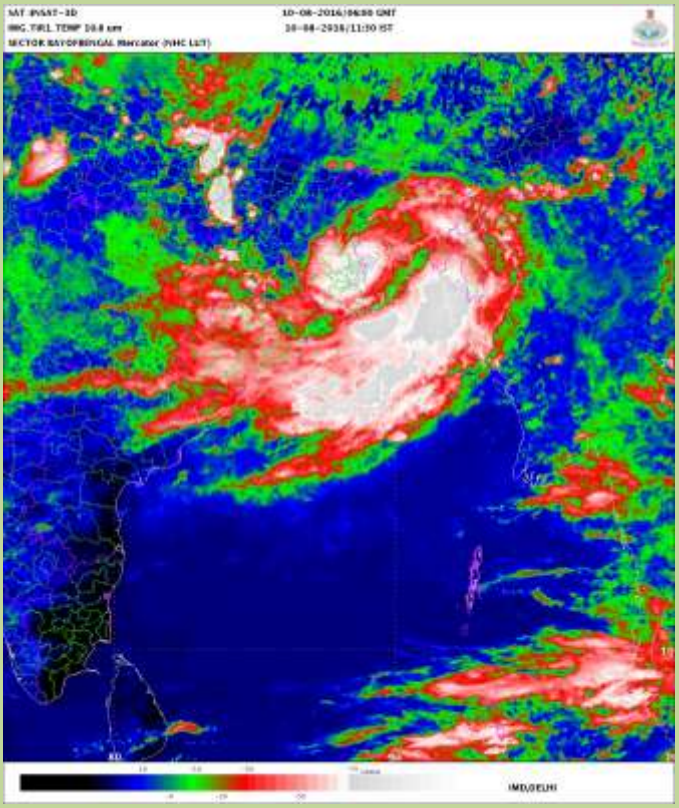
GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
INDIA METEOROLOGICAL DEPARTMENT

Deep Depression over West Bengal (09-12 August 2016): A Report



INSAT-3D enhanced colored IR imagery based on 0600 UTC of 10th August

Cyclone Warning Division

India Meteorological Department

New Delhi

December 2016

Deep Depression over West Bengal (9-12 August 2016)

1. Introduction

A low pressure area formed over northwest Bay of Bengal (BoB) and adjoining areas of West Bengal in the morning of 8th August, 2016. It concentrated into a depression over coastal areas of West Bengal and neighbourhood on 9th afternoon. It moved initially north-northeastwards and intensified into a deep depression on 10th morning. It then moved west-northwestwards and maintained the intensity of deep depression till 11th morning. It then weakened into a depression at 0300 UTC of 11th and further into a well marked low pressure area on the morning of 13th August while moving west-northwestwards upto southwest Bihar.

Under its influence, southwest monsoon was active/ vigorous over Gangetic West Bengal and Jharkhand on 11th & 12th and over Uttar Pradesh during 15th – 17th. Heavy to Very Heavy rainfall occurred over Gangetic West Bengal and Jharkhand regions on 11th & 12th, Uttar Pradesh and Bihar during 15th -17th August.

The salient characteristics like genesis, intensification, movement and associated adverse weather are discussed in the following sections.

2. Genesis

A low pressure area formed over northwest Bay of Bengal (BoB) and adjoining areas of West Bengal in the morning of 7th August, 2016. It became well marked over the northwest Bay of Bengal and adjoining West Bengal and Bangladesh coast on 8th. The environmental parameters became favourable on 09th with increase in low level vorticity at 850 hPa level, which was about 120×10^{-6} sec^{-1} at 0300 UTC of 9th. The lower level convergence at 850 hPa level was about $(10\text{-}20) \times 10^{-5}$ sec^{-1} and upper level divergence at 200 hPa level was about 30×10^{-5} sec^{-1}. The vertical wind shear of horizontal wind was 10-20 knots. The upper tropospheric ridge lay far to the north in association with the Tibetan high along latitude 30^0N. Under these conditions, the well marked low pressure area concentrated into a depression over coastal areas of West Bengal and neighbourhood on 9th afternoon.

3. Intensification and movement

The depression intensified into a deep depression over south Bangladesh and neighbourhood on 10th morning. It then moved west-northwestwards and lay over Gangetic West Bengal and adjoining Jharkhand on 11th morning as a deep depression. It weakened into a depression over north Jharkhand and neighbourhood in the afternoon of 11th. It lay over southwest Jharkhand on 12th and weakened into a well marked low pressure area over southwest Bihar and neighbourhood in the morning of 13th. It further weakened into a low pressure area over southeast Uttar Pradesh and neighbourhood in the morning of 14th. It persisted over the same region on 15th and became less marked on 16th.

The best track of the system is shown in Fig.1 and the best track parameters are shown in Table 1. The typical satellite imageries of the system are presented in Fig.2. The model analyses based on IMD GFS model at 0000 UTC of 16-21 August 2016 are presented in Fig.3.

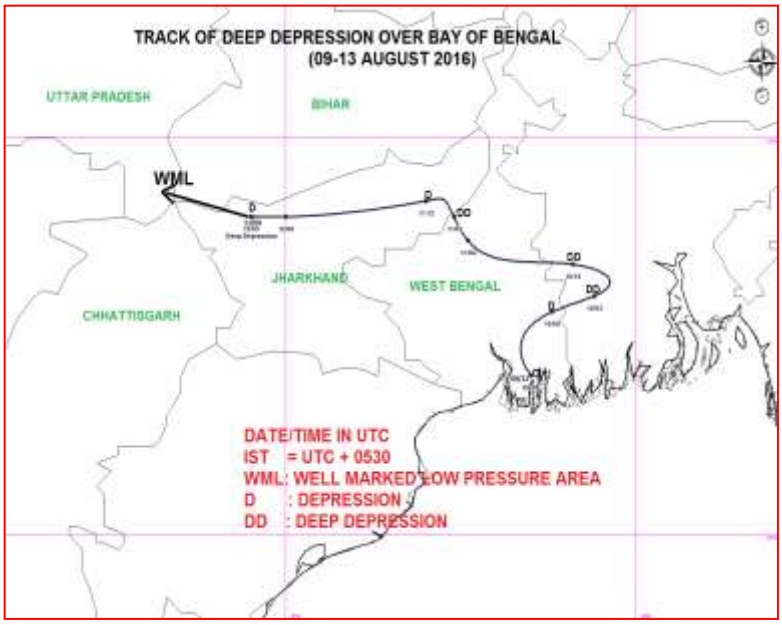


Fig.1: Track of deep depression (9-12 August 2016)

Table 1:. Best track positions and other parameters of the deep depression (9-13 August 2016)

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
9th August	0900	22.0/88.5	-	996	25	4	D
	1200	22.0/88.5	-	996	25	4	D
	1800	22.5/89.0	-	995	25	4	D
10th August	0000	22.8/89.7	-	995	25	4	D
	0300	23.0/89.4	-	994	30	5	DD
	0600	23.1/89.3	-	994	30	5	DD
	1200	23.4/89.1	-	994	30	5	DD
	1800	23.6/88.5	-	994	30	5	DD
	0000	23.8/87.8	-	994	30	5	DD
11th August	0300	24.0/87.4	-	994	30	5	DD
	0900	24.0/87.0	-	996	25	4	D
	1200	24/86.5	-	996	25	4	D
	1800	24/85.7	-	996	25	4	D
12th August	0000	24/85.0	-	996	25	4	D
	0300	24.0/84.5	-	996	25	4	D
	1200	24.2/84.5	-	996	25	4	D
	1800	24.4/84.0	-	996	20	3	D
13th August	0000	Weakened into a Well marked low pressure area over southwest Bihar and neighborhood on 13th morning					

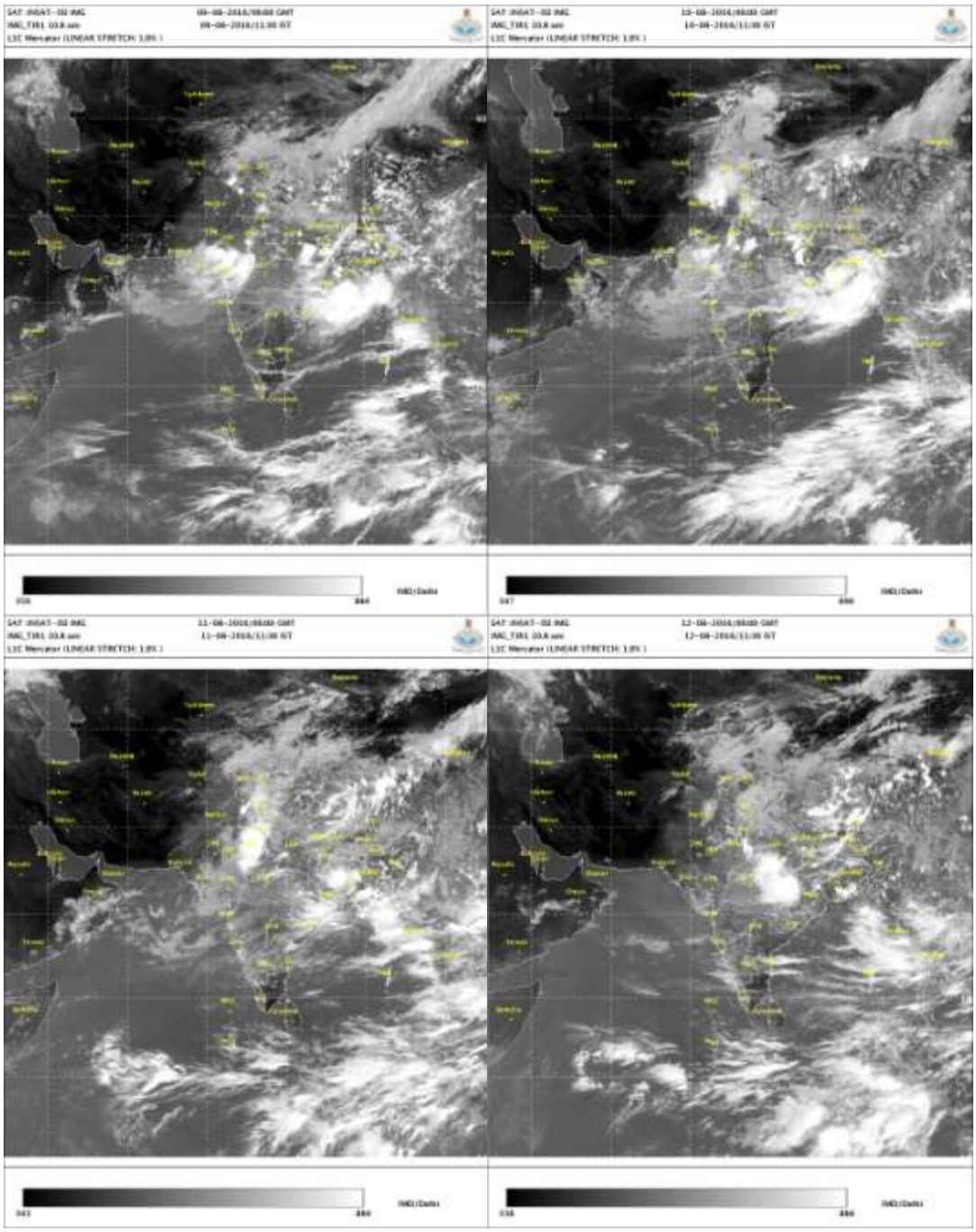


Fig.2 (i) INSAT 3D based imagery of depression at 0600 UTC of 9-12 August 2016

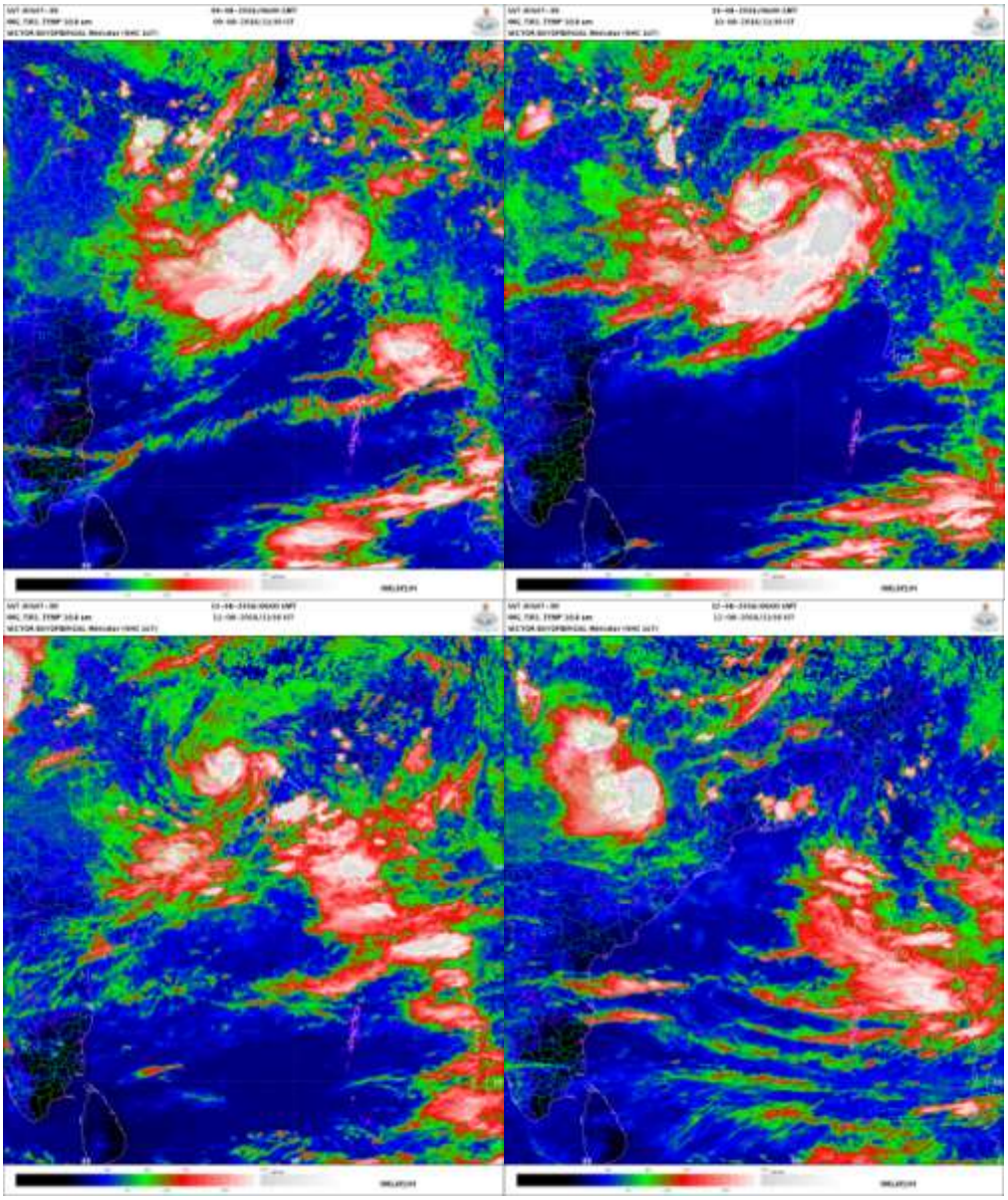


Fig.2(ii). INSAT 3D based enhanced color imagery of depression at 0000 UTC of 9-12 August 2016

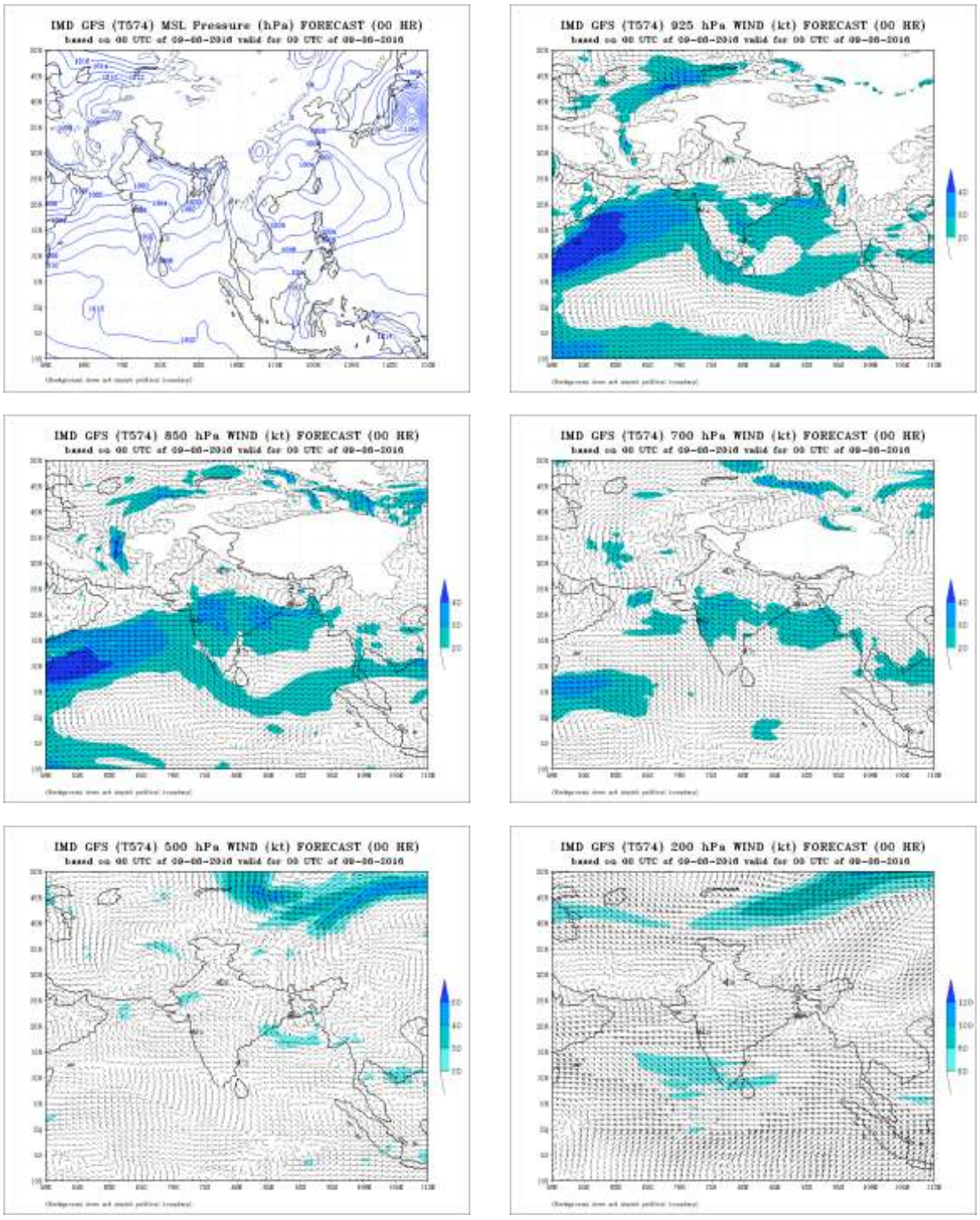


Fig.3 (i) IMD GFS Model analyses of mean sea level pressure (MSLP), and wind at 925, 850, 700, 500 and 200 hPa levels of 0000 UTC of 9 August 2016

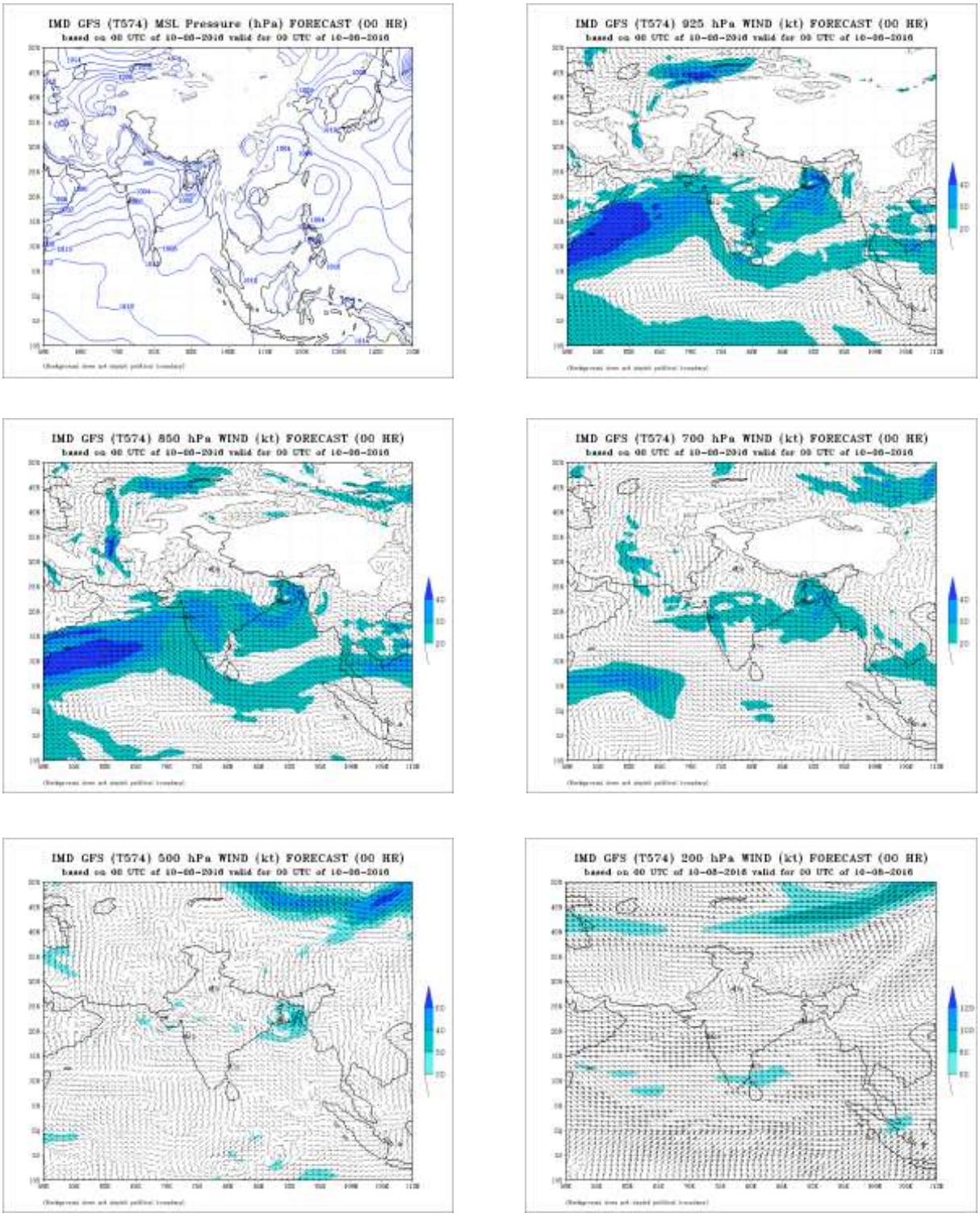


Fig.3 (ii) IMD GFS Model analyses of mean sea level pressure (MSLP), and wind at 925, 850, 700, 500 and 200 hPa levels at 0000 UTC of 10 August 2016

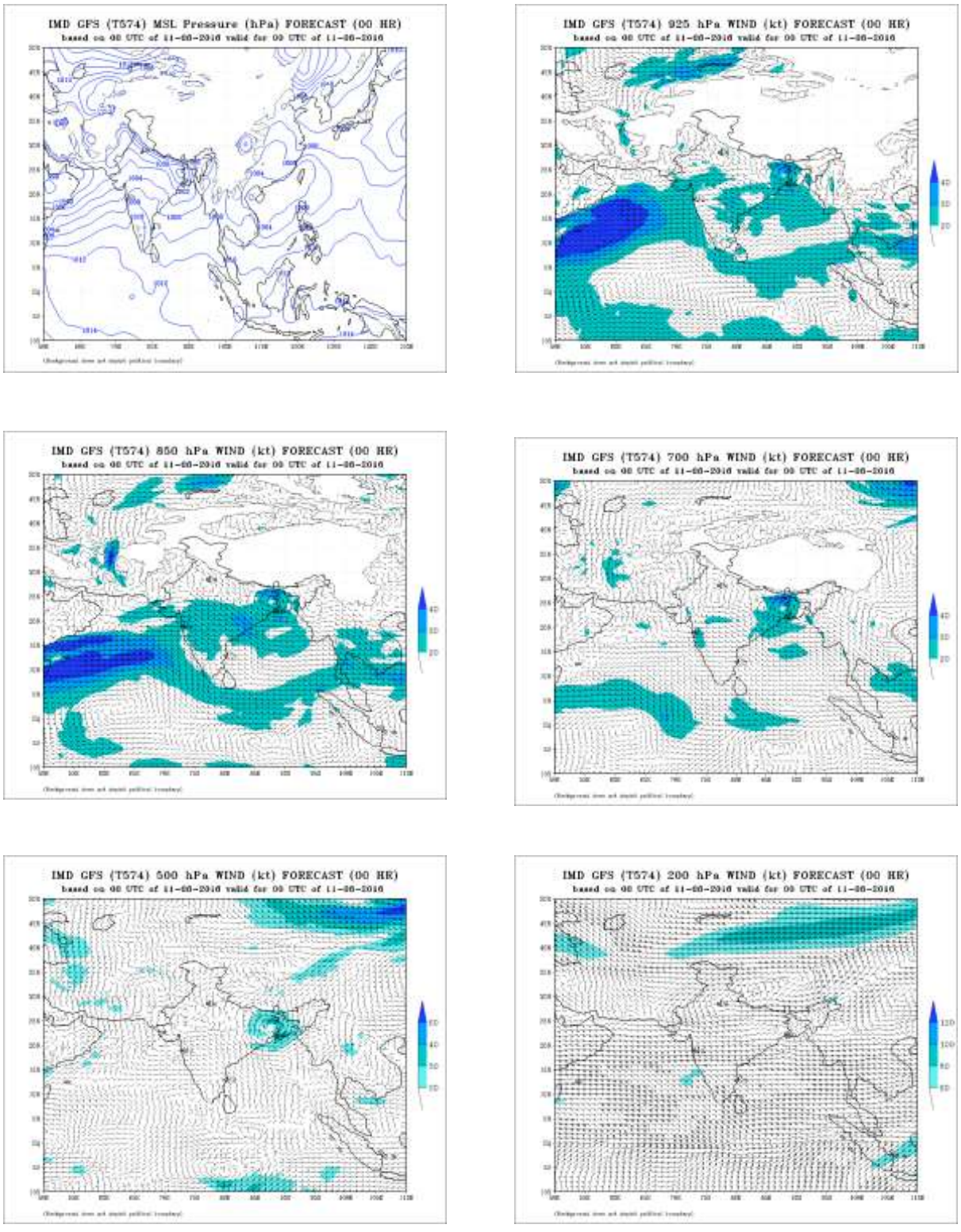


Fig.3 (iii) IMD GFS Model analyses of mean sea level pressure (MSLP), and wind at 925, 850, 700, 500 and 200 hPa levels at 0000 UTC of 11 August 2016

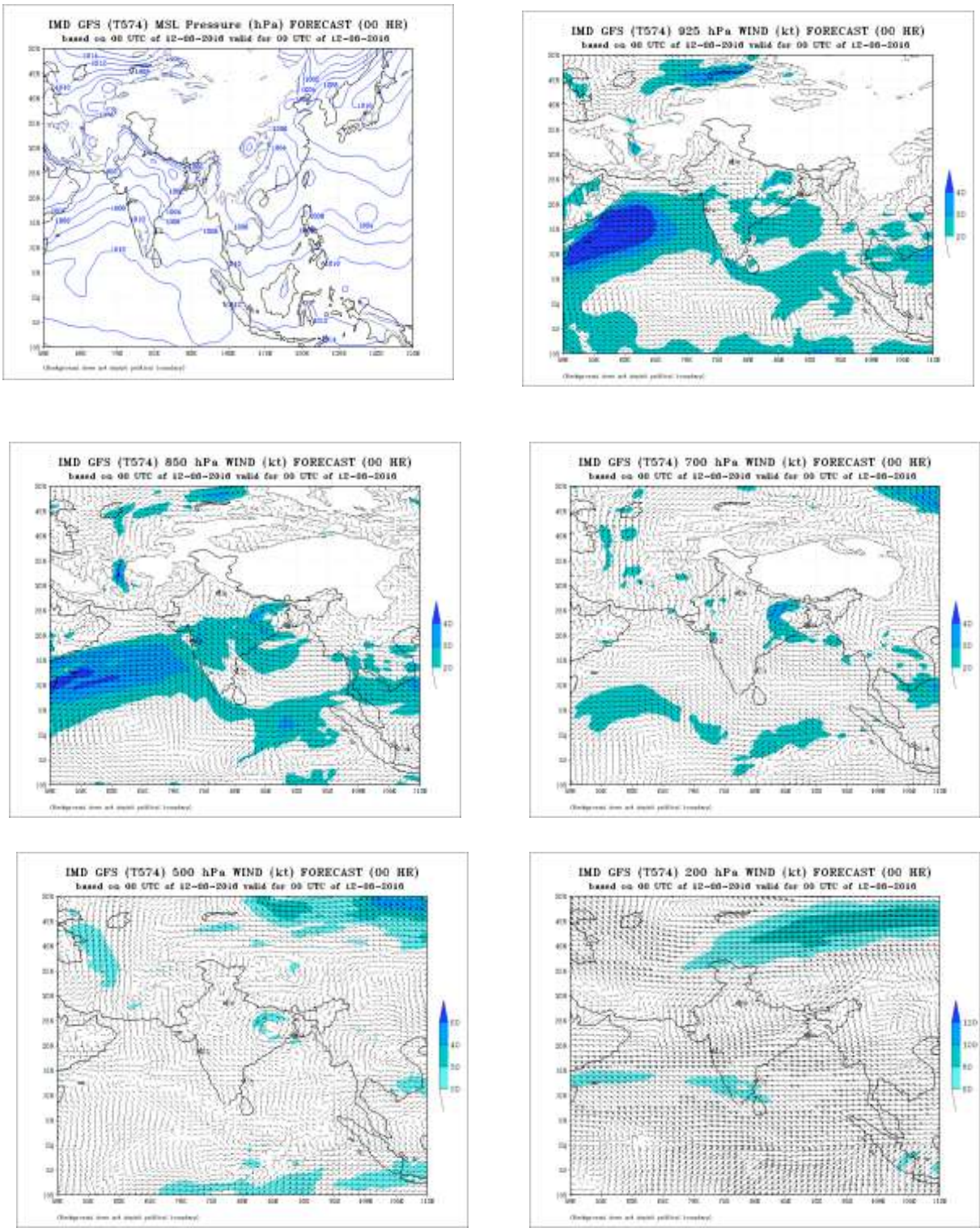


Fig.3 (iv) IMD GFS Model analyses of mean sea level pressure (MSLP), and wind at 925, 850, 700, 500 and 200 hPa levels at 0000 UTC of 12 August 2016

4. Realised weather:

Heavy to Very Heavy rainfall occurred over Gangetic West Bengal and Jharkhand regions on 11th & 12th, Uttar Pradesh and Bihar during 15th -17th August. The chief

amounts of past 24 hr rainfall realised (≥ 7 cm) ending at 0830 IST of date during the life cycle of system are furnished below:

09 August 2016
Gangetic West Bengal: Canning-8,
Odisha: Chandbali-11, Pattamundai & Rajkanika-9 each, Kendrapara-8, Derabis, Marsaghai, Danagadi- 7 each,
Jharkhand: Hunterganj-7,
Bihar: Bhabhua-11, Sherghati-7.

10 August 2016
Assam & Meghalaya: Karimganj-19,
Sub-Himalayan West Bengal & Sikkim: Gangtok-8,
Gangetic West Bengal: Canning-7,
Odisha: Chandanpur-14, Bhograi-13, Rajghat, Jaleswar-10 each, Samakhunta, Bangiriposi, Baripada-9 each, Lakhanpur, Gobindpur, Salebhatta-7 each,
Jharkhand: Jamshedpur Airport-22, Jamshedpur-14, Rajdhanwar-11,
Bihar: Sherghati-9.

11 August 2016
Sub-Himalayan West Bengal & Sikkim: Kalimpong-8,
Gangetic West Bengal: Mangalkote-16, Krishnanagar-13, Gheropara-11, Asansol (CWC), Debagram, Manteswar, Sonamukhi, Rajnagar, Sri Niketan-9 each, Asansol, Durgapur-8 each, Mohanpur, Mankar, Amtala, Hetampur-7 each,
Jharkhand: Maithon-14, Maheshpur, Jamshedpur-11 each, Jamtara-10, Satgaon, Jamshedpur Airport-9 each, Jarmindi-8, Pakuria, Panchet, Messenjore, Giridih-7 each,
East Uttar Pradesh: Rae Bareli (CWC)-8.

12 August 2016
Assam & Meghalaya: Margherita-10,
Odisha: Tikarpara-8,
Bihar: Sono-7,
East Uttar Pradesh: Churk-15, Ghorawal-13, Robertsganj-12, Dudhi-10, Sandila, Meja-9 each, Varanasi-BHU, Mirzapur (CWC)-7 each,
East Madhya Pradesh: Singrauli-AWS-7,
Konkan & Goa: Matheran-8, Pen, Karjat, Bhira, Khalapur, Sudhagad Pali-7 each,
Chhattisgarh: Ramanujganj-15, Ambikapur-10.

5. Damage

No damage has been reported due to this system.

6. Acknowledgements:

RSMC New Delhi duly acknowledges the contribution of the valuable inputs and guidance from NCMRWF, INCOIS and NIOT Chennai. The inputs from NWP Division, ISSD Division and Satellite Division at IMD HQ New Delhi and Area Cyclone Warning Centre (ACWC) Kolkata, Cyclone Warning Centre (CWC) Bhubaneswar are also appreciated.