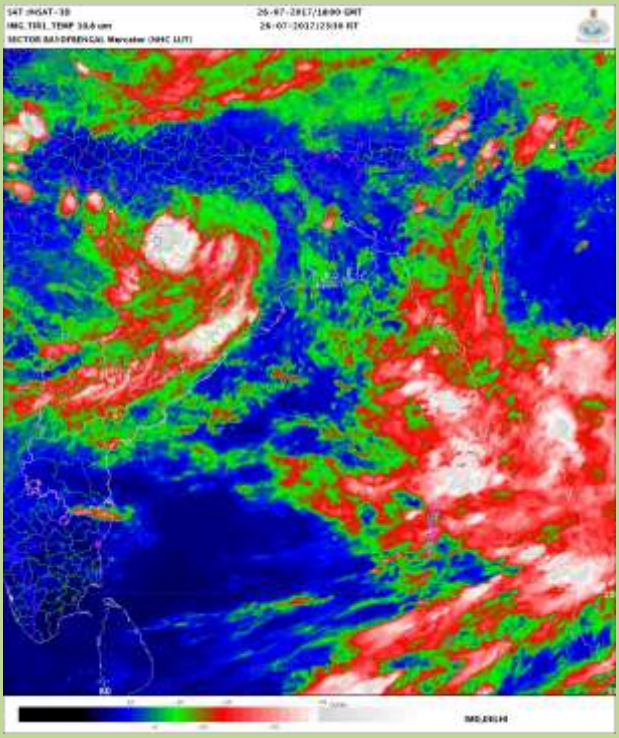
GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
INDIA METEOROLOGICAL DEPARTMENT

Depression over Northwest Jharkhand and Neighbourhood (26-27 July, 2017): A Report



INSAT-3D enhanced coloured IR imagery based on 1800 UTC of 26th July

Cyclone Warning Division

India Meteorological Department

New Delhi

August 2017

Depression Northwest Jharkhand and neighbourhood
(26-27 July 2017)

1. Introduction

In association with active monsoon condition, a low pressure area formed over Gangetic West Bengal and adjoining Jharkhand in the evening of 23rd July 2017. It concentrated into a depression over northwest Jharkhand & neighbourhood in the morning of 26th. It moved northwestwards and maintained the intensity of depression till early morning of 27th It then weakened into a well marked low pressure area over northeast Madhya Pradesh and neighbourhood in the morning of 27th July. The remnant low pressure area moved upto south Rajasthan and neighbourhood. As a result there was active monsoon condition across central part of the country and there was intense rainfall activity over this region.

2. Brief life history

In association with active monsoon condition, an upper air cyclonic circulation developed over south Bangladesh and Gangetic West Bengal and adjoining north Bay of Bengal in the morning of 22nd July. Under its influence, a low pressure area formed over Gangetic West Bengal and adjoining Jharkhand in the evening of 23rd. It lay as a well marked low pressure area over Gangetic West Bengal and adjoining Jharkhand in the morning of 24th. It intensified into a depression over Jharkhand & neighbourhood and lay centered at 0000 UTC of 26th July 2017 near Lat. 24.0ºN and Long.85.0ºE, close to Hazaribagh. It moved northwestwards initially till 1200 UTC of 26th July 2017 and then nearly westwards upto northeast Madhya Pradesh. Due to lack of moisture supply and high vertical wind shear, the depression did not intensify further. Rather, it weakened into a well marked low pressure area over northeast Madhya Pradesh at 0300 UTC of 27th July 2017. It continued to move westwards and weakened gradually.

The best track parameters are shown in Table 1. The track of the depression is shown in Fig.1. The typical satellite imageries are shown in Fig. 2.

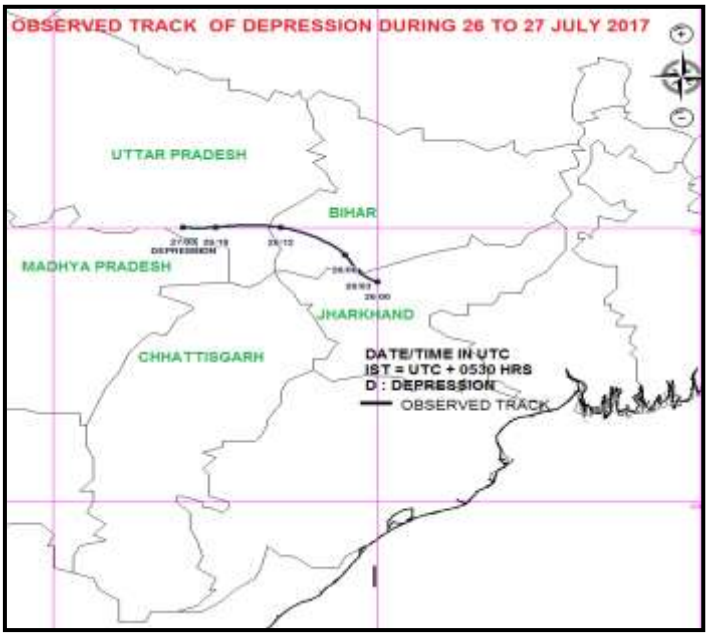


Fig.1.Observed track of Depression over northwest Bay of Bengal (26-27 July 2017)

Table 1: Best track positions and other parameters of the Depression over the west central Bay of Bengal and coastal areas of Odisha & north Andhra Pradesh during 26-27 July, 2017

Date	Time (UTC)	Centre lat.^{0} N/ long.^{0} E	C.I. NO.	Estimated Central Pressure (hPa)	Estimated Maximum Sustained Surface Wind (kt)	Estimated Pressure drop at the Centre (hPa)	Grade
26/07/2017	0000	24.0ºN/85.0º E	-	993	25	3	D
	0300	24.2ºN/84.7º E	-	994	25	3	D
	0600	24.5ºN/84.5º E	-	994	25	3	D
	1200	25.0ºN/83.5º E	-	994	20	3	D
	1800	25.0ºN/82.5º E	-	995	20	3	D
27/07/2017	0000	25.0ºN/82.0º E	-	995	20	3	D
	0300	Depression weakened into a well marked low pressure area over northeast Madhya Pradesh & neighbourhood at 0300 UTC of 27th July					

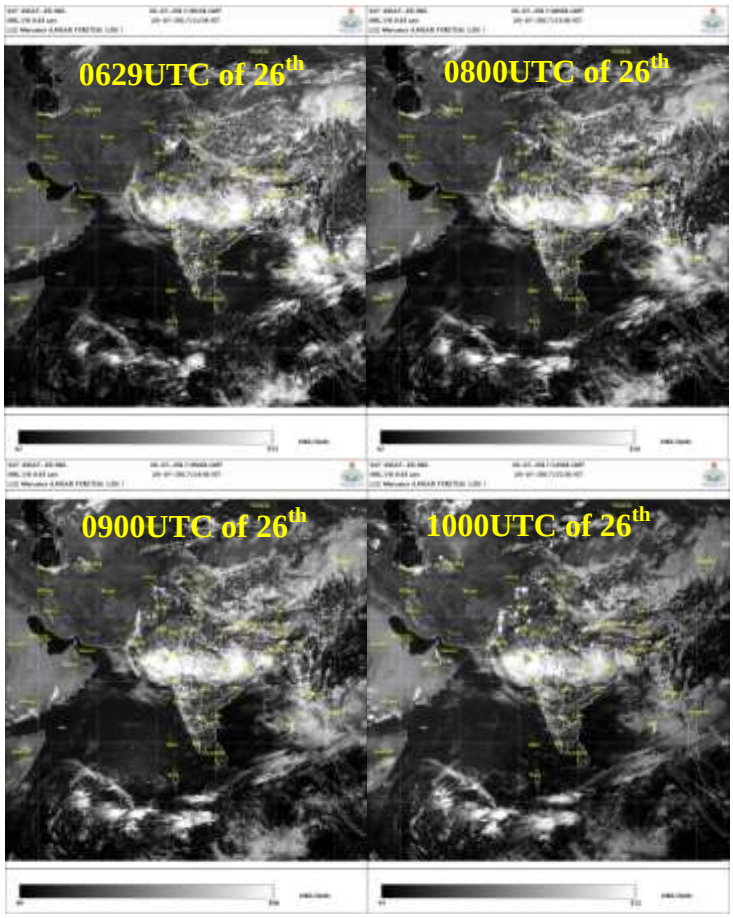


Fig. 2(i): INSAT-3D visible imageries during Depression (26-27 July, 2017)

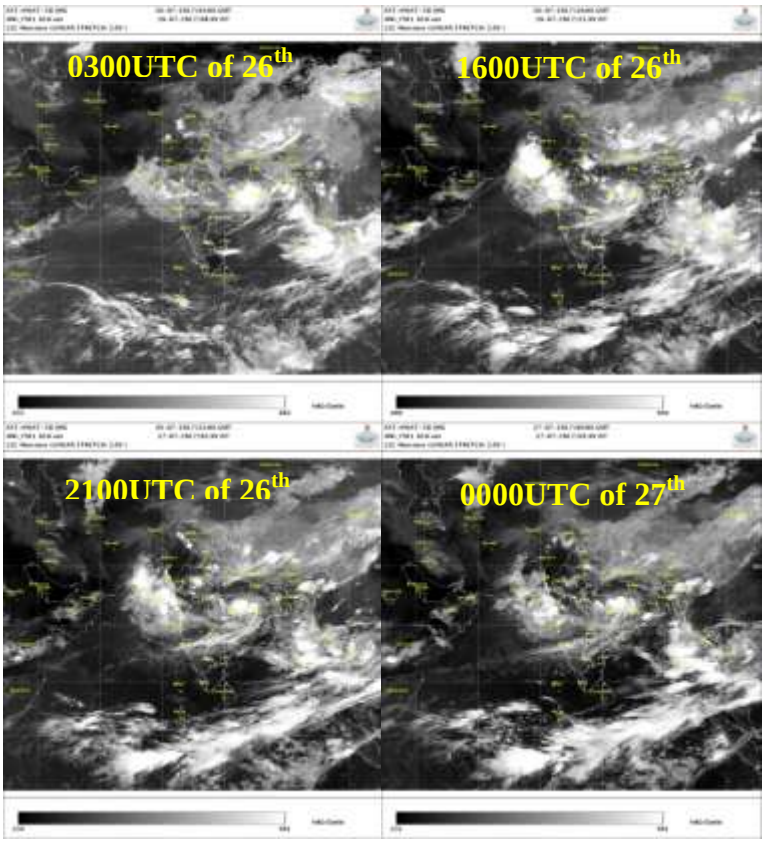


Fig. 2(ii): INSAT-3D IR imageries during Depression (26-27 July, 2017)

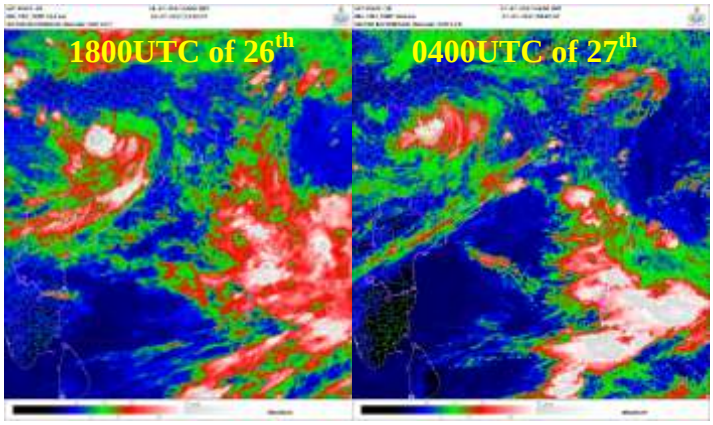


Fig. 2(iii): INSAT-3D enhanced coloured imageries during Depression (26-27 July, 2017)

3. Dynamical features

IMD GFS (T1534) mean sea level pressure (MSLP), winds at 10 m, 850, 500 and 200 hPa levels are presented in Fig.3. GFS (T1534) could simulate the genesis of the system and the associated circulation features during the life period of Depression.

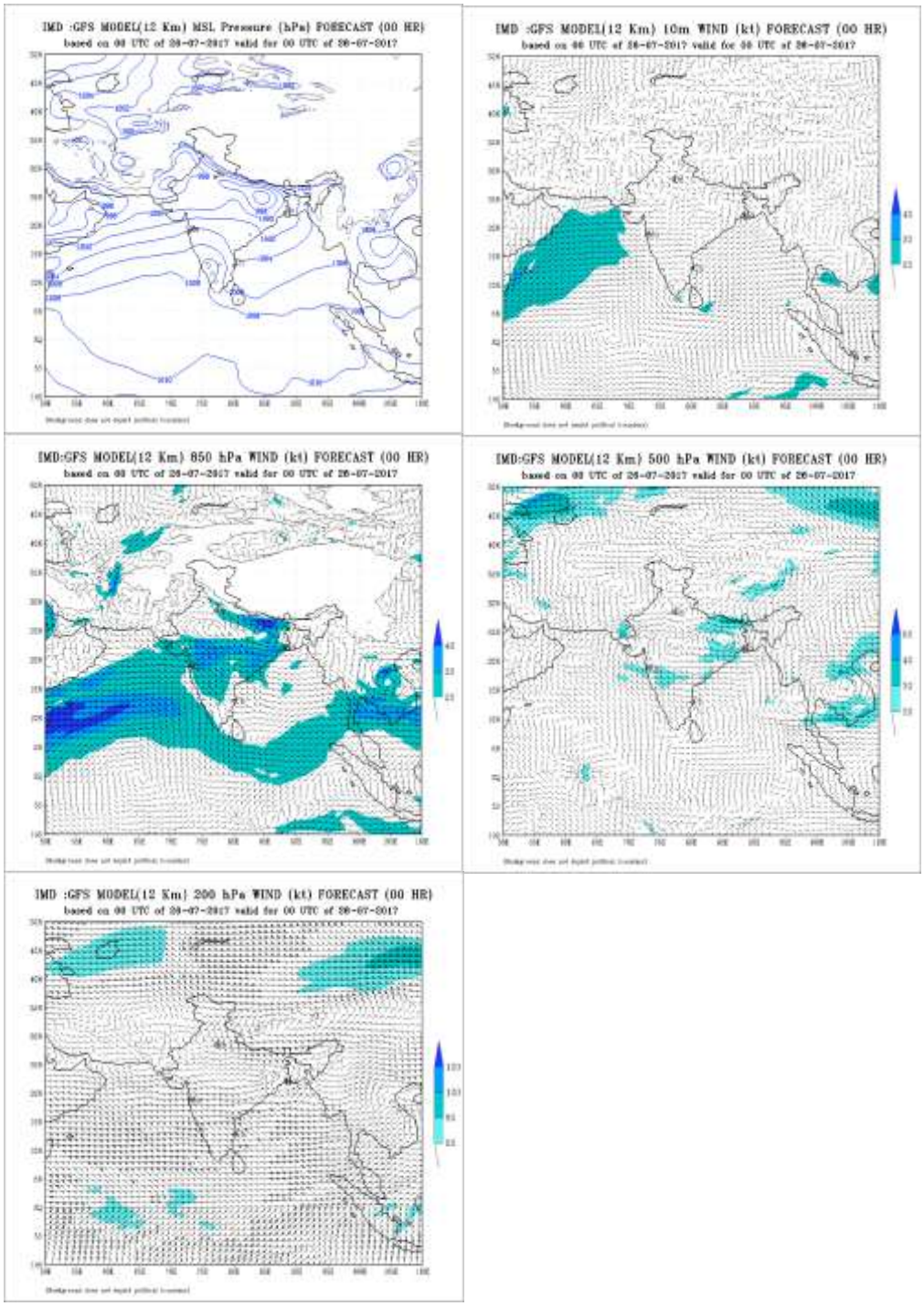


Fig3 (i): IMD GFS (T1534) mean sea level pressure (MSLP), winds at 10m, 850, 500 and 200 hPa levels based on 0000 UTC of 26th July

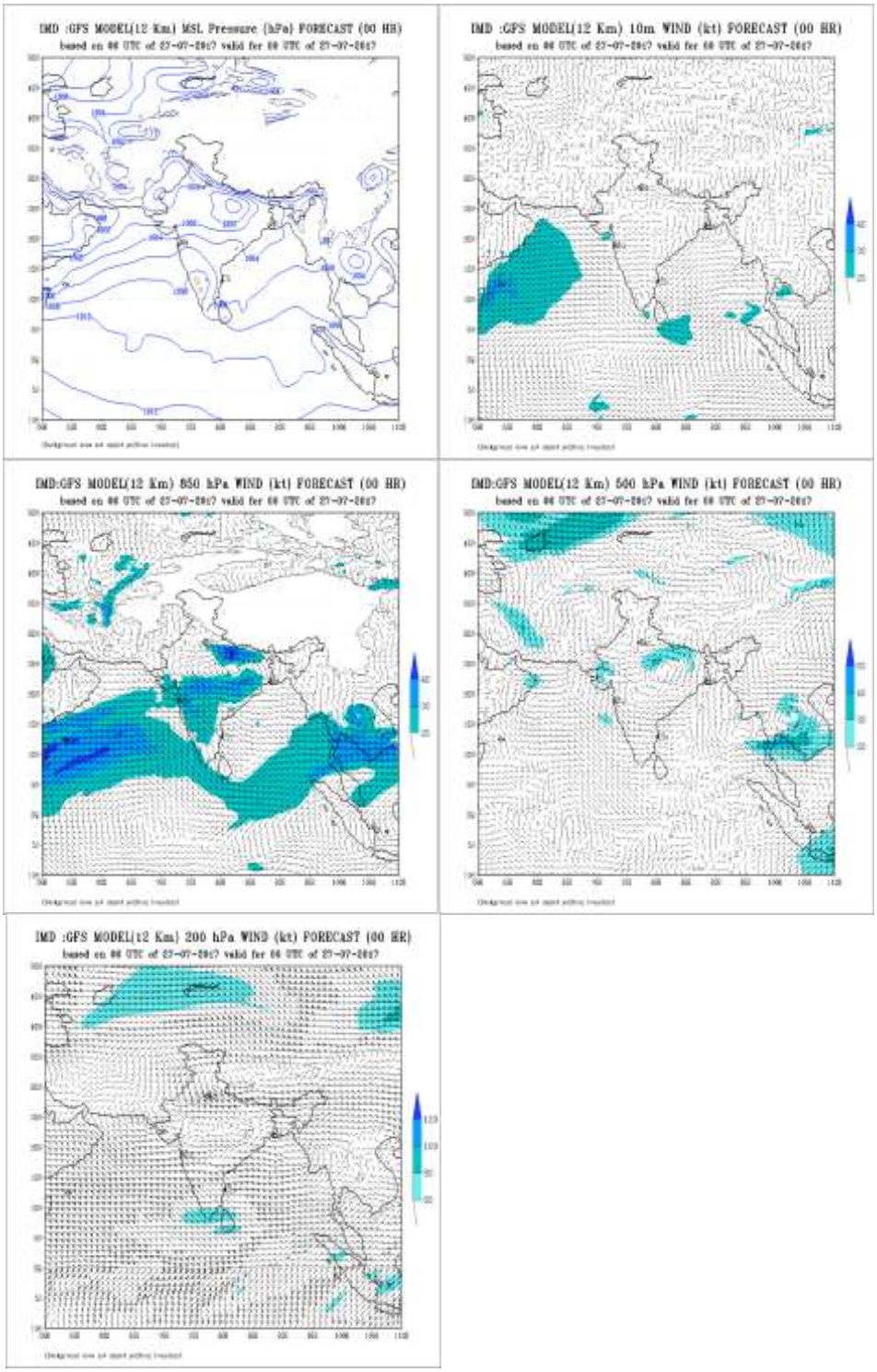


Fig3 (ii): IMD GFS (T1534) mean sea level pressure (MSLP), winds at 10m, 850, 500 and 200 hPa levels based on 0000 UTC of 27th July

4. Realized Weather:

4.1 Rainfall:

Realised weather:

Under the influence of this depression, rainfall at most places with heavy to very heavy rainfall at a few places and isolated extremely heavy rainfall occurred over Jharkhand on 25th and over west Madhya Pradesh on 27th. Rainfall at most paces with isolated heavy to very heavy rainfall occurred over Chhattisgarh and east Uttar Pradesh on 25th, Chhattisgarh, east and west Uttar Pradesh, east and west Madhya Pradesh on 26th, and over west Uttar Pradesh, east and west Madhya Pradesh on 27th. The daily rainfall distribution based on merged gridded rainfall data of IMD/NCMRWF during depression period is shown in fig.4.

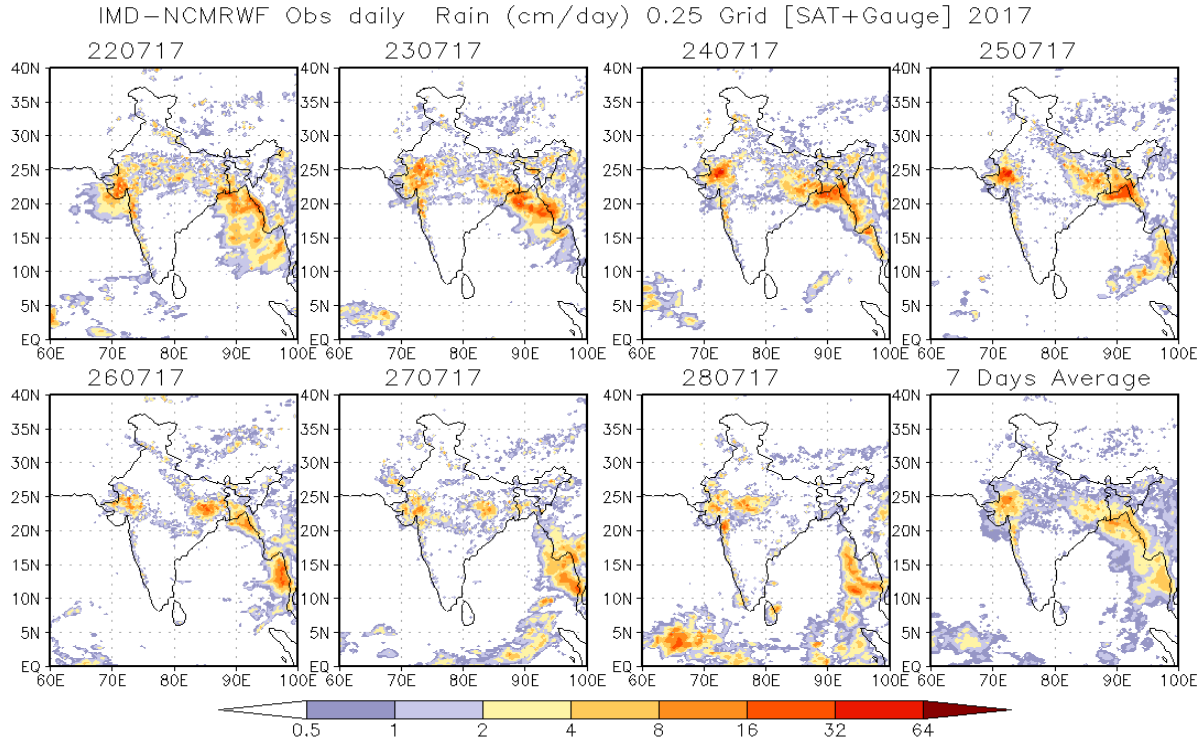


Fig.4: Daily rainfall distribution based on merged grided rainfall data of IMD/NCMRWF during 22-28 July 2017.

Realized 24 hrs accumulated rainfall (≥7cm) ending at 0830 hrs IST of date during the life cycle of the system are presented below:

26th July:

Jharkhand: Latehar-27, Mandar-25, Hindgir, Ranchi-21 each, Kuru-19, Lohardaga-17, Gomia, Maheshpur-14 each, Ramgarh, Daltonganj-13 each, Jamshedpur-12, Pupunki, Dhanbad, Koner-10 each, Putki-9, Panchet, Tenughat, Maithon, Topchanchi, Jaridih, Palkot-8 each, Raidih, Nandadih, Giridih, Dumri, Bokaro, Torpa, Barhi, Barkisuraiya, Gumla-7 each,

Chhattisgarh: Ramanujganj-9

East Uttar Pradesh: Ghorawal-9

27th July

Jharkhand: Daltonganj-10, Lohardaga, Kurdeg, Ramgarh-9 each

Chhattisgarh: Ambikapur-13, Pathalgaon-11, Surajpur, Jashpurnagar-9 each

East Uttar Pradesh: Dudhi-10

West Uttar Pradesh: Deoband-7
West Madhya Pradesh: Khandwa-AWS-9
East Madhya Pradesh: Singrauli-AWS-8,

28th July
West Uttar Pradesh: Lalitpur-9
East Madhya Pradesh: Panna-AWS-8, Tendukheda-7.
West Madhya Pradesh: Narsingarh-23, Raisen-AWS-21, Bareli & Agar-12 each, Suvasara-11, Guna-AWS-10, Khilchipur & Ashoknagar-AWS- 9 each, Biaora, Chanderi & Isagarh-8 each, Manasa, Vidisha-AWS, Sarangpur & Udaipura-7 each

29th July:
West Madhya Pradesh: Agar & Neemuch-AWS-11 each, Jawad-10, Mandsaur-AWS-9, Bhanpura-7.
East Rajasthan: Pratapgarh-24, Rashmi SR-16, Nimbahera & Bakani SR-15 each, Chhotisadri, Dug, Kapasan SR, Chittorgarh, Pachpahar SR, Asnawar SR-13 each, Jhalarapatan SR, Pindwara, Mangliawas SR-12 each, Dungla SR, Badesar SR, Kotda SR, Bari-Sadri, Chambal/R.B.Dam-11 each, Banera SR, Mount Abu, Mounntabu Tehsil, Khanpur, Arnod SR-10, Bhainsroadgarh, Bhopalsagar SR, Begu Sr, Nasirabad & Sheoganj- 9 each, Gangdhar SR & Ramganjmandi SR-8 each, Sirohi, Mandal SR, Nayanagar/Beawar, Aklera, Gangrar, Salumber & Bhilwara Tehsil SR-7 each.

5. Bulletins issued by IMD

IMD issued warning bulletins to the concerned central and state disaster management authorities and press & media.

5.1 Bulletins issued by Cyclone Warning Division, New Delhi

Bulletins issued by Cyclone Warning services of IMD in association with the system are given in Table 2

Table 2 : Bulletins issued by Cyclone Warning Division, India Meteorological Department

S.No.	Bulletin	No. of Bulletins	Issued to
1	National Bulletin	6	1. IMD's website 2. FAX and e-mail to Control Room NDM, Ministry of Home affairs, Control Room NDMA, Cabinet Secretariat, Minister of Sc. & Tech, Secretary MoES, DST, HQ Integrated Defence Staff, DG Doordarshan, All India Radio, DG-NDRF, Director Indian Railways, Indian Navy, IAF, Chief Secretary: Jharkhand, Uttarpradesh, Chhatisgarh, Madhya Pradesh, Maharashtra, Rajasthan

6. Operational Forecast Performance

- The first information regarding genesis of depression was issued by RSMC New Delhi with probability low on 24th July (about 48 hours in advance). On 25th July, the genesis was also predicted for 26th July.
- In the first bulletin issued on 26th morning, it was predicted that depression would move west northwestwards and weaken gradually and it moved north westwards initially and later westwards and weakened into a low pressure area over northeast Madhya Pradesh & neighbourhood at 0830hrs IST of 27th July.

IMD issued warning bulletins to the concerned central and state disaster management authorities & press and media. The verification of heavy rainfall warnings issued by IMD for depression during 26-27th July is presented in Table 3. It can be found that the occurrence of heavy rainfall in association with the system could be predicted well in advance.

Table 3 : Verification of heavy rainfall warning issued by IMD for Deep Depression over Bay of Bengal (26-27 July, 2017)

Date/Time of issue	Heavy rainfall warning	Realised heavy rainfall (7cm or more) ending at 0830 hrs IST of date
0830 IST of 26th July 2017	Heavy to very heavy rainfall (7-20 cm) at a few places and isolated extremely heavy rainfall (21 cm or more) is very likely over Jharkhand, north Chhattisgarh & Northeast Madhya Pradesh and isolated heavy falls over southeast Uttar Pradesh during next 24 hrs. Isolated heavy to very heavy rainfall very likely over East Madhya Pradesh and isolated heavy rainfall over East Uttar Pradesh, West Madhya Pradesh & Chhattisgarh on 27th.	**26th July:** **Jharkhand:** Latehar-27, Mandar-25, Hindgir, Ranchi-21 each, Kuru-19, Lohardaga-17, Gomia, Maheshpur-14 each, Ramgarh, Daltonganj-13 each, Jamshedpur-12, Pupunki, Dhanbad, Koner-10 each, Putki-9, Panchet, Tenughat, Maithon, Topchanchi, Jaridih, Palkot-8 each, Raidih, Nandadih, Giridih, Dumri, Bokaro, Torpa, Barhi, Barkisuraiya, Gumla-7 each, **Chhattisgarh:** Ramanujganj-9 **East Uttar Pradesh:** Ghorawal-9 **27th July** **Jharkhand:** Daltonganj-10, Lohardaga, Kurdeg, Ramgarh-9 each **Chhattisgarh:** Ambikapur-13, Pathalgaon-11, Surajpur, Jashpurnagar-9 each **East Uttar Pradesh:** Dudhi-10 **West Uttar Pradesh:** Deoband-7 **West Madhya Pradesh:** Khandwa-AWS-9 **East Madhya Pradesh:** Singrauli-AWS-8, **28th July** **West Uttar Pradesh:** Lalitpur-9 **East Madhya Pradesh:** Panna-AWS-8, Tendukheda-7. **West Madhya Pradesh:** Narsingarh-23, Raisen-AWS-21, Bareli & Agar-12 each, Suvasara-11, Guna-AWS-10, Khilchipur & Ashoknagar-AWS-
0830 IST of 27th July 2017	**27.07.2017:** Isolated heavy to very heavy rainfall with isolated extremely heavy rainfall is very likely over Madhya Pradesh; isolated heavy to very heavy falls likely over East Rajasthan & Chhattisgarh and isolated heavy falls over southeast	

	Uttar Pradesh & Vidarbha. **28.07.2017:** Rainfall at most places with isolated heavy to very heavy rainfall with extremely heavy rainfall is very likely over East Rajasthan; isolated heavy to very heavy is very likely over West Madhya Pradesh & West Rajasthan and isolated heavy over East Madhya Pradesh.	9 each, Biaora, Chanderi & Isagarh-8 each, Manasa, Vidisha-AWS, Sarangpur & Udaipura-7 each **29th July:** **West Madhya Pradesh:** Agar & Neemuch-AWS-11 each, Jawad-10, Mandsaur-AWS-9, Bhanpura-7. **East Rajasthan:** Pratapgarh-24, Rashmi SR-16, Nimbahera & Bakani SR-15 each, Chhotisadri, Dug, Kapasan SR, Chittorgarh, Pachpahar SR, Asnawar SR-13 each, Jhalarapatan SR, Pindwara, Mangliawas SR-12 each, Dungla SR, Badesar SR, Kotda SR, Bari-Sadri, Chambal/R.B.Dam-11 each, Banera SR, Mount Abu, Mounntabu Tehsil, Khanpur, Arnod SR-10, Bhainsroadgarh, Bhopalsagar SR, Begu Sr, Nasirabad & Sheoganj- 9 each, Gangdhar SR & Ramganjmandi SR-8 each, Sirohi, Mandal SR, Nayanagar/Beawar, Aklera, Gangrar, Salumber & Bhilwara Tehsil SR-7 each.

7. Summary and Conclusion:

A low pressure area formed over Gangetic west Bengal and adjoining Jharkhand on 24th **July** 2017. It became a depression over Gangetic West Bengal and adjoining Jharkhand in the morning of 26th. Moving nearly northwestwards initially and later westwards,it weakened into a well marked low pressure area over northeast Madhya Pradesh & neighbourhood at 0830hours IST of 27th July, 2017. It caused heavy to very heavy rainfall over central pars of the country. Its genesis, movement and associated adverse weather could be predicted well by IMD.

8. Acknowledgements:

India Meteorological Department (IMD) duly acknowledges the contribution from all the stake holders who contributed to the successful monitoring, prediction and early warning service of Depression. We specifically acknowledge the contribution of all sister organizations of Ministry of Earth Sciences including National Centre for Medium Range Weather Forecasting Centre (NCMRWF). The support from various Divisions/Sections of IMD including Area Cyclone Warning Centre (ACWC) Mumbai, MC : Ranchi, Patna, Bhopal, Lucknow, Numerical Weather Prediction (NWP) Division, Information System & Services Division (ISSD) and Satellite Division at IMD HQ New Delhi is also acknowledged.