

# Weather Synopsis – May 2021

Above normal rainfall was reported over most parts of the island except northeastern coastal areas where slightly below average rainfall was reported (Fig 1). All meteorological stations reported above normal rainy days (Fig.8) while most of the meteorological stations reported above average rainfall except Colombo (90%) where near average rainfall reported and Polonnaruwa (70%) and Trincomalee (66%) (Fig. 6). Most of the hydro catchment stations, except Bowathenna ((3%) and Samanalawewa (50%) reported above average rainfall (Fig. 7). Highest cumulative rainfall was 1191.6 mm at Moraliya . Highest rainfall received during 24hours, was 332.2 mm at Poddiwela Farm on the 13<sup>th</sup>.

Inter monsoon conditions continued during first two weeks with widespread afternoon thundershowers in the Western parts. Strong convective activity caused two deaths due to lightning at Anamaduwa on 07<sup>th</sup> and at Nawagaththegama on 08<sup>th</sup> (Fig 1).

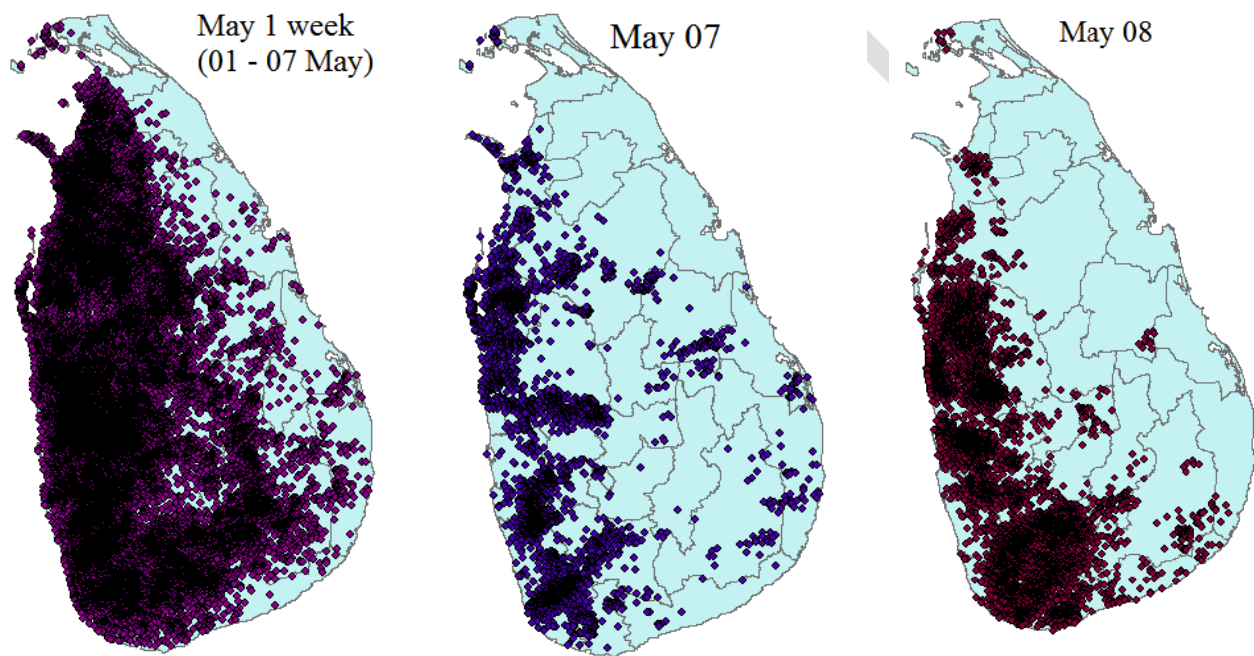


Fig 1 . Lightning activity reported during May 1<sup>st</sup> week (left), May 07 (middle) and May 08 (right)

With the formation of low pressure area formed over southeast Arabian Sea & adjoining Lakshadweep area in the morning (0300 UTC) of 13<sup>th</sup> May 2021 and subsequent intensification in to a well marked low pressure area over Lakshadweep area and adjoining southeast Arabian Sea in the same evening (1200 UTC of 13<sup>th</sup> May) torrential rain experienced in Southwest parts of the country. This system later further intensifies in to a cyclonic storm “TAUKTAE” on 14<sup>th</sup> night, the first cyclonic storm over the north Indian Ocean during the year 2021 and crossed Gujarat coast near Saurashtra on 17<sup>th</sup> night (Fig 2 (left)) (Source: India Meteorological Department (IMD)). It was a very rare that cyclone developed over the Arabian Sea caused adverse weather and damage over Sri Lanka.

Westerly wind burst between 04<sup>0</sup>N to 08<sup>0</sup>N with vortices straddling the equator (10<sup>0</sup>N and 02<sup>0</sup>S) (Figs 3c and 3d), is apparent to the west of Sri Lanka in the surface as well as lower parts of the atmosphere. Westward tilt of westerly wind burst is evident with height providing strong vertical wind shear over Sri Lanka (Fig 3d). A deep northwest-southeast oriented low-level trough appeared to the west of Sri Lanka at early morning hours moved across Sri Lanka during course of the day at 850mb, 700mb and 500mb levels (Fig 3d). The deep trough appeared over Sri Lanka (Figs 3c and 3d) as well as strong vertical wind shear (Fig 3e) provided favorable conditions for the formation of multicell thunderstorms bringing torrential rain exceeding 300mm rainfall at some places over southwestern quarter and adjacent areas on 13<sup>th</sup> May 2021 (Fig 3b) leading to Floods, landslides and cutting failures affecting more than 11500 families and around 46500 people. 5 people were died following this disaster (source DMC).

Onset of the southwest monsoon often triggers heavy rains and strong winds over Sri Lanka, especially over the southwest quarter. Development of low pressure / cyclonic systems in the Bay of Bengal, convergence of monsoon winds, near sea level westerly wind burst (narrow strip with strong westerly winds), and low-level trough in the vicinity of Sri Lanka provide favourable conditions to the Monsoon onset over Sri Lanka bringing heavy rainfall strong winds and southwest coastal erosion.

With the formation of low-pressure area subsequent cyclonic storm "Yaas" in the northwest Bay of Bengal (Fig 2 (right)) southwest monsoon flow established over Sri Lanka from 24<sup>th</sup> to 26<sup>th</sup> (Figs 4b, 4c and 4d). In addition, westerly wind burst between Equator to 08<sup>0</sup>N with vortices straddling the equator (15<sup>0</sup>N and 05<sup>0</sup>S), apparent over Sri Lanka further boost strong winds across Sri Lanka (Figs 4b, 4c and 4d). The onset of Southwest monsoon brought heavy rainfalls especially over western

slopes of the central hills (Fig 4a), strong gusty winds cross the land as well as sea areas surrounding Sri Lanka, Rough seas and coastal inundation and erosion along western coast. Most of the heavy rainfall confined to the western slopes of the central hills (Fig 4a) due to orographic effect. Strong westerly to south-westerly wind flow is apparent at low levels as well as mid-levels (Figs 4c and 4d) over Sri Lanka. Strong winds, floods, landslides and cutting failures associated with monsoon onset affected more than 11000 families and around 38500 people (source DMC) . One death was reported following this disaster (source DMC). A power outage has been reported in several areas and according to Ministry of Power around 177,000 people have been affected by the breakdown in power supply caused by the extreme weather conditions. Fishing and naval activities were suspended over the sea areas around the island from 23<sup>rd</sup> May.

Most of the meteorological stations reported above average Maximum temperatures except from 13<sup>th</sup> to 15<sup>th</sup> and during third week when most of the meteorological stations reported during and near average temperatures below average temperatures (Fig.15). Minimum temperatures were above average over most of the stations especially during the last three weeks of the month (Fig.16). Reported maximum temperature was 36.3<sup>0</sup>C at Polonnaruwa on 18<sup>th</sup> May and reported minimum temperature was 11.7<sup>0</sup>C at NuwaraEliya on 3<sup>rd</sup> May (Table 3).

During May 2021, sea surface temperatures (SSTs) were near-average across much of the equatorial Pacific reflecting ENSO-neutral conditions.

Sea surface waters in Bay of Bengal (BoB) and north Arabian sea are warmer than average while cooler than normal sea surface temperature are apparent in southwest Arabian sea (Fig. 10 ).

The average position of the shear line laid around Equator 40<sup>0</sup>E, 01<sup>0</sup>S70<sup>0</sup>E and 02<sup>0</sup>S90<sup>0</sup>E and 02<sup>0</sup>N120<sup>0</sup>E (Fig 10).

The Madden-Julian Oscillation (MJO) was strong at phase 1 from 01<sup>st</sup> May to 04<sup>th</sup> May, propagated to phase 2 and 3 from 05<sup>th</sup> to 18<sup>th</sup>, entered phase 4 on 19<sup>th</sup> then to phase 5 on 23<sup>rd</sup> , propagated became weak from 25<sup>th</sup> to the remaining days of the month (Fig.11).

## Weather Systems

A low pressure area formed over southeast Arabian Sea & adjoining Lakshadweep area in the morning of 13th May 2021. It lay as a well marked low pressure area over Lakshadweep area and adjoining southeast Arabian Sea in the same evening. Under favourable environmental conditions, it concentrated into a depression over Lakshadweep area in the morning of 14<sup>th</sup> May, 2021. It intensified into a deep depression over Lakshadweep area and adjoining southeast & eastcentral Arabian Sea in the same afternoon and into cyclonic storm “TAUKTAE” in the same midnight over the same region (Fig 2 (left)).

It moved nearly northwards and intensified into a severe cyclonic storm in the evening of 15<sup>th</sup> May over eastcentral Arabian Sea. Continuing to move nearly northwards, it intensified into a very severe cyclonic storm over eastcentral Arabian Sea in the early hours of 16<sup>th</sup> May over eastcentral Arabian Sea. It gradually started moving north-northwestwards from noon of 16<sup>th</sup> May and intensified rapidly into an extremely severe cyclonic storm in the early hours of 17<sup>th</sup> May and crossed Saurashtra coast near latitude 20.8°N and longitude 71.1°E, during 2000-2300 hours of 17<sup>th</sup> May, 2021 with maximum sustained wind speed of 160-170 kmph gusting to 185 kmph (Source: India Meteorological Department).

A low pressure area formed over east central Bay of Bengal (BoB) in the morning of 22<sup>nd</sup> May. It lay as a well marked low pressure area in the same afternoon over east central BoB. Under favourable environmental conditions, it concentrated into a depression over east central BoB in the noon of 23<sup>rd</sup> May, 2021. It moved north westwards and intensified into a deep depression over eastcentral BoB in the midnight of 23<sup>rd</sup> May and into the cyclonic storm “YAAS” in the early morning of 24<sup>th</sup> over the same region. It moved nearly north-northwestwards and intensified into a severe cyclonic storm in the midnight of 24<sup>th</sup> May over eastcentral BoB and further intensified into a very severe cyclonic storm in the evening over northwest BoB (Fig 2 (right)). Thereafter, it moved north-northwestwards and crossed north Odisha coast near latitude 21.35°N and longitude 86.95°E, about 20 km to the south of Balasore with maximum sustained wind speed 130 -140 kmph gusting to 155 kmph between 1030-1130 hour on 26<sup>th</sup> (Source: India Meteorological Department).

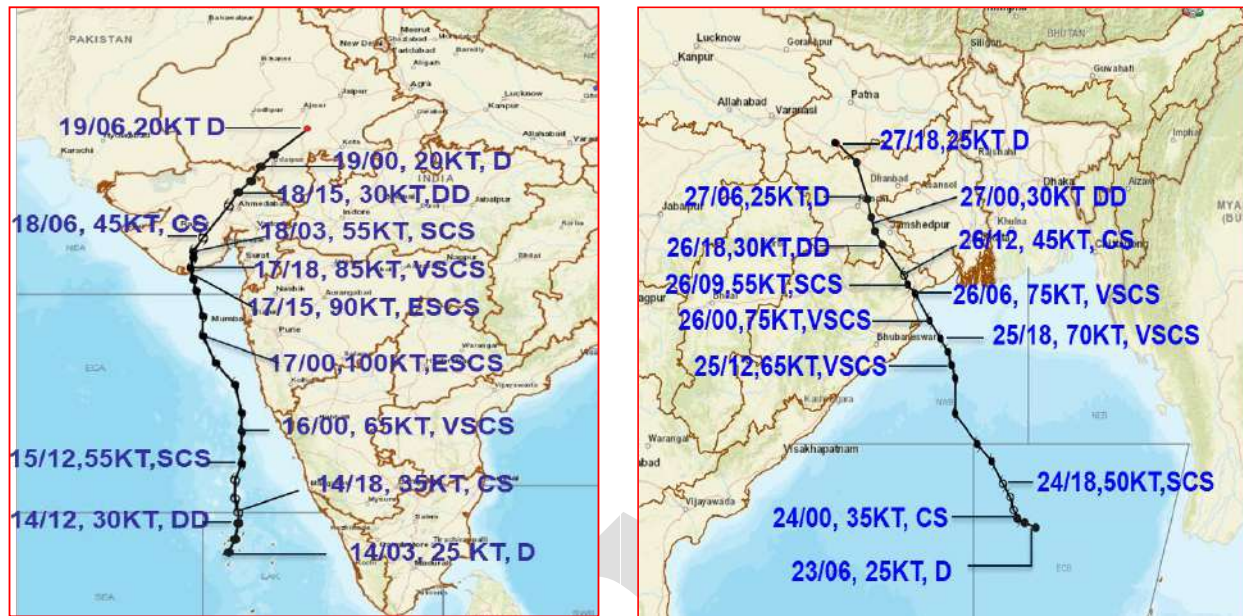


Fig 2: Observed Track of TAUKTAE during 14<sup>th</sup>-19<sup>th</sup> May, 2021 (left) and YAAS during 23<sup>rd</sup>-28<sup>th</sup> May, 2021 (right) (Source : IMD)

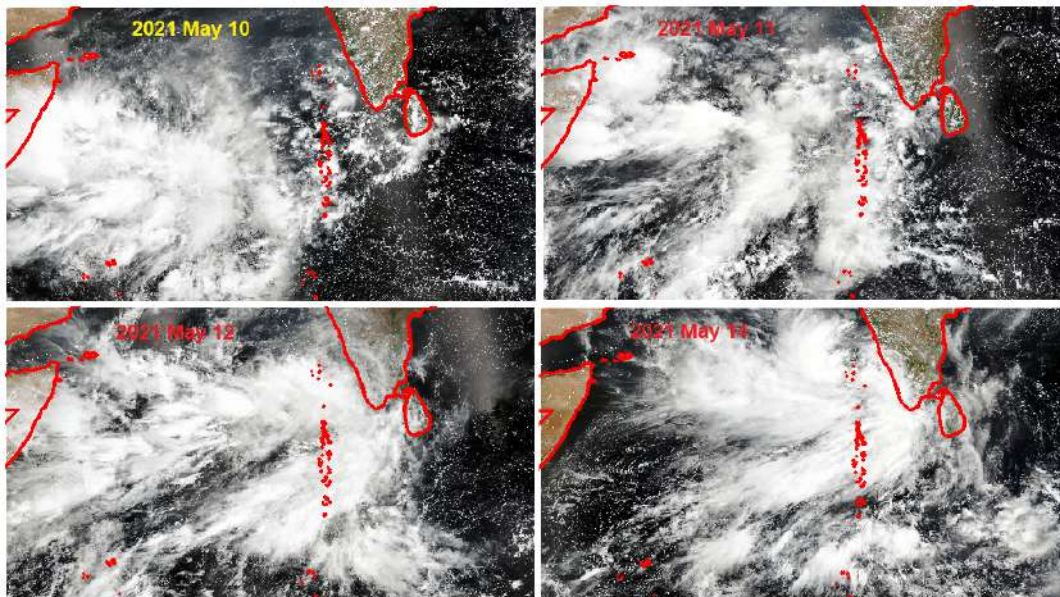


Fig 3a : Visible images from 10<sup>th</sup> to 14<sup>th</sup> May 2021



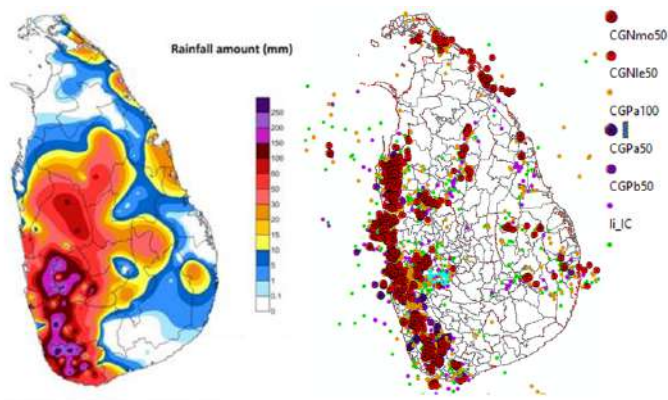


Fig 3b : Accumulated rainfall (mm) from 0830am 13<sup>th</sup>May to 0830am 14<sup>th</sup> May 2021(left) and lightning stroke maps on 13<sup>th</sup> May 2021

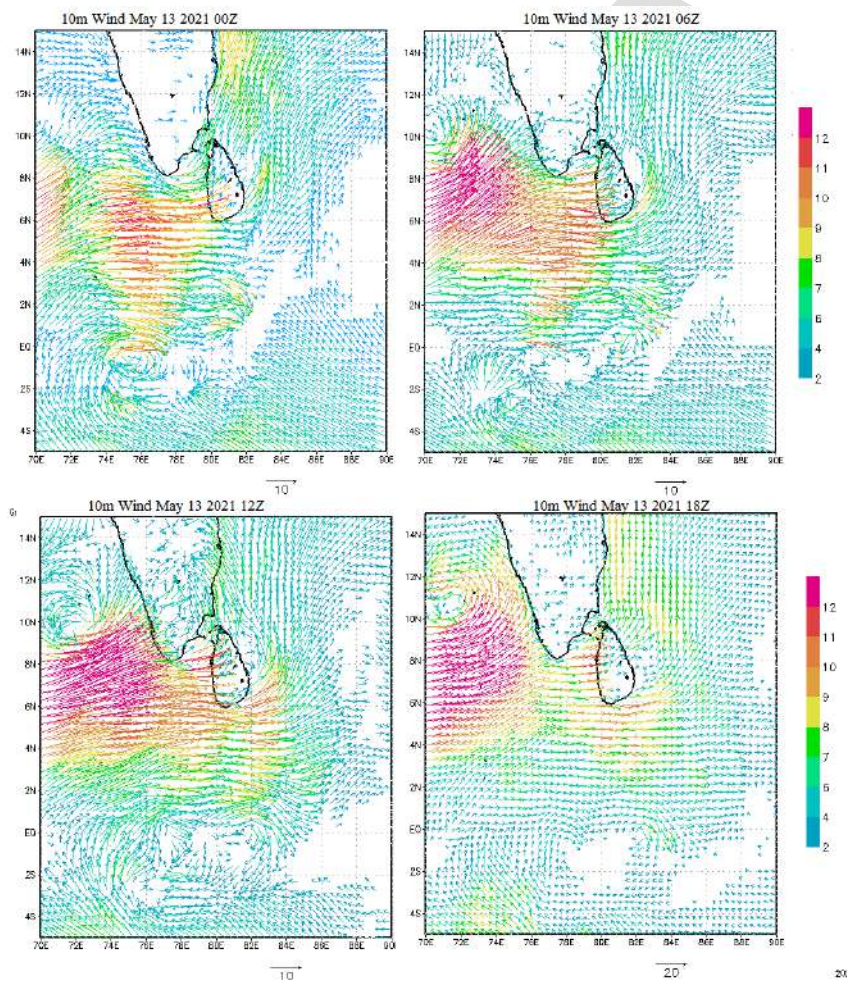


Fig 3c: ECMWF 10m wind at 13 May 00z, 13 May 06z, 13 May 12z, and 13 May 18z 2021



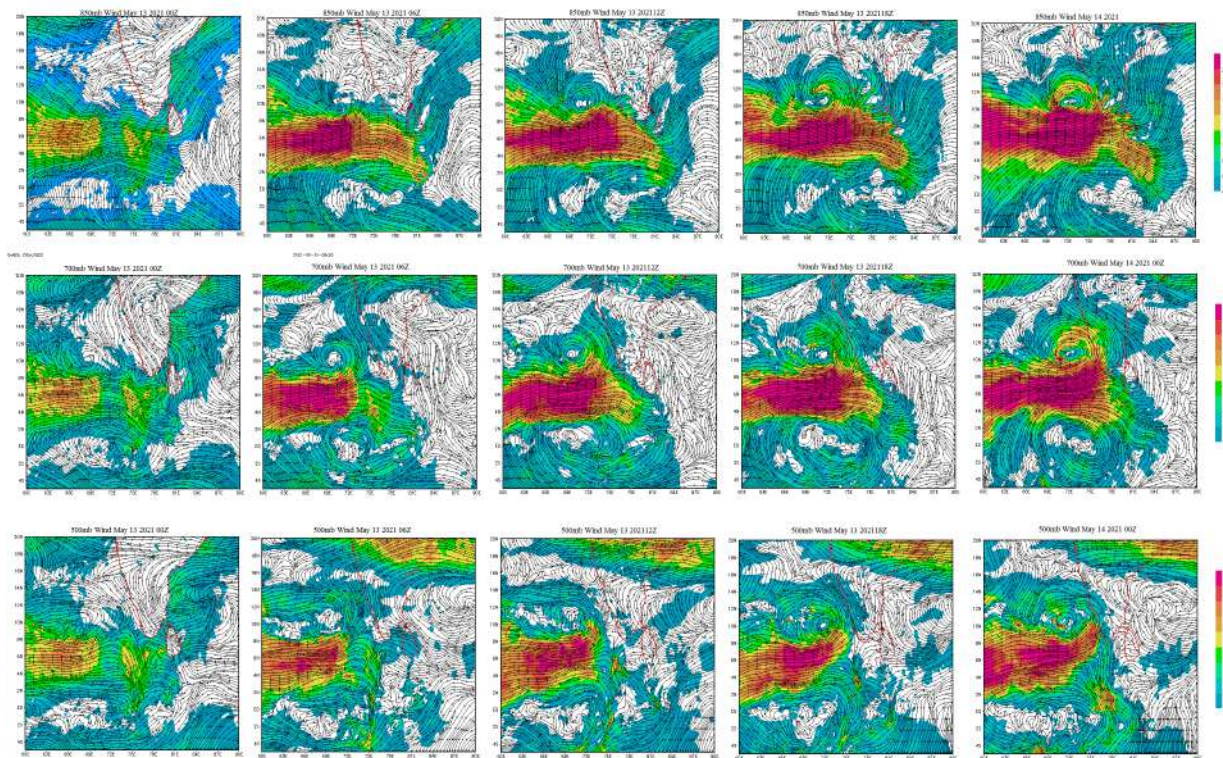


Fig 3d: ECMWF 850 mb wind (upper) , 700 mb wind (middle) and 500mb wind (lower) from 13 May 00z, 13 May 06z, 13 May 12z, 13 May 18z and 14 May 00z 2021

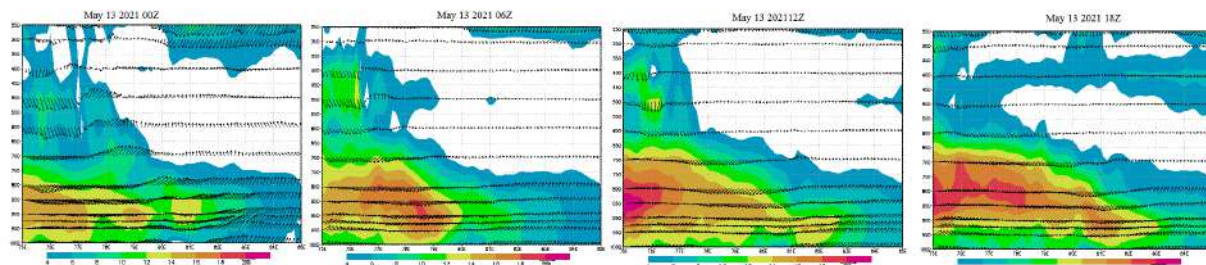


Fig 3e: Vertical cross-section of wind across Sri Lanka ( $7^{\circ}\text{N}$ ) at 13 May 00z, 13 May 06z, 13 May 12z, and 13 May 18z 2021



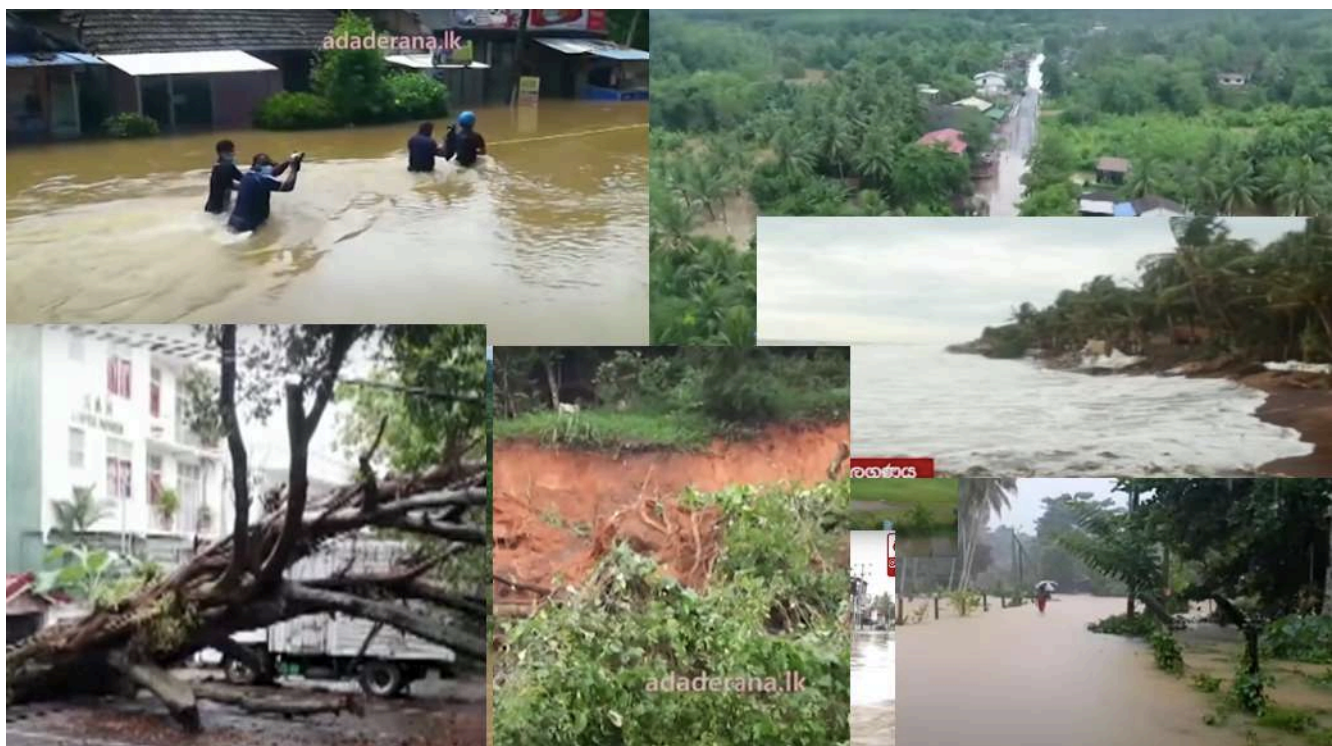


Fig 3f: Impacts of extreme weather on 13<sup>th</sup> May 2021

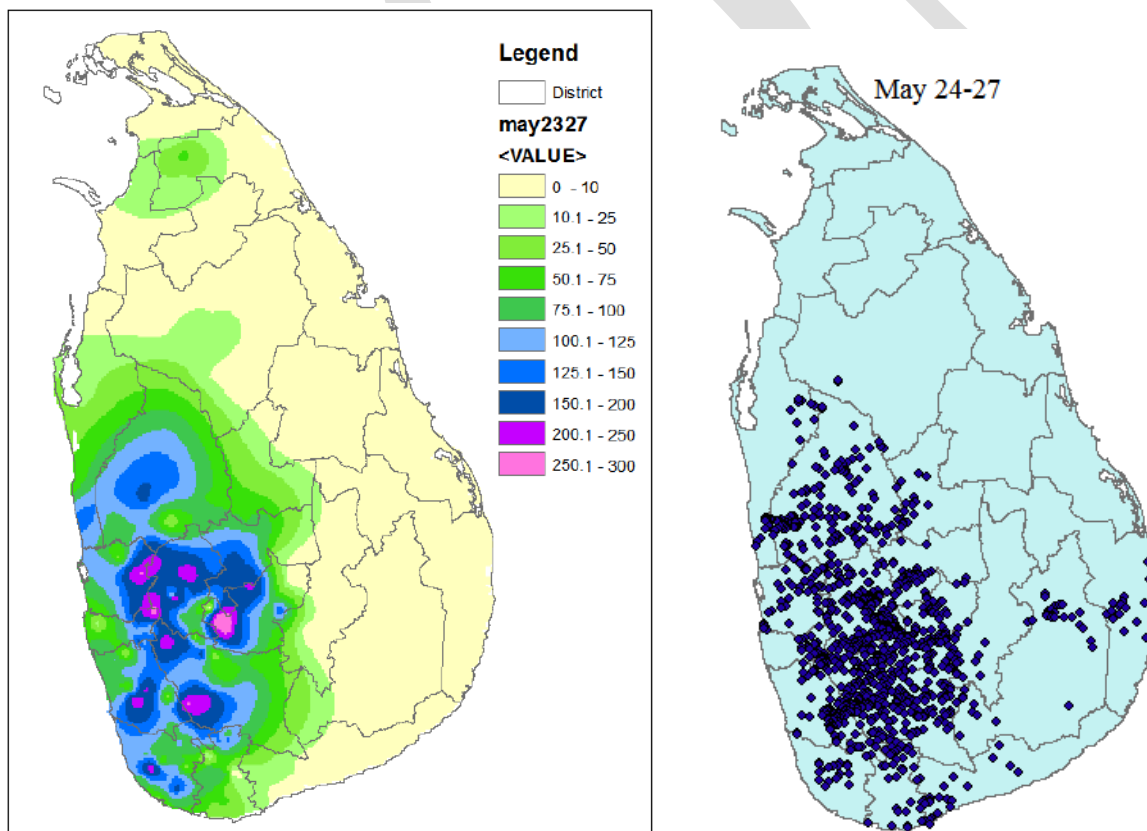


Fig 4a : Accumulated rainfall (mm) from 0830am 23<sup>rd</sup> May to 0830am 28<sup>th</sup> May 2021(left) and lightning stroke maps from 24<sup>th</sup> to 27<sup>th</sup> May 2021



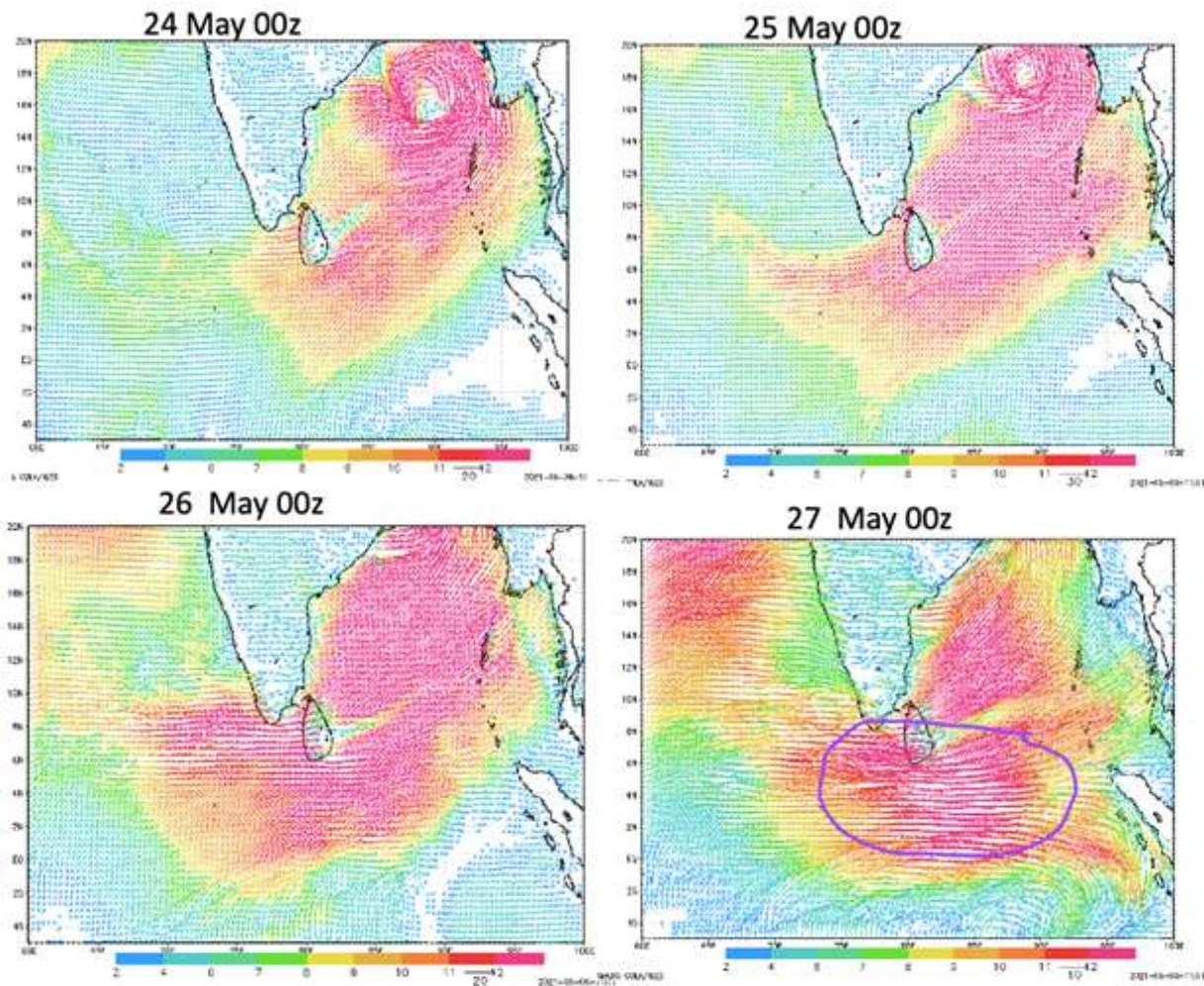


Fig 4b: ECMWF 10m wind at 24 May 00z, 25 May 00z, 26 May 00z, and 27 May 00z



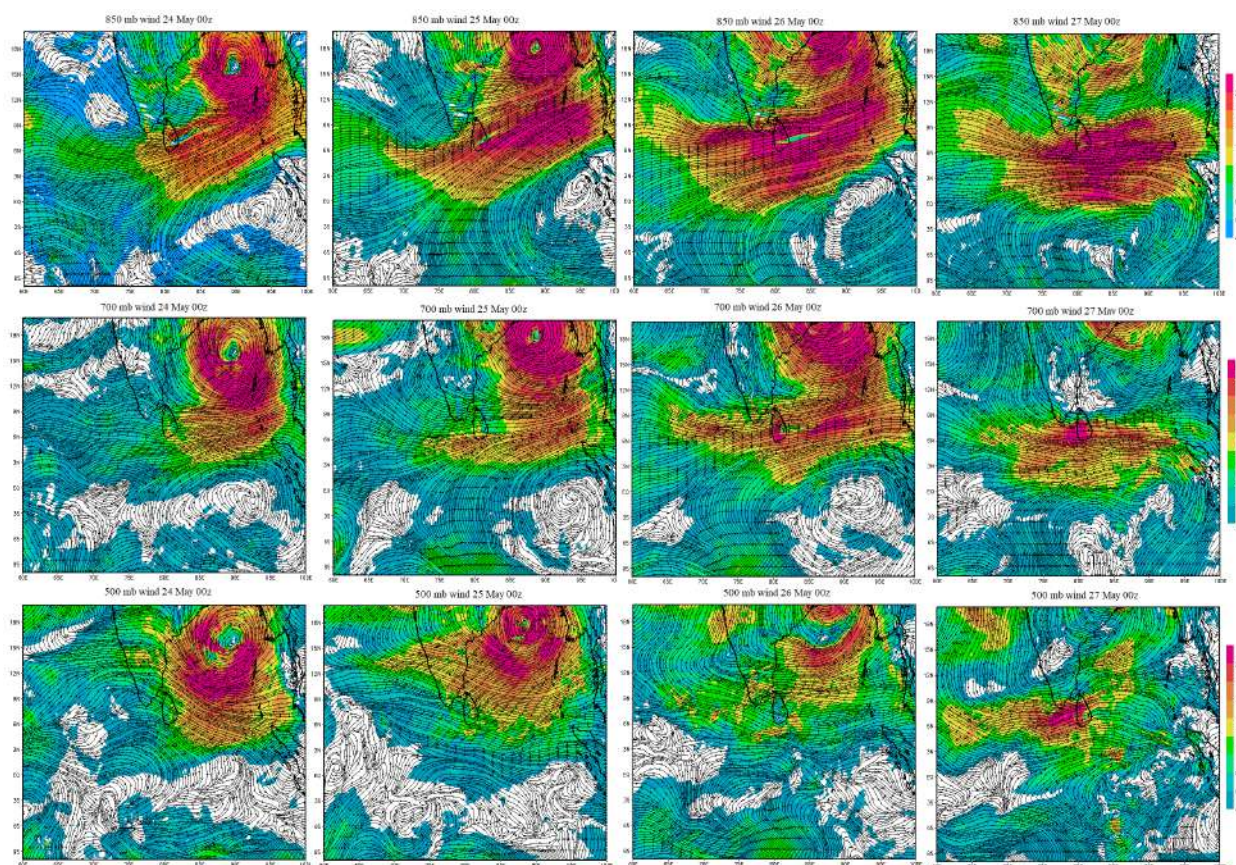


Fig 4c : ECMWF 850 mb wind (upper) , 700 mb wind (middle) and 500mb wind (lower) at 24 May 00z, 25 May 00z, 26 May 00z, and 27 May 00z

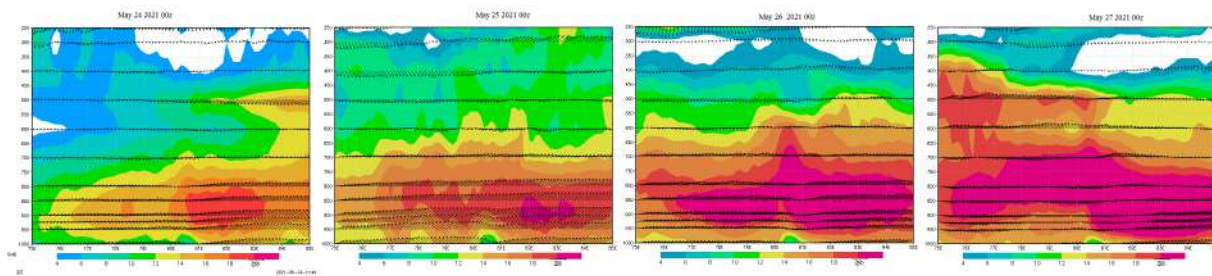


Fig 4d : Vertical cross-section of wind across Sri Lanka (7°N) at 24 May 00z, 25 May 00z, 26 May 00z, and 27 May 00z





Fig 4e: Impacts of extreme weather associate with Monsoon onset, from 24<sup>th</sup> to 27<sup>th</sup> May 2021

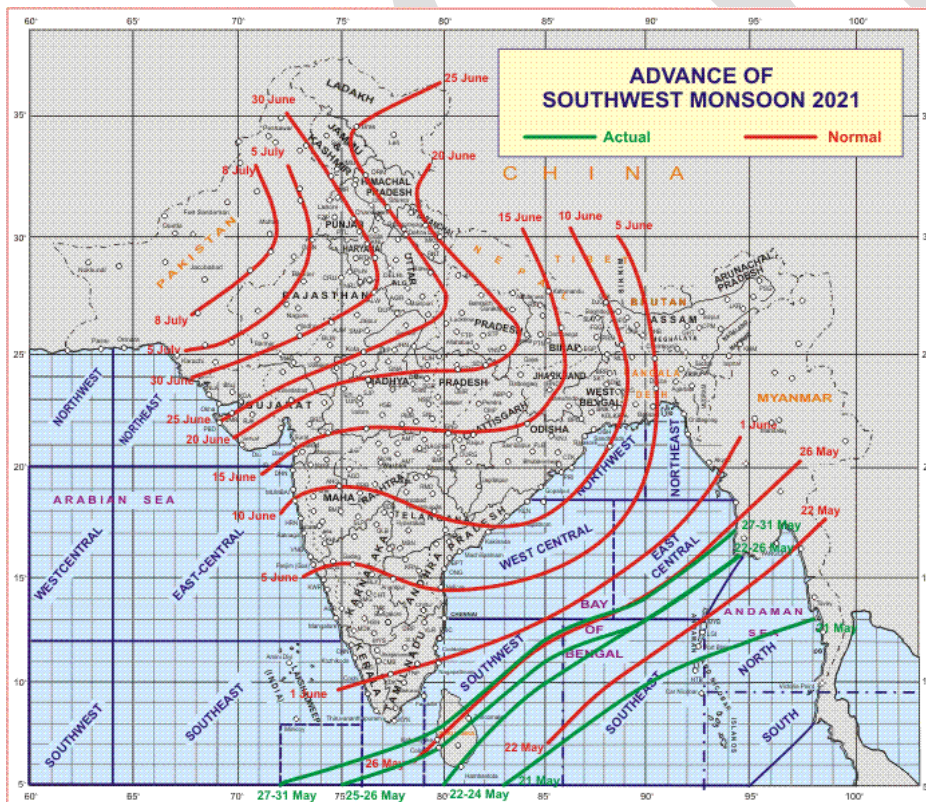


Fig 5: Monsoon onset isochrones for May 2021 (Source : IMD)



**Surface pressure and winds:** The surface pressure was about or above average during first week. The surface pressure was generally below average from second week onwards. The surface pressure was above average along the north-eastern and eastern coasts while below average along western coast from 16th to 20th. There were even or fairly even pressure distribution from 02<sup>nd</sup> to 12<sup>th</sup> and southwesterly pressure gradient for the rest of the month. The pressure gradient was steep from 24<sup>th</sup> to 27<sup>th</sup>, moderate on 14<sup>th</sup>, from 21<sup>st</sup> to 23<sup>rd</sup> and 28<sup>th</sup> to 31<sup>st</sup>, and mild on 01<sup>st</sup>, on 13<sup>th</sup>, and from 15<sup>th</sup> to 20<sup>th</sup>.

The surface wind was light and variable until 12<sup>th</sup> and westerly to South-westerly for the rest of the month and speed varied within 05-15kts. 20 -25 knots surface wind was reported from Nuwara Eliya on 25<sup>th</sup> to 27<sup>th</sup>.

### Upper winds:

**At 850hPa,** Westerly wind flow was dominated over the island (Fig 12).

**At 700 hPa,** Southwesterly wind flow was dominated over the island. Anomalous South westerly flow evident across of Sri Lanka indicate strengthening of monsoonal flow over the island (Fig 13)

**At 500 hPa,** North Westerly wind flow was dominated over the island. Anomalous South westerly flow evident across of Sri Lanka indicate strengthening of monsoonal flow over the island (Fig 14)

**The 200 hpa** the upper tropospheric ridge was laid from 12<sup>0</sup>N40<sup>0</sup>E to 14<sup>0</sup>N80<sup>0</sup>E and 16<sup>0</sup>N100<sup>0</sup>E bringing predominantly southeasterly winds across Sri Lanka.

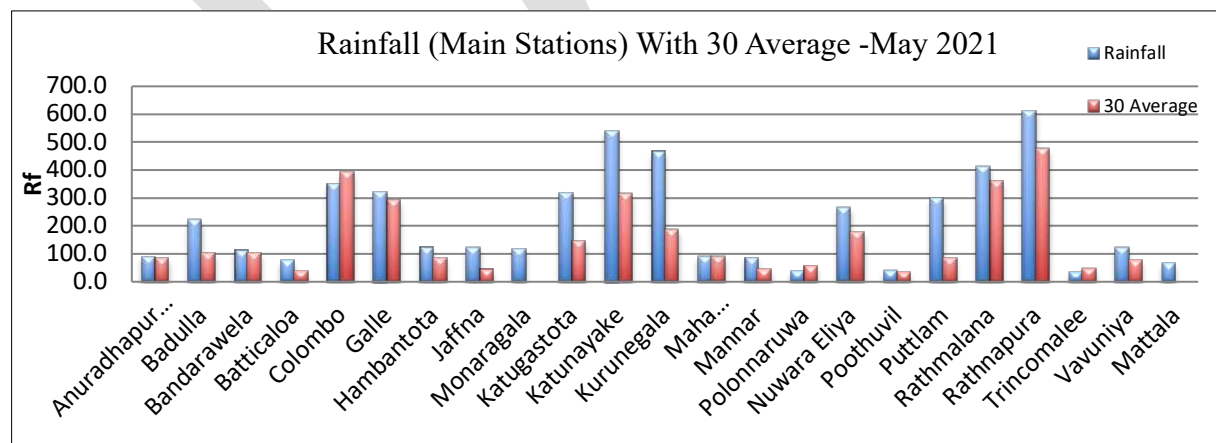


Fig 6: Monthly Total Rainfall (mm) with 30 years (1961-1990) of their averages at Main Meteorological stations areas during May 2021

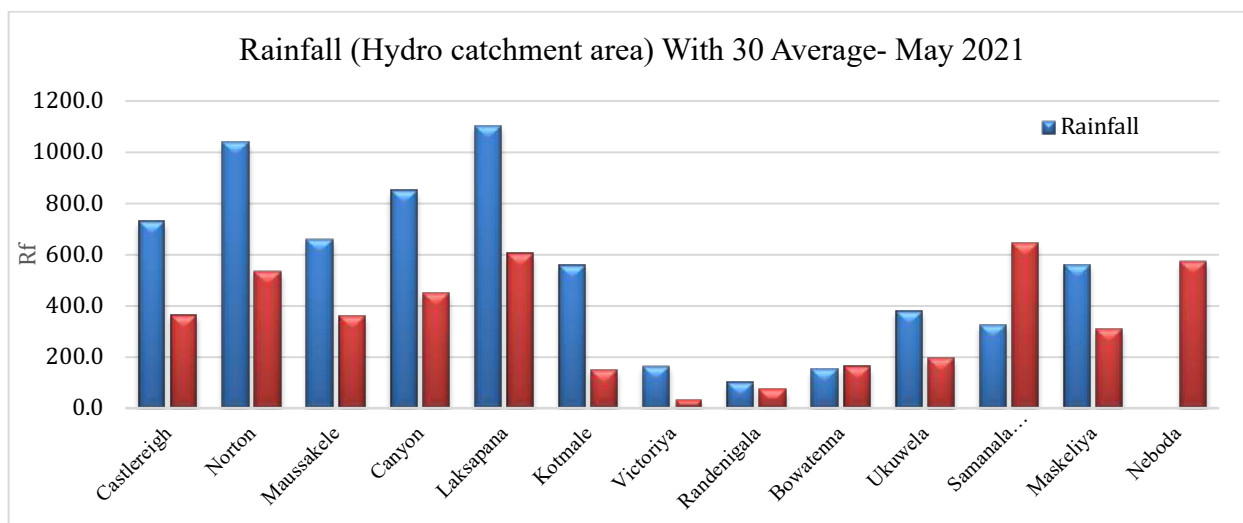


Fig 7: Monthly Total Rainfall(mm) with 30 years (1961-1990) of their averages at Hydro catchment areas during May 2021

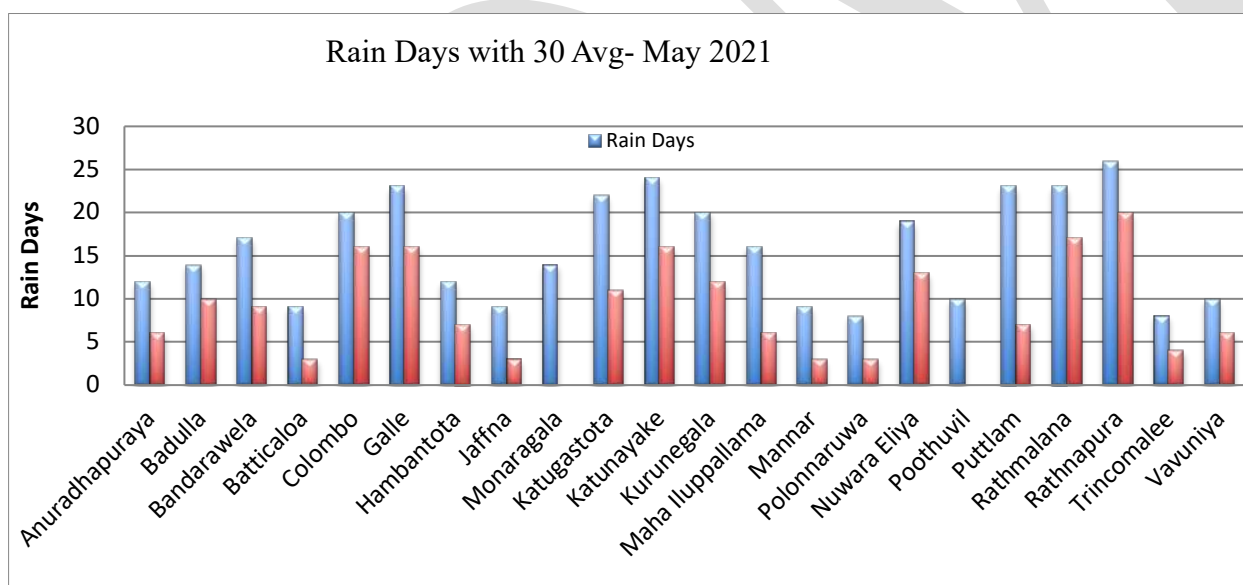


Fig 8: monthly total no of rainy days with 30 years (1961-1990) of their averages at main Meteorological stations during May 2021

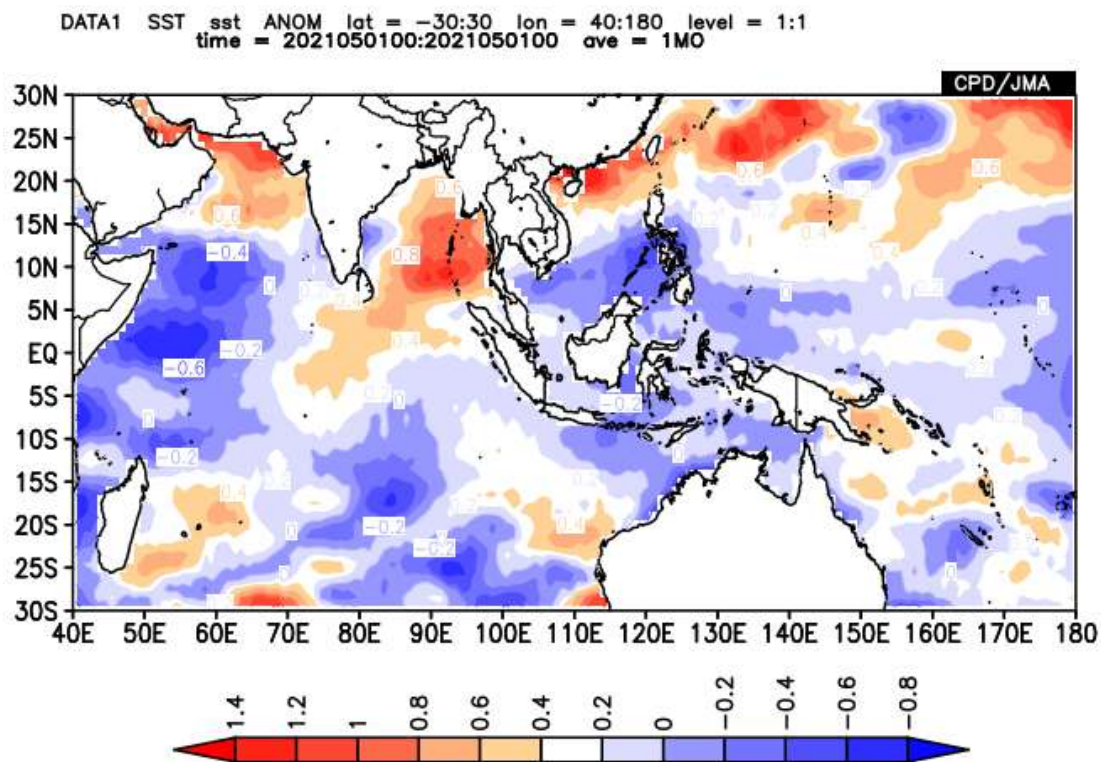


Fig 9: SST anomaly map for May 2021

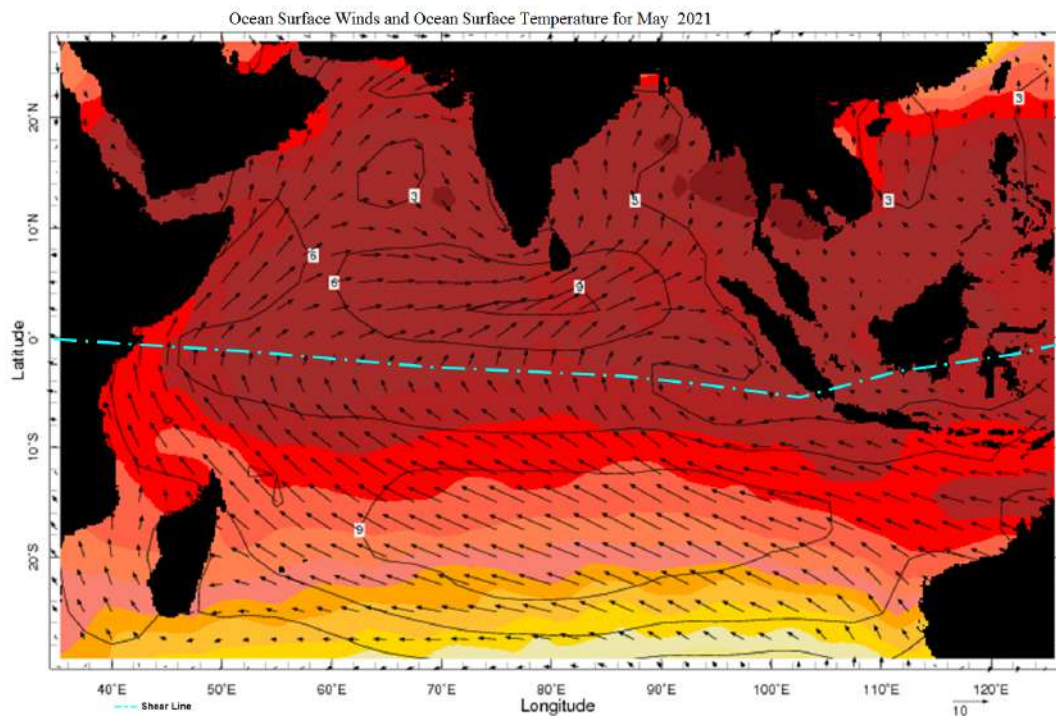


Fig 10: Ocean Surface Winds and Ocean Surface Temperature for May 2021



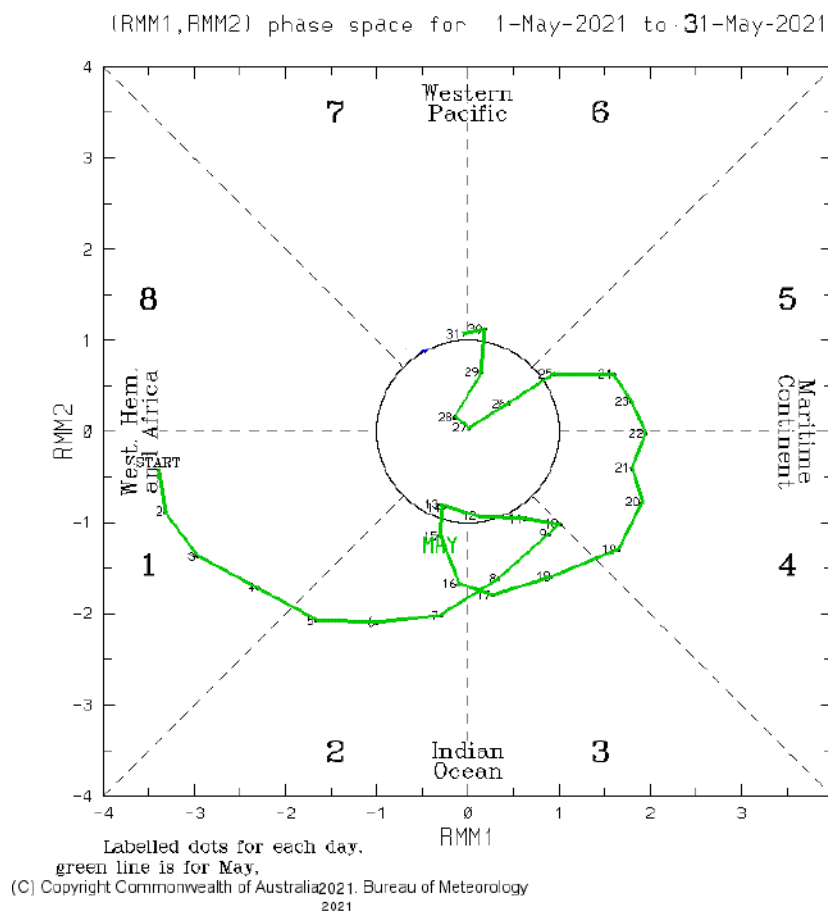


Fig 11 Phase diagram of MJO Index

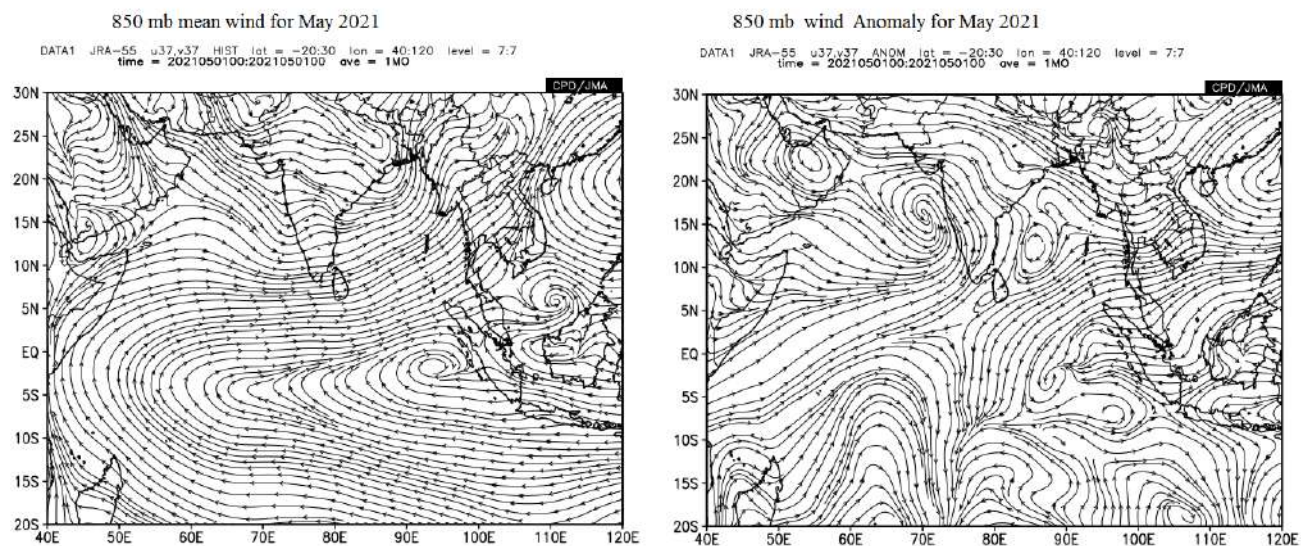
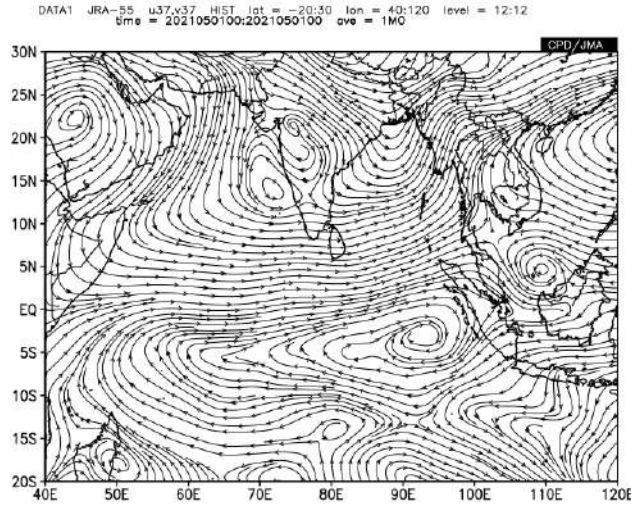


Fig. 12 Monthly average wind pattern at 850hpa level during the month of May 2021 (JRA55)

700 mb mean wind for May 2021



700 mb wind Anomaly for May 2021

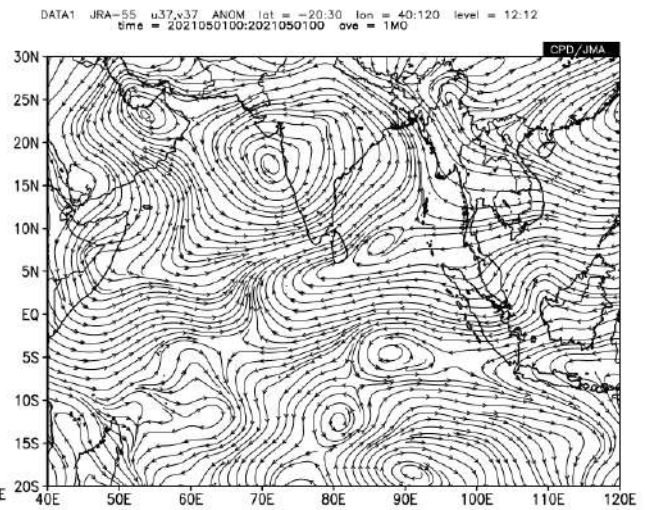
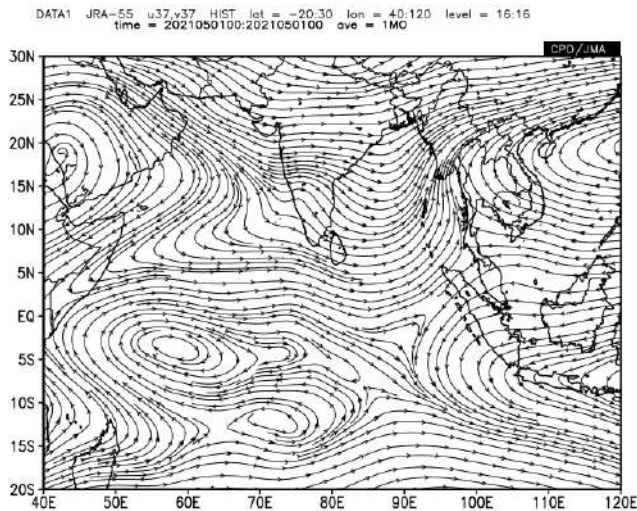


Fig. 13 Monthly average wind pattern at 700hpa level during the month of May 2021 (JRA55)

500 mb mean wind for May 2021



500 mb wind Anomaly for May 2021

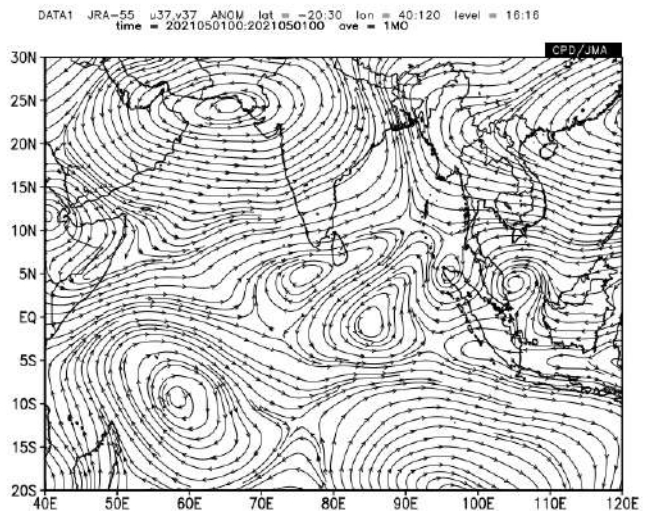


Fig. 14 Monthly average wind pattern at 500hpa level during the month of May2021 (JRA55)



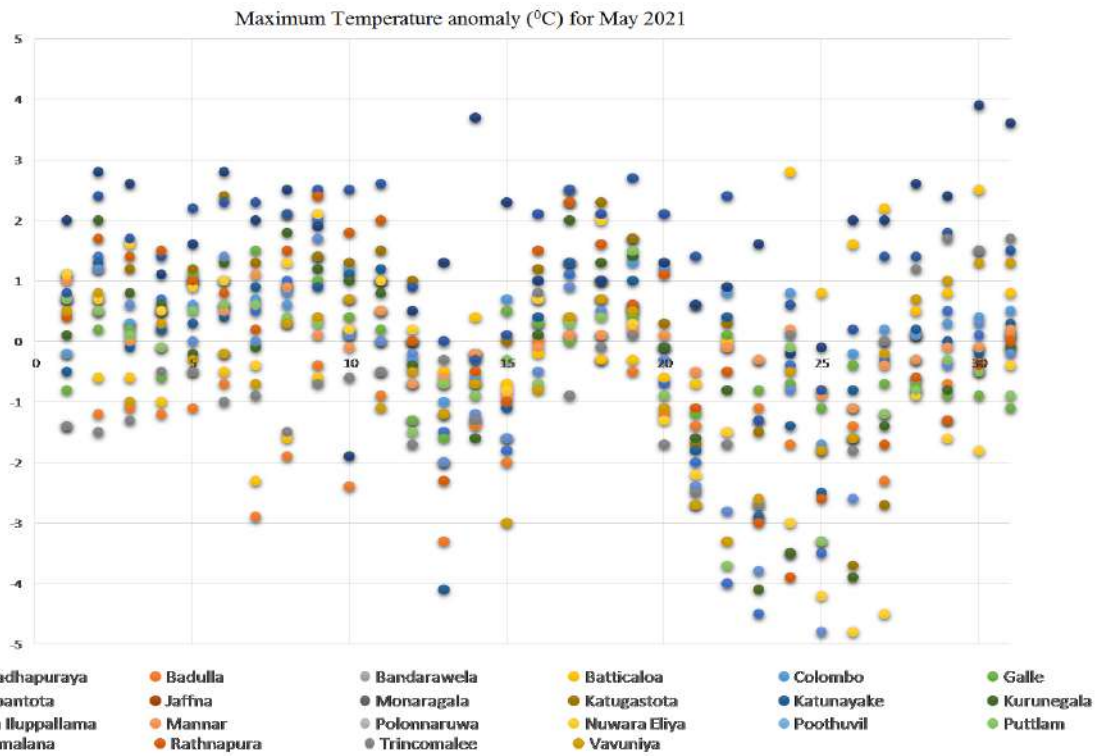


Fig 15 Maximum Temperature anomaly ( $^{\circ}\text{C}$ ) for May 2021

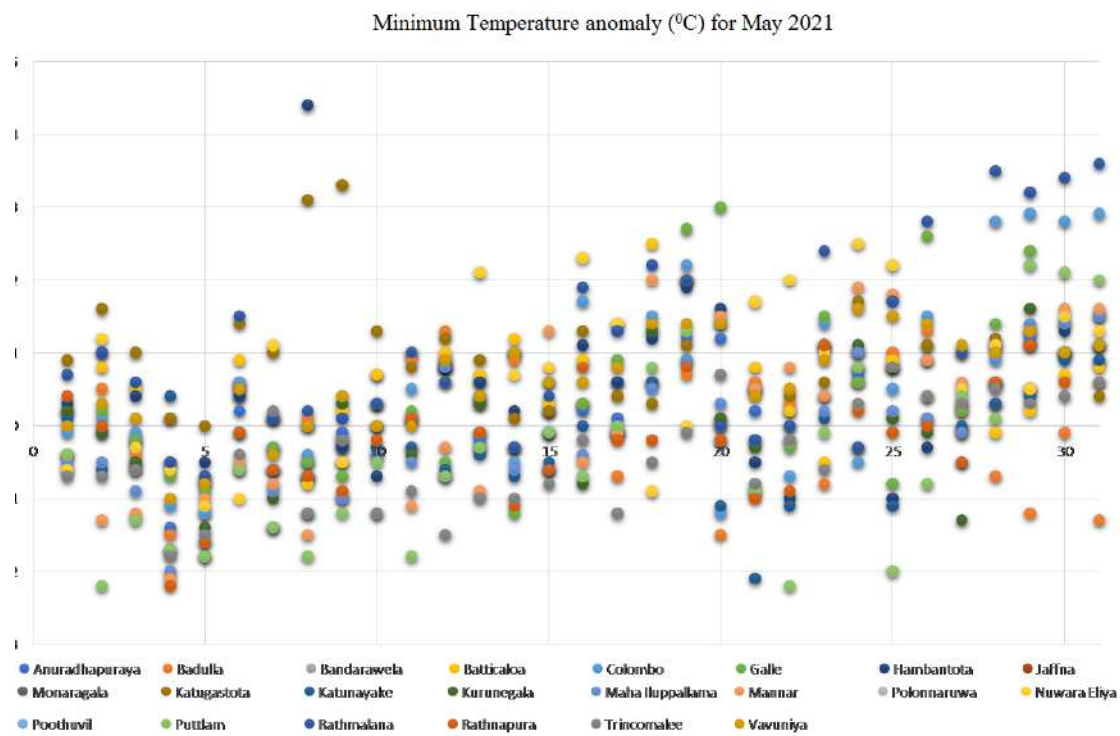


Fig 16 Minimum Temperature anomaly ( $^{\circ}\text{C}$ ) for May 2021



### **Temperature Field:**

Most of the meteorological stations reported above average Maximum temperatures except from 13 to 15 and during third week when most of the meteorological stations reported during and near average temperatures below average temperatures (Fig.15). Highest recorded maximum temperature for the month of May 2021 was 36.3<sup>0</sup>C at Polonnaruwa on 18<sup>th</sup> May (Table 3a).

Minimum temperatures were above average over most of the stations especially during the last three weeks of the month (Fig.16). Lowest recorded minimum temperature for the month of May 2021 was 11.7<sup>0</sup>C at NuwaraEliya on 3<sup>rd</sup> May (Table 3b).

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

**Rainfall:** Wetter than normal condition was evident over most parts of the Island except northeastern coastal areas (Fig 7) for May 2021. Above normal rainfall was reported from most of the principal meteorological stations except stations except Colombo (90%) where near average rainfall reported and Polonnaruwa (70%) and Trincomalee (66%) (Fig 7). Maximum percentage was reported from Puttalam (355.6%) while minimum from Trincomalee station (66.7%) (Table 2). Number of rainy days was above average (Fig 9). Highest cumulative rainfall was 1191.6 mm at Moraliya . Highest rainfall received during 24hours, was 332.2 mm at Poddiwela Farm on the 13<sup>th</sup>.

Most of the hydro catchment stations, except Bowathenna ((3%) Samanalawewa (50%) reported above average rainfall (Fig. 8).

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).

Meteorological station	Monthly Total rainfall(mm)			Monthly Total No of rainy Days		
	2021-May	Average	%	2021-May	Average	%
Anuradhapuraya	90.6	84.3	107.5%	12	6	200.0%
Badulla	224.0	104.0	215.4%	14	10	140.0%
Bandarawela	114.2	104.2	109.6%	17	9	188.9%
Batticaloa	75.2	39.3	191.3%	9	3	300.0%
Colombo	350.5	392.4	89.3%	20	16	125.0%
Galle	320.2	290.4	110.3%	23	16	143.8%
Hambantota	123.7	85.1	145.4%	12	7	171.4%
Jaffna	123.2	46.7	263.8%	9	3	300.0%
Monaragala	116.9			14		
Katugastota	319.0	144.0	221.5%	22	11	200.0%
Katunayake	540.6	317.6	170.2%	24	16	150.0%
Kurunegala	468.4	188.3	248.8%	20	12	166.7%
MahaIluppallama	92.7	93.0	99.7%	16	6	266.7%
Mannar	85.0	44.7	190.2%	9	3	300.0%
Polonnaruwa	39.6	57.9	68.4%	8	3	266.7%
Nuwara Eliya	266.0	175.9	151.2%	19	13	146.2%
Poothuvil	41.5	35.1	118.2%	10	na	
Puttlam	299.8	84.3	355.6%	23	7	328.6%
Rathmalana	412.4	360.6	114.4%	23	17	135.3%
Rathnapura	611.4	475.9	128.5%	26	20	130.0%
Trincomalee	33.5	50.2	66.7%	8	4	200.0%
Vavuniya	123.5	74.8	165.1%	10	6	166.7%
Mattala	66.0			12		

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

Castlereigh	730.4	366.2	199.4%
Norton	1037.9	534.4	194.2%
Maussakele	660.5	358.0	184.5%
Canyon	849.7	449.0	189.2%
Laksapana	1104.2	604.3	182.7%
Kotmale	560.1	148.7	376.7%
Victoriya	164.2	31.9	514.1%
Randenigala	99.7	72.6	137.3%
Bowatenna	152.3	165.0	92.3%
Ukuwela	380.2	195.5	194.5%
SamanalaWewa	323.5	642.3	50.4%
Maskeliya	559.2	307.1	182.1%
Neboda		576.1	
Castlereigh	730.4	366.2	199.4%

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

Table 3(a) - Extremes of Maximum Temperatures May 2021				
	Maximum			Highest Std.Div
	Value	Offsets		
		(-)	(+)	
Value	36.3 <sup>0</sup> C	5.4	3.9	1.96
Station	Polonnaruwa	Kurunegala	Hambantota	NuwaraEliya
Date	18/05/2021	25/05/2021	30/05/2021	
Table 3(b) -Extremes of Minimum Temperature May2021				
	Minimum			Highest Std.Div
	Value	Offsets		
		(-)	(+)	
Value	11.7 <sup>0</sup> C	2.2	4.4	1.51
Station	NuwaraEliya	Puttalam 02 and 22 May and Ratnapura 04 May	Hambantota	Jaffna
Date	05/05/2021	02, 04 and 22/05/2021	08/05/2021	

Prepared by National Meteorological Centre (NMC)  
Department of Meteorology