Weather Synopsis –October 2020.

Below normal rainfall was reported at most of the principal meteorological stations except Batticoloa where about normal rainfall was reported for month of October (Fig 1).

Some of the hydro catchment stations located along western slopes of the central hills such as Castlereigh, Norton, Canyon and Kothmale reported about normal rainfall. Rest of the hydro catchment stations reported below normal rainfall. Hydro catchment stations located along eastern slopes of the central hills received significantly below normal rainfall.

Highest cumulative rainfall was 538.5 mm at Norton . Highest rainfall received during 24hours, was 127mm at Minneriya on 06th October.

South-westerly wind flow dominated across the island during the month. Showery conditions were enhanced over the southwest quarter with isolated fairly heavy falls during the second week of the month. Afternoon thundershowers were reported from northern and northcentral provinces on 06th, 08th 17th , 18th and 19th October. Isolated afternoon thunderstorms occurred at Eastern and Uva provinces 25, 29and 30th October. Afternoon convective showers were enhanced especially over the north-western, north-central and south-eastern parts from 26th to 28th October with the formation of northeast-southwest oriented trough across Sri Lanka at low levels.

According to Disaster Management Center (DMC),three deaths, (one death at Kanthale on 27th and two deaths at Thirukkovil on 30th) were reported due to lightning. Several families were affected by strong winds and heavy rain during October 2020 (Table 3**).**

Above averageday temperatures were experienced during the month.Night minimum temperatures over most parts were above normal.

Reported maximum temperature was 38.1^{0}C at Vavuniya on 05thand reported minimum temperature was 8.8^{0}C at Nuwara Eliya on 06th

La Nina conditions were observed during Month of October 2020. Ocean Nino Index is -1and -1.2 duringAugust-September-Octoberand September-October-November (NOAA Climate prediction Center). Neutral IOD was observed during October 2020 (BoM, Australia). Slightly cooler Sea surface waters can be seen to the west of Sri Lanka (Fig. 5)

The average position of the shear line was laid between 02^0N 50^0E, 02^0S 80^0E and 04^0N120^0E (Fig 4). It was fluctuated about 2^0 north and south of average position.

Strong Madden-Julian Oscillation (MJO) was at phase 5during first three weeks, and propagated to phase 6 and 7 during the last week of October (Fig.6).

Weather Systems

October and November are the most vulnerable months for formation of Cyclonic disturbances over the north India Ocean (NIO). In October 2020, a total of 3 Depressions formed over NIO. Out of these 3 systems (1 Deep Depression & 2 Depressions) formed over NIO, 1 formed over the Arabian Sea and 2 (one Deep Depression & one Depression) formed over the Bay of Bengal (BoB).

Deep Depression over Bay of Bengal (11-14 Oct 2020)

A low pressure area has formed over north Andaman Sea on 9th October 2020 and intensified into a well marked low pressure area over east-central BoB and adjoining north Andaman Sea on 10th October. It has concentrated into a Depression over west-central BoB on 11th October; further intensified into Deep Depression on 12th October and crossed north Andhra Pradesh coast near latitude 17.0°N & longitude 82.4° E on 13th October 2020(Source : India Meteorological Department) .

Depression over Arabian Sea (17-19 Oct 2020)

The remnant of Deep Depression over westcentral BoB emerged into eastcentral Arabian Sea as a well marked low pressure area on 16th October . It has intensified into a depression on 17th morning and

weakened into a well marked low pressure area on 19th October(Source : India Meteorological Department) .

Depression over Bay of Bengal (BoB) 22-24 Oct 2020

A low-pressure area formed over central BoB on 20thOctober, 2020. It was intensified into a well marked low pressure area over west-central BoB on 21st October and then into a Depression over west-central BoB on 22nd October, 2020 and crossed West Bengal & adjoining Bangladesh coasts near latitude 21.8°N and longitude 88.5°E on 23rd October 2020(Source : India Meteorological Department) .

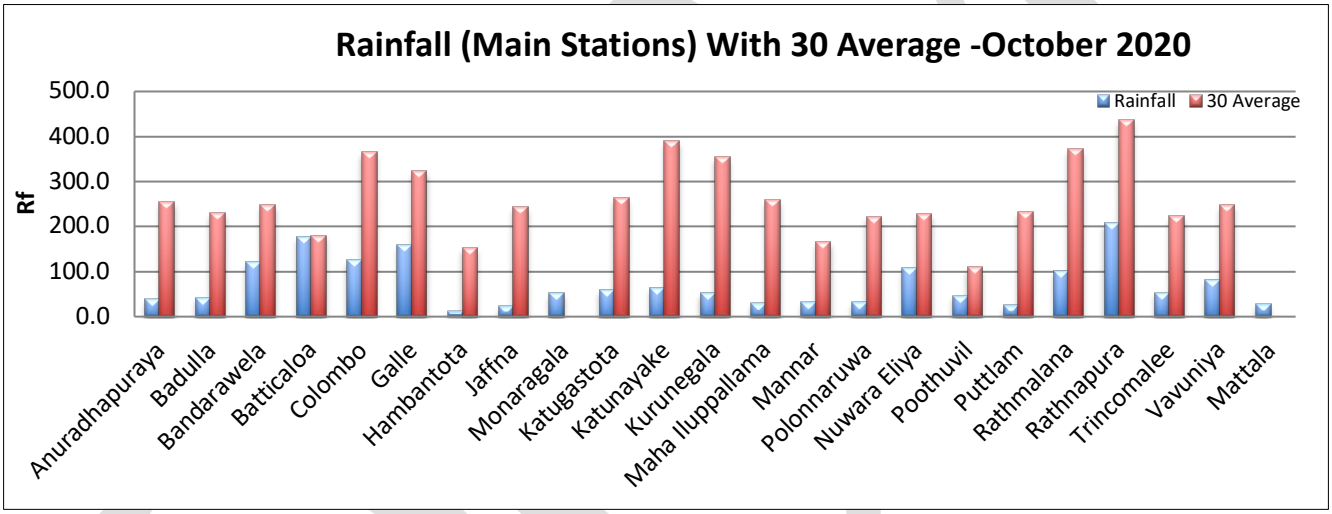

Fig 1: Monthly Total Rainfall (mm) with 30 years (1961-1990) of their averages at Main Meteorological stations areas during October 2020.

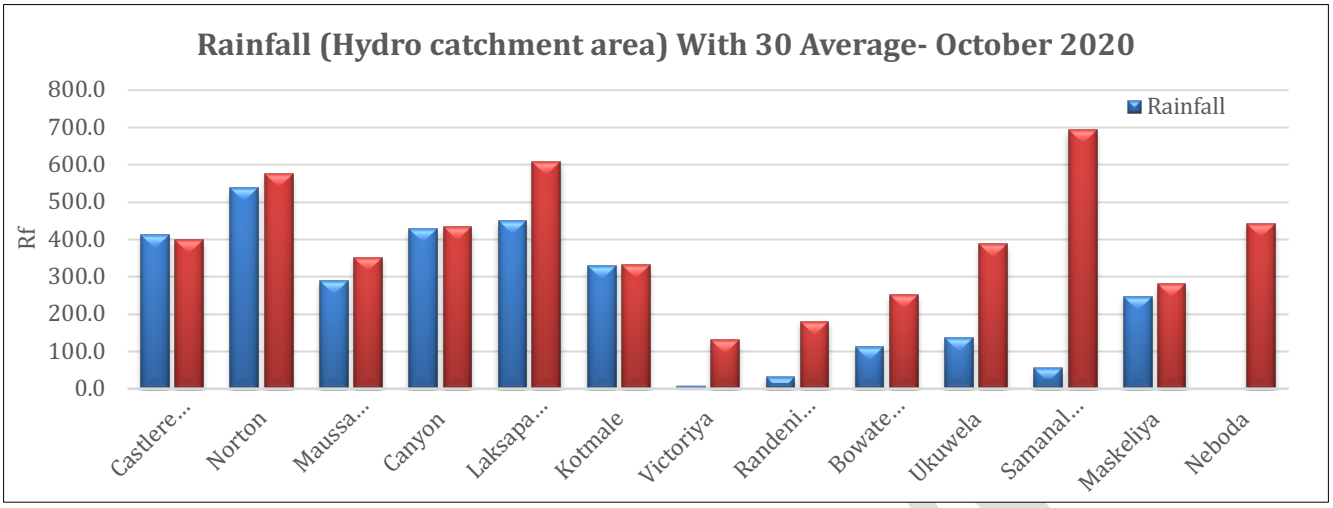

Fig 2: Monthly Total Rainfall(mm) with 30 years (1961-1990) of their averages at Hydro catchment areas during October 2020

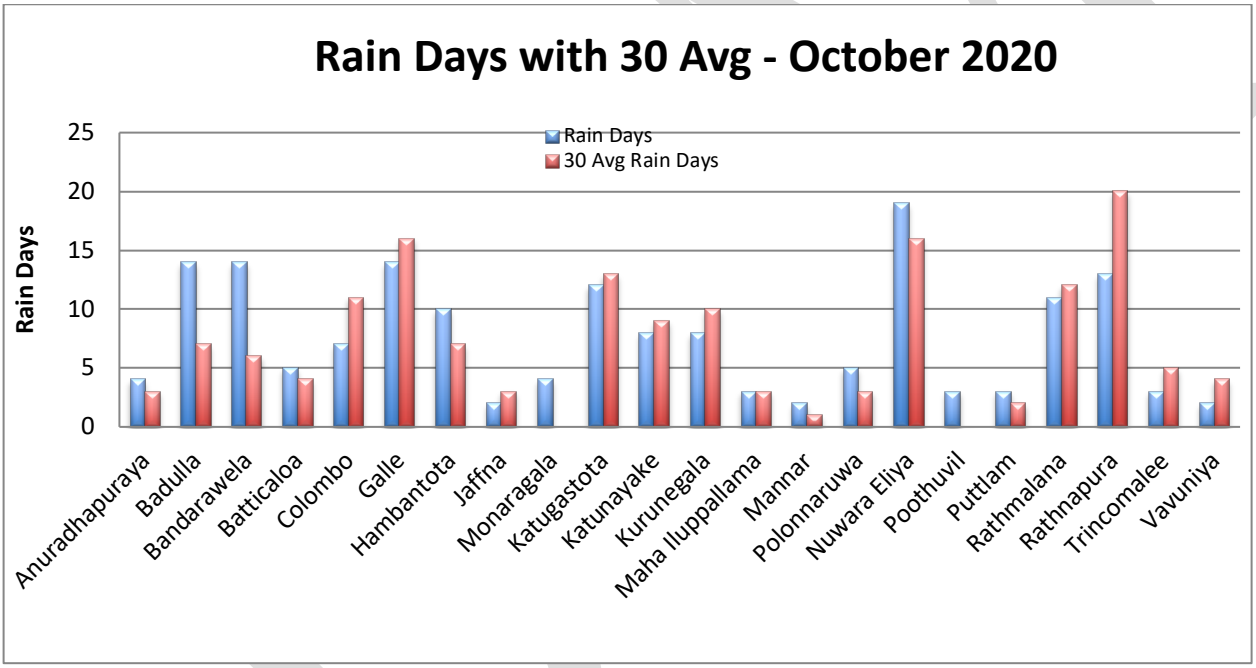

Fig 3: monthly total no of rainy days with 30 years (1961-1990) of their averages at main Meteorological stations during October 2020

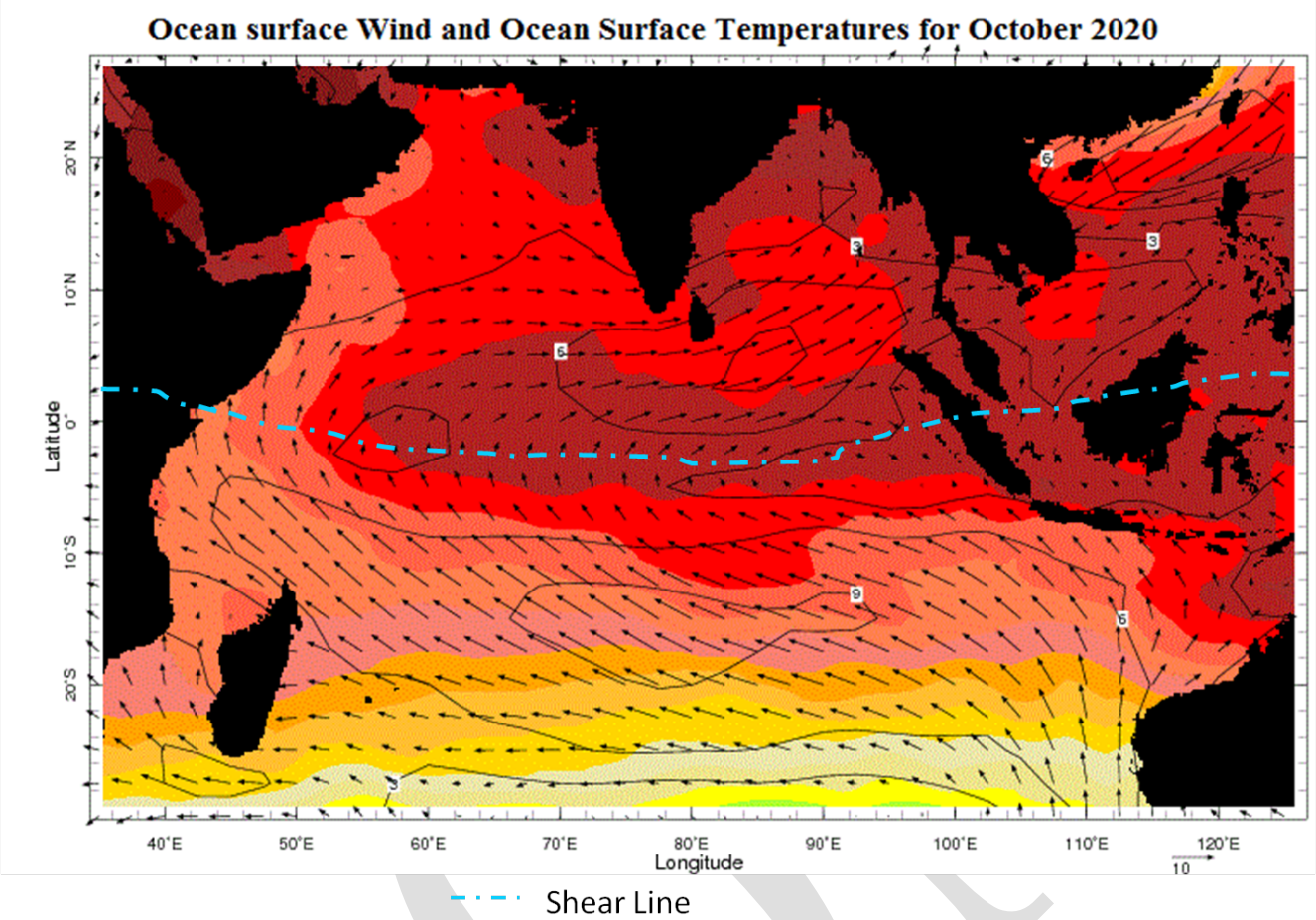

Fig 4: Ocean Surface Winds and Ocean Surface Temperature for October 2020

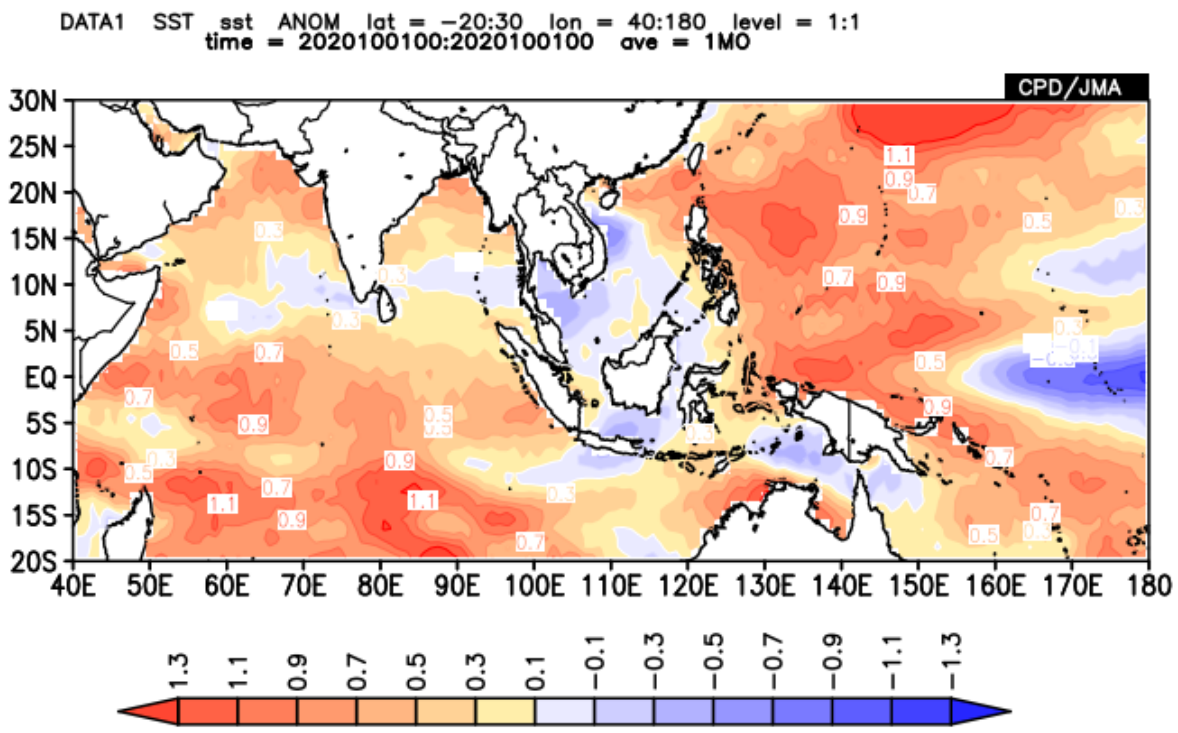

Fig 5: Sea Surface Temperature anomalies for October 2020

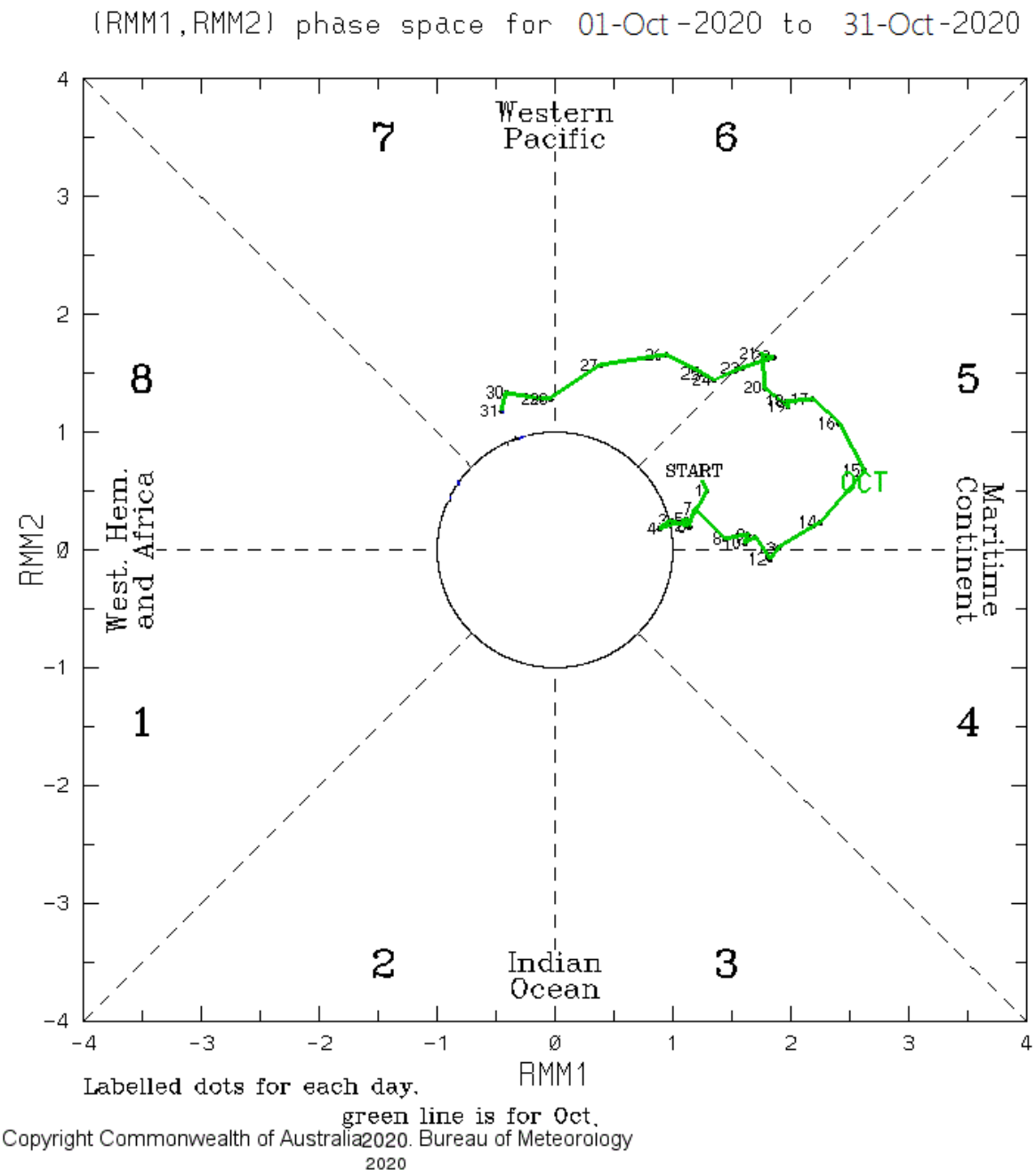

Fig 6: Phase diagram of MJO Index

Surface pressure and winds: The surface pressure was about or below average except 03, 05th , 08th , 09th , and 26th when it was above average. South-westerly pressure gradient was mild on 06th , 18th , 26th,and 31st; moderate from 01st to 05th, 07th to 12th, 16th, 19th to 25th; and steep on 13th to 15th. Pressure distribution was fairly even from 27th to 30th.

The surface wind was from westerly to southwesterly direction and speed varied within 05-15kts till 25th. The surface wind was calm and variable in direction from 26th to 31st.

Upper winds:

At 850hPa, Westerly wind flow is dominated over the island. Anomalous north-westerly to westerly wind appeared over Sri Lanka at 850mb level suggested the enhancement of westerly wind flow across the island (Fig 7).

At 700 hPa, North-westerly wind flow is dominated over the island with anomalous north-westerly wind flow over Sri Lanka at at700mb level (Fig 8).

At 500 hPa, North-westerly wind flow is dominated over the island with anomalous north-westerly wind flow over Sri Lanka at at 500mb level.

The 200 hpa the upper tropospheric ridge was laid about 19^0N40^0E , 20^0N 70^0E , to 22^0N100^0E . Tropical easterly jet was appeared in the vicinity of Sri Lanka.

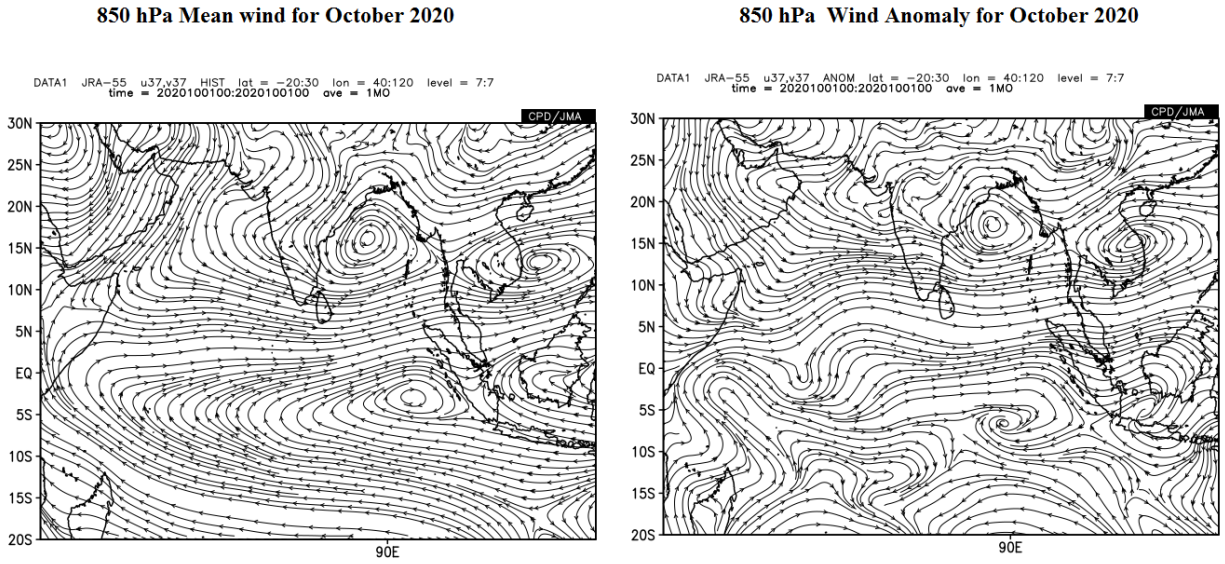

Fig. 7 Monthly average wind pattern at 850hpa level during the month of October2020 (JRA55)

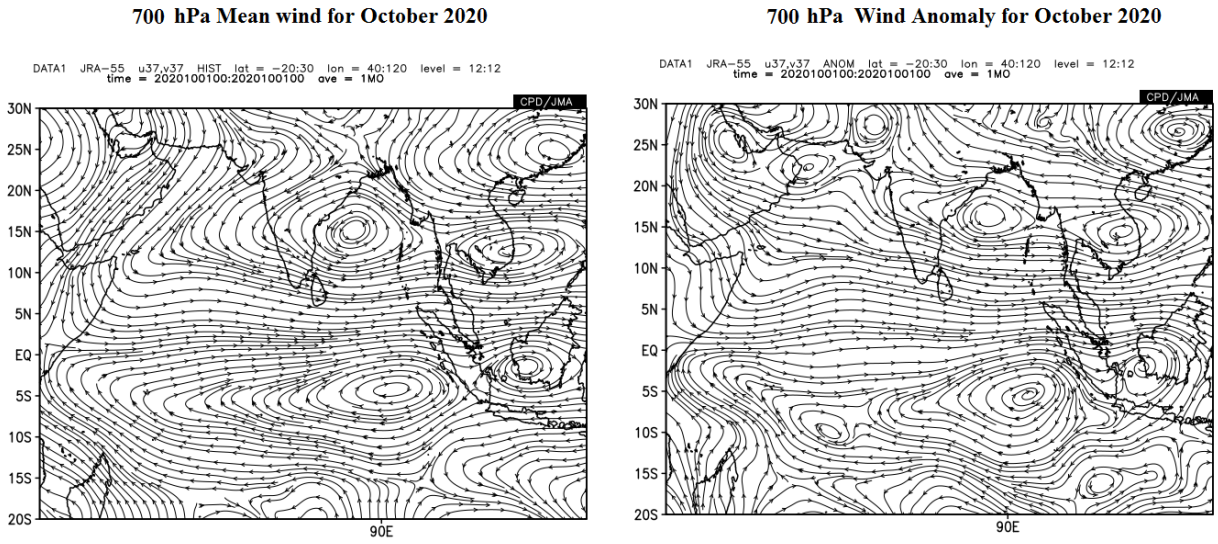

Fig. 8Monthly average wind pattern at 700hpa level during the month of October2020 (JRA55)

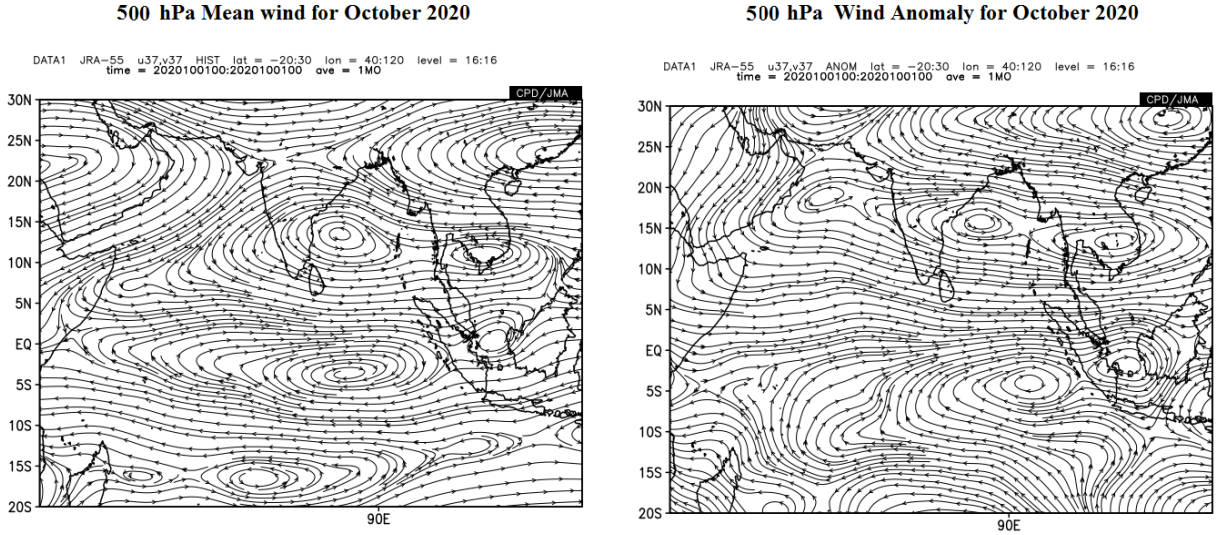

Fig. 9Monthly average wind pattern at 500hpa level during the month of October2020 (JRA55)

Temperature Field:

The maximum temperatures in the day were mostly above normal in most places during the month of October 2020.Day temperatures were considerably above normal at Batticoloa from 02nd to 04th, from 11th to 16th , on 20th and 23rd . Well below normal day temperatures were reported from NuwaraEliya from 11th to 15th (Fig.10). Highest recorded maximum temperature for the month of October 2020 was 38.1 ^{0}C at Vavuniya on 05th (Table4a).

Night minimum temperatures over most parts were above normal during the month of October 2020 (Fig 11). Night temperatures were appreciably above normal at Ratmalana from 2nd to 3rd , from 5th to 7th , from 12th to 13th , from 19th to 21st and on 24th . However Badulla reported appreciably below average minimum temperatures on 05th, 06th, and 17th. Lowest recorded minimum temperature for the month of October 2020 was 8.8^{0}C at Nuwara Eliya on 06th (Table 4b).

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

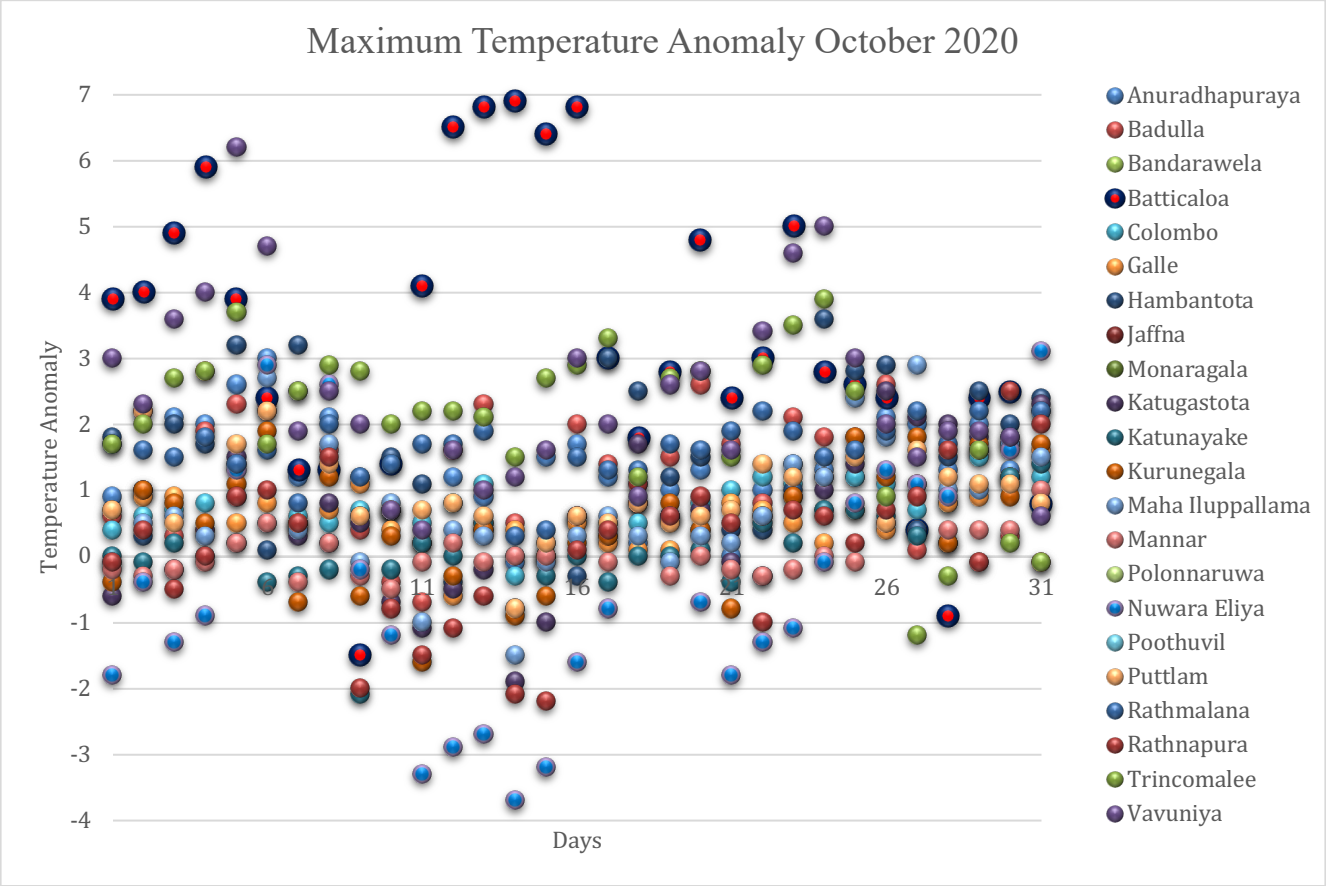

Fig 10. Maximum Temperature anomaly (^{0}C) for October 2020

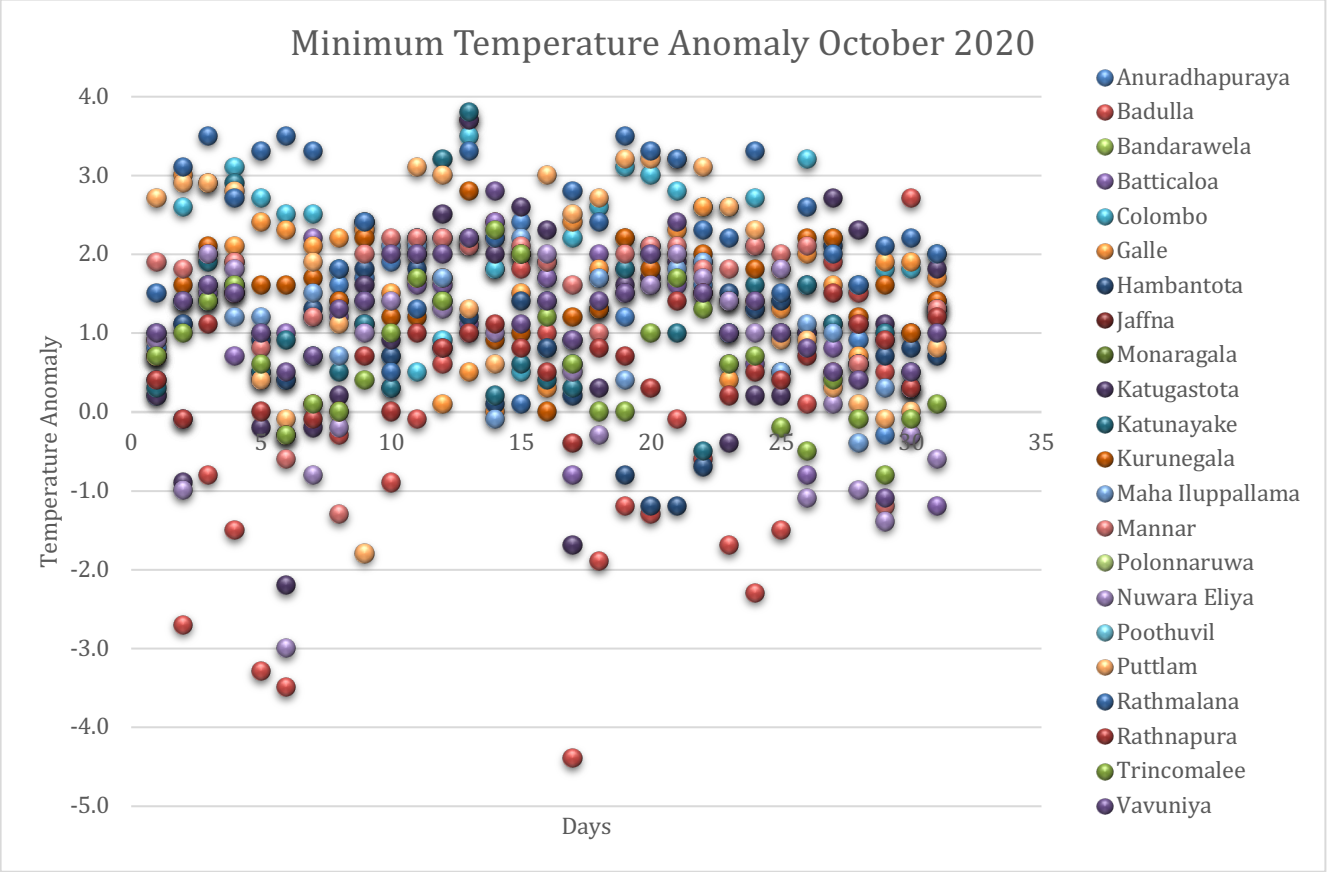

Fig 11 Minimum Temperature anomaly (^{0}C) for October 2020

Below average rainfall was reported from most of the main meteorological stations. Maximum percentage was reported from Batticaloa (98.6%) while minimum from Hambantota station (7.7%) (Table 2).

Most of the hydro catchment stations reported about or below normal rainfall. Hydro catchment stations located along eastern slopes of the central hills such as Victoria, Randenigala, Bowatenna, Samanalawewa and Ukuwela reported significantly below normal rainfall (Fig 2).

Highest cumulative rainfall was 538.5mm at Norton.Highest rainfall received during 24hours, was 127mm at Minneriya on 06th October.

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 1 and 2.

Table-01- total rainfall and the number of rain days at the principal meteorological stations recorded in the month against the respective averages (1961-1990).

	Monthly Total rainfall(mm)			Monthly Total No of rainy Days		
Meteorological station	2020-Oct	Average	%	2020-Oct	Average	%
Anuradhapuraya	39.3	254.5	15.4%	4	14	28.6%
Badulla	41.4	230.4	18.0%	6	15	40.0%
Bandarawela	121.4	247.3	49.1%	8	15	53.3%
Batticaloa	177.4	180.0	98.6%	7	11	63.6%
Colombo	125.6	365.4	34.4%	11	17	64.7%
Galle	160.2	322.7	49.6%	13	18	72.2%
Hambantota	11.7	152.2	7.7%	5	10	50.0%
Jaffna	23.3	242.8	9.6%	4	12	33.3%
Monaragala	52.4			6		
Katugastota	59.5	263.7	22.6%	10	17	58.8%
Katunayake	63.5	389.7	16.3%	10	18	55.6%
Kurunegala	52.4	354.4	14.8%	10	17	58.8%
Maha Iluppallama	29.0	258.1	11.2%	6	14	42.9%
Mannar	32.1	166.2	19.3%	5	10	50.0%
Polonnaruwa	32.0	220.4	14.5%	6	10	60.0%
Nuwara Eliya	107.5	226.8	47.4%	11	18	61.1%
Pothuvil	46.2	109.6	42.2%	7		
Puttlam	24.4	232.1	10.5%	4	13	30.8%
Rathmalana	100.1	371.4	27.0%	14	18	77.8%
Rathnapura	207.4	436.8	47.5%	17	21	81.0%
Trincomalee	53.4	222.1	24.0%	6	12	50.0%
Vavuniya	81.0	248.4	32.6%	8	15	53.3%
Mattala	27.7			7		

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

Hydro Catchment	October 2020	Average	% (percentage of average)
Castlereigh	411.8	396.9	103.8%
Norton	538.5	575.4	93.6%
Maussakele	288.2	351.1	82.1%
Canyon	427.0	433.0	98.6%
Laksapana	450.2	608.0	74.0%
Kotmale	329.4	330.6	99.6%
Victoriya	6.3	129.3	4.9%
Randenigala	31.6	179.5	17.6%
Bowatenna	111.7	250.8	44.5%
Ukuwela	134.6	387.3	34.8%
Samanala Wewa	54.5	692.4	7.9%
Maskeliya	246.6	280.6	87.9%
Neboda		442.7	

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

Table 3 hazards caused during October 2020

Date	Lightning	Strong Winds and Heavy Rain	Cutting failure
01		Galigamuwa	
02		EllaKatuwanaMawanelle	
03		Warakapola Kanthale	
04		Beliatta	
05		Passara Haldummulle Katuwana	
06			
07		Ambalanthota	
08		Aranayaka	
09		YatinuwaraPoojapitiya	
10		SoranathotaRuwanwella	
11		Eravurpattu, ChenkaladyElpitiya Dehiowita Aranayaka Yatiyanthota Harispattuwa Deltota Mawanella RuwanwellaDeraniyagala	
12		Balangoda Pasbagekorale Balangoda Warakapola Porathivupattu, Vellavely Udapalatha , Welivita – Divithura Pasbage Korale Kundasale Welimada	
13		MinipeKundasale Vavuniya North	
14		Siyambalanduwa Harispaththuwa Kundasale Ruwanwella Warakapola Aranayake Rambukkana Kegalle Imbulpe GaligamuwaVavuniya Vavuniya South Beliatta Vengalacheddikulam Gagawatakoralaya Hatharaliyadda Paathahewaheta Angunukolapelessa	
15	Yatiyanthota	Harispaththuwa Udunuwara Pujapitiya Medadumbara Hambanthota Koralaipattu Valaichenai Koralaipattu North Vaharai Seruwila Bulathkohupitiya Mawanella Yatiyanthota	
16	Oddusuddan (lightning)	Udunuwara Medadumbara Pasbagekorale Udapalatha Ududumbara Kanthale Kinniya	
17		Medadumbara Thumpane Pasbagekorale Udapalatha Ududumbara	
18		Yatinuwara	
19		Maritimepattu	
22		Dimbulagala	
23		Weerakatiya Welimada	
26		Kanthale	
27	Kanthale (Lightning) Sandilippay (high Tide)		
28	Sandilippay (High Tide)	Morawewa Walikanda	
29	Jaffna (High Tide)		
30	Thirukkovil (Lightning)	Thirukkovil	

Table 4(a) - Extremes of Maximum Temperatures October 2020				
	Maximum			
	Value	Offsets (-)	Offsets (+)	Highest Std.Div
Value	38.1C	3.7	6.9	2.2
Station	Vavunia	NuwaraEliya	Batticoloa	Batticoloa
Date	05/10	14/10	14/10	

Table 4(b) -Extremes of Minimum Temperature October 2020				
	Minimum			
	Value	Offsets (-)	Offsets (+)	Highest Std.Div
Value	8.8C	4.4	3.8	1.97
Station	NuwaraEliya	Badulla	Katunayake	Badulla
Date	06/10	17/10	13/10	

Prepared by National Meteorological Centre (NMC)

Department of Meteorology