

# Weather Synopsis –November 2022.

Below or about normal rainfall was reported at most of the principal meteorological stations except Badulla, Bandarawela, Batticaloa and Hambantota for month of November (Fig 4). Further below normal rainy days were reported from most of the principal meteorological stations except Batticaloa and Polonnaruwa (Fig 6).

Below normal rainfall was reported from most of the hydro catchment stations except Ukuwela where above normal rainfall was reported (Fig 5).

Highest cumulative rainfall was 948.5 mm at Handapanagala. Highest rainfall received during 24hours, was 260mm at Handapanagala on 27<sup>th</sup> November.

High lightning density was reported from Manthai, Musali, Vanathavilluva, Nochiyagama, Karuwalagasweva, Kahatagasdigiliya, Madirigiriya, Thamankaduwa, Dimbulagala, Dehiaththakandiya, Mahiyangana, Uhana, Siyambalaanduwa, Thanamalwila, Thissamaharama, Angunukolapalassa, Walallawita, Niyagama, and Nagoda (Fig 3).

Presence of the near equatorial shear zone across Sri Lanka during first two weeks provided positive low level convergence to trigger isolated heavy falls during first two weeks of the month. According to Disaster Management Centre, 10 deaths were reported while 1027 Families, and 3618 people were affected by the extreme weather events occurred during first two weeks of November. Further one house was fully damaged , 224 houses were partly damaged and 1 small and medium enterprises were affected.

Shear zone shifted to the south of Sri Lanka bringing dry northerly flow over Sri Lanka from 17<sup>th</sup> to 25<sup>th</sup> resulting mainly fair weather over most parts of the island .

Thunderstorm activity over southern and southwestern parts of the country was reported from 27<sup>th</sup> to 29<sup>th</sup> .

The maximum temperatures as well as minimum temperatures were mostly above normal in most places during the month of November 2022. However below normal maximum temperatures were reported at some places on 01<sup>st</sup> , on 09<sup>th</sup> , on 11<sup>th</sup> and on 19<sup>th</sup> . Below average minimum temperatures were reported at some places on 18<sup>th</sup> , 21<sup>st</sup> , 24<sup>th</sup> and 30<sup>th</sup> . The highest recorded maximum temperature was 34.6<sup>0</sup>C at Ratnapura on 02<sup>nd</sup> and the lowest recorded minimum temperature was 8.5 <sup>0</sup>C at Nuwara Eliya on 25<sup>th</sup> for the month of November 2022.



Fig 1: Lightning density map for November 2022

Table 1 stations received above 100mm rainfall during November 2022

Date	Station	24 hour Rainfall (mm)
01 <sup>st</sup> November 2022	<b>Batalagoda</b>	<b>104.5</b>
01 <sup>st</sup> November 2022	<b>SL NAVY TCO</b>	<b>110.7</b>
02 <sup>nd</sup> November 2022	<b>Norochcholai</b>	<b>132.0</b>
03 <sup>rd</sup> November 2022	<b>ALAMPIL</b>	<b>145.2</b>
04 <sup>th</sup> November 2022	<b>Wagolla</b>	<b>123.8</b>
04 <sup>th</sup> November 2022	<b>Dodangaslanda</b>	<b>108.0</b>
05 <sup>th</sup> November 2022	<b>Mattla</b>	<b>116.0</b>
05 <sup>th</sup> November 2022	<b>ILLUKKUCHCHANAI</b>	<b>100.1</b>
05 <sup>th</sup> November 2022	<b>Handapanagala</b>	<b>190.0</b>
06 <sup>th</sup> November 2022	<b>PODDIWELA FARM</b>	<b>106.8</b>
06 <sup>th</sup> November 2022	<b>Hiniduma</b>	<b>141.5</b>
07 <sup>th</sup> November 2022	<b>Kalatuwawa</b>	<b>133.0</b>
07 <sup>th</sup> November 2022	<b>Deniyaya</b>	<b>105.0</b>
07 <sup>th</sup> November 2022	<b>Elston</b>	<b>102.0</b>
08 <sup>th</sup> November 2022	<b>Colombo Fort</b>	<b>118.4</b>

09 <sup>th</sup> November 2022	<b>Deniyaya</b>	<b>132.5</b>
10 <sup>th</sup> November 2022	<b>Chavakachcheri</b>	<b>135.0</b>
10 <sup>th</sup> November 2022	<b>Elephant pass</b>	<b>143.5</b>
10 <sup>th</sup> November 2022	<b>Jaffna</b>	<b>108.8</b>
10 <sup>th</sup> November 2022	<b>ACHCHIWELI</b>	<b>130.0</b>
10 <sup>th</sup> November 2022	<b>PEDURUTUDUWA</b>	<b>150.7</b>
13 <sup>th</sup> November 2022	<b>Mattla</b>	<b>116.2</b>
13 <sup>th</sup> November 2022	<b>Handapanagala</b>	<b>165.0</b>
14 <sup>th</sup> November 2022	<b>Guruluwana</b>	<b>134.5</b>
14 <sup>th</sup> November 2022	<b>Karagala</b>	<b>110.0</b>
14 <sup>th</sup> November 2022	<b>Angoda</b>	<b>118.5</b>
14 <sup>th</sup> November 2022	<b>Rathnapura</b>	<b>133.9</b>
14 <sup>th</sup> November 2022	<b>Hanwella</b>	<b>147.2</b>
14 <sup>th</sup> November 2022	<b>Vincit Estate</b>	<b>116.0</b>
14 <sup>th</sup> November 2022	<b>Colombo</b>	<b>124.9</b>
14 <sup>th</sup> November 2022	<b>Moralioya</b>	<b>119.8</b>
14 <sup>th</sup> November 2022	<b>Weweltalawa</b>	<b>180.0</b>
26 <sup>th</sup> November 2022	<b>NAGADEEPA</b>	<b>124.0</b>
26 <sup>th</sup> November 2022	<b>Handapanagala</b>	<b>195.0</b>
27 <sup>th</sup> November 2022	<b>Handapanagala</b>	<b>260.0</b>

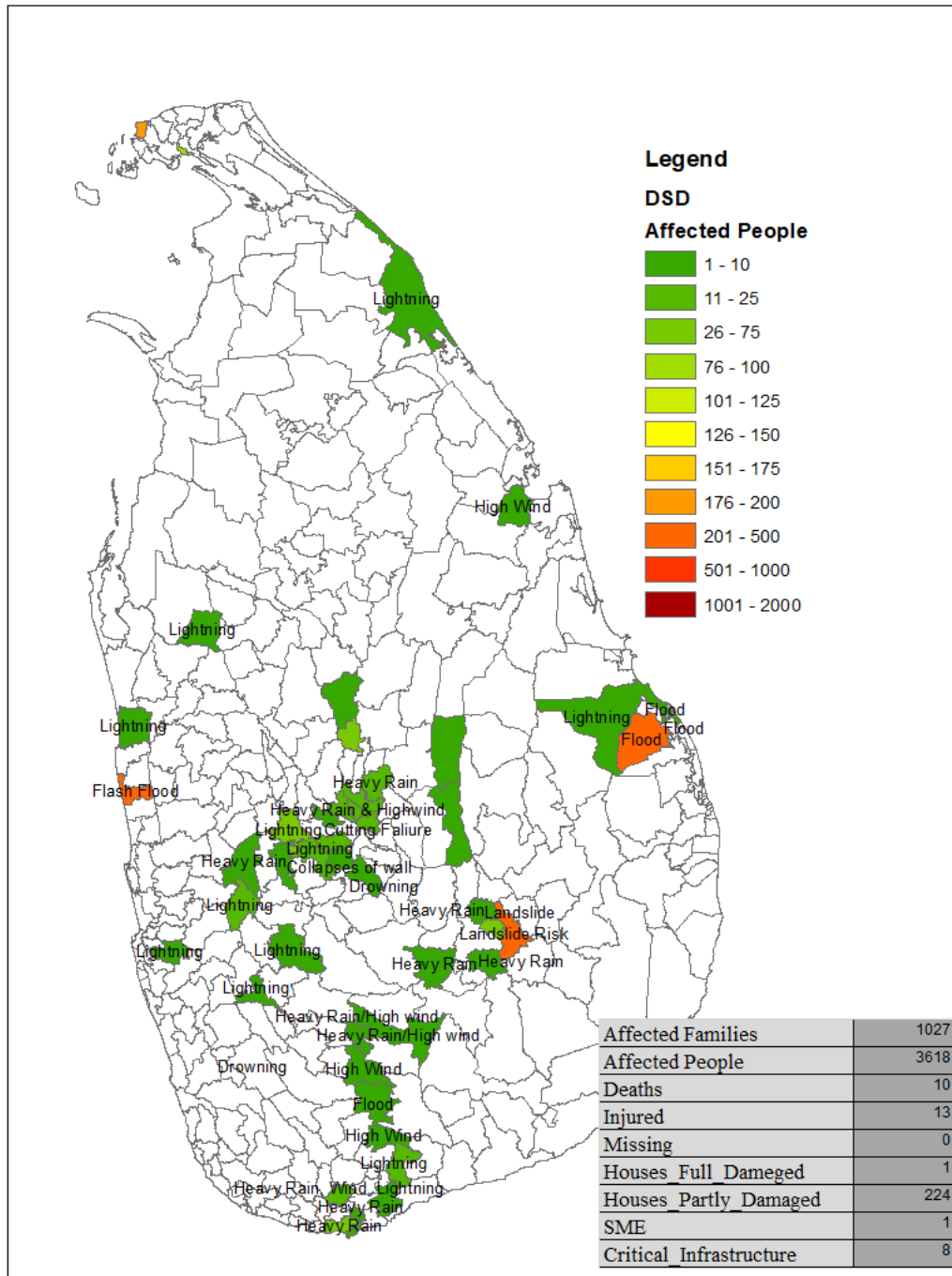


Fig 2 : Hazards caused from extreme weather events during first two weeks of November 2023

La Niña persisted during November, as indicated by well below-average sea surface temperatures (SSTs) extending from the Date Line to the eastern Pacific Ocean . Ocean Nino Index is -1.0, -0.9, and -0.8 during September-October-November ; October-November-December; and November-December-January (NOAA Climate prediction Center). Neutral IOD was observed during November 2022 (BoM, Australia). Cooler Sea surface waters can be seen over sea areas surrounding Sri Lanka coast(Fig. 7)

Two shearlines were appeared with ITCZ in between them. The average position of the shear line in north Indian Ocean was laid between Equator 03<sup>0</sup>N50<sup>0</sup>E, 07<sup>0</sup>N 60<sup>0</sup>E, 06<sup>0</sup>N70<sup>0</sup>E , 06<sup>0</sup>N80<sup>0</sup>E, 04<sup>0</sup>N100<sup>0</sup>E and 01<sup>0</sup>N120<sup>0</sup>E while the average position of the shear line in south Indian Ocean was laid between 05<sup>0</sup>S60<sup>0</sup>E, 08<sup>0</sup>S80<sup>0</sup>E , 07<sup>0</sup>S80<sup>0</sup>E, 07<sup>0</sup>S100<sup>0</sup>E, and 04<sup>0</sup>S120<sup>0</sup>E. The average position of the Inter-Tropical Convergence zone (ITCZ) was laid between EQ50<sup>0</sup>E, 01<sup>0</sup>N80<sup>0</sup>E, 01<sup>0</sup>S100<sup>0</sup>E and 01<sup>0</sup>S120<sup>0</sup>E (Fig 5).

Madden-Julian Oscillation (MJO) was strong at phase 07 from 01<sup>st</sup> to 03<sup>rd</sup> , propagate to phase 8 from 04<sup>th</sup> to 08<sup>th</sup> , weaken again from 09<sup>th</sup> to 17<sup>th</sup> . MJO became strong again at phase 5 on 18<sup>th</sup> , propagated to phase 6 and 7 from 19<sup>th</sup> to 29<sup>th</sup> , and weaken again on 30<sup>th</sup> (Fig.7).

### Weather Systems

A cyclonic circulation was developed over South Andaman Sea on 15th November and intensified into a Low pressure area over Southeast BoB & adjoining Andaman Sea in the morning of 17th November, 2022. The low-pressure system moved westnorthwestwards and became a well-marked low pressure area (WML) over southcentral BoB in the morning of 19th November. It has further intensified into a depression over southwest and adjoining Southeast BoB in the morning of the 20th November. Moving west-northwestwards it weakened into a Low pressure area over Southwest Bay of Bengal off South Andhra Pradesh-North Tamil Nadu coasts on 22nd November, 2022. (Source : India Meteorological Department).

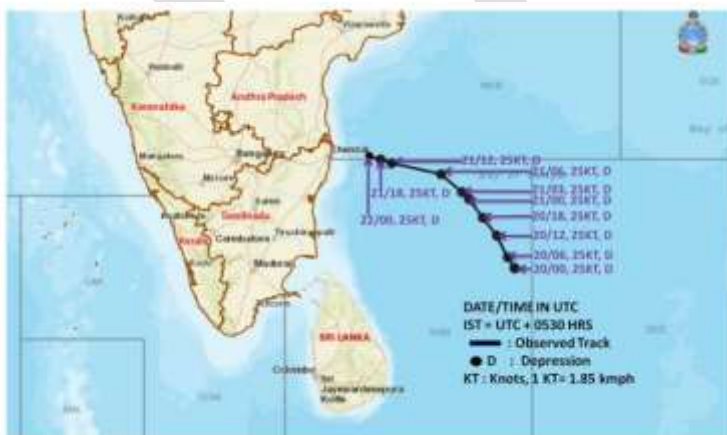


Fig 3 : Observed track of the depression over Southwest & adjoining Southeast BoB (20th – 22nd Nov, 2022)

**Rainfall (Main Stations) With 30 Average - November 2022**

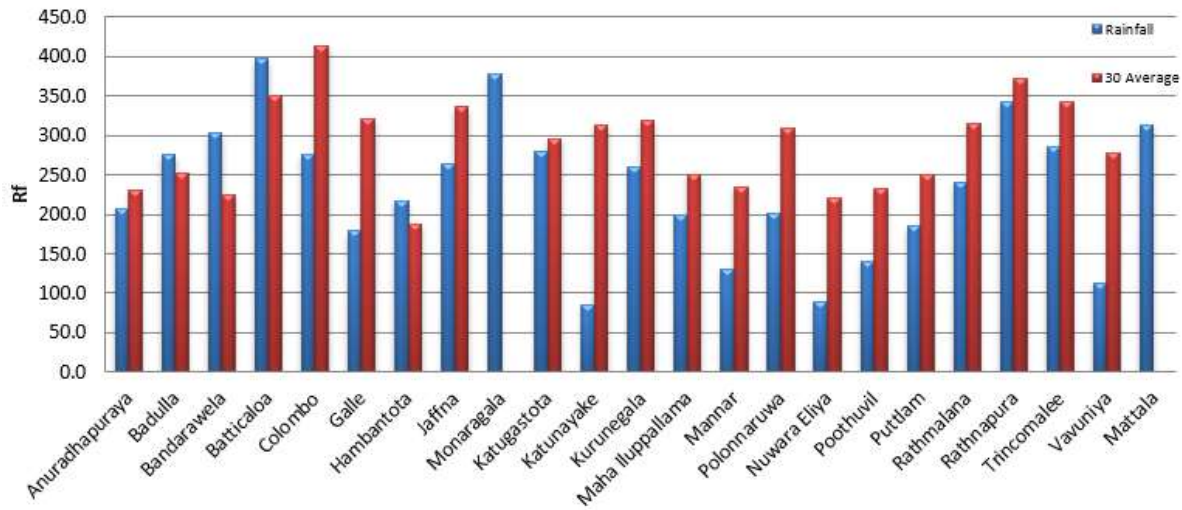


Fig 4: Monthly Total Rainfall(mm) with 30 years (1961-1990) of their averages at Main Meteorological stations areas during November 2022

**Rainfall (Hydro catchment area) With 30 Average- November 2022**

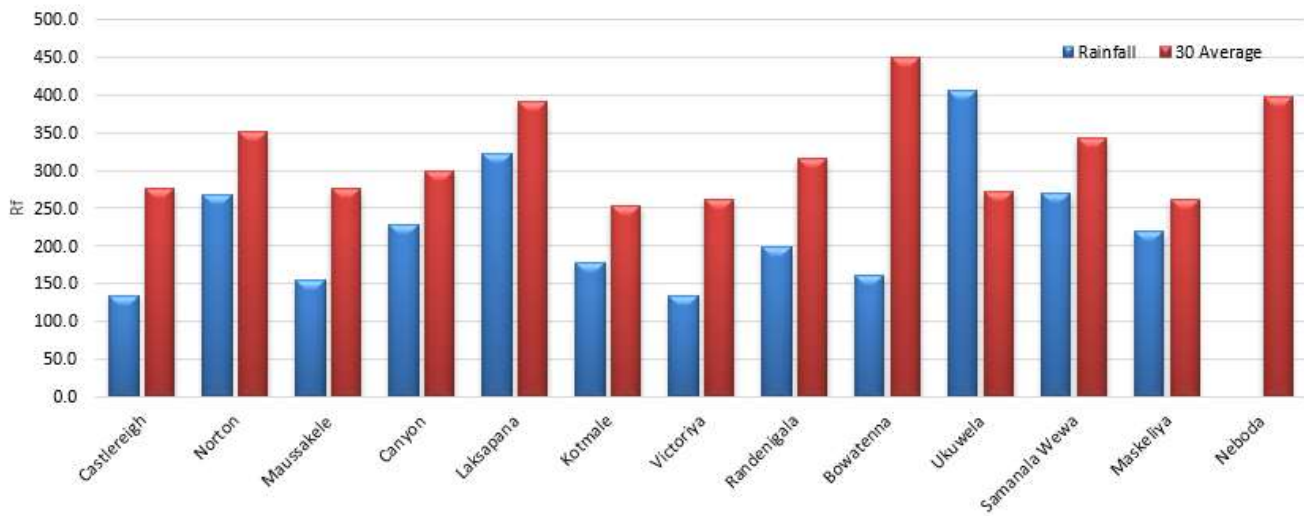


Fig 5: Monthly Total Rainfall (mm) with 30 years (1961-1990) of their averages at Hydro catchment areas during November 2022

### Rain Days with 30 Avg- November 2022

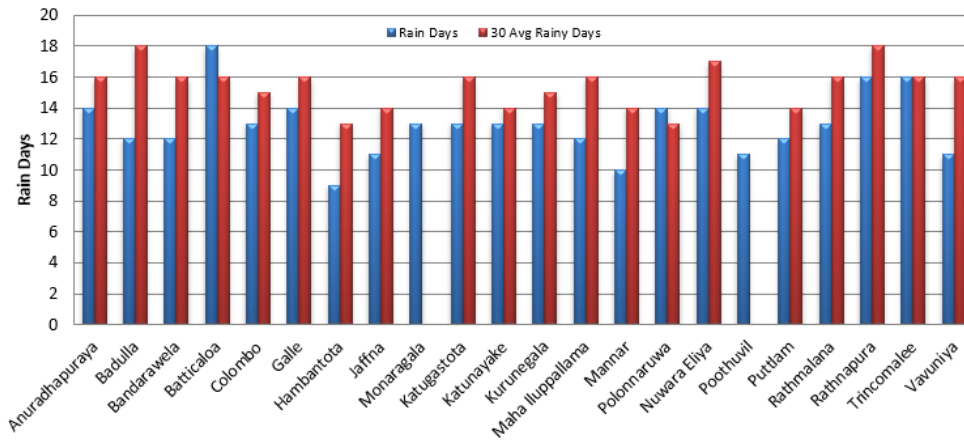


Fig 6: monthly total no of rainy days with 30 years (1961-1990) of their averages at main Meteorological stations during November 2022

### Ocean Surface Winds and Ocean Surface Temperature for November 2022

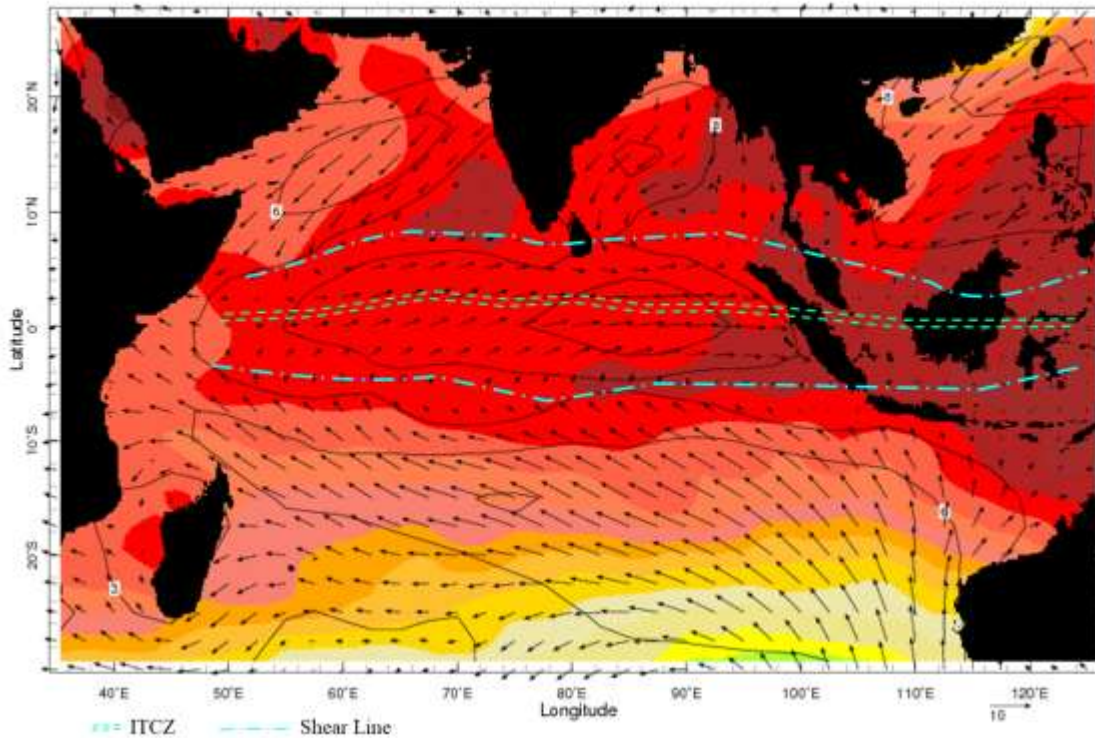


Fig 7: Ocean Surface Winds and Ocean Surface Temperature for November 2022

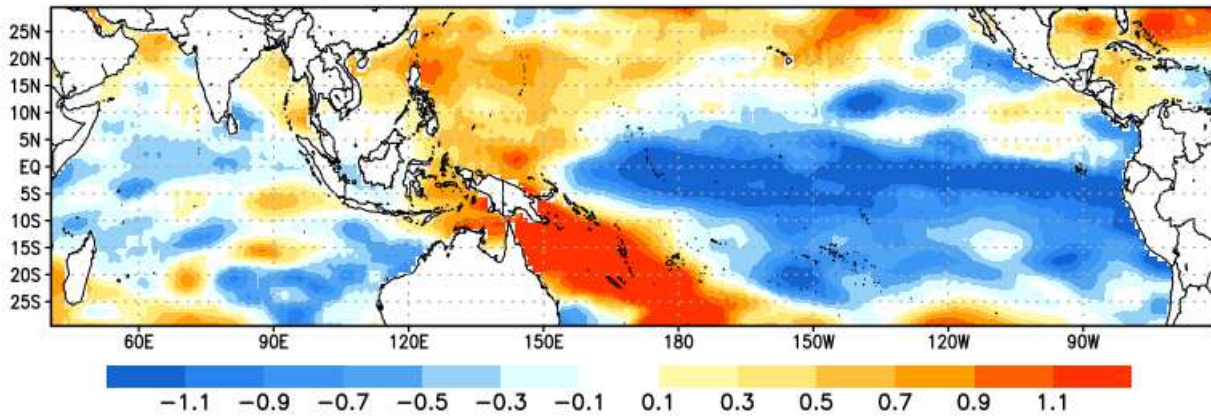


Fig 8: Sea Surface Temperature anomalies for November 2022

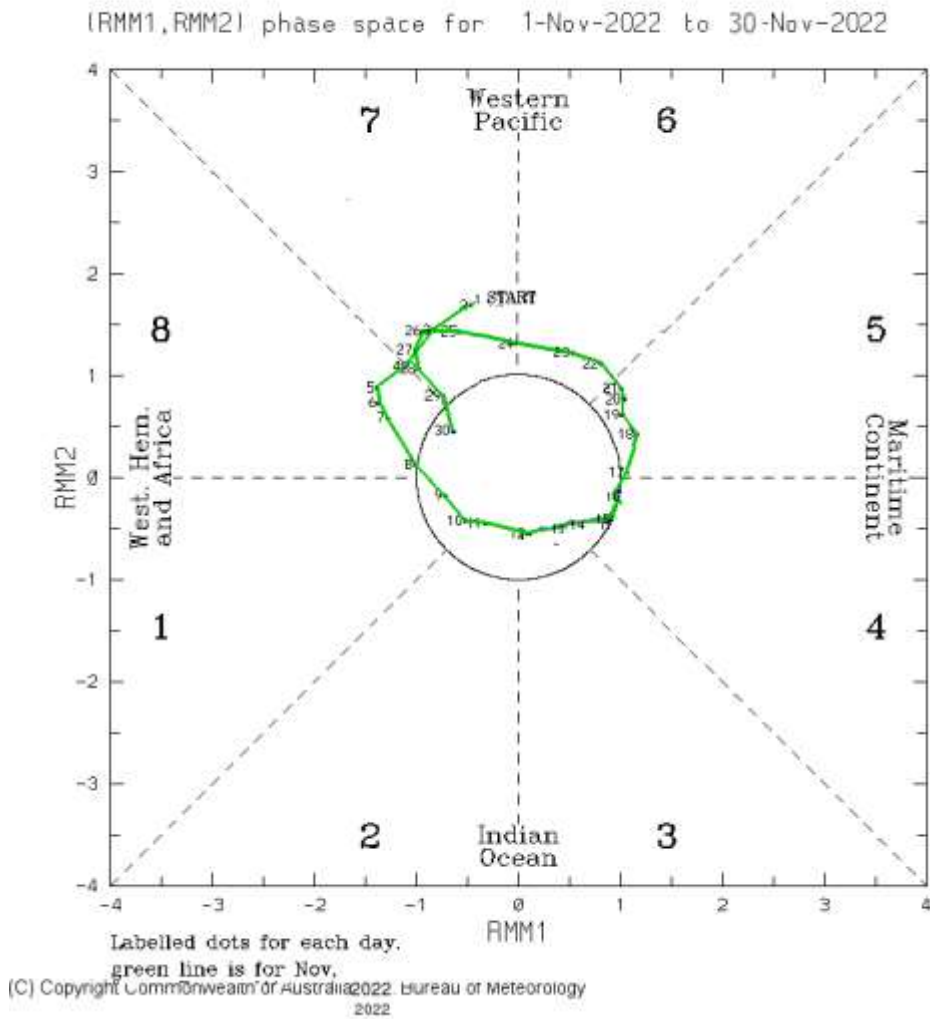


Fig 9: Phase diagram of MJO Index



**Surface pressure and winds:** The surface pressure was below average on 01<sup>st</sup>, on 03<sup>rd</sup>, from 09<sup>th</sup> to 11<sup>th</sup>, from 16<sup>th</sup> to 22<sup>nd</sup>, and from 27<sup>th</sup> to 19<sup>th</sup>. It was above average during remaining days of the month. Mild pressure gradient was observed on 01<sup>st</sup>, from 10<sup>th</sup> to 11<sup>th</sup>, and 18<sup>th</sup> to 19<sup>th</sup> and 21<sup>st</sup>. Pressure distribution was even or fairly even during remaining days of November. The surface wind was calm and variable in direction during most of November month.

**Upper winds:**

**At 850hPa,** mild cyclonic circulation to the northeast of Sri Lanka and anomalous trough over northeast parts provided favorable conditions for the formation of thunderstorms during first two weeks of the month while dry northerly winds blowing across Indian sub continent responsible for suppressed rainfall during last two weeks of the month (Fig 10A and 10B).

**At 700 hPa,** mild cyclonic circulation over northeast parts and anomalous trough across Sri Lanka provided favorable conditions for the formation of thunderstorms during first two weeks of the month while dry northerly winds blowing across Indian sub-continent responsible for suppressed rainfall during last two weeks of the month (Fig 11 A and 11B).

**At 500 hPa,** Northwest-southeast oriented trough axis across Sri Lanka with embedding cyclonic vortex over northwest of Sri Lanka provided favorable conditions for cloud formation during first two weeks (Fig 12 A)

**The 200 hpa** the upper tropospheric ridge was laid about 13<sup>0</sup>N40<sup>0</sup>E, 14<sup>0</sup>N 60<sup>0</sup>E, 15<sup>0</sup>N100<sup>0</sup>E, and 15<sup>0</sup>N120<sup>0</sup>E .

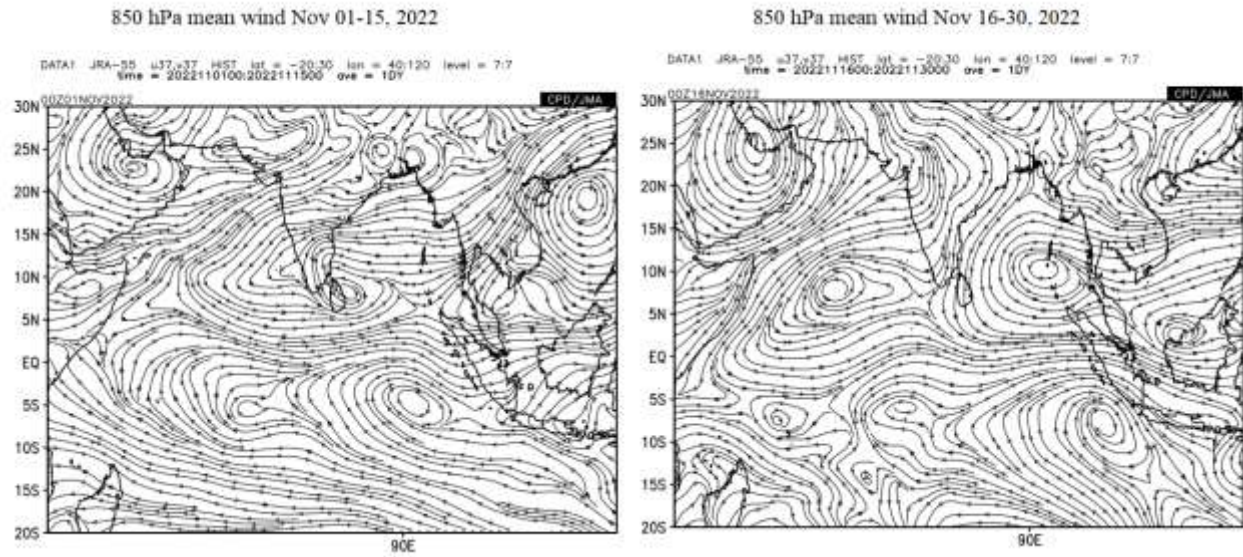


Fig. 10A: Average wind pattern at 850hpa level from 01-15 (left) and 16-30 (right), November 2022 (JRA55)

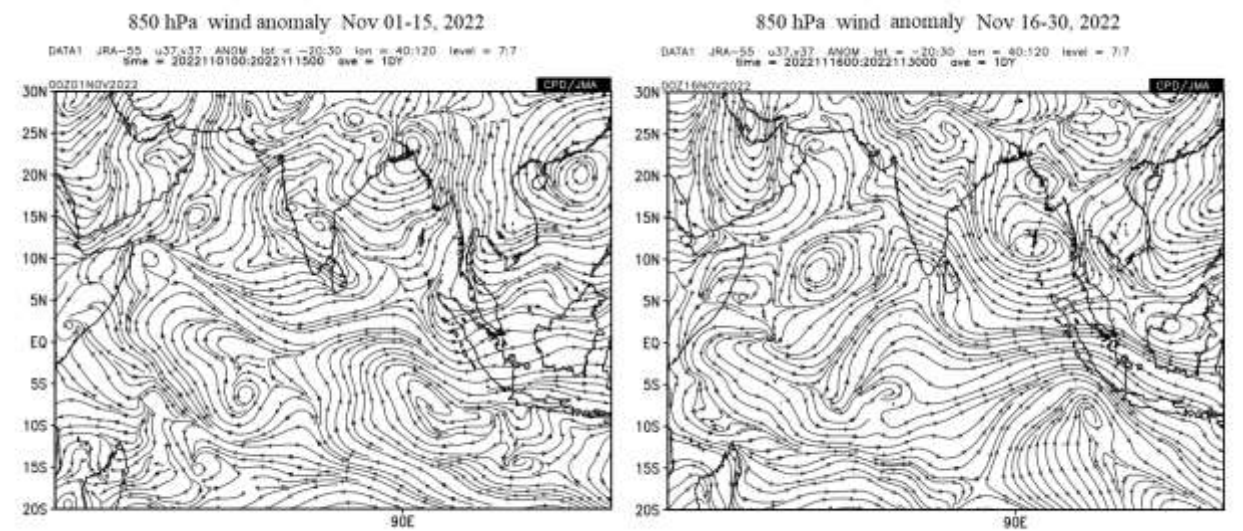


Fig. 10B: wind anomaly at 850hpa level from 01-15 (left) and 16-30 (right), November 2022 (JRA55)

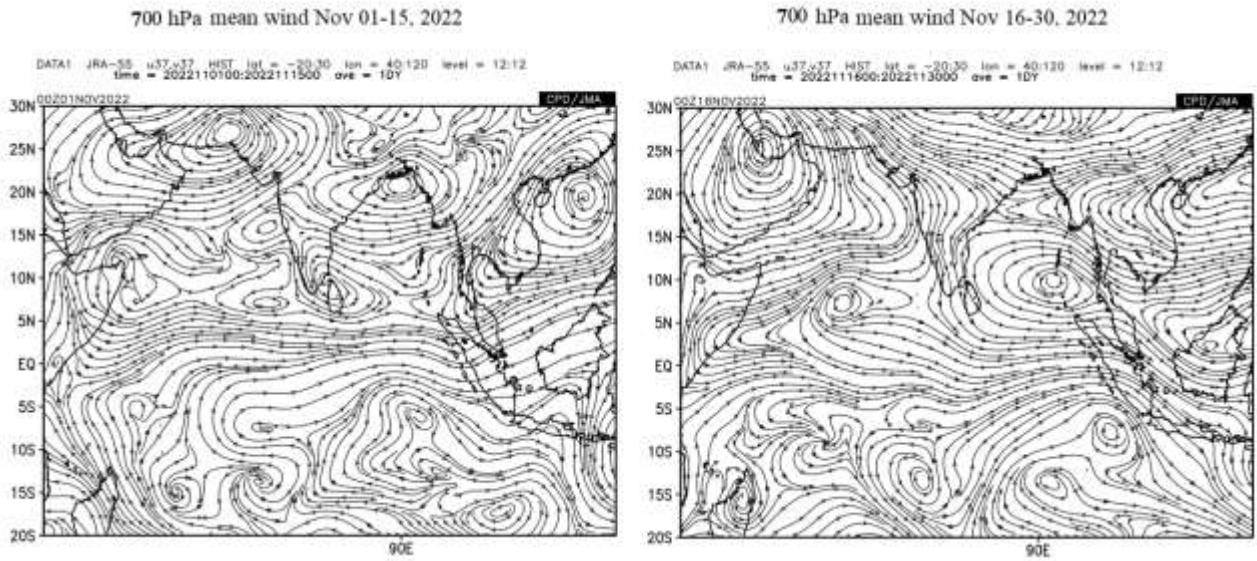


Fig. 11A: Average wind pattern at 700 hpa level from 01-15 (left) and 16-30 (right), November 2022 (JRA55)

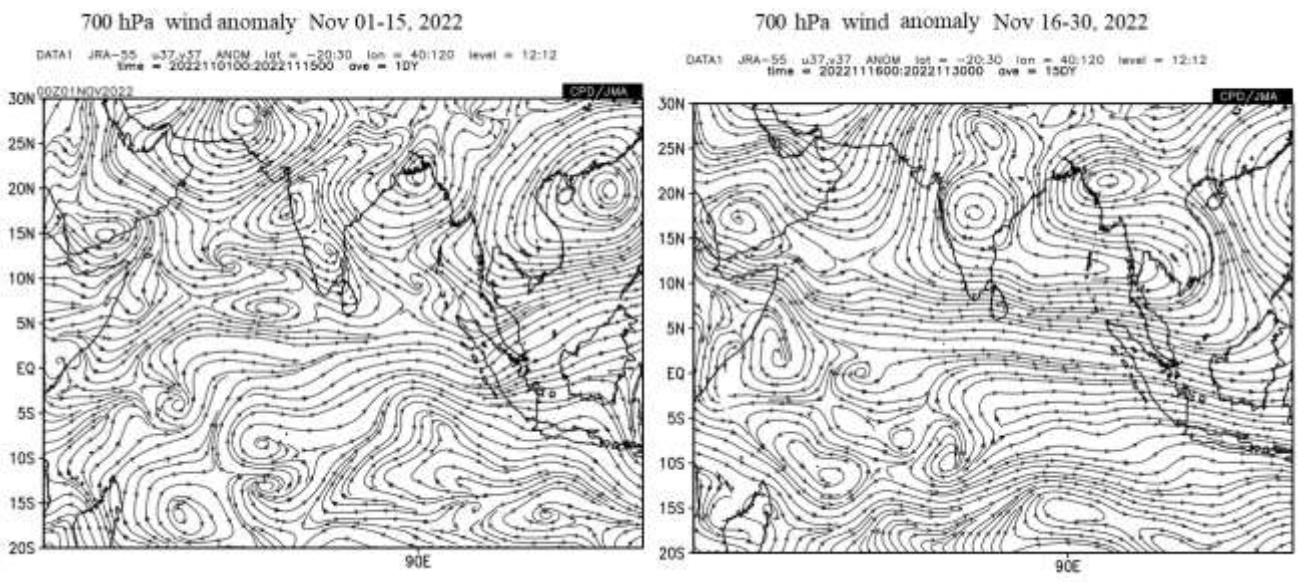


Fig. 11B: wind anomaly at 700hpa level from 01-15 (left) and 16-30 (right), November 2022 (JRA55)

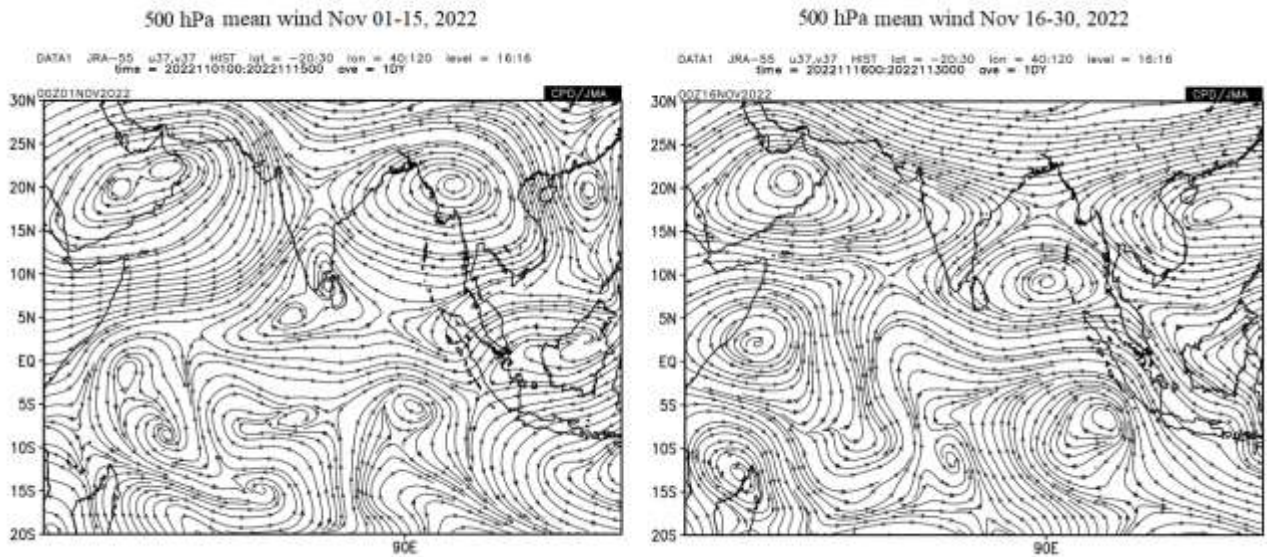


Fig. 12A: Average wind pattern at 850hpa level from 01-15 (left) and 16-30 (right), November 2022 (JRA55)

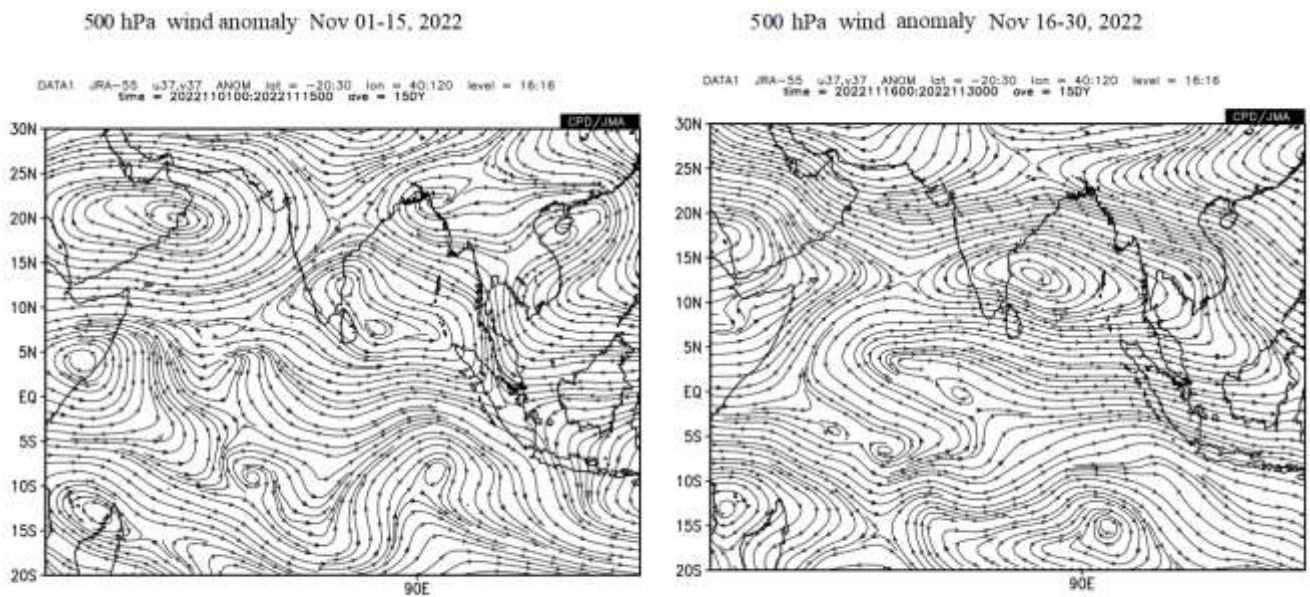


Fig. 12B: wind anomaly at 850hpa level from 01-15 (left) and 16-30 (right), November 2022 (JRA55)

### Temperature Field:

The maximum temperatures as well as minimum temperatures were mostly above normal in most places during the month of November 2022. However below normal maximum temperatures were reported at some places on 01<sup>st</sup> , on 09<sup>th</sup> , on 11<sup>th</sup> and on 19<sup>th</sup> . The highest recorded maximum temperature was 34.6<sup>o</sup>C at Ratnapura on 02<sup>nd</sup> for the month of November 2022.

Below average minimum temperatures were reported at some places on 18<sup>th</sup> , 21<sup>st</sup> , 24<sup>th</sup> and 30<sup>th</sup> .

The lowest recorded minimum temperature was 8.5 °C at Nuwara Eliya on 25<sup>th</sup> for the month of November 2022 (Table 4b).

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

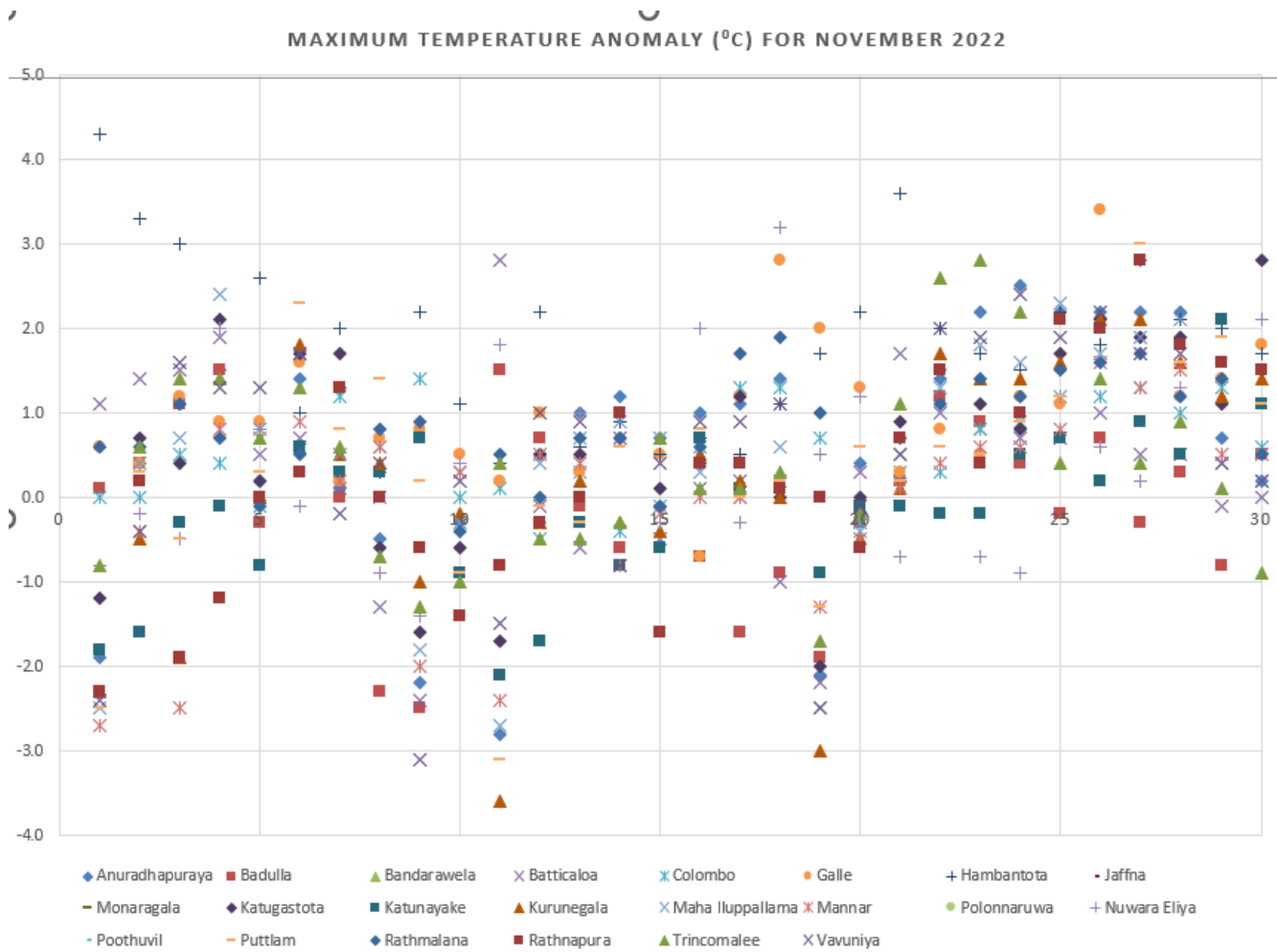


Fig 13 Maximum Temperature anomaly (°C) for November 2022

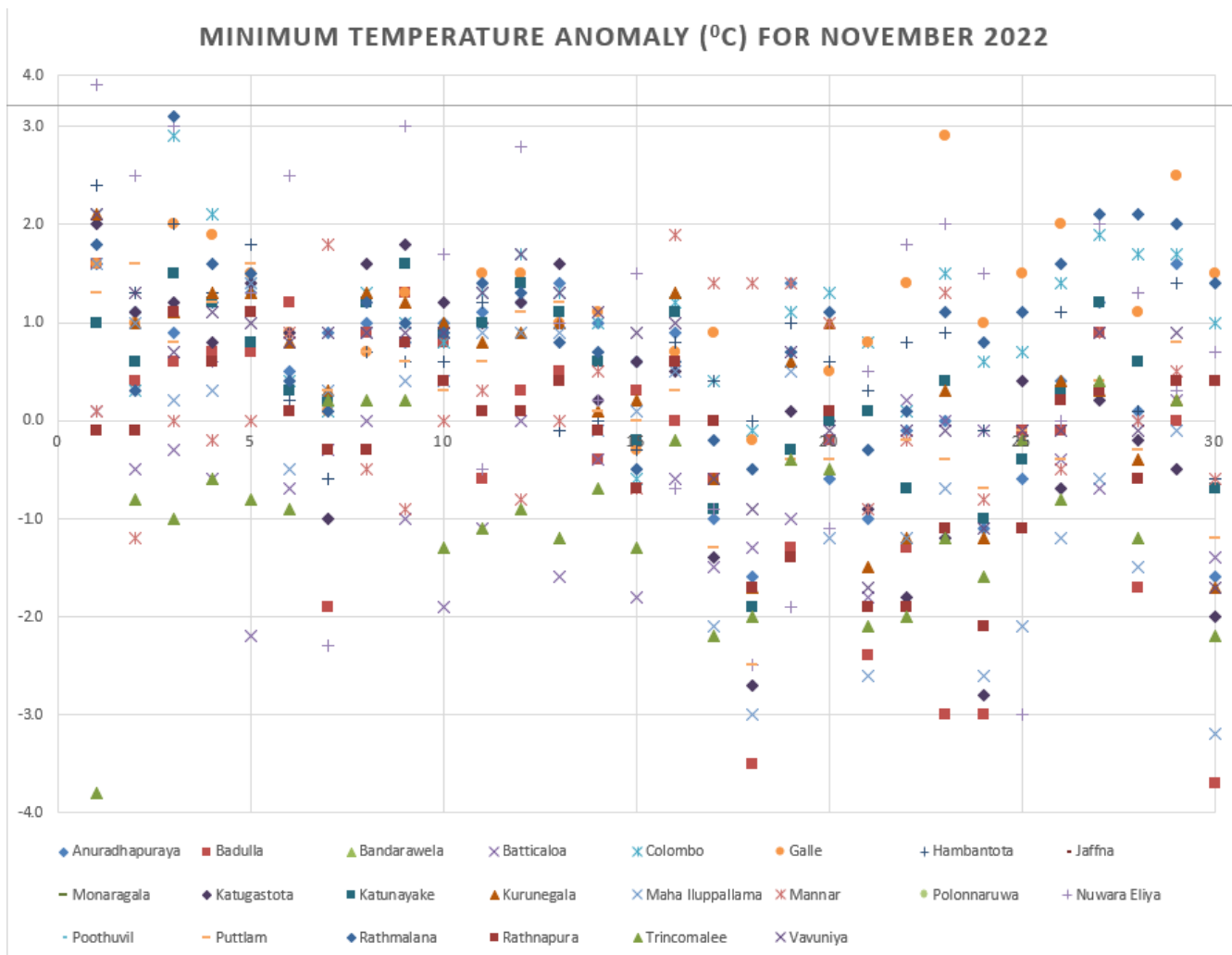


Fig 14 Minimum Temperature anomaly ( $^{\circ}\text{C}$ ) for November 2022

Below or about normal rainfall was reported at most of the principal meteorological stations except Badulla, Bandarawela, Batticaloa and Hambantota for month of November (Fig 4). Maximum percentage was reported from Bandarawela (134.9%) while minimum from Katunayake station (27.0%) (Table 2). Further below normal rainy days were reported from most of the principal meteorological stations except Batticaloa and Polonnaruwa (Fig 6).

Below normal rainfall was reported from most of the hydro catchment stations except Ukuwela where above normal rainfall was reported (Fig 5).

Highest cumulative rainfall was 948.5 mm at Handapanagala. Highest rainfall received during 24hours, was 260mm at Handapanagala on 27<sup>th</sup> November.

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 1 :The monthly total rainfall and the number of rain days at the principal meteorological stations

Meteorological station	Monthly Total rainfall(mm)			Monthly Total No of rainy Days		
	2022-Nov	Average	%	2022-Nov	Average	%
Anuradhapuraya	207.1	229.7	90.2%	14	16	87.5%
Badulla	275.2	253.0	108.8%	12	18	66.7%
Bandarawela	302.6	224.3	134.9%	12	16	75.0%
Batticaloa	397.0	349.6	113.6%	18	16	112.5%
Colombo	276.6	414.4	66.7%	13	15	86.7%
Galle	179.3	321.0	55.9%	14	16	87.5%
Hambantota	217.7	187.5	116.1%	9	13	69.2%
Jaffna	263.4	336.1	78.4%	11	14	78.6%
Monaragala	377.1			13		
Katugastota	280.4	295.6	94.9%	13	16	81.3%
Katunayake	84.7	313.7	27.0%	13	14	92.9%
Kurunegala	260.0	318.6	81.6%	13	15	86.7%
Maha Iluppallama	199.5	250.4	79.7%	12	16	75.0%
Mannar	130.8	235.0	55.7%	10	14	71.4%
Polonnaruwa	202.0	308.6	65.5%	14	13	107.7%
Nuwara Eliya	89.6	221.7	40.4%	14	17	82.4%
Poothuvil	141.0	232.0	60.8%	11	na	
Puttlam	185.4	250.3	74.1%	12	14	85.7%
Rathmalana	240.5	314.7	76.4%	13	16	81.3%
Rathnapura	342.0	371.4	92.1%	16	18	88.9%
Trincomalee	286.4	342.9	83.5%	16	16	100.0%
Vavuniya	112.8	278.2	40.6%	11	16	68.8%
Mattala	313.3			9		

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

Hydro Catchment	Nov2022	Average	% (percentage of average)
Castlereigh	133.5	276.4	48.3%
Norton	267.0	350.5	76.2%
Maussakele	153.9	275.8	55.8%
Canyon	228.7	299.8	76.3%
Laksapana	322.9	390.6	82.7%
Kotmale	176.9	253.1	69.9%
Victoriya	133.4	261.8	51.0%
Randenigala	198.3	315.0	63.0%
Bowatenna	160.7	450.8	35.7%
Ukuwela	406.4	272.1	149.3%
Samanala Wewa	270.5	342.4	79.0%
Maskeliya	218.6	261.4	83.6%
Neboda		397.8	

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

Table-02- total rainfall and the number of rain days at the principal meteorological stations recorded in the month against the respective averages (1961-1990).

Table 4(a) - Extremes of Maximum Temperatures			November	2022
	Maximum	Offsets		Highest Std.Div
	Value	(-)	(+)	
Value	34.5 <sup>0</sup> C	3.6	4.3	1.5
Station	Ratnapura	Kurunegala	Hambantota	Polonnaruwa
Date	27/11	11/11	01/11	
Table 4(b) -Extremes of Minimum Temperature November 2022				
	Minimum	Offsets		Highest Std.Div
	Value	(-)	(+)	
Value	8.5C	3.8	3.9	1.82
Station	NuwaraEliya	Trincomalee	NuwaraEliya	NuwaraEliya
Date	25/11	01/11	01/11	

Prepared by National Meteorological Centre (NMC)

Department of Meteorology