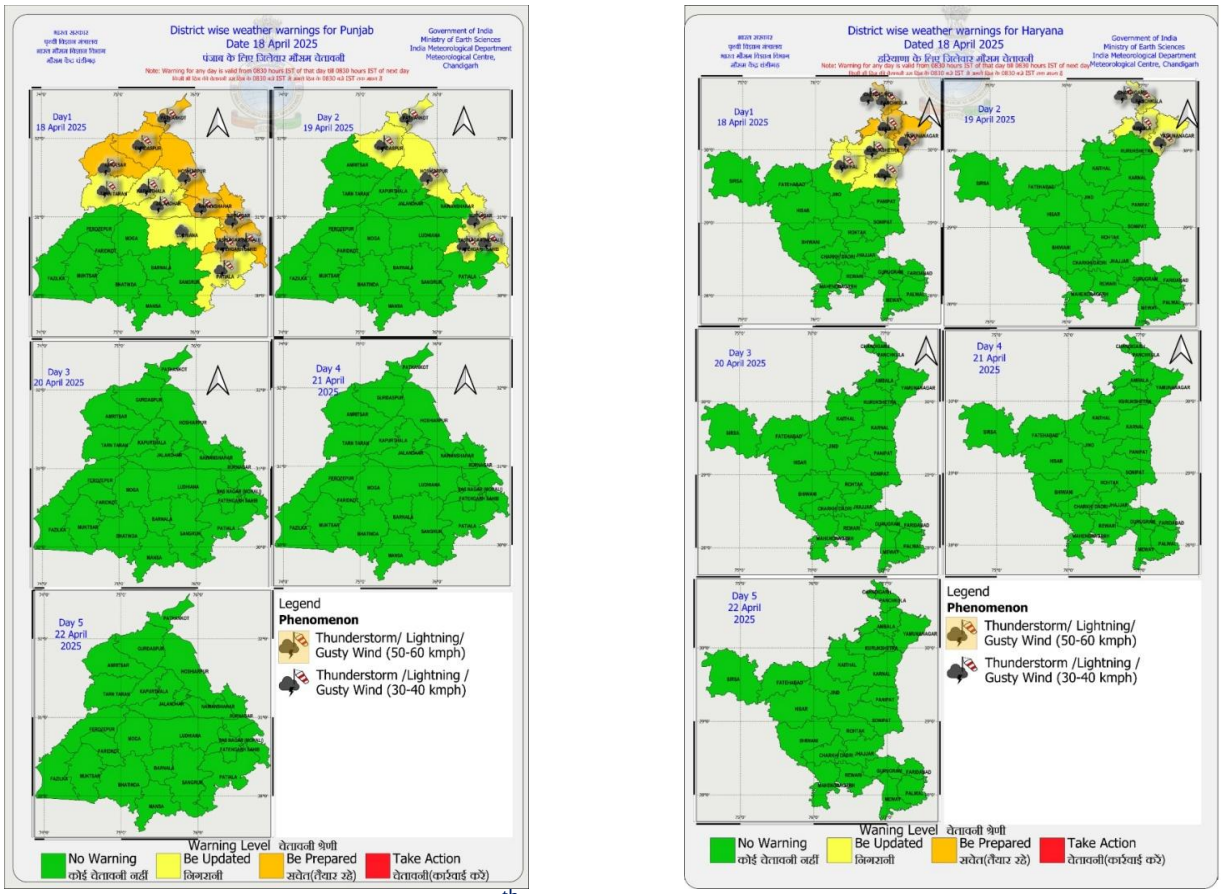


Fig 5.b: Weather warning issued for 18th April on 18.04.2025.

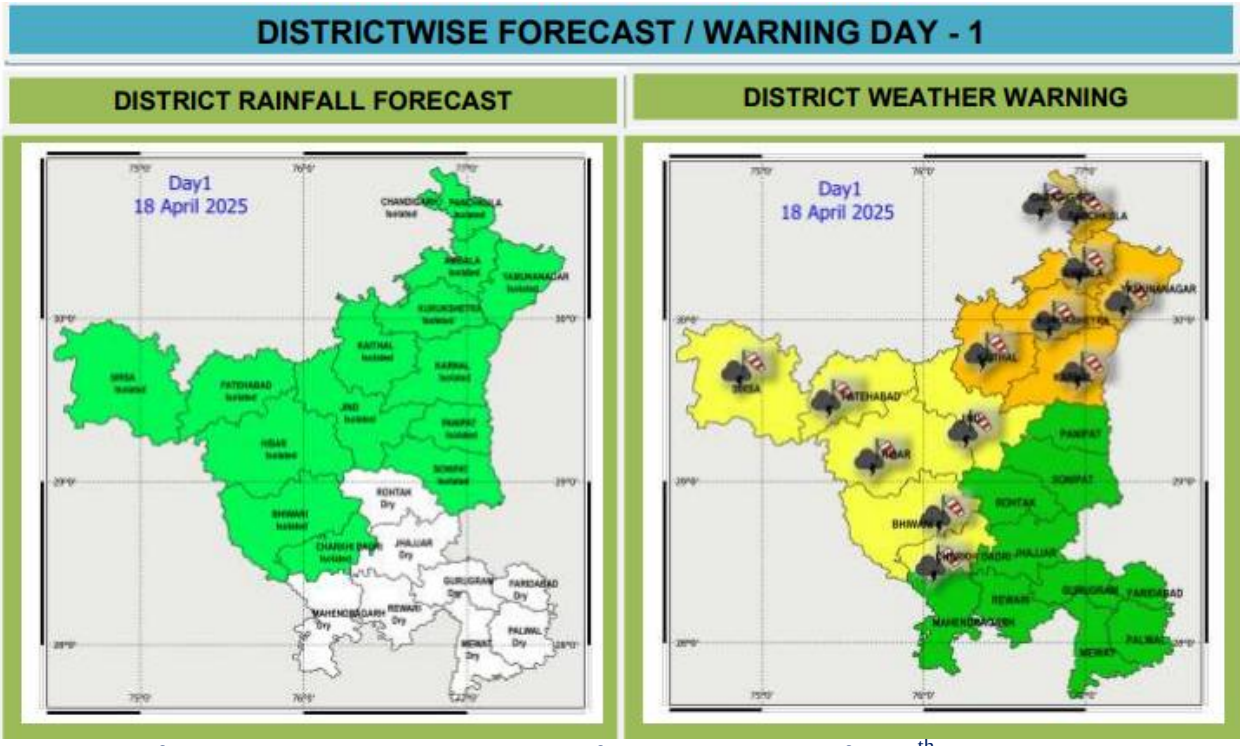


Fig 5.c: Rainfall Forecast & weather warning of Haryana reissued for 18th April on 18.04.2025.

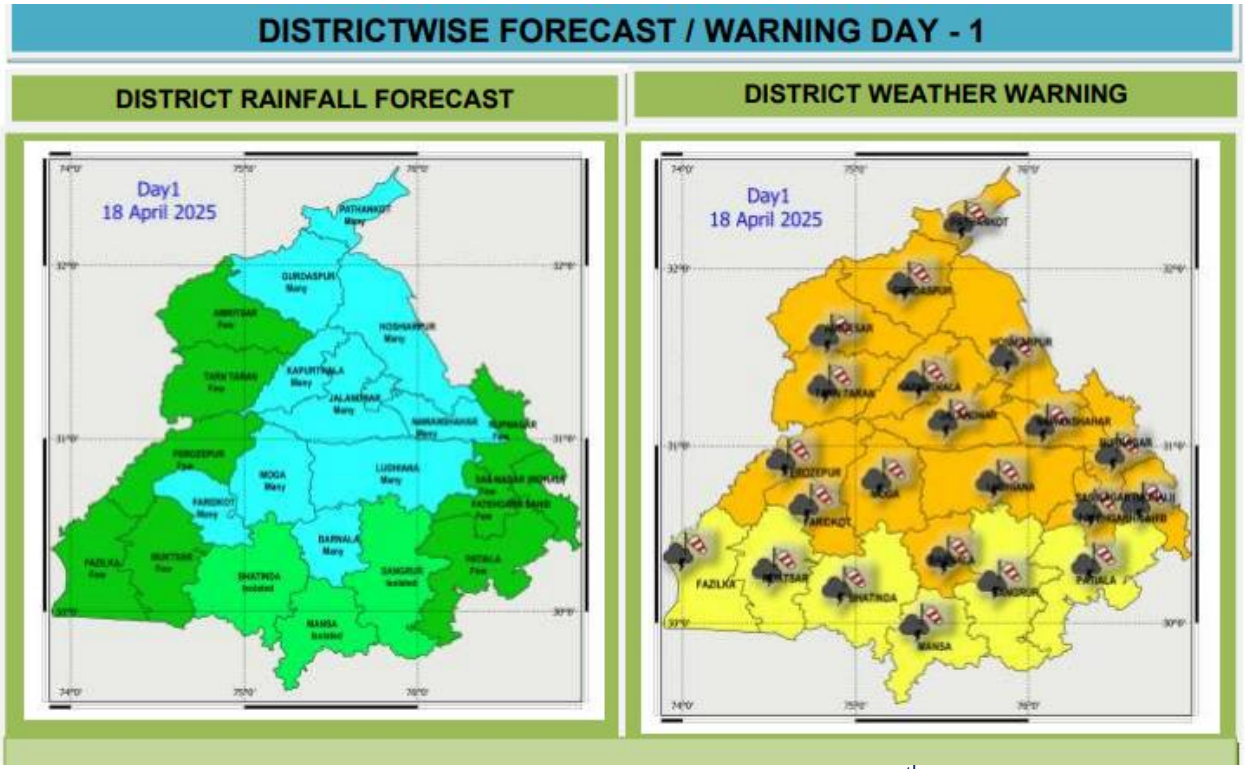


Fig 5.d: Rainfall Forecast & weather warning of Punjab reissued for 18th April on 18.04.2025.

Nowcast issued : With the development of cell over Punjab border first nowcast issued at 14:31 with yellow warning and these warning updated for Punjab & Haryana with orange and red alert according to the intensity of the Thunderstorm cells. (Refer fig 6)

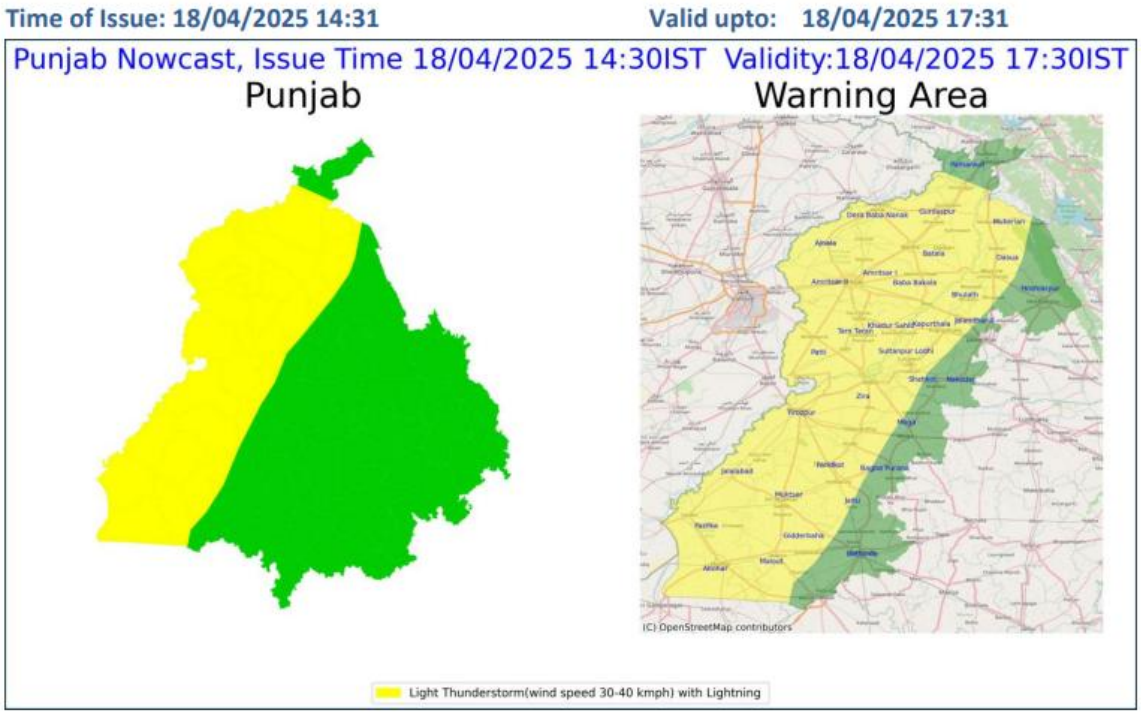


Fig 6.a: First nowcast with yellow alert issued for Punjab at 14:31 IST.

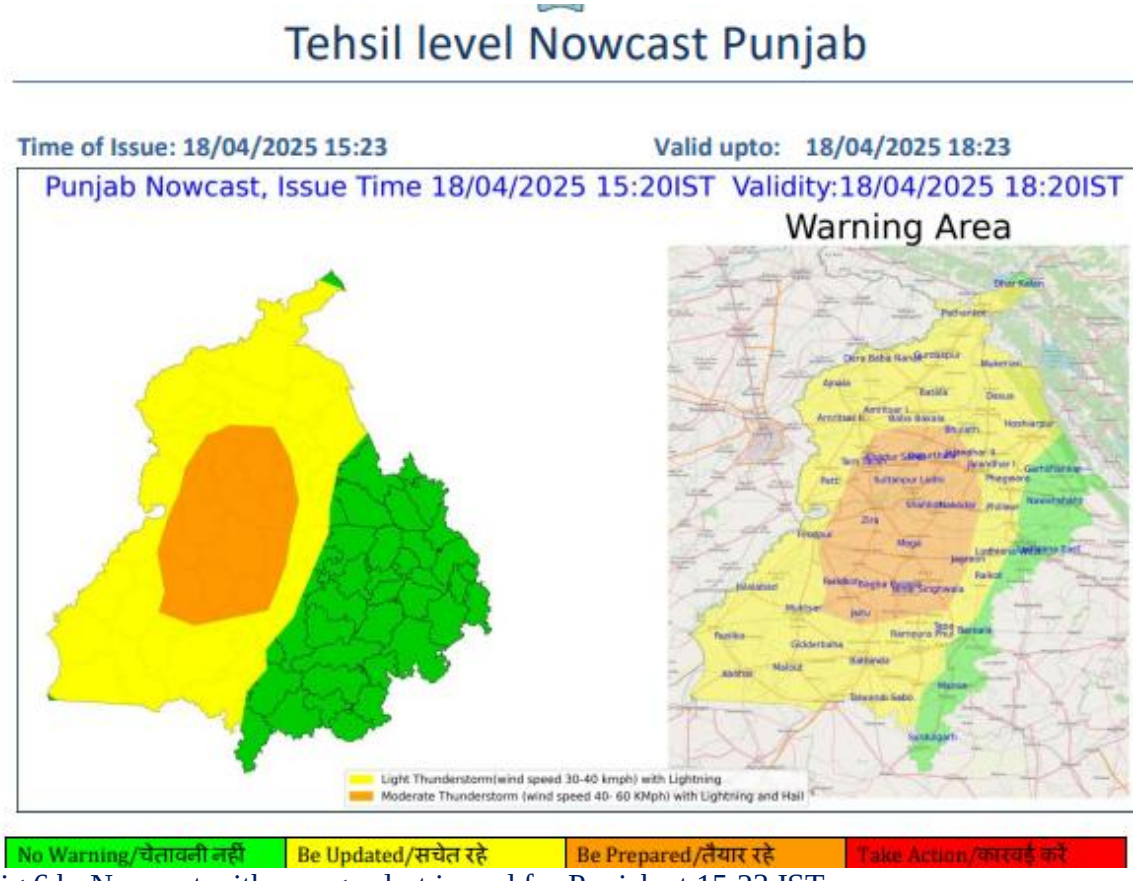


Fig 6.b: Nowcast with orange alert issued for Punjab at 15:23 IST.

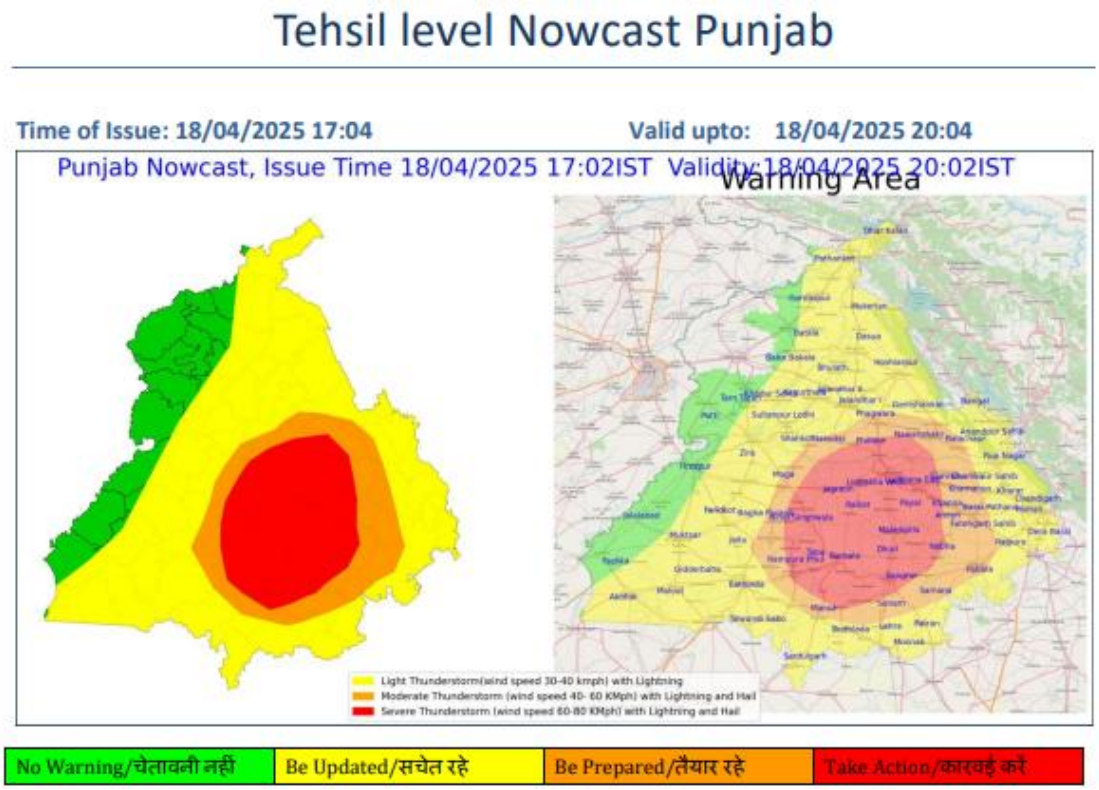


Fig 6.c: Nowcast with red & orange alert issued for Punjab at 17:04 IST.

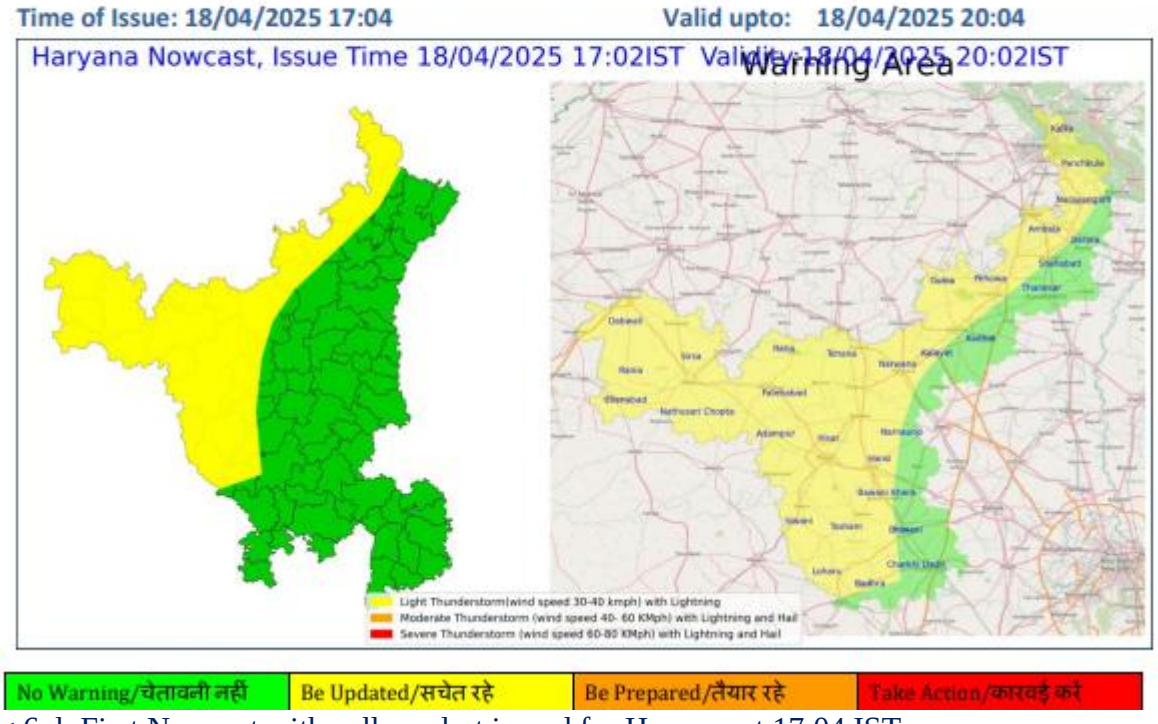


Fig 6.d: First Nowcast with yellow alert issued for Haryana at 17:04 IST.

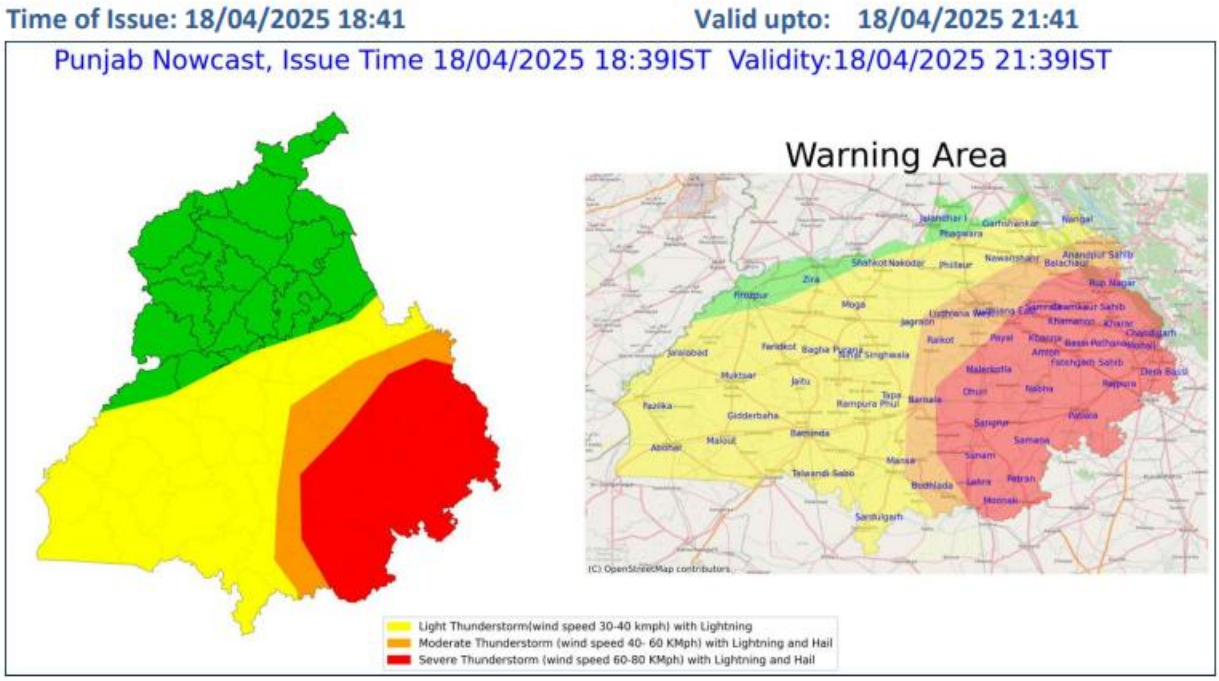


Fig 6.e: Nowcast with again red & orange alert issued for Punjab at 18:41 IST.

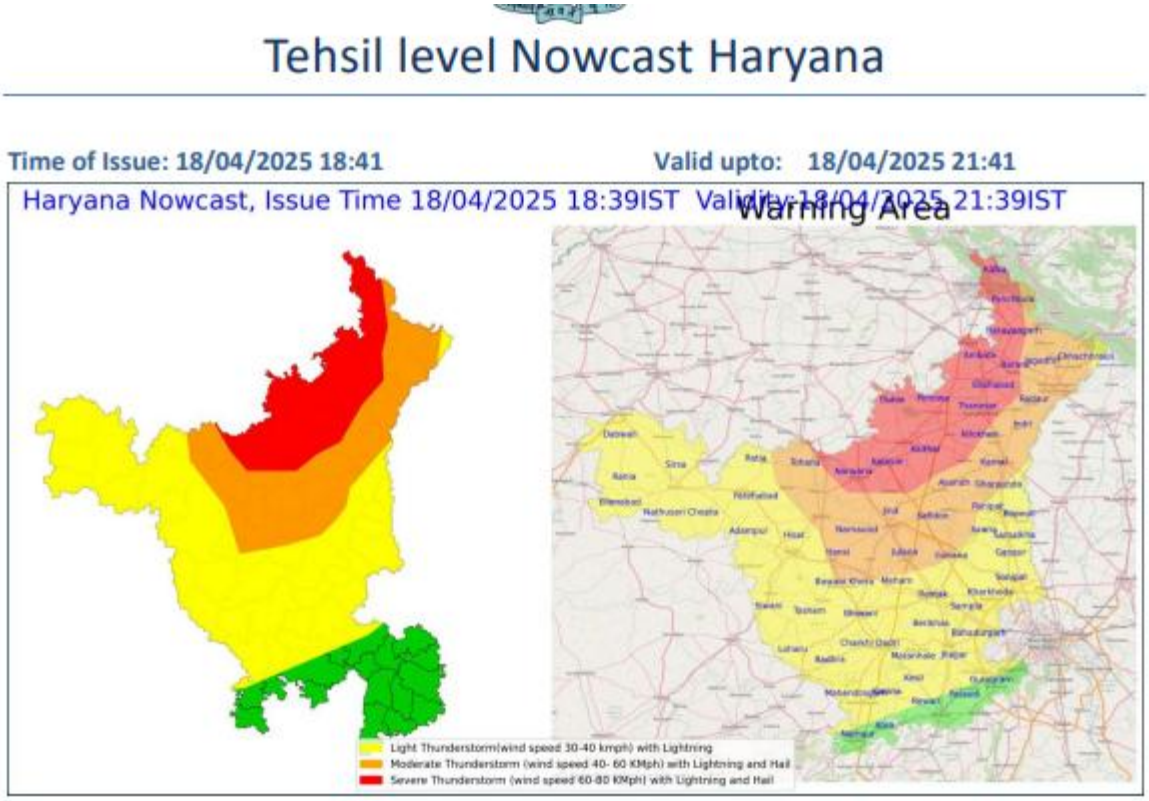


Fig 6.f: Nowcast with again red & orange alert issued for Haryana at 18:41 IST.

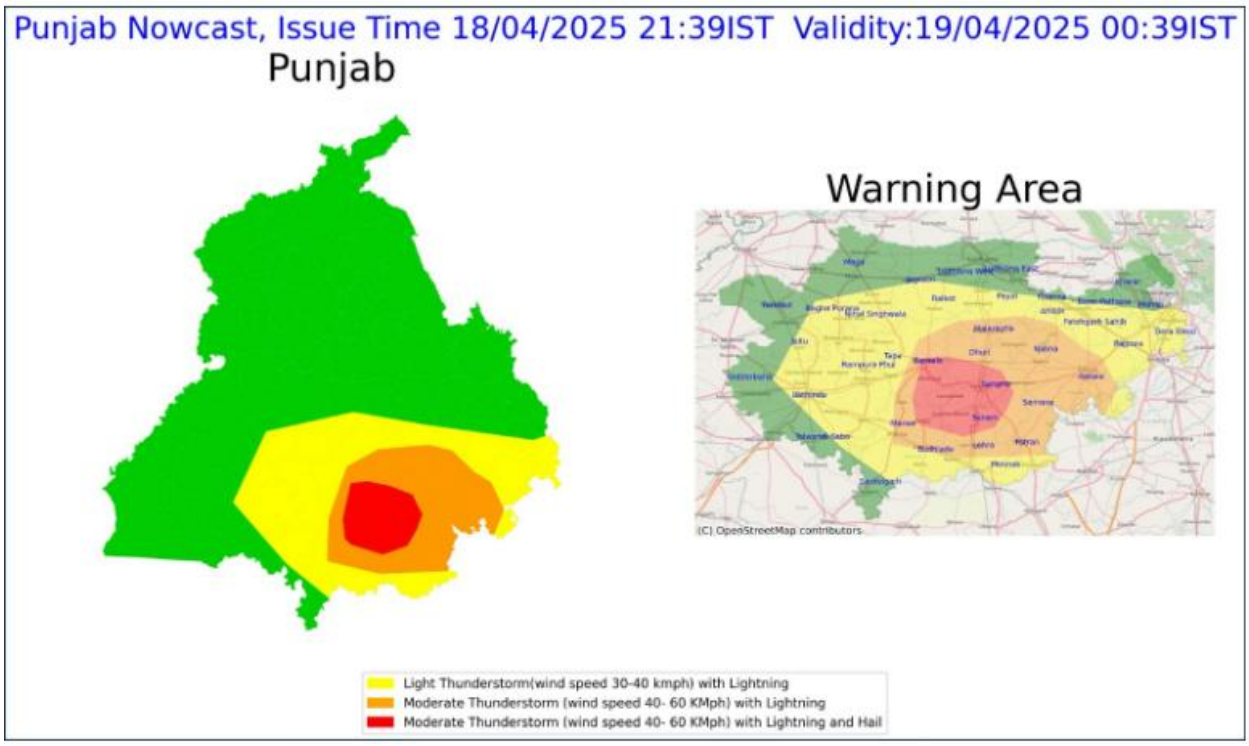


Fig 6.g: Nowcast with again red & orange alert issued for Punjab at 21:39 IST.

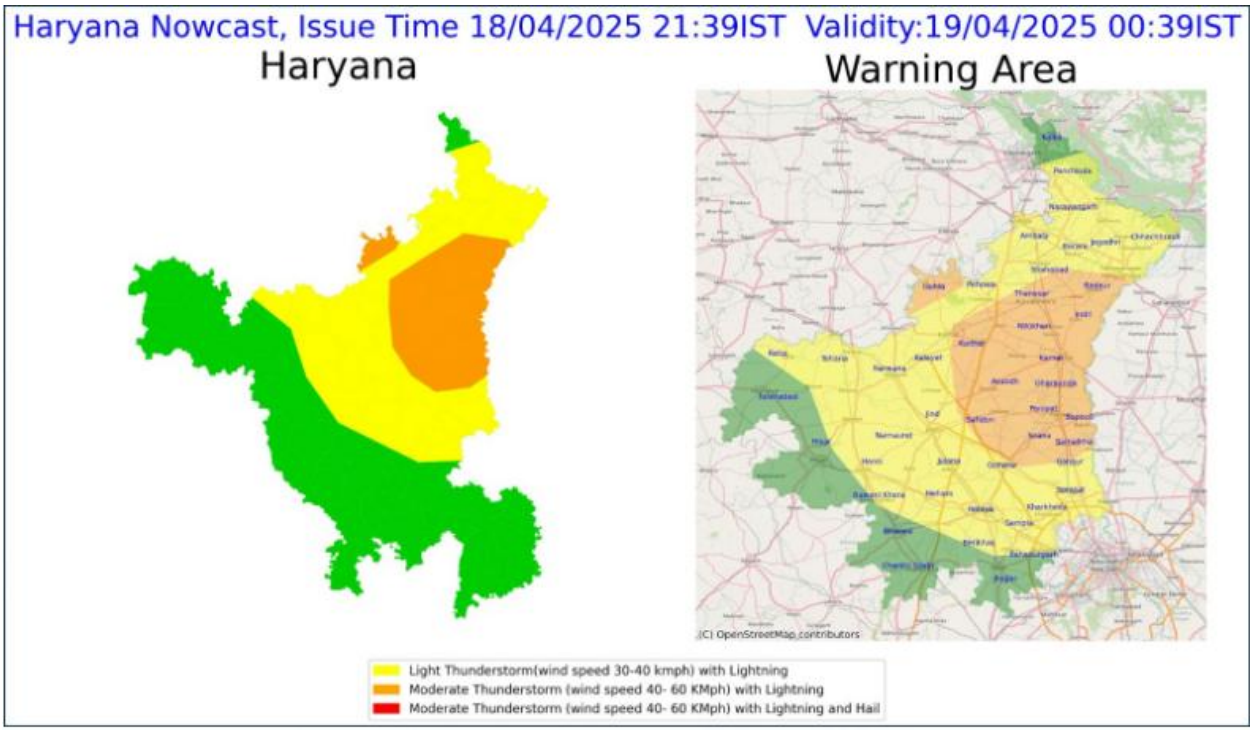


Fig 6.h: Nowcast with again orange alert issued for Haryana at 21:39 IST.

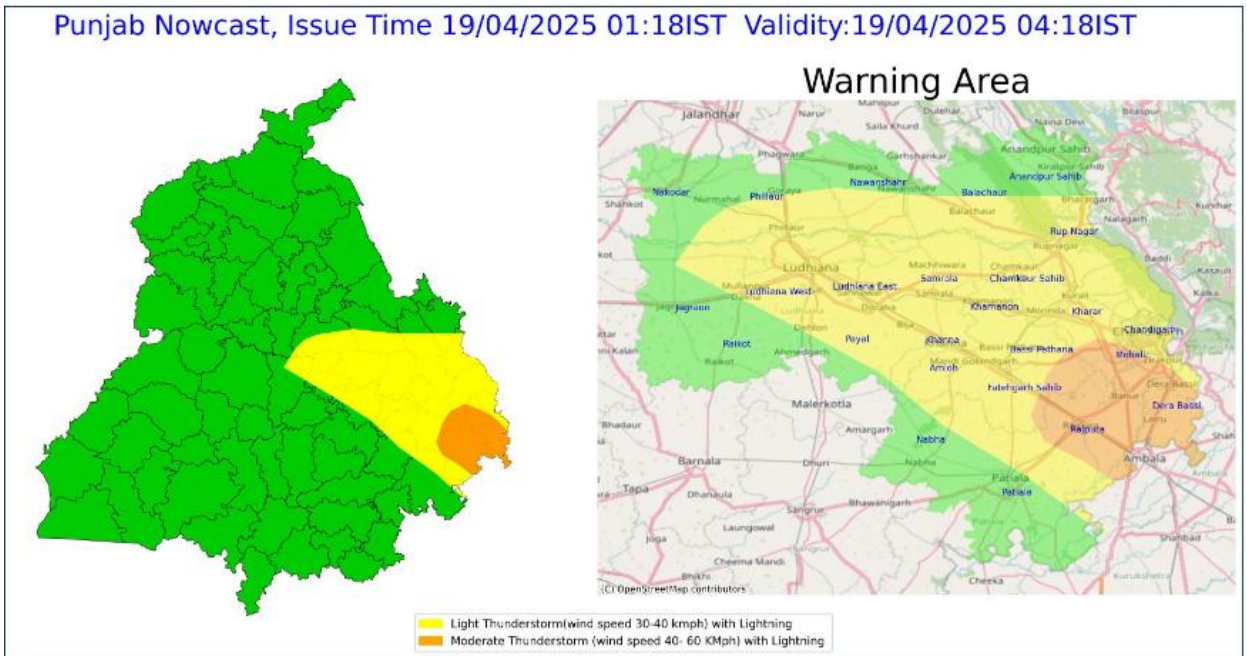


Fig 6.i: Nowcast with again orange alert issued for Punjab at 01:18 IST of 19.04.2025.

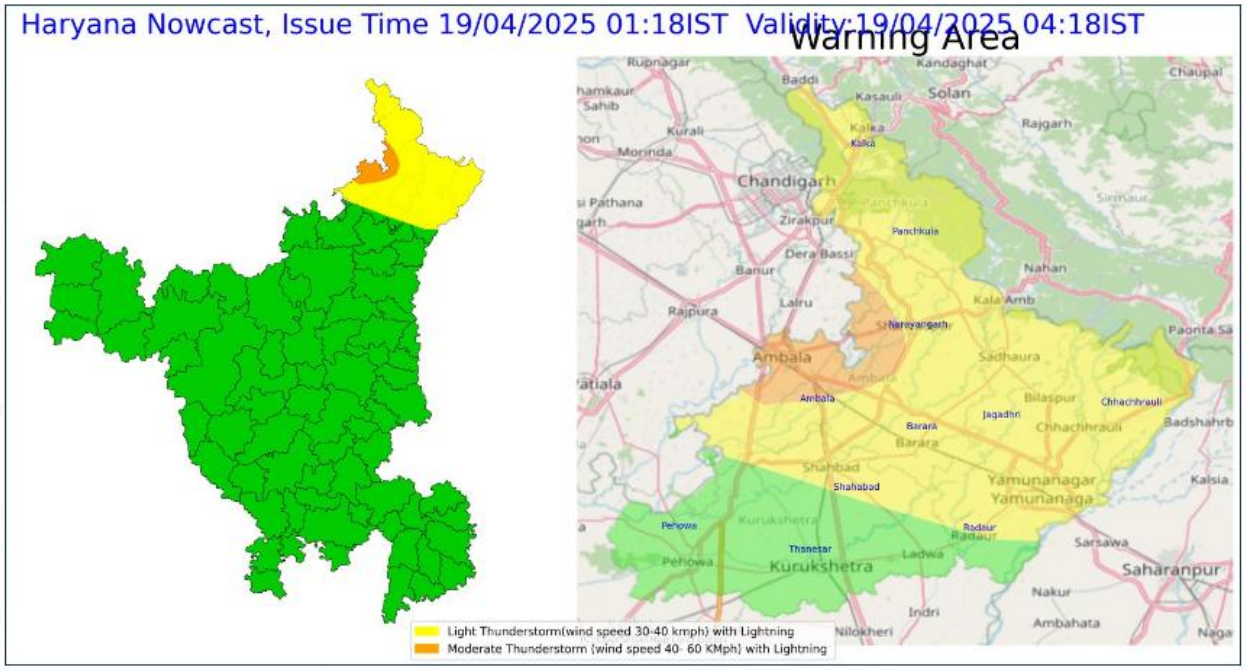


Fig 6.j: Nowcast with again orange alert issued for Haryana at 01:18 IST 19.04.2025

As per information from govt of Punjab and Haryana some damage to standing Rabi Crop viz wheat has been reported in distt Barnala , Faridkot, Moga, Sanruru, Tarantarn and Mansa in Punjab and Bhiwani and Jind district of Haryana.