

Weather Synopsis –June 2023.

Weak Monsoon conditions prevailed during the month of June 2023. Below normal rainfall was reported from most of the principal meteorological stations except Bandarawela Mannar, Pottuwil, Vavuniya, Trincomalee, Galle and Ratnapura, whereabove normal rainfall was reported (Fig 1A). Monsoon has established across Sri Lanka on 08th June

Highest cumulative rainfall was **1017.0** mm at Moraliyoa . Highest rainfall received during 24hours, was **227.1**mm at Mathugama on the 05th. No rainy days has been reported from Puttalam . Maximum percentage of rainfall was reported from (**386.5%**) Pottuwil while minimum from Puttalam station (0.5%)

Most of the hydro catchment stations, except Bowathena reported below average rainfall. No rain has reported from Maskeliya, Samanala Wewa and Randenigala (Fig. 5).

Figure 3 depicted lightning flash density map for June 2023. High lightning density was reported from Vavunya North, Welioya, Kebithigollawa, Madhu, Madulla, Medagama, , Ridimaliyadda, Padiyathalawa, Seruwawila, Lankapura, and Medirigiriya

Fairly widespread showers with isolated fairly heavy falls were reported from southwestern quarter on during the first week , and on 10th and 12th ,

Except for a few light showers in southwestern parts mainly dry weather was evident on 08th , on 13th and during the last few days of the month from 26th to 30th.

Mostly above normal day temperatures and night temperatures were experienced during the month of June 2023. Highest recorded maximum temperature was 38.3⁰C at Mullaitiv on 15th and lowest recorded minimum temperature was 13⁰C at NuwaraEliya on 02nd and 29th .

During June 2023, sea surface temperatures (SSTs) were above-average in much of the equatorial Pacific . The latest monthly Nino indices were +2.6C for the Nino 1+2 region, +0.9C for the Nino 3.4 region and +1.2C for the Nino 3 region . Oceanic and atmospheric anomalies were consistent with weak El Nino conditions.. Ocean Nino Index is 0.5 during April to June (AMJ) , 0.8 May to July

(MJJ) respectively (NOAA Climate prediction Center). Neutral IOD was observed during June 2023 (BoM, Australia). Sea surface waters in tropical Indian Ocean are warmer than average (Fig. 4)

Strong Madden-Julian Oscillation (MJO) was at phase 1 from 01st to 06th June, at the phase 2 from 07th to 08th, at the phase 3 during 2nd week of July, weakened during 3rd week of July, strengthened at the phase 1 on 21st propagated to the phase 2 from 24th to 30th (Fig. 6).

The average position of the shear line was laid between 02^oN - Equator from 40^oE to 70^oE, between Equator and 02S^o from 70^oE to 100^oE and between Equator to 03^oN from 100^oE to 120^oE (Fig 5). It was fluctuated to the 03^o north and south of average position.

Date	Rain gauge Station	24 Rainfall (mm)
01 June 2023	Karagala	208.0
01 June 2023	Rathnapura	183.2
01 June 2023	Ilubuluwa Estate	166.3
01 June 2023	Mathugama	155.2
01 June 2023	Guruluwana	128.7
01 June 2023	Deniyaya	119.0
01 June 2023	AYAGAMA	109.5
01 June 2023	BATUWANAGALA	107.5
03 June 2023	Hiniduma	101.5
05 June 2023	Mathugama	227.1
05 June 2023	Hiniduma	128.5
05 June 2023	Vogan Estate	118.3
10 June 2023	Awissawella	120.3
12 June 2023	Karagala	135.0
12 June 2023	Guruluwana	127.0
12 June 2023	Maliboda	125.1
12 June 2023	Weweltalawa	100.6

Weather Systems

Under the influence of upper air Cyclonic Circulation formed over the Southeast Arabian Sea (AS), a Low Pressure Area formed on 05th June. It concentrated into a Depression in the early morning of 6th June over Southeast AS. It moved nearly northwards and intensified into a Deep Depression (DD) over the same region around noon and into the Cyclonic Storm (CS) "BIPARJOY" over eastcentral and adjoining southeast AS in the evening of 6th June. Continuing to move further nearly northwards, it intensified into a Severe Cyclonic Storm (SCS) over eastcentral AS in the early morning and into a Very Severe Cyclonic Storm (VSCS) over the same region around noon of 7th June. During 7th to 11th June, it followed a recurving track, moving gradually north-northwestwards for some time, then north-northeastwards & finally northwards. While moving northwards, it intensified into an Extremely Severe Cyclonic Storm (ESCS) over eastcentral AS in the early morning of 11th June. It then moved north-northeastwards for sometime and then northwards till early morning of 12th maintaining the intensity of ESCS. It then moved north-northwestwards and weakened into a VSCS around midnight. It then moved northeastwards and crossed Saurashtra & Kutch and adjoining Pakistan coasts near 23.28°N and 68.56°E between 2230 and 2330 hours IST of 15th June, 2023 as a VSCS

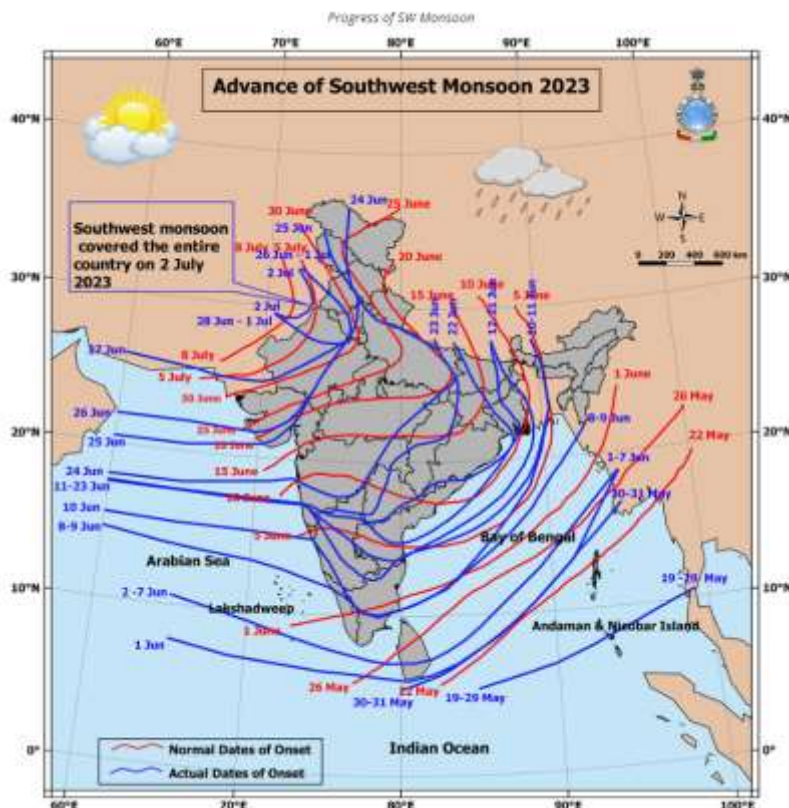


Fig 1A: Monsoon onset isochrones for 2023 (Source : IMD)

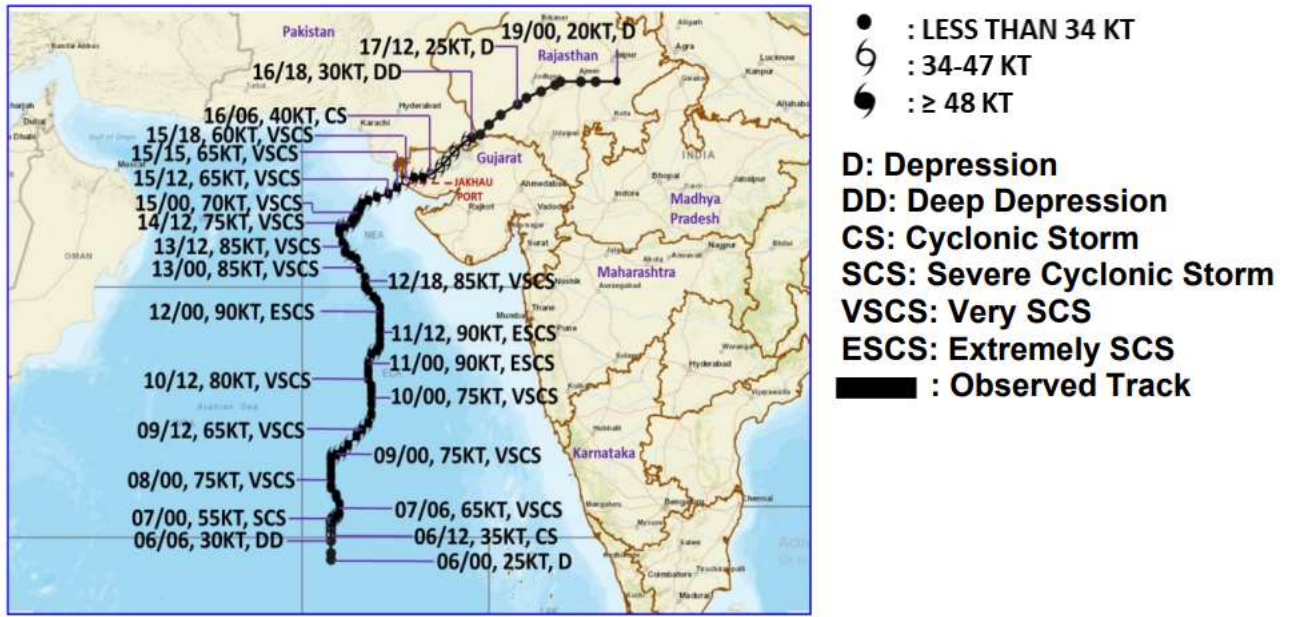


Fig 1B: Observed Track of BIPARJOY (Source : IMD)

Rainfall (Main Stations) With 30 Average -June 2023

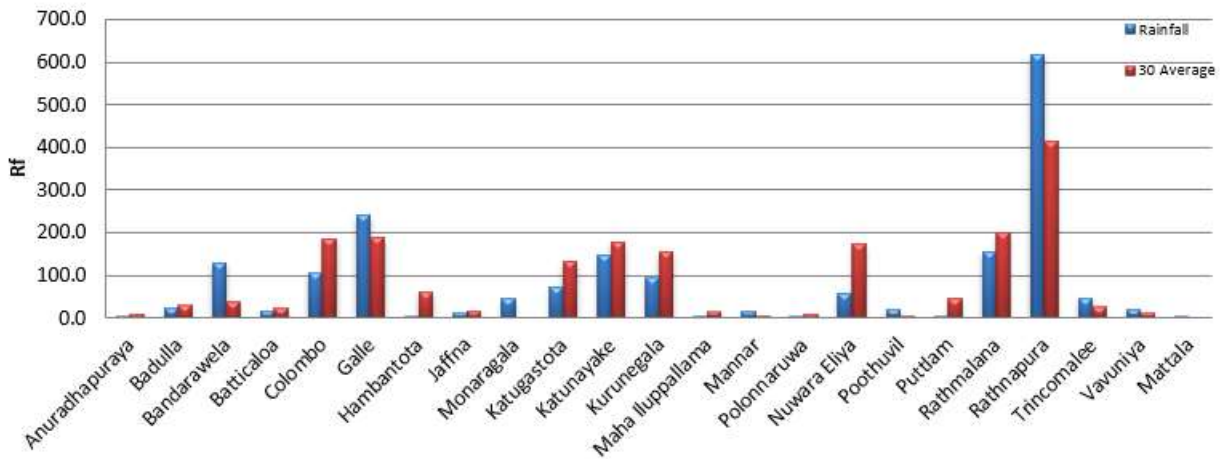


Fig 2A: Monthly Total Rainfall(mm) with 30 years (1961-1990) of their averages at Main Meteorological stations areas during June 2023

Rain Days with 30 Avg- June 2023

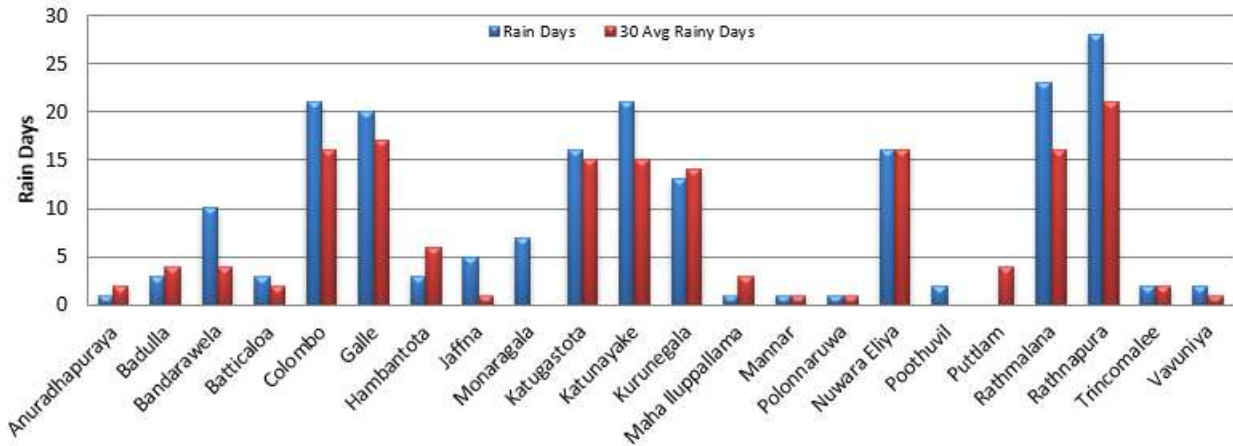


Fig 2B: monthly total no of rainy days with 30 years(1961-1990) of their averages at main Meteorological stations during June 2023

Rainfall (Hydro catchment area) With 30 Average- June 2023

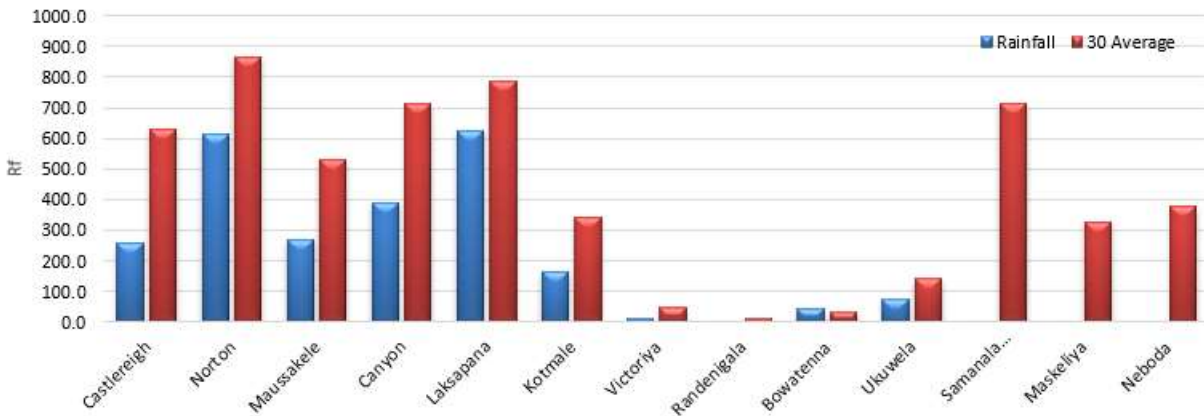


Fig 2C: Monthly Total Rainfall(mm) with 30 years (1961-1990) of their averages at Hydro catchment areas during June 2023

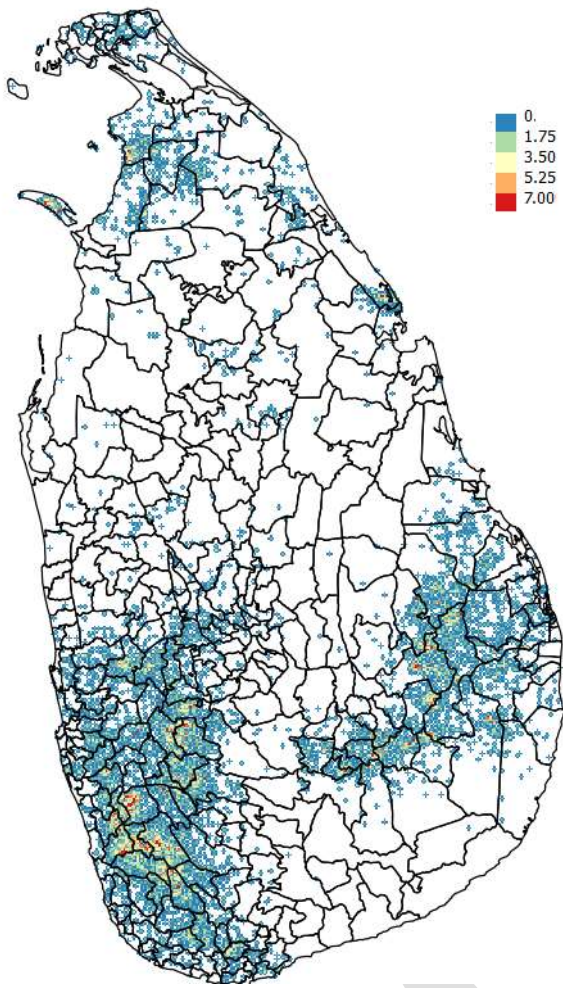


Fig 3:Lightning flash density map for June2023

Ocean Surface Winds and Ocean Surface Temperature for June 2023

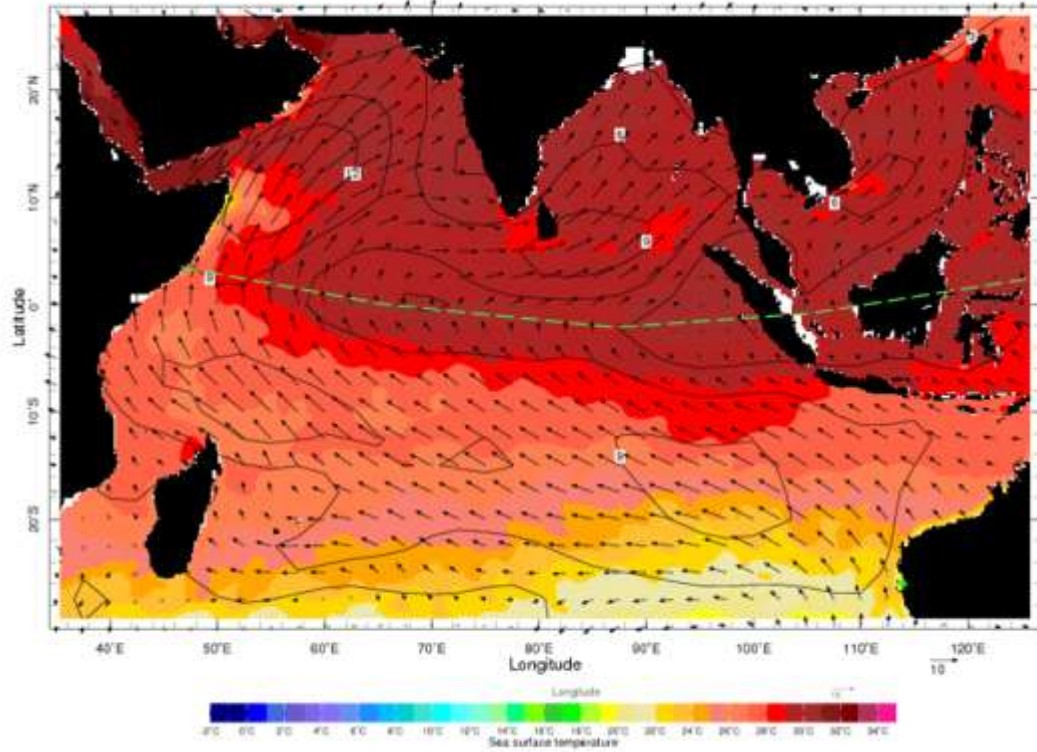


Fig 4: Ocean Surface Winds and Ocean Surface Temperature for June 2023

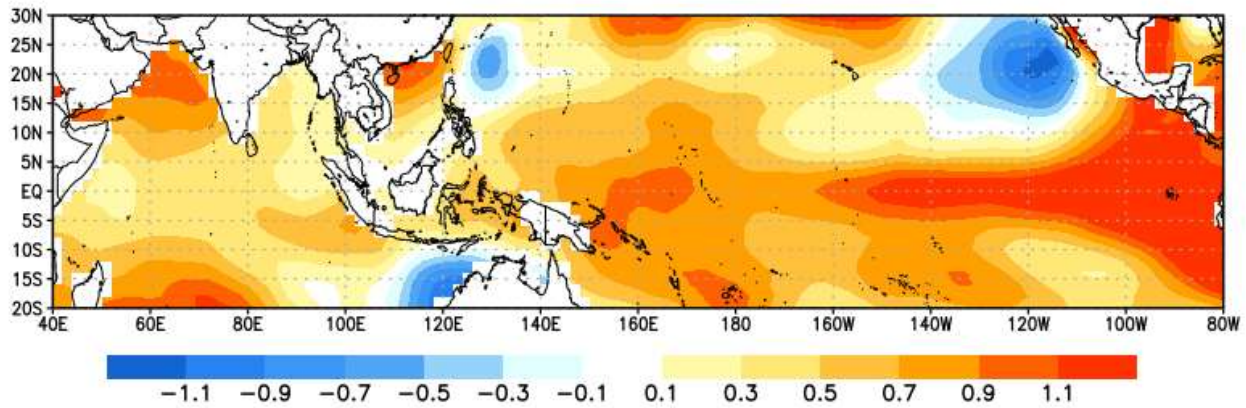
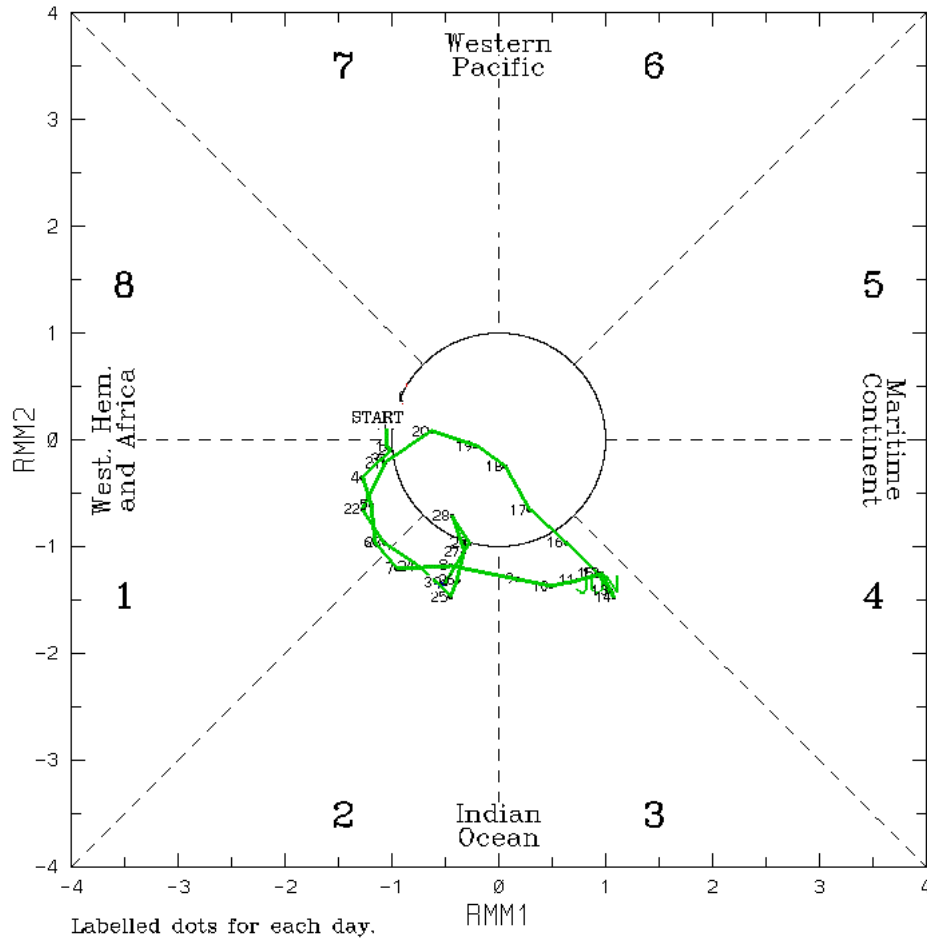


Fig 5: Sea Surface Temperature anomalies for June 2023

RMM1, RMM2 phase space for 01 June 2023 to 30 June 2023



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Fig 6: Phase diagram of MJO Index

Surface pressure and winds: The surface pressure was below average except from 01st to 05th , on 08th , from 14th to 16th , on 23rd and from 26th to 30th when above average pressures were reported . The pressure gradient was steep from 09th to 10th , on 13th, from 16th to 17th ; moderate from 01st to 08th, from 11th to 12th ; on 14th ; from 23rd to 30th; and mild during remaining days.

The surface wind was westerly to South-westerly for the rest of the month and speed varied within 05-15kts.

Upper winds:

At 850hPa, Westerly to north-westerly wind flow is dominated over the island. Anomalous easterly flow suggest that weakening of monsoon flow at 850mb level . (Fig 7) .

At 700 hPa, North Westerly to Westerly wind flow is dominated over the island. Anomalous northeasterly wind flow suggest that weakening of monsoon flow at 700mb level (Fig 8).

At 500 hPa,North Westerly wind flow is dominated over the island. Anomalous northeasterly wind flow suggest that weakening of monsoon flow at 500mb level

The 250 hpa the upper tropospheric ridge was laid from 23⁰N40⁰E to 25⁰N100⁰E . Tropical easterly jet was appeared in the vicinity of Sri Lanka.

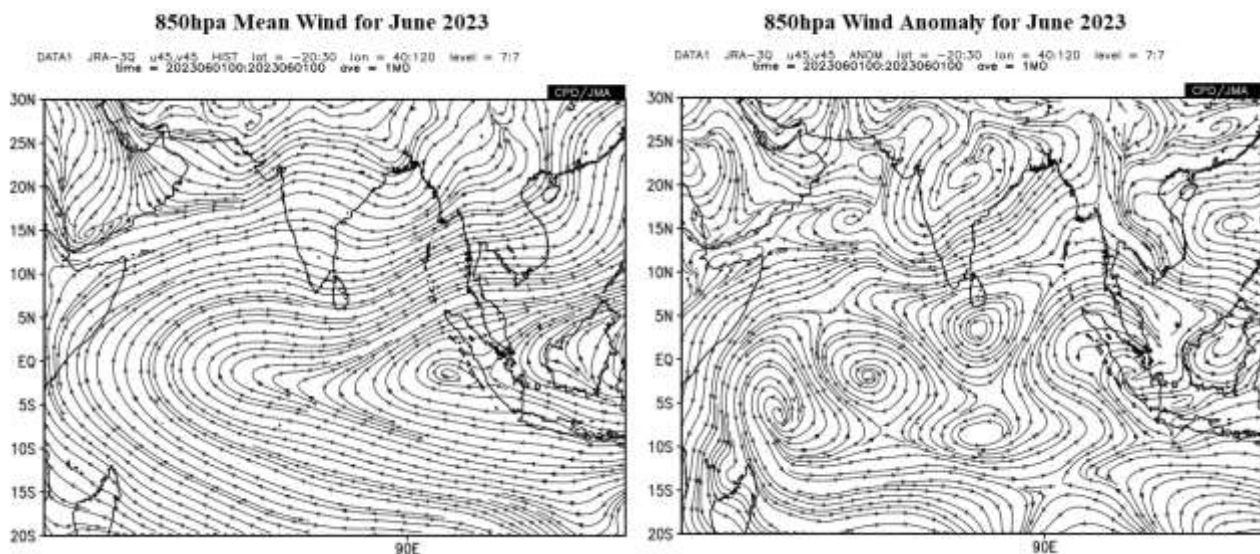


Fig. 7 : Monthly average wind pattern at 850hpa level during the month of June2023 (JRA55)

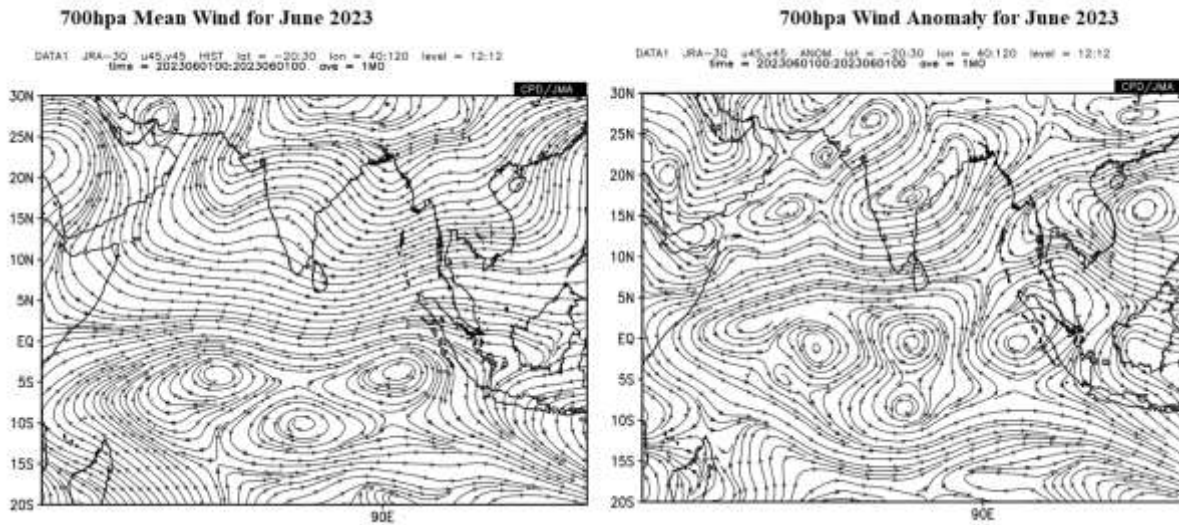


Fig. 8 Monthly average wind pattern at 700hpa level during the month of June 2023 (JRA55)

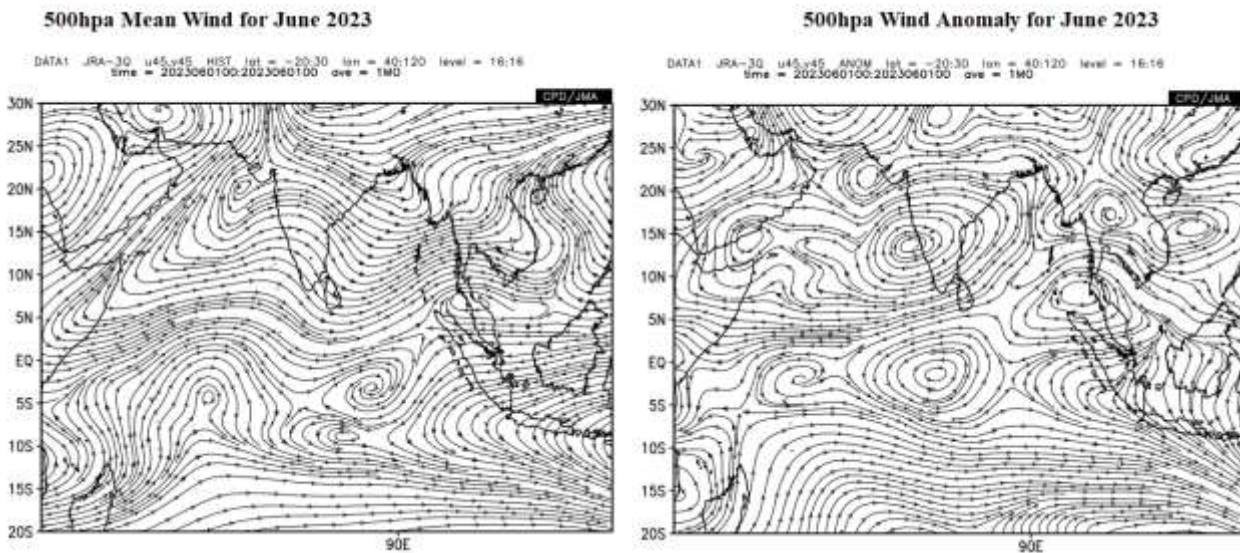


Fig. 9 Monthly average wind pattern at 500hpa level during the month of June 2023 (JRA55)

Temperature Field:

The maximum temperatures in the day were mostly above normal in most places during the month of June 2023. However some stations reported below average maximum temperatures 17th and 18th. (Fig.10). Highest recorded maximum temperature for the month of June 2023 was 38.3⁰C at Mullaitiv on 15th (Table 4a).

Night minimum temperatures over most parts were above above normal during the month (Fig 11). However below average minimum temperatures were experienced at some stations on 19th during most

of the month. Lowest recorded minimum temperature for the month of June 2023 was 13.0 °C at Nuwara Eliya on 02nd and 29th (Table 4b).

Maximum and Minimum departures from normal day/night temperature were shown in table 4.

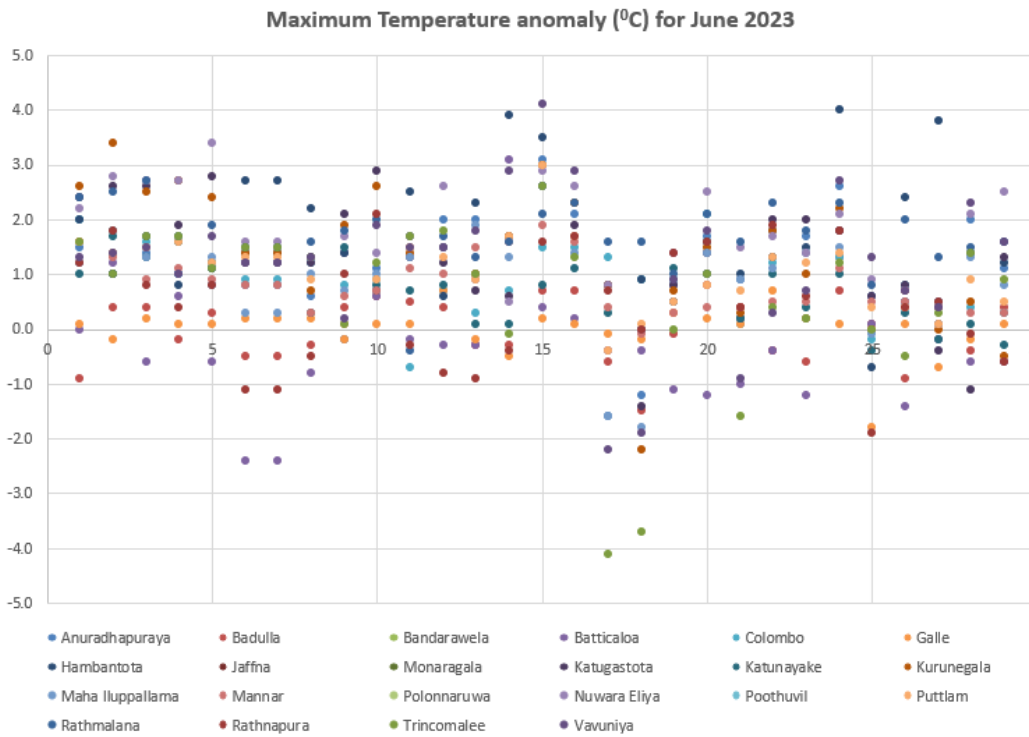


Fig 10 Maximum Temperature anomaly (°C) for June 2023

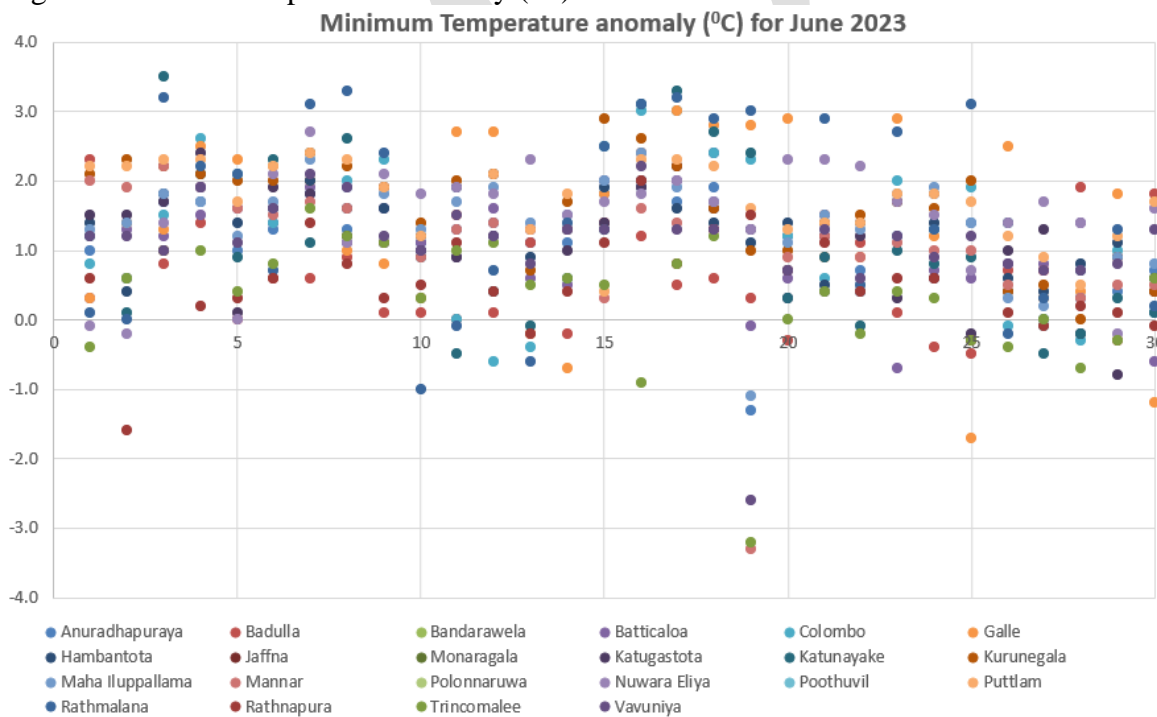


Fig 11 Minimum Temperature anomaly (°C) for June 2023

Below normal rainfall was reported from most of the principal meteorological stations except Bandarawela Mannar, Pottuwil, Vavuniya, Trincomalee, Galle and Ratnapura, where above normal rainfall was reported (Fig 1A).

Highest cumulative rainfall was **1017.0** mm at Moraliyoa . Highest rainfall received during 24hours, was **227.1**mm at Mathugama on the 05th. No rainy days has been reported from Puttalam . Maximum percentage of rainfall was reported from (**386.5%**) Pottuwil while minimum from Puttalam station (0.5%)

There was a significant deficiency of rainfall in the hydro catchment areas, which could have a potential impact on the water levels of the major reservoirs. Only Bowathenna reported above average rainfall. No rain has reported from Maskeliya, Samanala Wewa and Randeniya (Fig. 5).

All of the hydro catchment stations reported below normal rainfall. (Fig 2).

The monthly total rainfall and the number of rain days at the principal meteorological stations, total rainfall at hydro catchment areas, are shown in tables 2, and 3.

Table-02-Monthly Total Rainfall (mm) with 30 years (1961-1990) of their averages at Hydro catchment areas

Hydro Catchment	June2023	Average	% (percentage of average)
Castlereigh	257.0	630.9	40.7%
Norton	613.4	866.3	70.8%
Maussakele	269.3	530.1	50.8%
Canyon	390.9	711.4	54.9%
Laksapana	625.5	787.8	79.4%
Kotmale	164.3	344.3	47.7%
Victoriya	11.3	46.4	24.3%
Randeniya	0.0	12.5	0.0%
Bowatenna	45.9	33.8	136.0%
Ukuwela	75.1	141.0	53.2%
Samanala Wewa	0.0	714.7	0.0%
Maskeliya	0.0	327.7	0.0%
Neboda		376.7	

Note that the meteorological day in this text is reckoned as the 24hr period from 08.30hrs to 08.30hrs following day

Table-03- total rainfall and the number of rain days at the principal meteorological stations recorded in the month against the respective averages (1961-1990).

Meteorological station	Monthly Total rainfall(mm)			Monthly Total No of rainy Days		
	2023-June	Average	%	2023-June	Average	%
Anuradhapuraya	1.8	9.4	19.1%	1	2	50.0%
Badulla	22.9	29.3	78.3%	3	4	75.0%
Bandarawela	129.4	36.6	353.6%	10	4	250.0%
Batticaloa	17.0	23.9	71.2%	3	2	150.0%
Colombo	104.5	184.9	56.5%	21	16	131.3%
Galle	240.6	188.2	127.8%	20	17	117.6%
Hambantota	3.7	59.0	6.3%	3	6	50.0%
Jaffna	13.5	16.1	84.0%	5	1	500.0%
Monaragala	45.1			7		
Katugastota	72.4	131.9	54.9%	16	15	106.7%
Katunayake	146.1	177.2	82.5%	21	15	140.0%
Kurunegala	93.5	153.0	61.1%	13	14	92.9%
Maha Iluppallama	0.6	14.0	4.5%	1	3	33.3%
Mannar	14.3	4.6	310.9%	1	1	100.0%
Polonnaruwa	0.6	9.9	6.2%	1	1	100.0%
Nuwara Eliya	57.9	171.9	33.7%	16	16	100.0%
Poothuvil	20.1	5.2	386.5%	2	na	#VALUE!
Puttlam	0.2	44.7	0.5%	0	4	0.0%
Rathmalana	153.0	198.4	77.1%	23	16	143.8%
Rathnapura	618.5	412.2	150.1%	28	21	133.3%
Trincomalee	46.7	25.4	183.9%	2	2	100.0%
Vavuniya	20.0	11.2	178.6%	2	1	200.0%
Mattala	1.7			2		

Table 4(a) - Extremes of Maximum Temperatures				June	2023
	Maximum	Offsets		Highest Std.Div	
	Value	(-)	(+)		
Value	38.3°C	4.1	4.1	5.42	
Station	Mullaitive	Trincomalee	Vavuniya	Katugastota	
Date	15/06/2023	17/06/2023	15/06/2023		
Table 4(b) -Extremes of Minimum Temperature June2023					
	Minimum	Offsets		Highest Std.Div	
	Value	(-)	(+)		
Value	13.0°C	3.2	3.5	4.72	
Station	NuwaraEliya	Trincomalee	Katunayake	Mattala	
Date	02 &29/06/2023	19/06/2023	03/06/2023		

Prepared by National Meteorological Centre(NMC)
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