

Weather Synopsis –June 2021.

Above normal rainfall was reported from most of the principal meteorological stations except stations located at central , northcentral and south eastern parts where below or about normal rainfall was reported (Fig 7). Most of the hydro catchment stations located along western slopes of the central hills reported below normal rainfall. However, Kotmale, Victoriya, Bowatenna, and Ukuwela stations reported above normal rainfall (Fig 8).

Showery conditions were enhanced from 02nd to 04th June over southwestern parts and adjoining areas with extremely heavy falls exceeding 200 mm (Table 1). Afternoon thunderstorms were also reported at several places over remaining parts of the island during above said period (Fig 1 (right)).

A deep northwest-southeast oriented trough over Sri Lanka at the surface (Fig 2)and 850mb (Fig 3 (upper)), mild cyclonic circulations embedded in the deep northwest-southeast oriented trough over Sri Lanka at 700mb (Fig 3 (middle)) and easterly wind flow feeding in to cyclonic circulation to the South-southeast of Sri Lanka at 500 levels (Fig 3 (lower)) together with strong vertical wind shear (speed shear as well as directional shear) (Fig 4) provided favorable conditions for formations of multicell thunderstorms bringing torrential rain exceeding 600mm rainfall at some places over southwestern quarter and adjacent areas (Fig 1(left)) from 02nd June evening to 04th June 2021 .

Due to the heavy rainfall, 16 deaths were reported due to floods and Landslides and 3 person were missing while 270912 people from 10 districts got affected Due to torrential rains, many areas were inundated in Galle, Gampaha, Kalutara, Ratnapura, Puttalam and Colombo districts due to flash flooding, blockage of drainages and river overflows. Most affected areas were Kolonnawa, Kaduwela and Kotte in Colombo district; Wattala, Kelaniya, Biyagama, Ekala, Ja-Ela, Katana, Gampaha in Gampaha district; Ehaliyagoda in Ratnapura district; Millaniya in Kalutara district (Situation Report, Disaster Management center) (Fig 5).

Table 1 stations received above 150mm rainfall during June 02 to 04 2021

Station	Date : June 02 (24 hour Rainfall mm)
Halwathura Estate	327
Mahayaya Area Estate, Dansalwaththa	288
Isipathana Primary School, Arakawila	249
Nittambuwa	233.7
Kiriella	210
Hanwella	207.5
Labugama	204
Kirindiwela	203.2
Padukka Estate	190.2
Erepola, Eheliyagoda	188
W.K.K. Engineering, Hanwella	187
Wathupitiwala Base Hospital	184.5
Ayr Estate	177.5
Pasyala	169.3
Salawa Estate	163.5
Kukuleganga	162
Siyane National College of Education	157.5

Station	Date : June 03 (24 hour Rainfall mm)
Dummalasooriya	346.7
Karandana Dammulla Sampath Tea Factory	316.5
Erepola, Eheliyagoda	311.5
Fruit Research and Development Institute, Horana	302.5
Keselhenawa Police Station	301
Pimbura Hospital	293
Halwathura Estate	280.5
Kamalasram (Udu Baddawa)	243
Angoda	224.3
Bandaragama	223
Bandaragama Government Farm	223
Katunayake	217
Vogan Estate	204.5
Isipathana Primary School, Arakawila	198
Vogan Estate	194.2
Padukka Estate	185
Negombo	183.4
Elston	182.4
Horagasgala	182.4
Hanwella	180.5
District Hospital, Meegahatenna	179.5
Melkopiwatta	179.5
Hindawa	176.4
Kiriella	175
W.K.K. Engineering, Hanwella	173
Detanagalla	164.5
Theppanawa	163.5
Gampaha Technical College	162.5
Salawa Estate	161
Ilubuluwa Estate	159.8
Labugama	157.3
Kuliyapitiya	155.8
Kalatuwawa	155.7
NIWITIGALA TEA FAC	150.9

Station	Date : June 04 (24 hour Rainfall mm)
Algama Central College	197.5
Pasyala	189.3
Moralioya	188.2
Vogan Estate	165.4
Nittambuwa	156.2

Except for a few light showers in southwestern parts mainly dry weather was evident from 10th to 11th, and during the third week extending from 14th to 21st.

Mostly above normal day temperatures were experienced during the month of June 2021 while night temperatures over most parts were above normal especially during the second half of the month. 1-4⁰C above normal day temperatures were experienced in Ratmalana, and Nuwara Eliya. 2⁰ to 3⁰C above normal night temperatures were reported at Galle and Ratmalana during 2nd and 3rd week of the month. Highest recorded maximum temperature was 37.5⁰C at Batticaloa on 16th and lowest recorded minimum temperature was 10.7⁰C at Nuwara Eliya on 21st.

Transition between borderline La Nina to ENSO neutral conditions were observed during Month of June 2021. Ocean Nino Index is -0.5 and -0.4 during April , May and June (AMJ) and May , June and July (MJJ) respectively (NOAA Climate prediction Center). Slightly positive IOD was observed during June 2021 (BoM, Australia). Sea surface waters in tropical Indian Ocean are warmer than average (Fig. 11)

The average position of the shear line was laid around Equator from 40⁰E to 70⁰E, between Equator and 02⁰S from 70⁰E to 100⁰E and between Equator to 05⁰N from 100⁰E to 120⁰E (Fig 10). It was fluctuated to the 03⁰ north and south of average position.

Strong Madden-Julian Oscillation (MJO) was at phase 8 during first 3 days of June and weaken till 12th June. It was strengthen in phase 2 from 13th to 19th and weaken again from 19th to 21st, intensified again at phase 1 during remaining days of the month (Fig. 12).

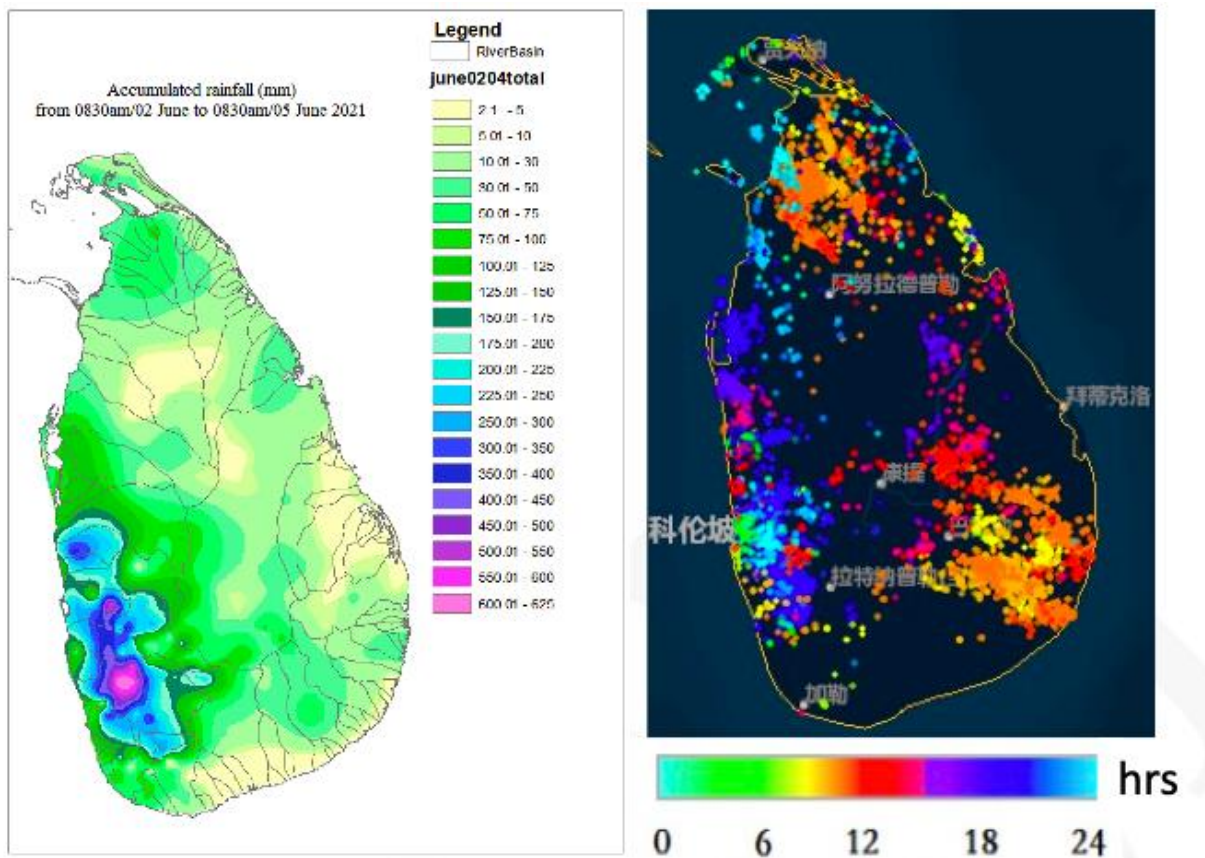


Fig 1a: Accumulated rainfall (mm) from 0830am 02nd June to 0830am 05th June 2021 and lightning stroke map (data from the lightning detection system donated by Chinese Government) from 02nd to 04th June 2021.

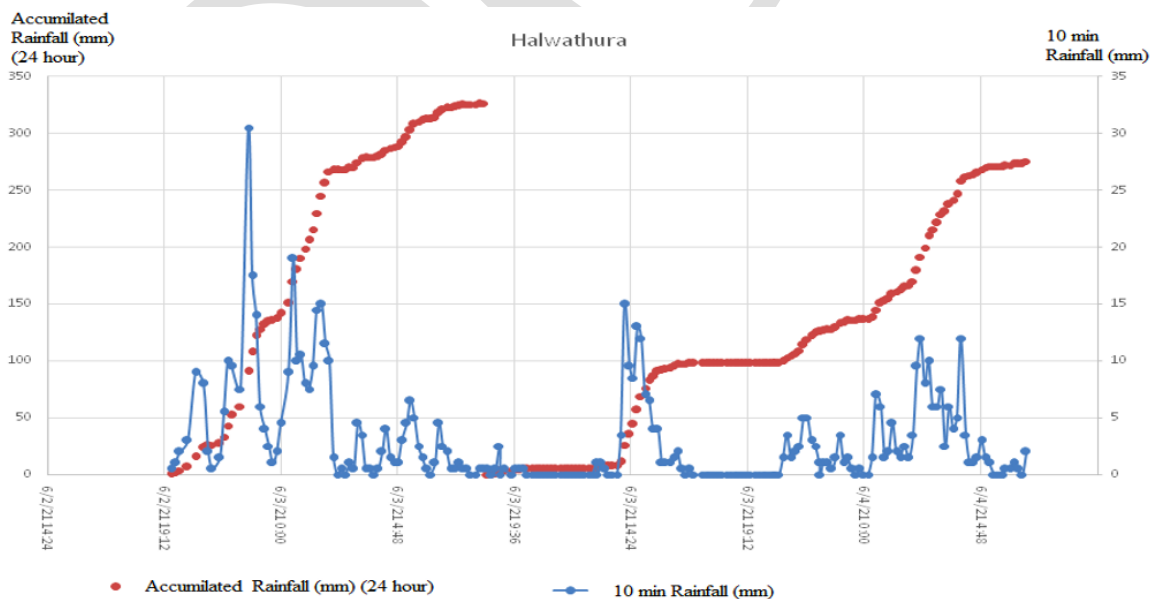


Fig 1 b : Accumulated Rainfall and 10 minute rainfall reported at Automatic Rainguage at Halwathura 03rd and 04th June 2021.

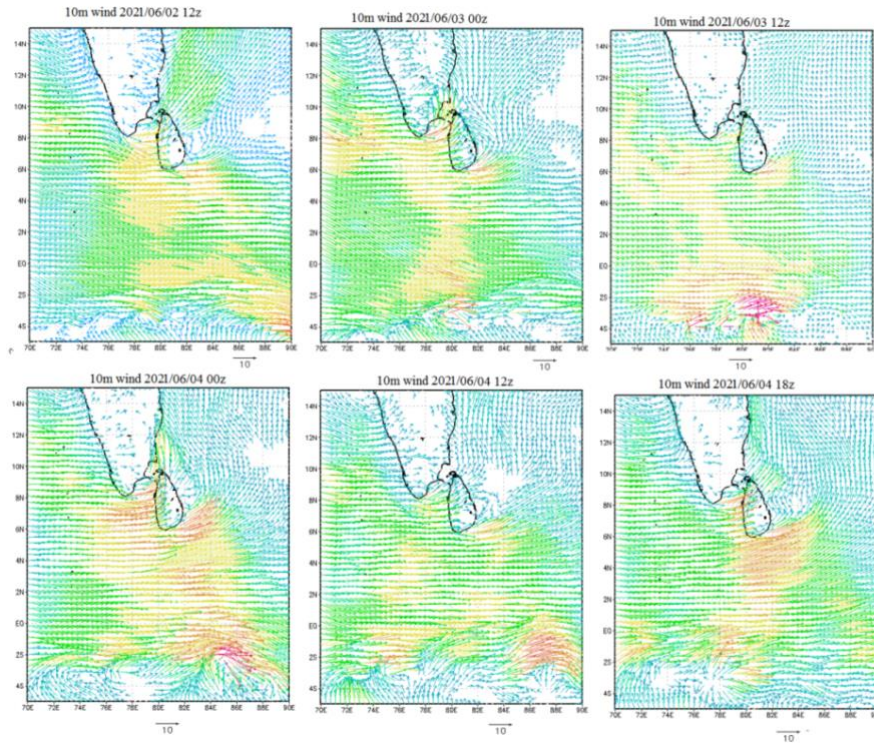


Fig 2: ECMWF 10m wind at 02 June 12z, 03 June 00z, 03 June 12z, 04 June 00z, 04 June 12z and 04 June 18z 2021

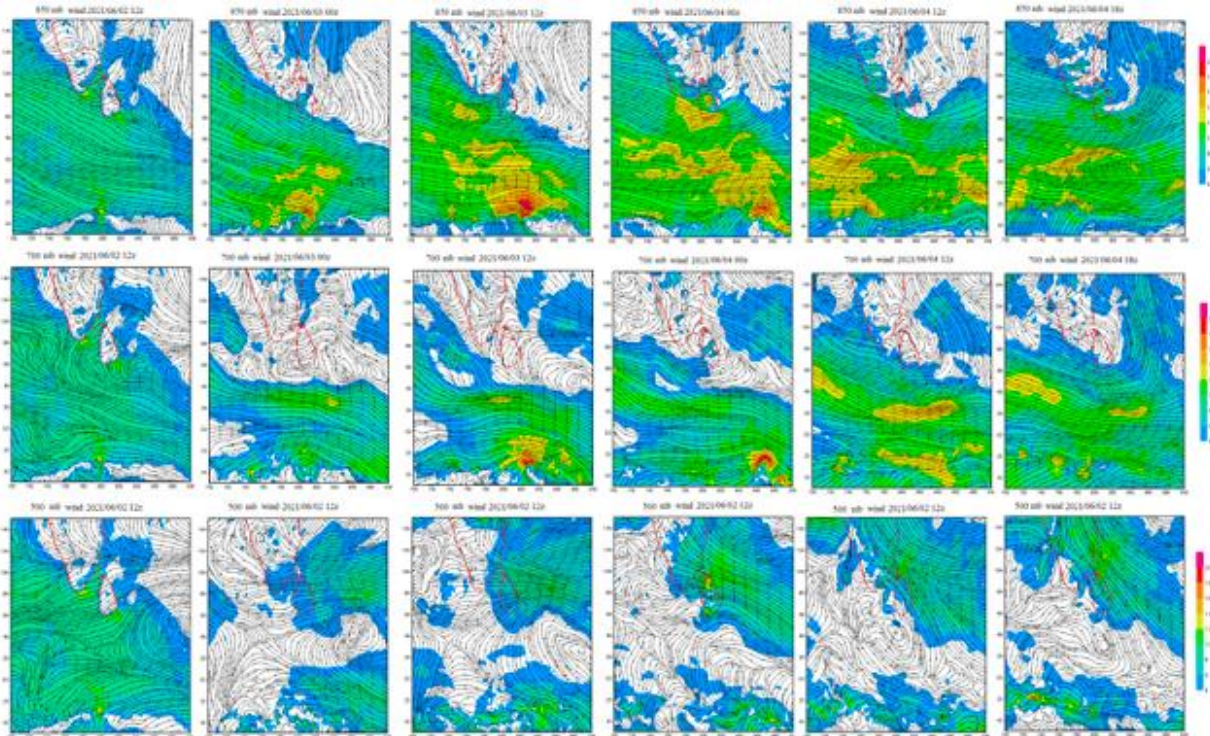


Fig 3: ECMWF 850 mb wind (upper) , 700 mb wind (middle) and 500mb wind (lower) at 02nd June 12z, 03rd June 00z, 03rd June 12z, 04th June 00z, 04th June 12z and 04th June 18z 2021.

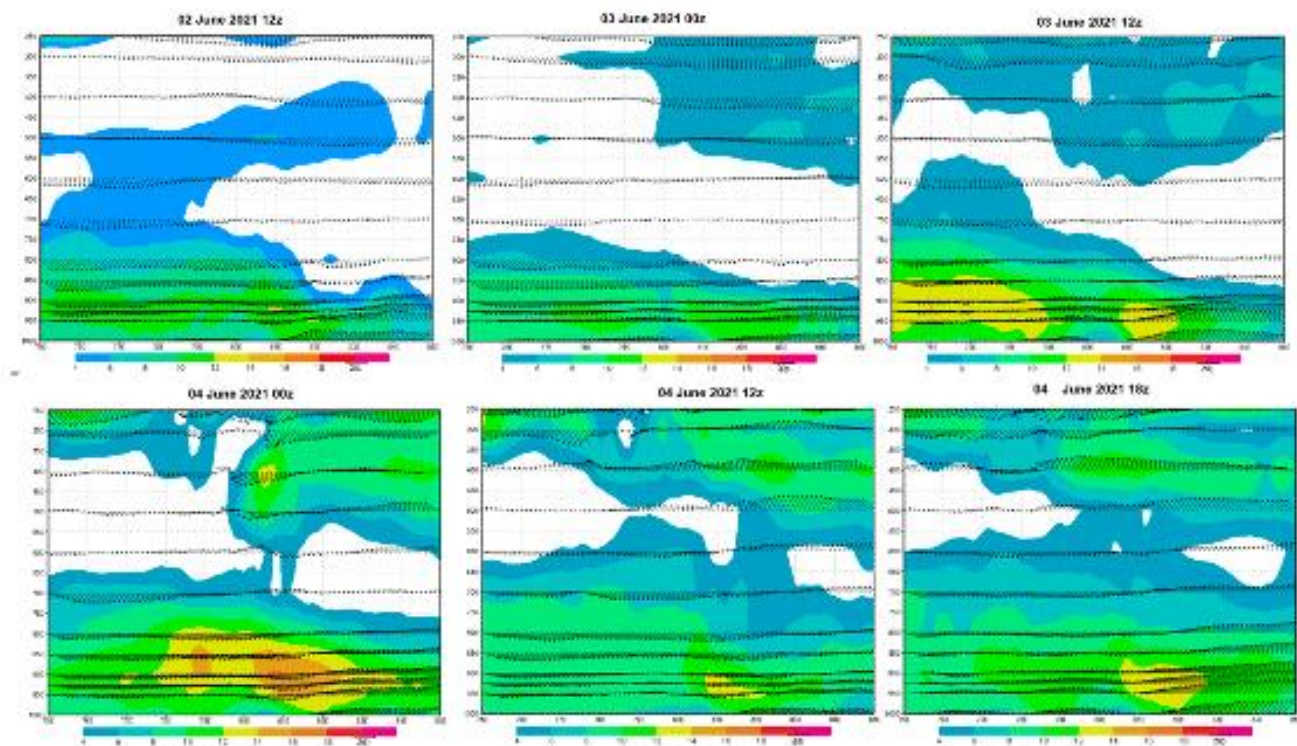


Fig 4 : Vertical cross-section of wind across Sri Lanka (7°N) at 02nd June 12z, 03rd June 00z, 03rd June 12z, 04th June 00z, 04th June 12z and 04th June 18z 2021.

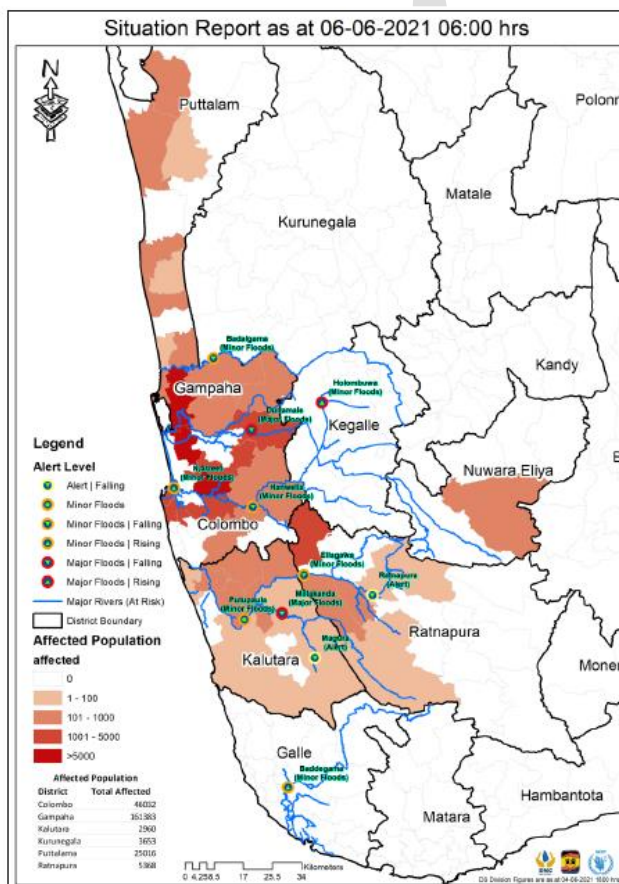


Fig 5. Affected population and area mapping, as of 0930hrs 06.06.2021 (Source : DMC)



Fig 6 : Impacts of extreme weather during 02 - 04 June 2021

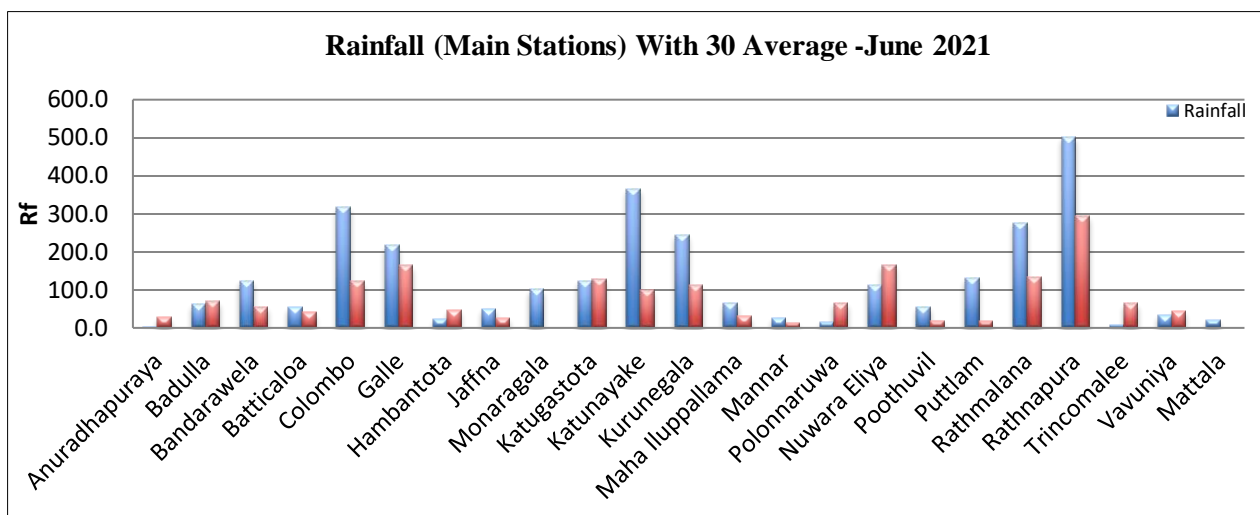


Fig 7: Monthly Total Rainfall(mm) with 30 years (1961-1990) of their averages at Main Meteorological stations areas during June 2021

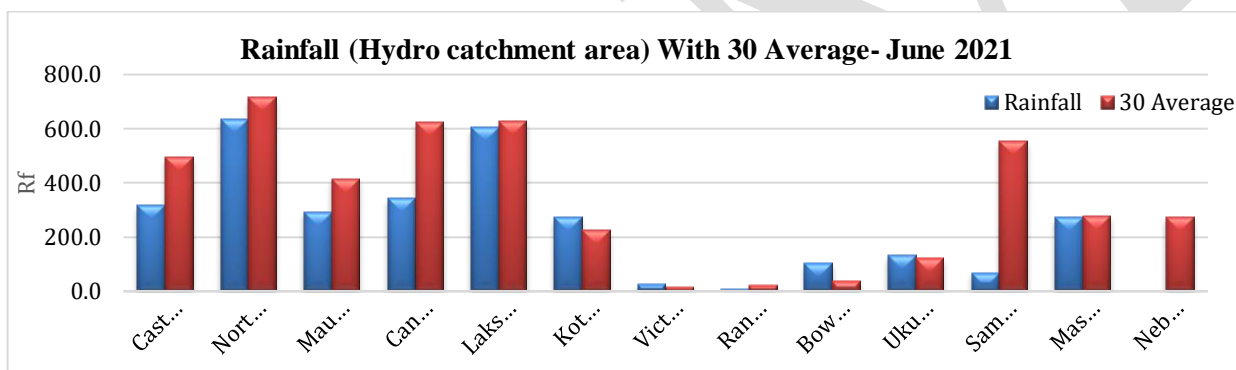


Fig 8: Monthly Total Rainfall(mm) with 30 years (1961-1990) of their averages at Hydro catchment areas during June 2021

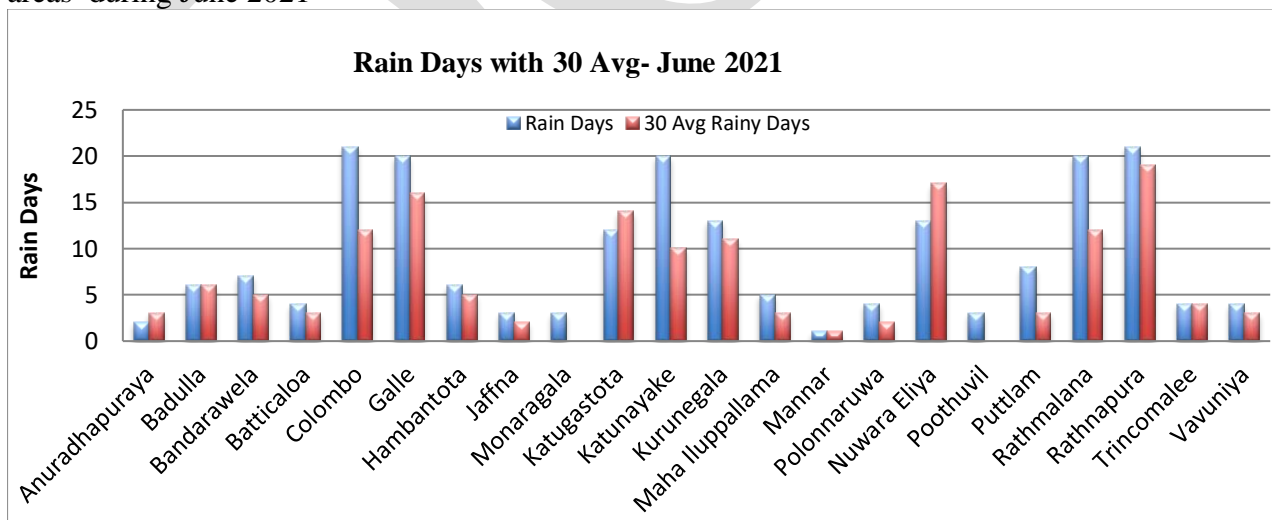


Fig 9: monthly total no of rainy days with 30 years (1961-1990) of their averages at main Meteorological stations during June 2021

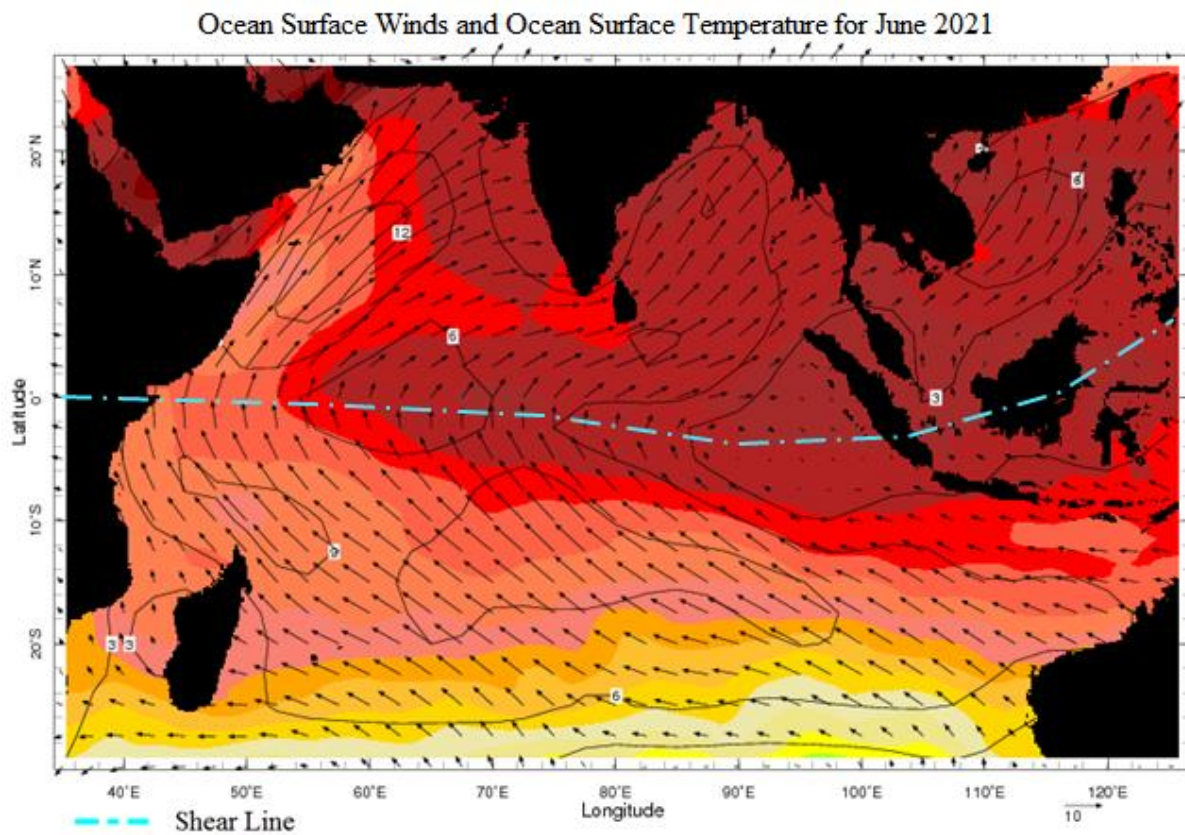


Fig 8: Ocean Surface Winds and Ocean Surface Temperature for June 2021

DATA1 SST sst ANOM lat = -20:30 lon = 40:180 level = 1:1
time = 2021060100:2021060100 ave = 1MO

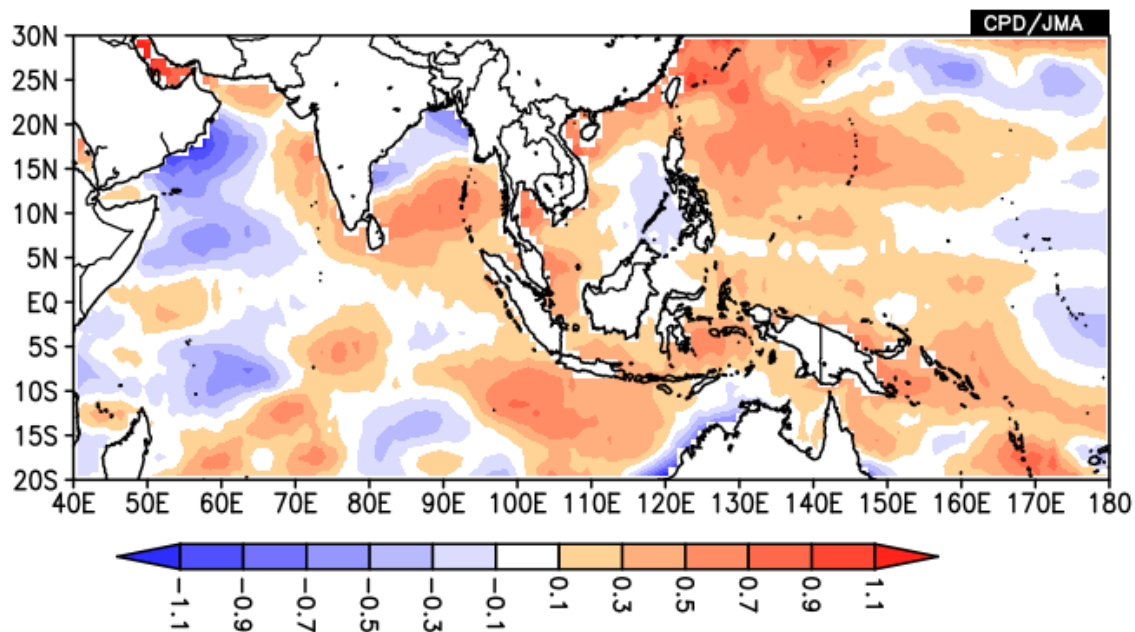
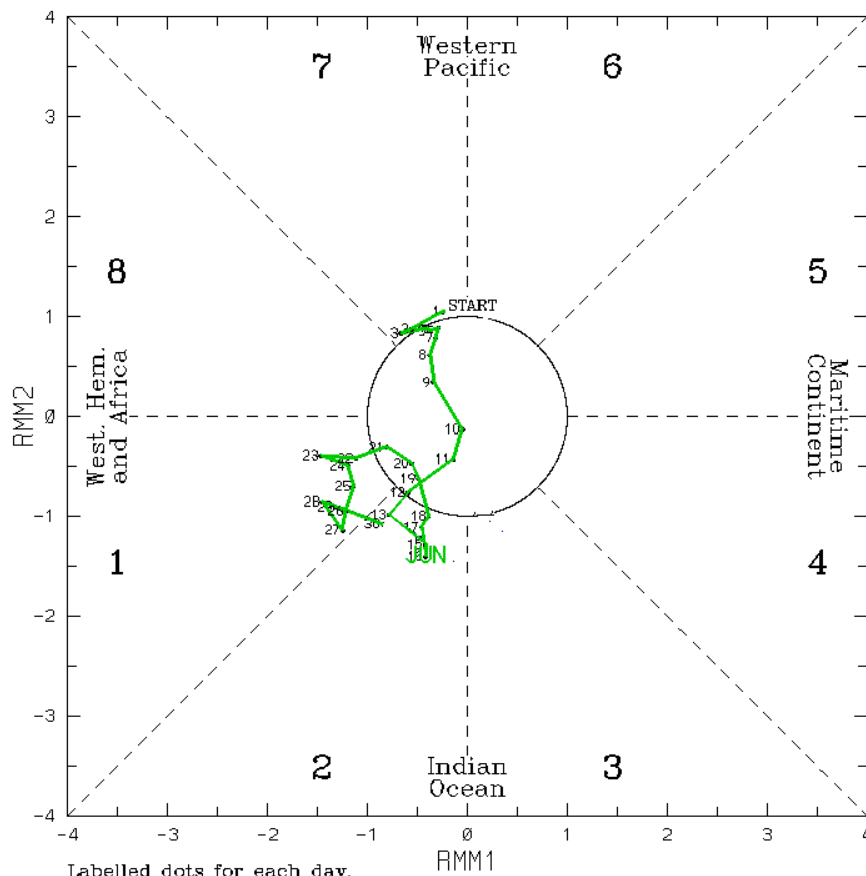


Fig 11: Sea Surface Temperature anomalies for June 2021

(RMM1,RMM2) phase space for 01-Jun-2021 to 30-Jun-2021



Labelled dots for each day.
green line is for Jun.
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2021

Fig 12 : Phase diagram of MJO Index

Surface pressure and winds: The surface pressure was above average from 03 to 08, from 14 to 25, and 27th to 30th. The surface pressure was below average from 01 to 02, from 09 to 13 and 15 and about average on 26th. Southwesterly pressure gradient was mild on 2, on 3, on 06 on 07, on 19, on 21 on 22, on 28, and on 29. The pressure gradient was moderate from 04 to 05, from 08 to 12, on 20, from 23 to 26 while steep pressure gradient was observed on 01st and from 13th to 14th.

The surface wind was from westerly to Southwesterly direction and speed varied within 05-15kts.

Upper winds:

At 850hPa, Westerly wind flow is dominated over the island. Anomalous easterly flow suggest that weakening of monsoon flow at 850mb level (Fig 13) .

At 700 hPa, Westerly wind flow is dominated over the island. Anomalous southeasterly flow suggest that weakening of monsoon flow at 700mb level (Fig 14).

At 500 hPa, Westerly wind flow is dominated over the island. Anomalous southeasterly flow suggest that weakening of monsoon flow at 500mb level (Fig 15). Cyclonic circulation was appear south of Sri Lanka on 04th of June. Easterly wind flow was appeared across Sri Lanka during first week of the month

The 250 hpa the upper tropospheric ridge was laid from 27⁰N 40⁰E to 28⁰N 100⁰E . Tropical easterly jet was appeared in the vicinity of Sri Lanka.

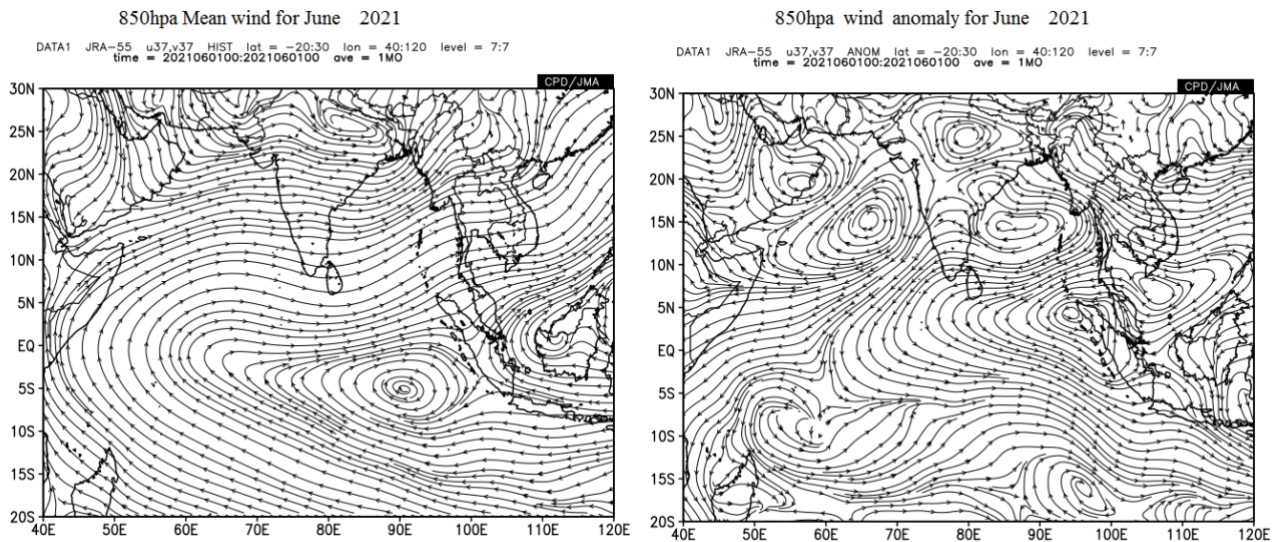


Fig. 13 : Monthly average wind pattern at 850hpa level during the month of June 2021 (JRA55)

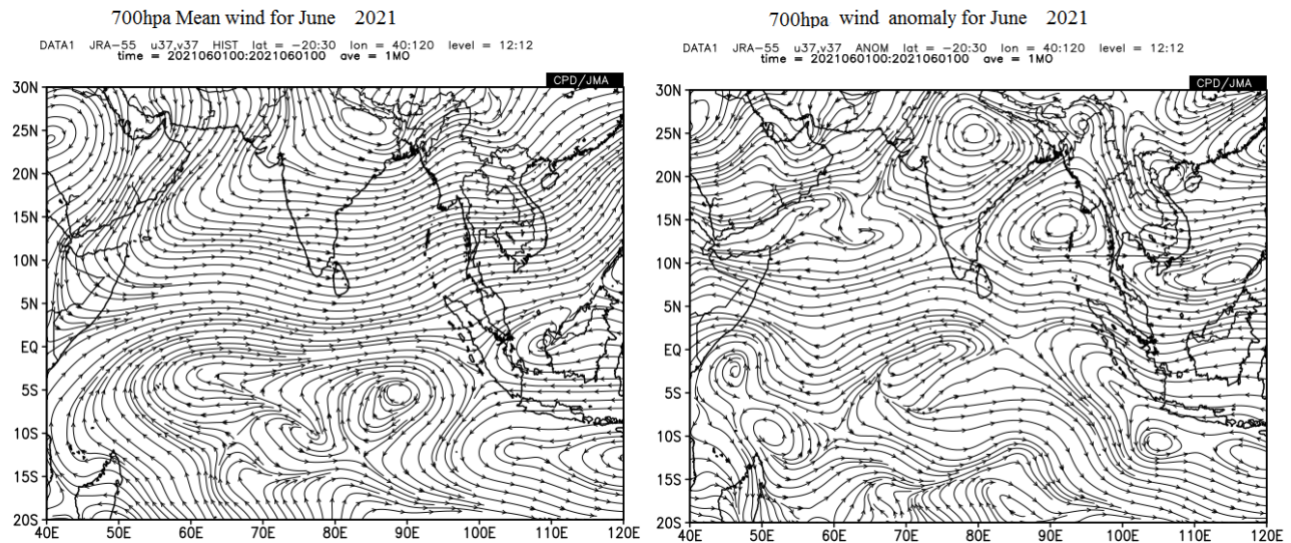


Fig. 14 Monthly average wind pattern at 700hpa level during the month of June 2021 (JRA55)

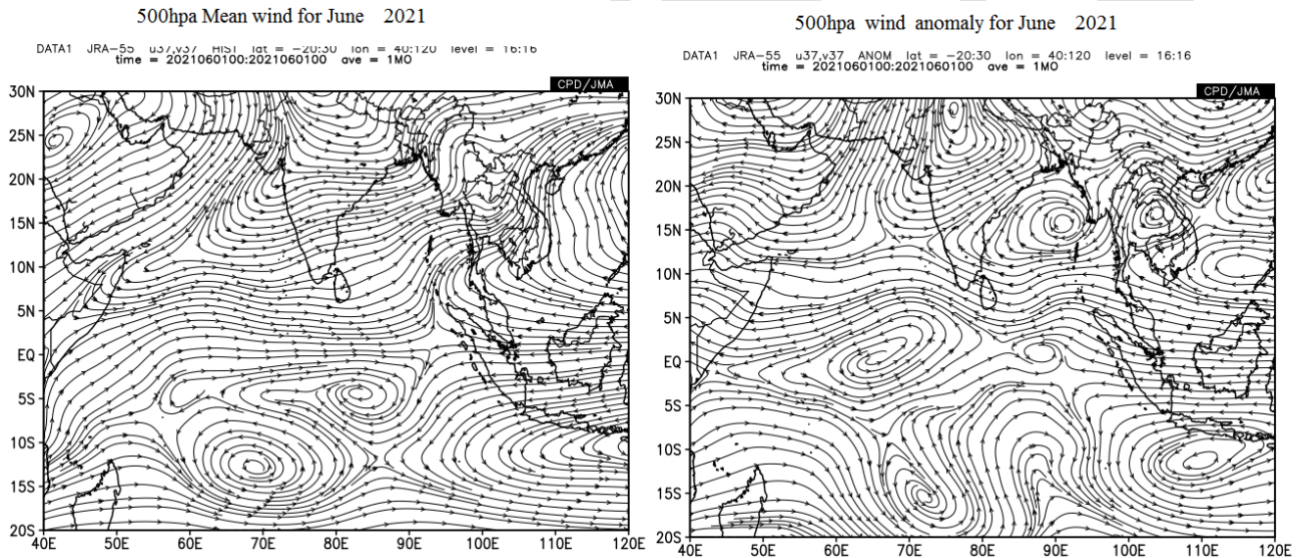


Fig. 15 Monthly average wind pattern at 500hpa level during the month of June 2021 (JRA55)

Temperature Field:

The maximum temperatures in the day were mostly above normal in most places during the month of June 2021. 1-4⁰C above normal day temperatures were experienced in Ratmalana, and NuwaraEliya. However Badulla and Maha Illuppallama reported below average maximum temperatures during most of the days. (Fig.16).

Highest recorded maximum temperature for the month of June 2021 was 37.5⁰C at Batticoloa on 16th (Table4a).

Night minimum temperatures over most parts were abovenormal especially during the second half of the month (Fig 17). However Badulla and Katunayake experienced below average minimum temperatures during most of the month. 2^o to 3^oC above normal night temperatures were reported at Galle and Ratmalana during 2nd and 3rd week of the month. Lowest recorded minimum temperature for the month of June 2021 was 10.7^oC at NuwaraEliya on 21st (Table 4b).

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

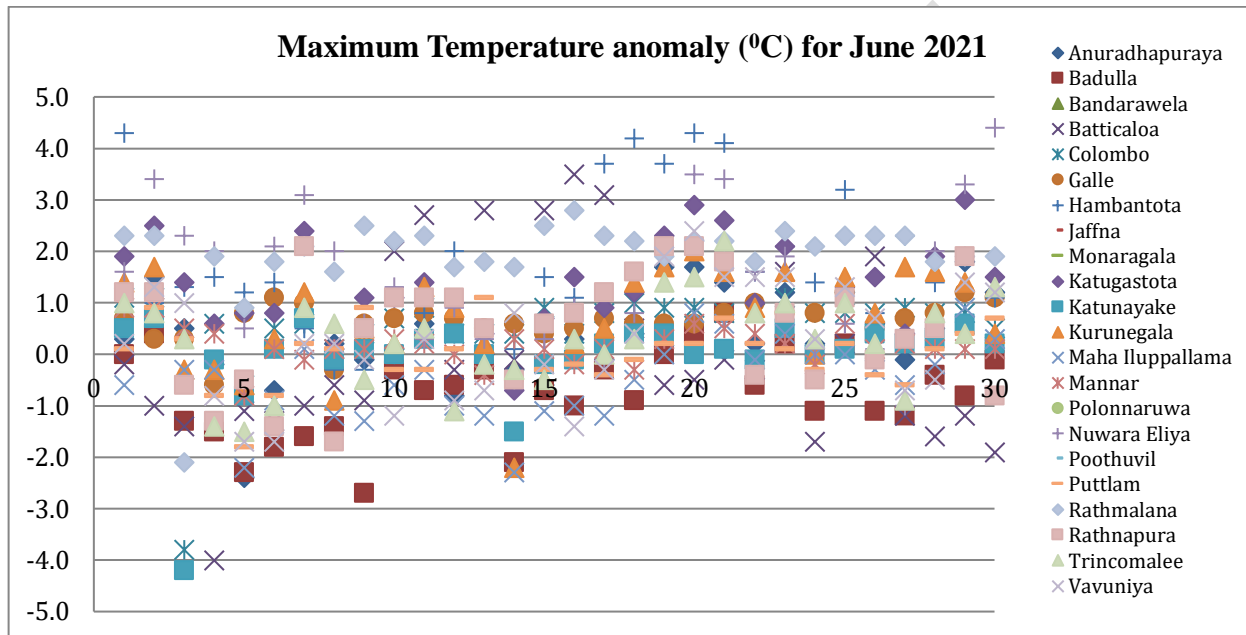


Fig 16 Maximum Temperature anomaly (°C) for June 2021

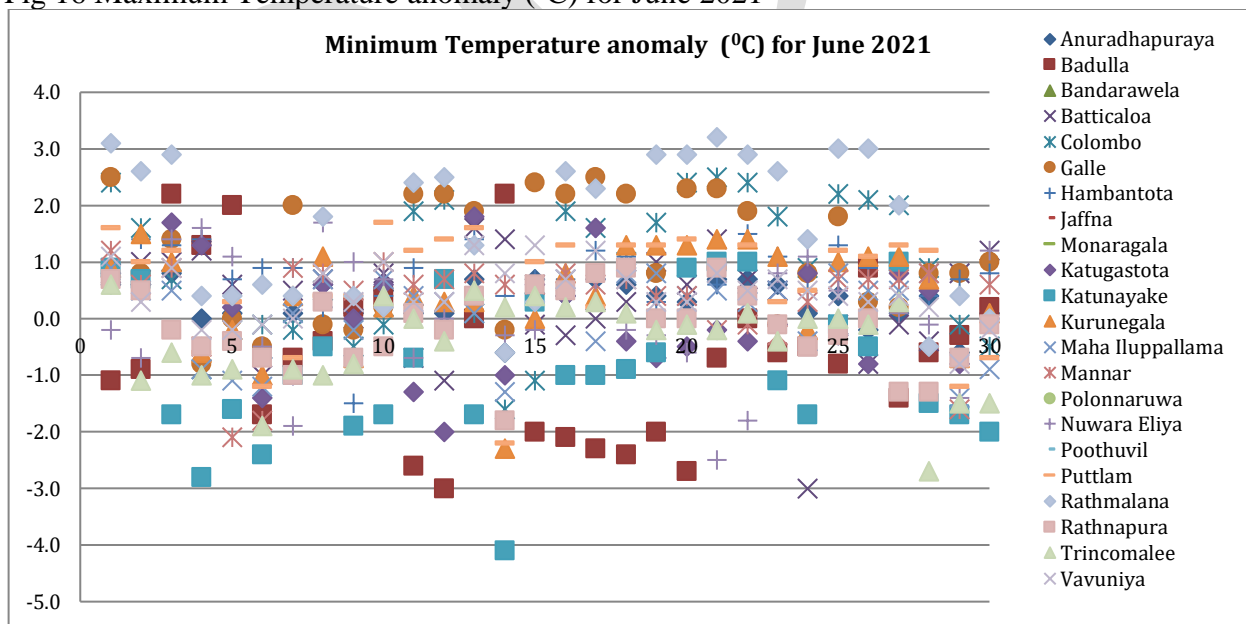


Fig 17 Minimum Temperature anomaly (°C) for June 2021

Above average rainfall was reported from station located at central parts such as Katugastota, and Nuwara Eliya ; at northcentral parts such as Polonnaruwa, Anuradhapuraya, and Vavuniya; Badulla, Hambantota, and Trincomalee stations. Maximum percentage of rainfall (772%) as well as rainy days (266.7%) was reported from Puttalam while minimum from percentage of rainfall (11.1%) as well as rainy days (66.7%) was reported from Anuradhapura station (Table 3). Number of rainy days was about or above average except Katugastota, Nuwara Eliya and Anuradhapura (Fig 9).

Most of the hydro catchment stations located along western slopes of the central hills reported below normal rainfall. However Kotmale, Victoriya, Bowatenna, and Ukuwela stations reported above normal rainfall (Fig 8).

Highest cumulative rainfall was 824.2 mm at Moraliya. Highest rainfall received during 24 hours, was 346.7 mm at Dummalasuriyaa on 03rd June.

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	June 2021	Average	% (percentage of average)
Castlereigh	316.3	495.1	63.9%
Norton	636.8	714.0	89.2%
Maussakele	291.0	415.2	70.1%
Canyon	343.7	623.9	55.1%
Laksapana	602.8	629.3	95.8%
Kotmale	270.5	225.2	120.1%
Victoriya	26.5	15.5	171.0%
Randenigala	9.3	21.1	44.1%
Bowatenna	101.9	38.2	266.8%
Ukuwela	131.3	120.5	109.0%
Samanala Wewa	68.5	554.1	12.4%
Maskeliya	271.7	277.1	98.1%
Neboda		272.6	

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		
	2021-June	Average	%	2021-June	Average	%
Anuradhapuraya	3.0	27.1	11.1%	2	3	66.7%
Badulla	61.5	69.3	88.7%	6	6	100.0%
Bandarawela	123.6	54.7	226.0%	7	5	140.0%
Batticaloa	53.5	41.4	129.2%	4	3	133.3%
Colombo	317.3	121.9	260.3%	21	12	175.0%
Galle	215.4	163.2	132.0%	20	16	125.0%
Hambantota	23.2	45.5	51.0%	6	5	120.0%
Jaffna	50.4	25.1	200.8%	3	2	150.0%
Monaragala	100.5			3		
Katugastota	122.8	128.1	95.9%	12	14	85.7%
Katunayake	365.0	99.2	367.9%	20	10	200.0%
Kurunegala	244.0	111.2	219.4%	13	11	118.2%
MahaIluppallama	65.5	31.0	211.3%	5	3	166.7%
Mannar	25.3	12.4	204.0%	1	1	100.0%
Polonnaruwa	14.1	65.6	21.5%	4	2	200.0%
Nuwara Eliya	111.3	164.9	67.5%	13	17	76.5%
Poothuvil	54.8	18.9	289.9%	3	na	
Puttlam	129.7	16.8	772.0%	8	3	266.7%
Rathmalana	276.5	132.7	208.4%	20	12	166.7%
Rathnapura	501.1	292.8	171.1%	21	19	110.5%
Trincomalee	7.8	63.8	12.2%	4	4	100.0%
Vavuniya	33.1	43.5	76.1%	4	3	133.3%
Mattala	19.7			2		

Table 4(a) - Extremes of Maximum Temperatures				June	2021
	Maximum		Highest Std.Div		
	Value	Offsets		(-)	(+)
Value	37.5°C	4.2		4.4	1.78
Station	Batticaloa	Katunayake		NuwaraEliya	Batticaloa
Date	16/06/2021	03/06/2021		30/06/2021	
Table 4(b) -Extremes of Minimum Temperature June2021					
	Minimum		Highest Std.Div		
	Value	Offsets		(-)	(+)
Value	10.7°C	4.1		3.2	1.46
Station	NuwaraEliya	Katunayake		Ratmalana	Badulla
Date	21/06/2021	14/06/2021		21-06-2021	

Prepared by National Meteorological Centre (NMC)
Department of Meteorology

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