Weather Synopsis –January 2021.

Northeast monsoon conditions was prevailed. Above or about normal rainfall was reported at most of the principal meteorological stations except Badulla and Pottuwil where below normal rainfall was reported and NuwaraEliya where about normal rainfall was reported for month of January (Fig 1). Maximum percentage was reported from Jaffna (473.2%) and Mannar (473.1%) while minimum from Badulla station (72.6%). Further above normal rainy days were reported from most of the principal meteorological stations with maximum percentage was reported from Puttalum (400%).

Above normal rainfall was reported from most of the hydro catchment stations except Kotmale, Victoria and Randenigala where below normal rainfall was reported.

Highest cumulative rainfall was **761.2** mm at Batticoloa . Highest rainfall received during 24 hours, was 218.0mm at Mylampavaley on 28th January.

Fairly widespread rainfall activity over eastern and northeastern parts with isolated heavy falls exceeding 100mm was reported on 03rd, from 10th to 12th , on 14th and on 28th. Fairly widespread showery conditions were experienced over the country from 09th to 14th due to the presence of low level disturbance in the vicinity of Sri Lanka. Afternoon thunderstorm activity was reported at some places in Southwest quarter during first 3 weeks of January except on 09th, 14th , and 15th and again from 29th to 31st. Dry weather condition was experienced over the country from 24th to 27th January

According to Disaster Management Center (DMC), several families were affected by flood due to heavy downpour from 10th to 14th in Northern and Eastern provinces**.**

Maximum temperatures were above normal during first week and the last 10 days of the month while minimum temperatures were mostly above normal in most places during the month of January 2021. Highest recorded maximum temperature for the month of January 2021 was 34.1^{0}C at Ratnapura on 21st and the lowest recorded minimum temperature for the month of January 2021 was 6.8^{0}C at Nuwara Eliya on 25th of January 2021.

La Niña persisted in January, as indicated by below-average sea surface temperatures (SSTs) extending from west-central to east-central Pacific Ocean. Ocean Nino Index is -1.2 during November, December and January (NOAA Climate prediction Center). Neutral IOD condition was observed during January 2021 (BoM, Australia). Sea surface waters in tropical Indian Ocean are warmer than average (Fig. 5)

The average position of the shear line was laid between 06^0S60^0E, Equator 80^0E, and 02^0S120^0E . The average position of the Inter-Tropical Convergence zone (ITCZ) was laid between 10^0S50^0E, 07^0S90^0E and 09^0S120^0E (Fig 4). Both shear line and ITCZ were fluctuated about 2^0 north and south of their average position .

Madden-Julian Oscillation (MJO) was weak at the beginning and became strong at the phase 3 from 05^{th} to 14^{th}. It has weaken again from 15^{th} to 20^{th} and strengthen at phase 6 and 7 during last 10 days of January (Fig.6).

Weather Systems

The cyclonic storm 'DANILO' over the Southern Indian Ocean, lay centered near latitude 11.2°S and longitude 72.1°E, at 18 hrs of 01st January. The system was initially moved southeastwards, due to interaction with the subtropical jet on 05th January, the system sharply turned to the westward direction and weaken to a moderate tropical storm. While moving westward it has weaken into a tropical depression on same day, becoming a remnant low on 9 January . Danilo passed north of Mauritius as a dissipating system on 11 January.

Tropical cyclone ELOISE formed over the South Indian Ocean on 17^{th} January and lay centered near latitude 12.6°S and longitude 62.1°E, at 06UTC of 17th of January. While moving in southwesterly direction the system has intensified to a severe tropical storm on 18 January. Eloise made landfall in northern Madagascar as a moderate tropical storm on 19 January, bringing heavy rainfall and flooding. After crossing Madagascar and the system entered the Mozambique Channel on 21 January. After moving southwestward across the Mozambique Channel, Eloise intensify into a Category 2-equivalent tropical cyclone and made landfall in Mozambique on 23 January. Eloise weakened into a remnant low over land on 25 January, dissipating soon afterward.

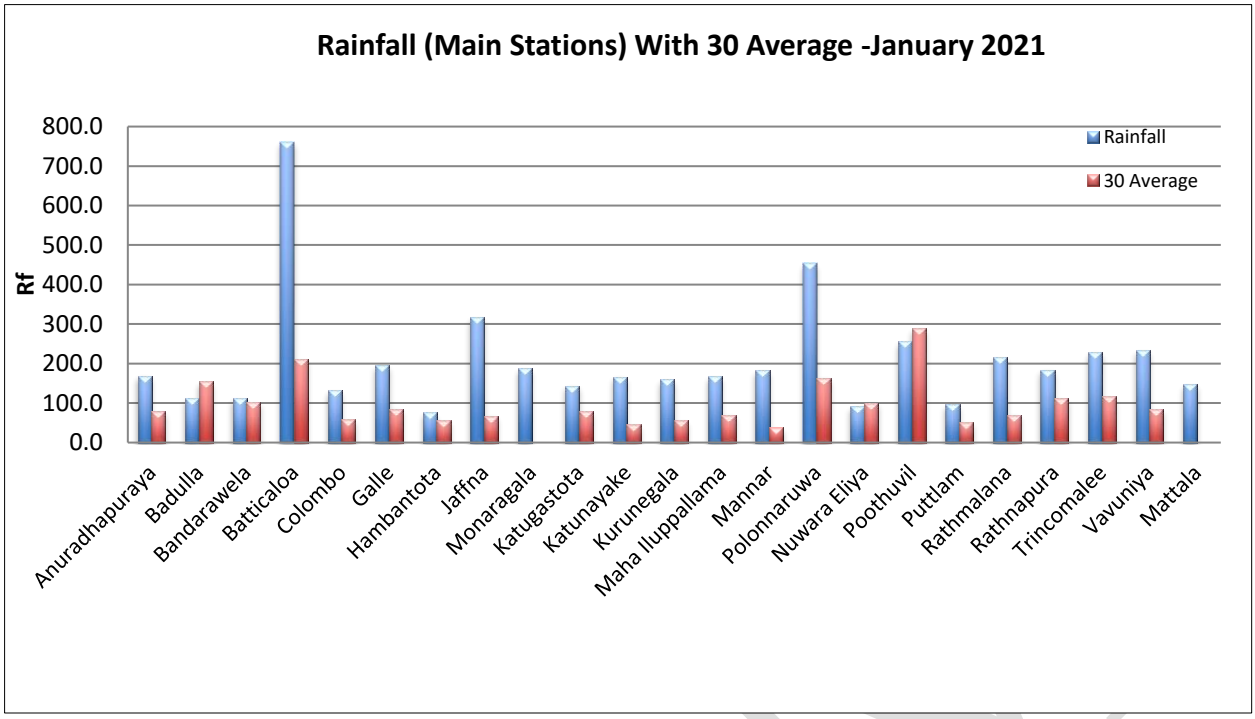

Fig 1: Monthly Total Rainfall(mm) with 30 years (1961-1990) of their averages at Main Meteorological stations areas during January 2021

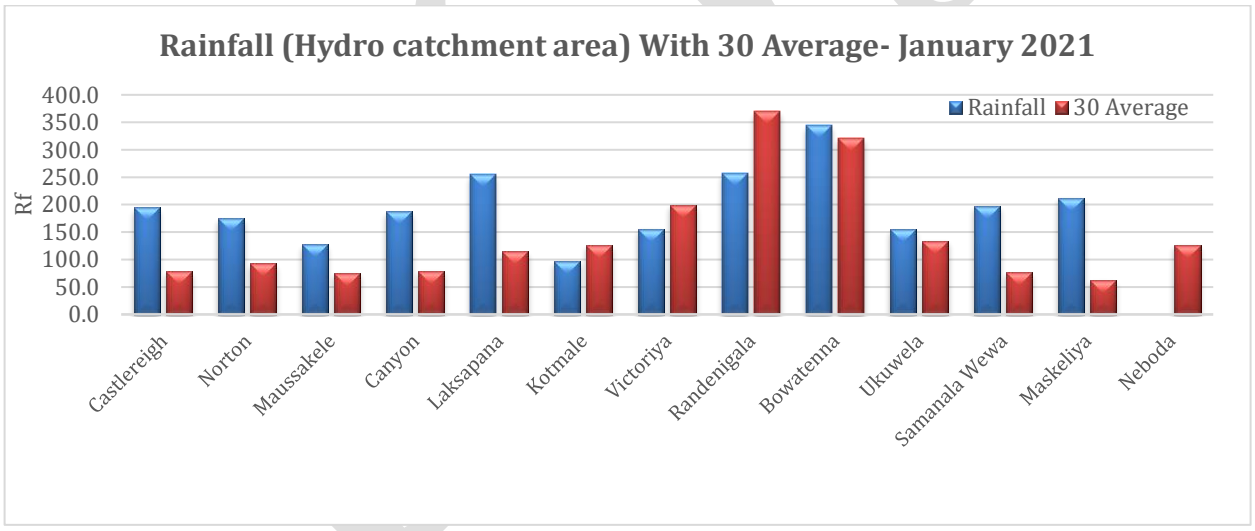

Fig 2: Monthly Total Rainfall(mm) with 30 years (1961-1990) of their averages at Hydro catchment areas during January 2021

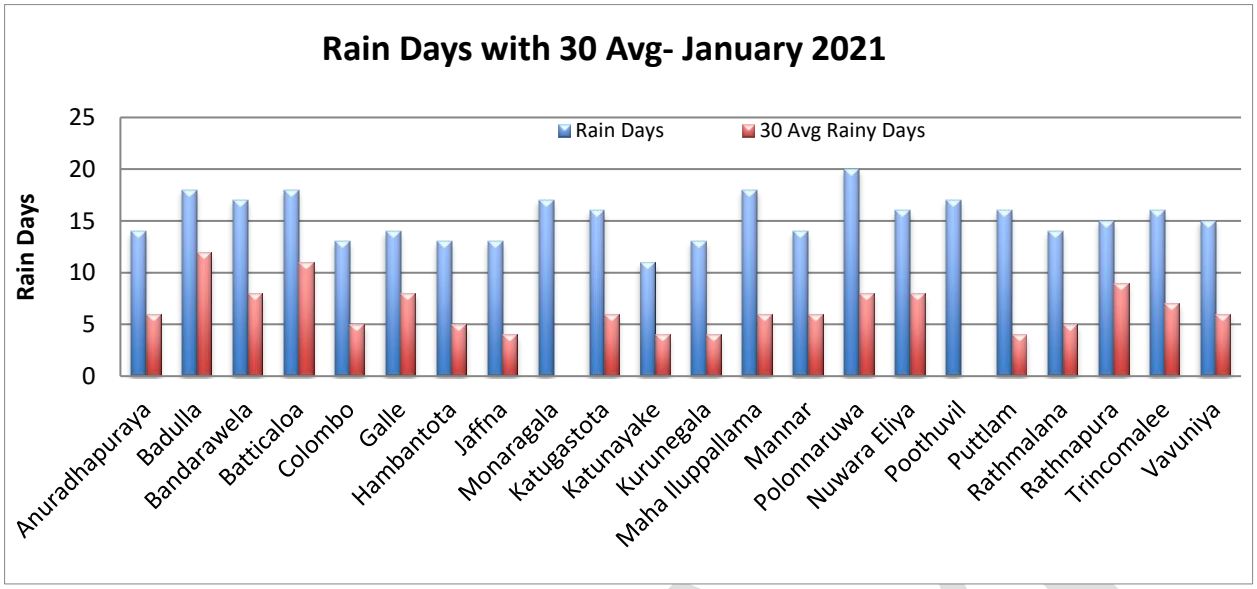

Fig 3: monthly total no of rainy days with 30 years(1961-1990) of their averages at main Meteorological stations during January 2021

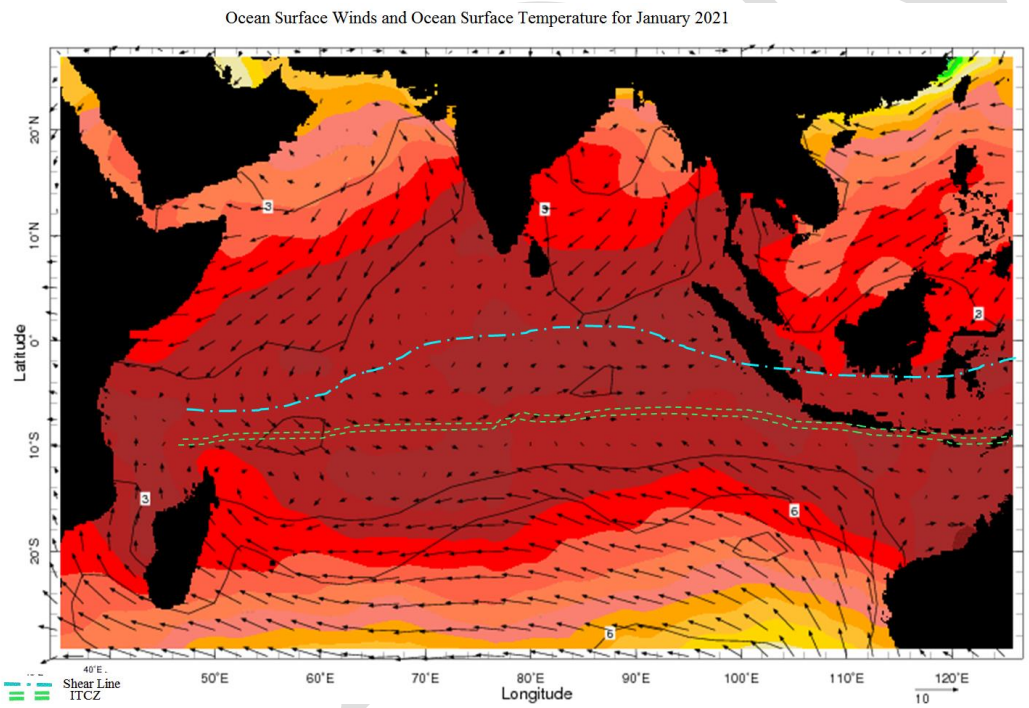

Fig 4: Ocean Surface Winds and Ocean Surface Temperature for January 2021

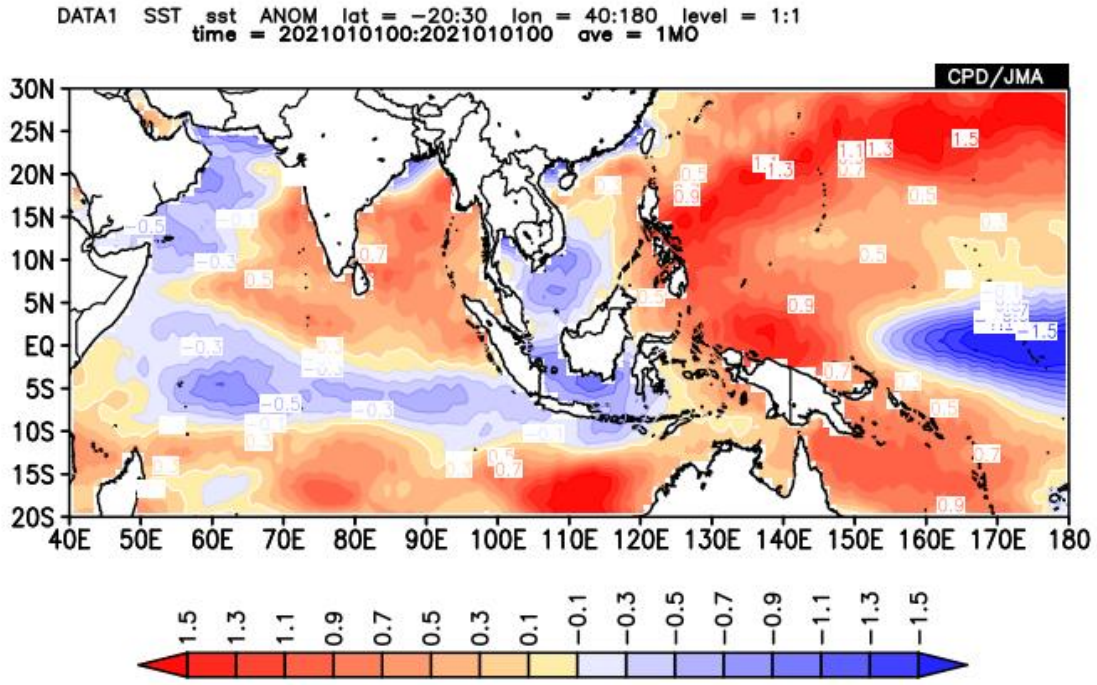

Fig 5: Sea Surface Temperature anomalies for January 2021

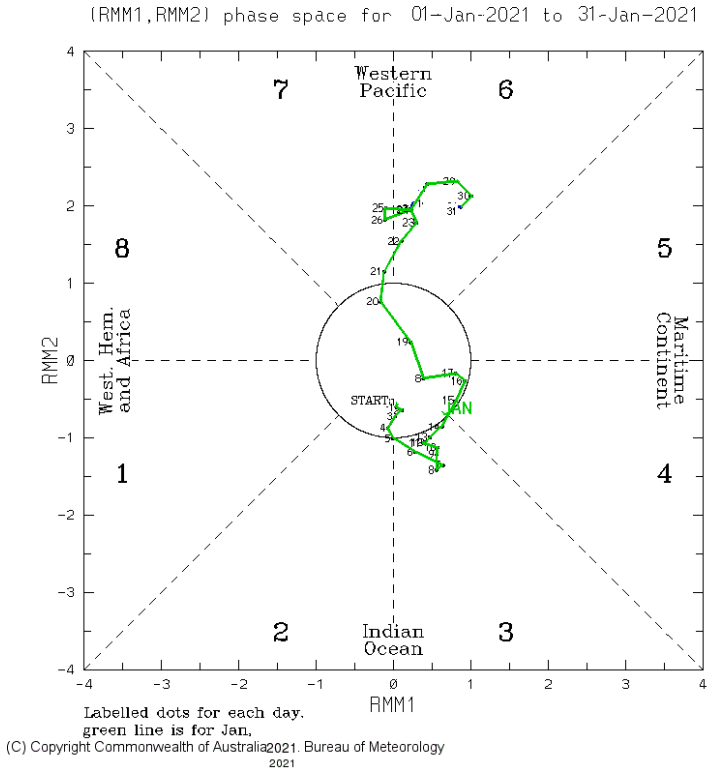

Fig 6: Phase diagram of MJO Index

Surface pressure and winds: The surface pressure was below average except from 25th to 26th and 31st when it was about average. Pressure distribution was even or fairly even during most of January except 15th and 31st when mild pressure gradient was observed.

Surface wind over the island was predominantly North easterly in direction with speed of 05-10 knots.

Upper winds:

At 850hPa, Northeasterly wind flow is dominated over the island. Anomolous east-west oriented trough is appeared over Sri Lanka providing favorable condition for formation of clouds at 850mb level (Fig 7).

At 700 hPa, Northeasterly to easterly wind flow is dominated over the island. Anomalous cyclonic circulation is appeared over west of Sri Lanka at 700mb level providing favorable condition for formation of clouds (Fig 8).

At 500 hPa, Northeasterly to easterly wind flow is dominated over the island. Anomalous cyclonic circulation is appeared over west of Sri Lanka at 500mb level providing favorable condition for formation of clouds.

The 200 hpa the upper tropospheric ridge was laid from 08^0N40^0E, 14^0N60^0E, 15^0N80^0E, and 15^0N120^0E.

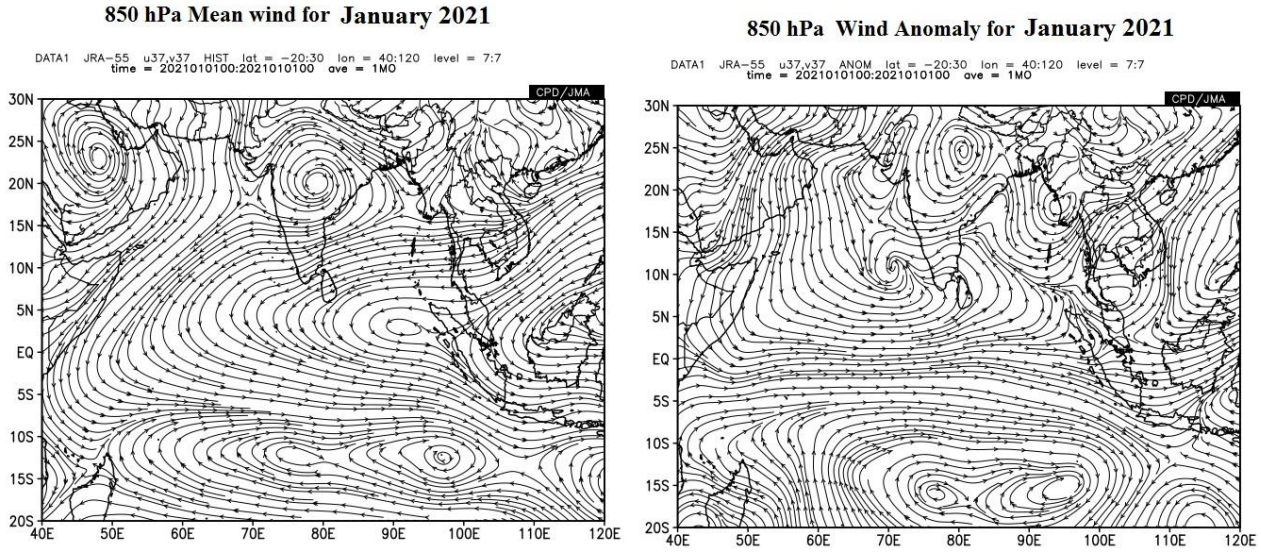

Fig. 7 Monthly average wind pattern at 850hpa level during the month of January 2021 (JRA55)

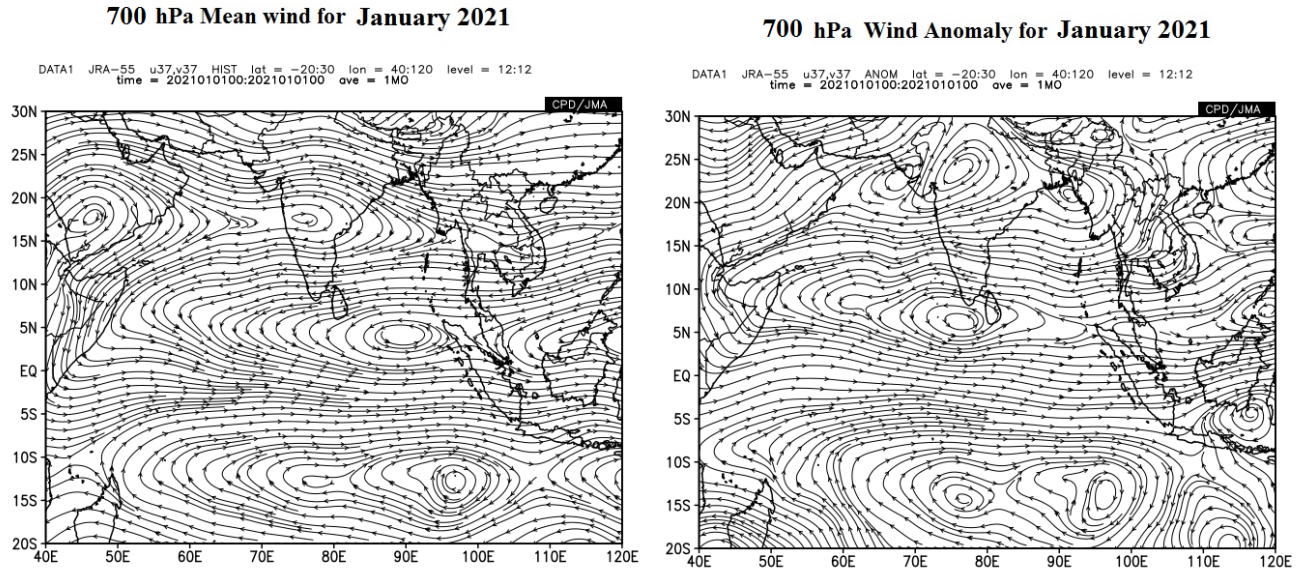

Fig. 8 Monthly average wind pattern at 700hpa level during the month of January 2021 (JRA55)

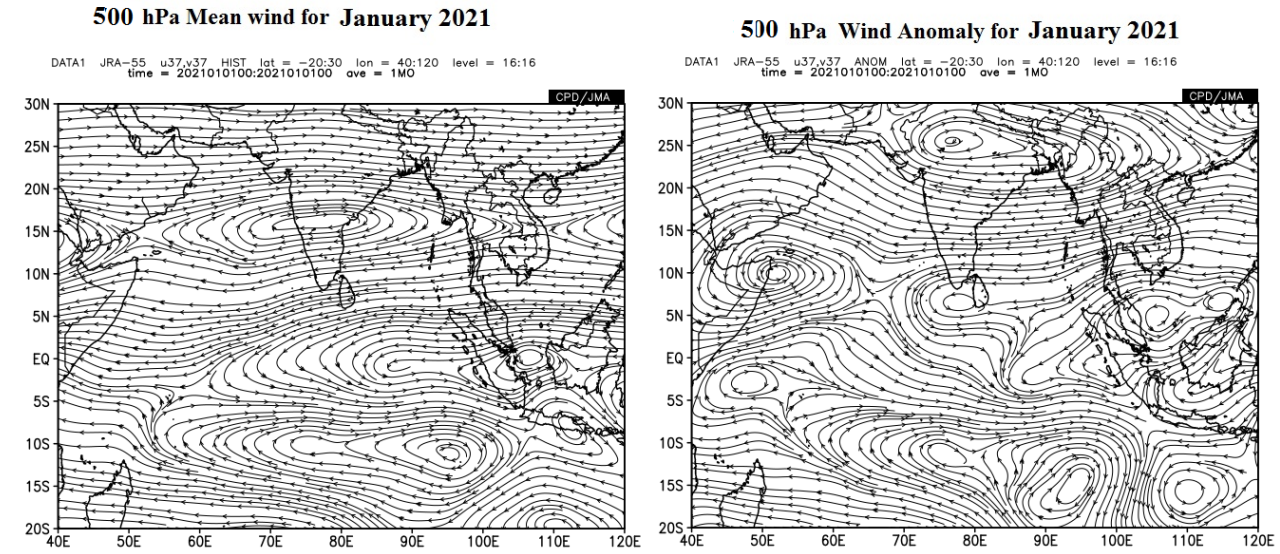

Fig. 9 Monthly average wind pattern at 500hpa level during the month of January 2021 (JRA55)

Temperature Field:

The maximum temperatures in the day were mostly above normal in most places from 04th to 08th, from 20th to 28th and 30th. However below normal maximum temperatures were reported over most places from 09th to 11th , on 15th , 18th, 29th and 31st (Fig.10). Highest recorded maximum temperature for the month of January 2021 was 34.1^{0}C at Ratnapura on 21st (Table4a).

Night minimum temperatures over most parts were above normal during the month (Fig 11). However night minimum temperatures were below or about normal at Trincomalee. Some stations such as Badulla, Katugastota, Katunayake, MahaIluppallama, Puttalum, Vavuniya, and Ratnapura reported below average minimum temperatures on 25th and 28th . Lowest recorded minimum temperature for the month of January 2021 was 6.8^{0}C at Nuwara Eliya on 25th (Table 4b).

Maximum and Minimum departures from normal day/night temperature were shown in table 3.

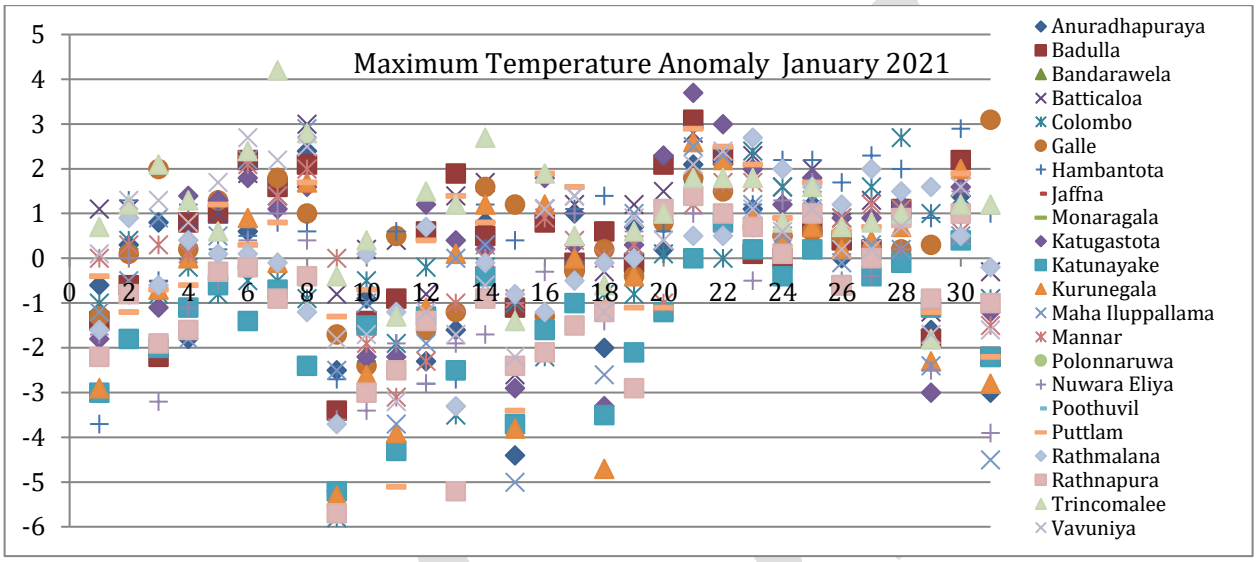

Fig 10 Maximum Temperature anomaly (^{0}C) for January 2021

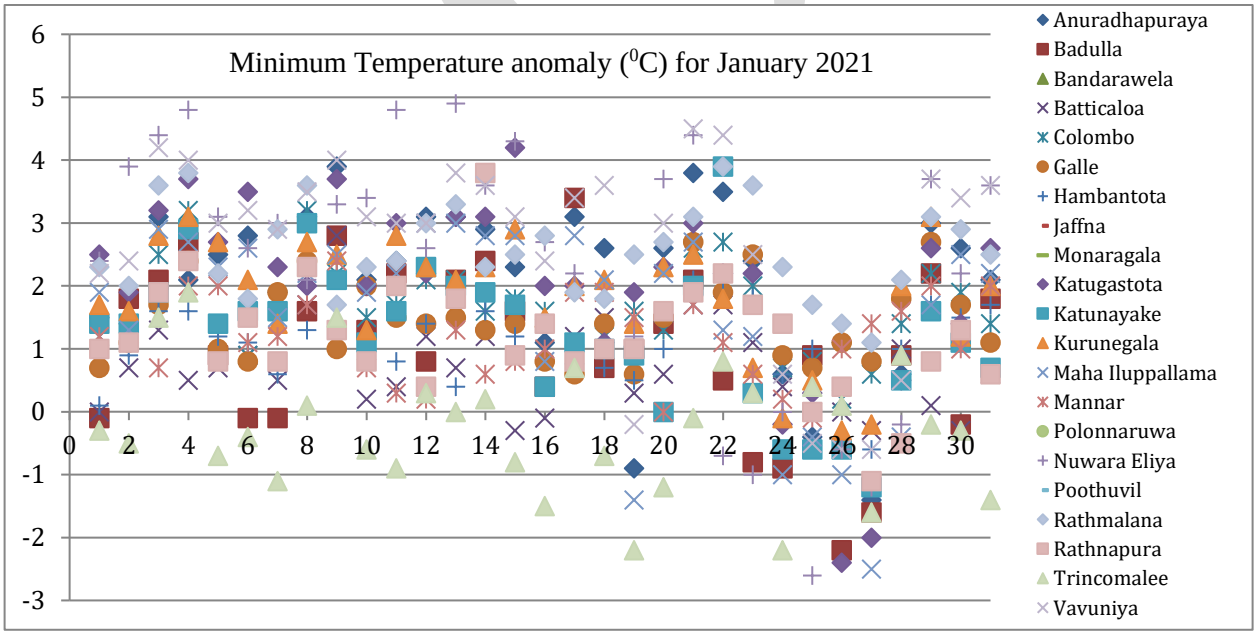

Fig 11 Minimum Temperature anomaly (^{0}C) for January 2021

Above or about normal rainfall was reported at most of the principal meteorological stations except Badulla and Pottuwil where below normal rainfall was reported and NuwaraEliya where about normal rainfall was reported for month of January (Fig 1). Maximum percentage was reported from Jaffna (473.2%) and Mannar (473.1%) while minimum from Badulla station (72.6%) (Table 2).
Further above normal rainy days were reported from most of the principal meteorological stations with maximum percentage was reported from Puttalum (400%).

Above normal rainfall was reported from most of the hydro catchment stations except Kotmale, Victoria and Randenigala where below normal rainfall was reported.

Highest cumulative rainfall was 761.2 mm at Batticoloa . Highest rainfall received during 24hours, was 218.0mm at Mylampavaley on 28th January.

The monthly total rainfall at hydro catchment areas, total rainfall and the number of rain days at the principal meteorological stations, are shown in tables1and 2.

Table-01-Monthly Total Rainfall (mm) with 30 years (1961-1990) of their averages at Hydro catchment areas

Hydro Catchment	Jan 2021	Average	% (percentage of average)
Castlereigh	194.9	78.7	247.6%
Norton	174.8	92.8	188.3%
Maussakele	127.3	75.5	168.7%
Canyon	187.2	79.3	236.1%
Laksapana	254.5	114.0	223.2%
Kotmale	97.5	126.6	77.0%
Victoriya	155.5	199.2	78.1%
Randenigala	257.2	369.7	69.6%
Bowatenna	344.9	321.3	107.4%
Ukuwela	154.7	134.1	115.4%
Samanala Wewa	197.5	76.9	256.8%
Maskeliya	212.1	63.1	336.1%
Neboda		126.2	

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).

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

Table 2 :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		
	2021-Jan	Average	%	2021-Jan	Average	%
Anuradhapuraya	168.6	79.2	212.9%	14	6	233.3%
Badulla	112.6	155.2	72.6%	18	12	150.0%
Bandarawela	112.6	102.4	110.0%	17	8	212.5%
Batticaloa	761.2	210.3	362.0%	18	11	163.6%
Colombo	132.4	58.2	227.5%	13	5	260.0%
Galle	195.8	85.1	230.1%	14	8	175.0%
Hambantota	75.5	55.1	137.0%	13	5	260.0%
Jaffna	317.5	67.1	473.2%	13	4	325.0%
Monaragala	187.0			17		
Katugastota	143.1	79.4	180.2%	16	6	266.7%
Katunayake	166.4	45.8	363.3%	11	4	275.0%
Kurunegala	158.9	56.4	281.7%	13	4	325.0%
Maha Iluppallama	166.9	69.8	239.1%	18	6	300.0%
Mannar	183.1	38.7	473.1%	14	6	233.3%
Polonnaruwa	453.6	163.5	277.4%	20	8	250.0%
Nuwara Eliya	91.4	100.6	90.9%	16	8	200.0%
Poothuvil	256.5	288.4	88.9%	17	na	
Puttlam	96.9	50.1	193.4%	16	4	400.0%
Rathmalana	214.7	69.3	309.8%	14	5	280.0%
Rathnapura	183.8	111.1	165.4%	15	9	166.7%
Trincomalee	229.5	115.6	198.5%	16	7	228.6%
Vavuniya	233.0	84.2	276.7%	15	6	250.0%
Mattala	147.6			14		

Table 4(a) - Extremes of Maximum Temperatures		January	2021
	Maximum		
		Offsets	Highest Std. Div
	Value	(-) (+)	
Value	34.1^{0}C	5.8 3.7	2.09
Station	Ratnapura	Colombo Katugastota	Katugastota
Date	21/01	09/01 21/01	

Table 4(b) -Extremes of Minimum Temperature January 2021			
	Minimum		
		Offsets	Highest
	Value	(-) (+)	Std. Div
Value	6.8C	2.6 4.9	2.06
Station	Nuwara Eliya	Nuwara Eliya Nuwara Eliya	NuwaraEliya
Date	25/01	25/01 13/01	

Prepared by National Meteorological Centre (NMC)
Department of Meteorology