# Weather Synopsis –June 2020.

Below normal rainfall was reported at the principal meteorological stations located in Southwest Quarter and Kurunegala, Puttalum and Jaffna. Above or about normal rainfall was reported from remaining principal meteorological stations mainly located in Dry and Intermediate zone (Fig 1).

Southwest Monsoon has established over Southern part of Sri Lanka on 28$^{th}$May. However further advancement of monsoon flow across Sri Lanka has restricted due to formation of a severe cyclonic storm Nisarga over Southeast and east central Arabian sea from 31 May to 3$^{rd}$ June. It crossed Maharashtra coast close to south of Alibagh as a severe cyclonic storm on 03$^{rd}$ June. With the re-strengthening of westerlies and increase in rainfall over the region, the southwest Monsoon has fully established over Sri Lanka by 07$^{th}$ June.

showery conditions were enhanced over southwestern parts and adjoining areas with the strengthening of westerly wind flow from 5th to 7th and strengthening of southwesterly flow due to a low pressure area developed over West central Bay of Bengal and neighbourhood from 10$^{th}$ to 12$^{th}$ June.

Thunderstorm activity was enhanced in north-eastern and eastern parts from 24$^{th}$ to 25$^{th}$ and showery conditions were enhanced over southwestern parts from 25$^{th}$ to 26$^{th}$ due to northwest southeast oriented mid tropospheric shear zone appeared over and across Sri Lanka at 700 and 500mb levels. It is worthy to mention that this shear zone was tilted south westwards with height

According to Disaster Management Center (DMC), several families were affected by strong winds and high intense rain leading to cutting failures during June 2020 (Table1**).**

Most of the meteorological stations reported above average maximum temperatures during the month of June 2020. However some stations reported below average maximum temperatures on 6$^{th}$ , 7 $^{th}$, 11 $^{th}$, 21$^{st}$ , 23$^{rd}$ , 26 $^{th}$ and 30 $^{th}$ (Fig.15). Most of the meteorological stations reported above average minimum temperatures during the month of June 2020. However some stations reported below average minimum temperatures during the first and last week of the month. Reported maximum temperature was 38.2$^{0}$C at Pottuvil on 09$^{th}$ June and reported minimum temperature was 17.4$^{0}$C at NuwaraEliya on 14$^{th}$ June (Table 4 ).

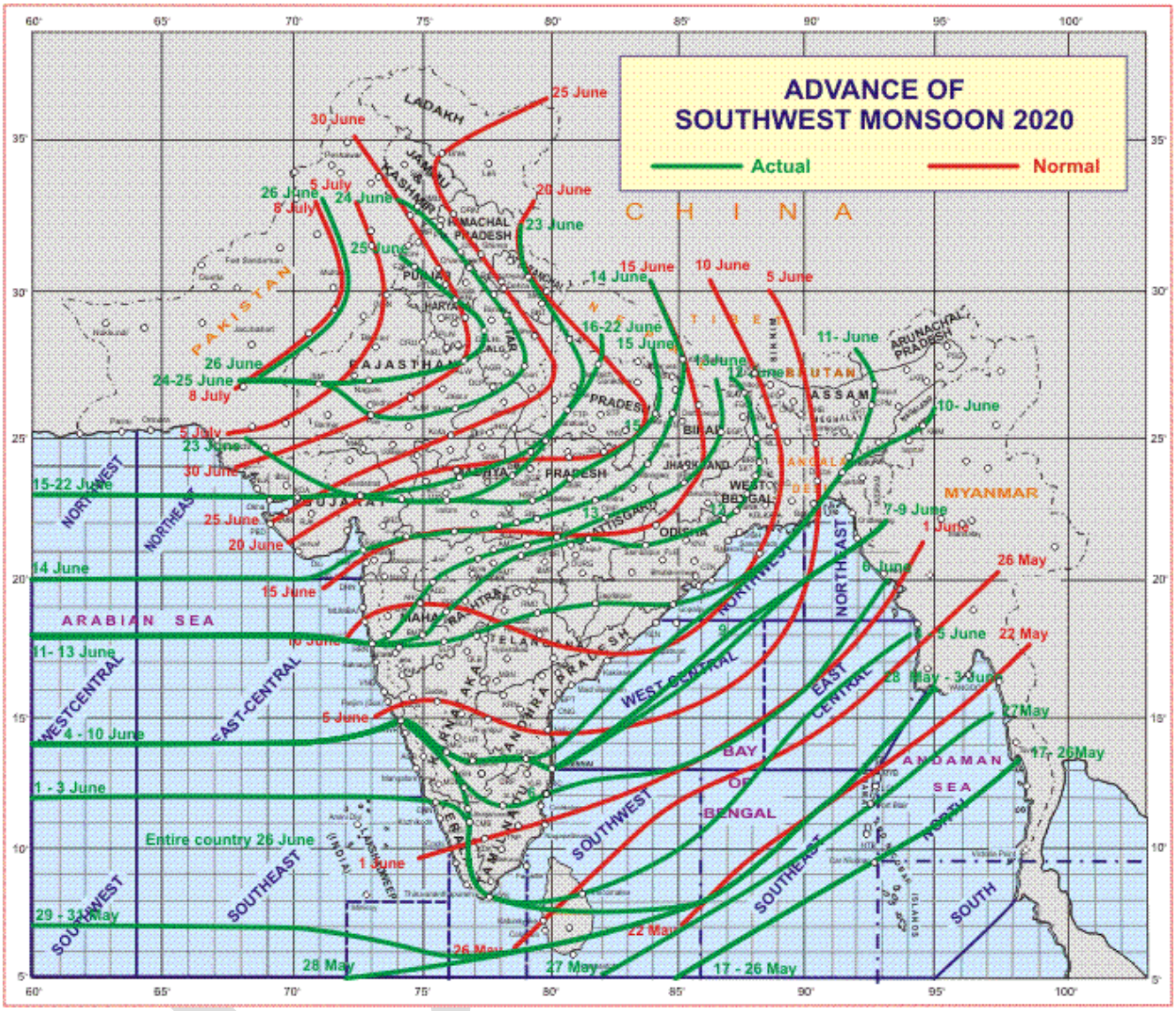


Fig 1: Monsoon onset isochrones for 2020 (Source : IMD)

ENSO neutral conditions were observed during Month of June 2020. Ocean Nino Index is 0 during April, May , and June (NOAA Climate prediction Center). Slightly positive IOD was observed during June 2020 (BoM, Australia). Sea surface waters in tropical Indian Ocean are warmer than average (Fig. 7 )

The average position of the shear line was laid around Equator from $40^0$E to $100^0$E (Fig 6).

Strong Madden-Julian Oscillation (MJO) was fluctuated at phase 01 and 2 during the month (Fig.8).

**Weather Systems**

A low pressure area formed over southeast & adjoining east-central Arabian Sea and Lakshadweep area in the early morning at 00UTC/ 31st May 2020. Under favourable environmental conditions, it concentrated into a depression over east-central and adjoining southeast Arabian Sea at 00UTC 1st June 2020. It intensified into deep depression over east-central Arabian Sea in the early morning at 00UTC 02ndJune and into cyclonic storm "NISARGA" in the 06UTC 2nd June. It moved northwards till evening 12UTC 2nd June. Thereafter, it gradually re-curved northeastwards and intensified into a severe cyclonic storm in the early morning 00UTC 3rd June 2020. Further moving northeastwards, it crossed Maharashtra coast close to south of Alibagh as a severe cyclonic storm with a maximum sustained wind speed of 100-110 kmph gusting to 120kmph between 07-09 UTC on 03rd June. Continuing to move northeastwards after landfall, it weakened into a cyclonic storm in theevening around 12UTC over north Madhya Maharashtra and into a deep depression in the midnight 18UTC on 3rd June 2020 over the same region. The observed track of the system is presented in Fig. 2 (Source : IMD).

A low pressure area over West central BoB developed in 10th and moved in to north Coastal Andhra Pradesh and adjoining Coastal Odisha & neighbourhood with associated cyclonic circulation extending up to 7.6 km above mean sea level, tilting south westwards with height persists on 12th .

Northwest southeast oriented mid tropospheric shear zone tilting south westwards with height appeared over and across Sri Lanka at 700 and 500mb levels

Mid tropospheric shear zone appeared over and across Sri Lanka at 700 and 500mb levels from 24th to 26th. This mid tropospheric shear zone appeared was tilted south westwards with height

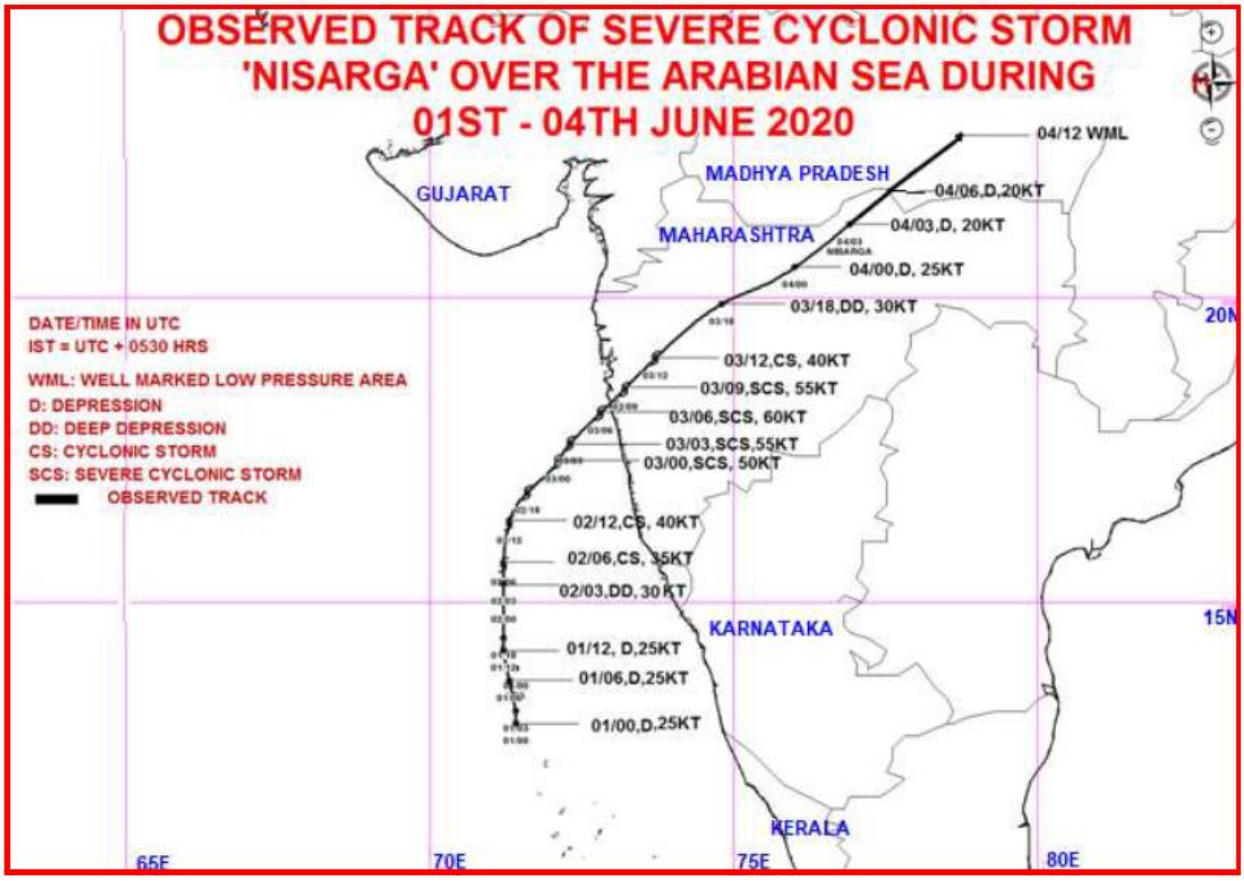


Fig 2: Observed Track of Nisarga over Arabian Sea (Source : IMD)

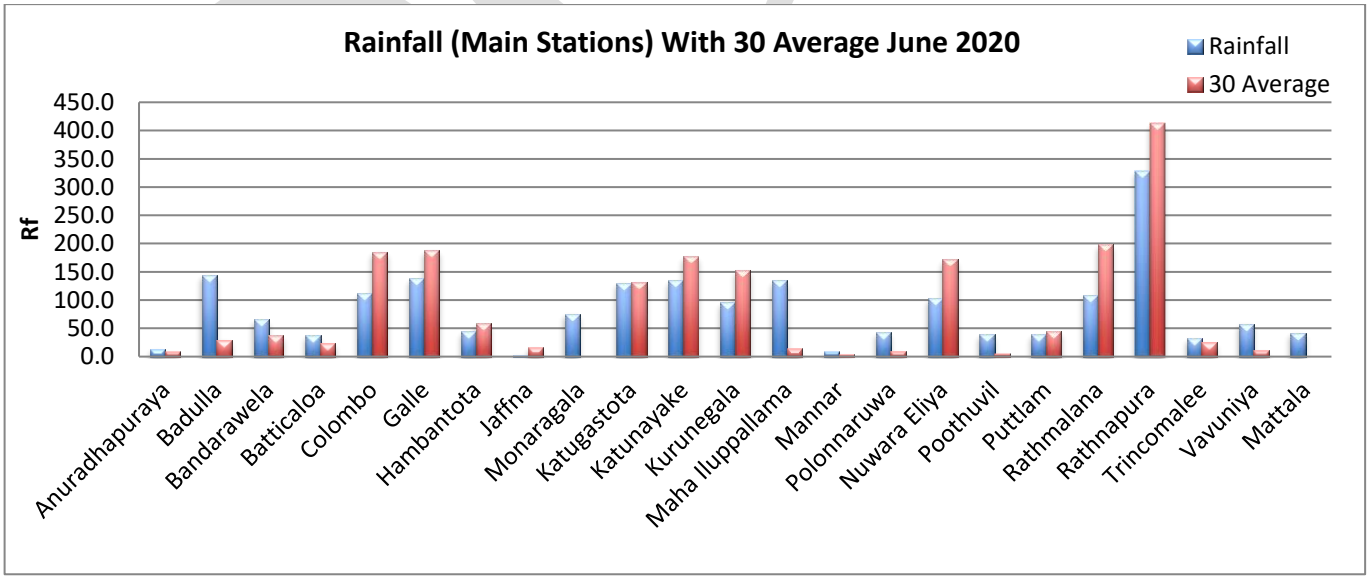


Fig 3: Monthly Total Rainfall(mm) with 30 years (1961-1990) of their averages at Main Meteorological stations areas duringJune 2020

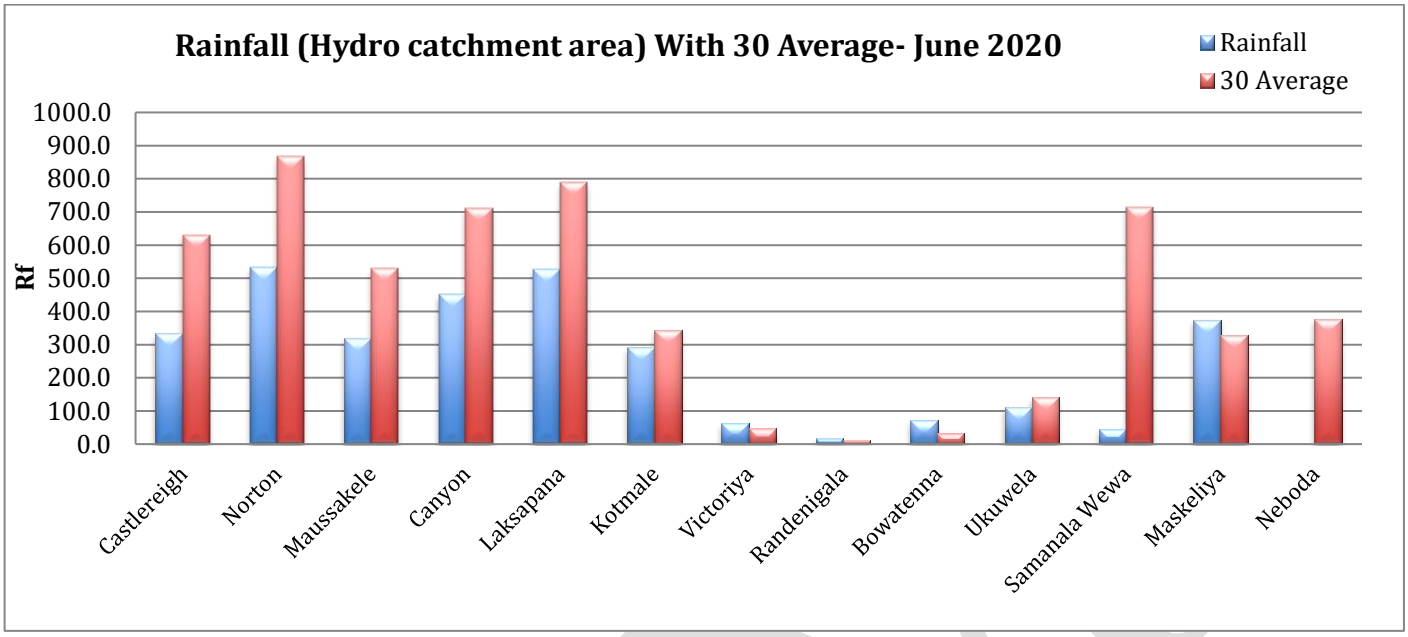


Fig 4: Monthly Total Rainfall(mm) with 30 years (1961-1990) of their averages at Hydro catchment areas during June 2020

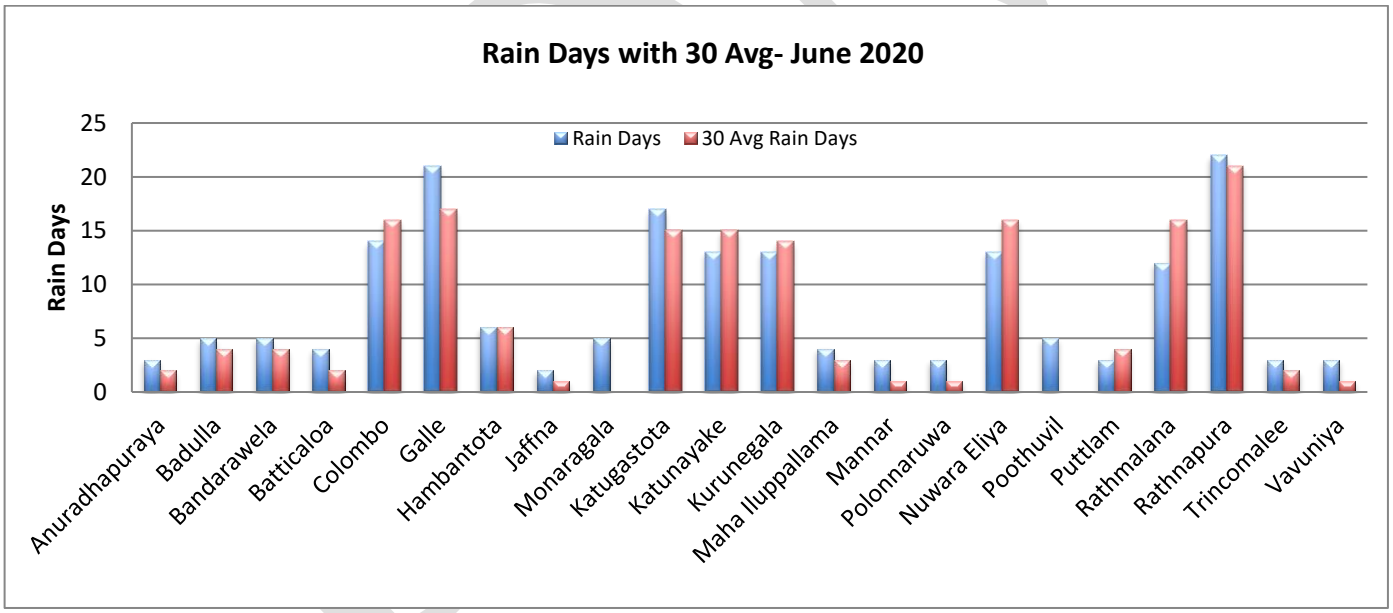


Fig 5: monthly total no of rainy days with 30 years(1961-1990) of their averages at main Meteorological stations during June 2020

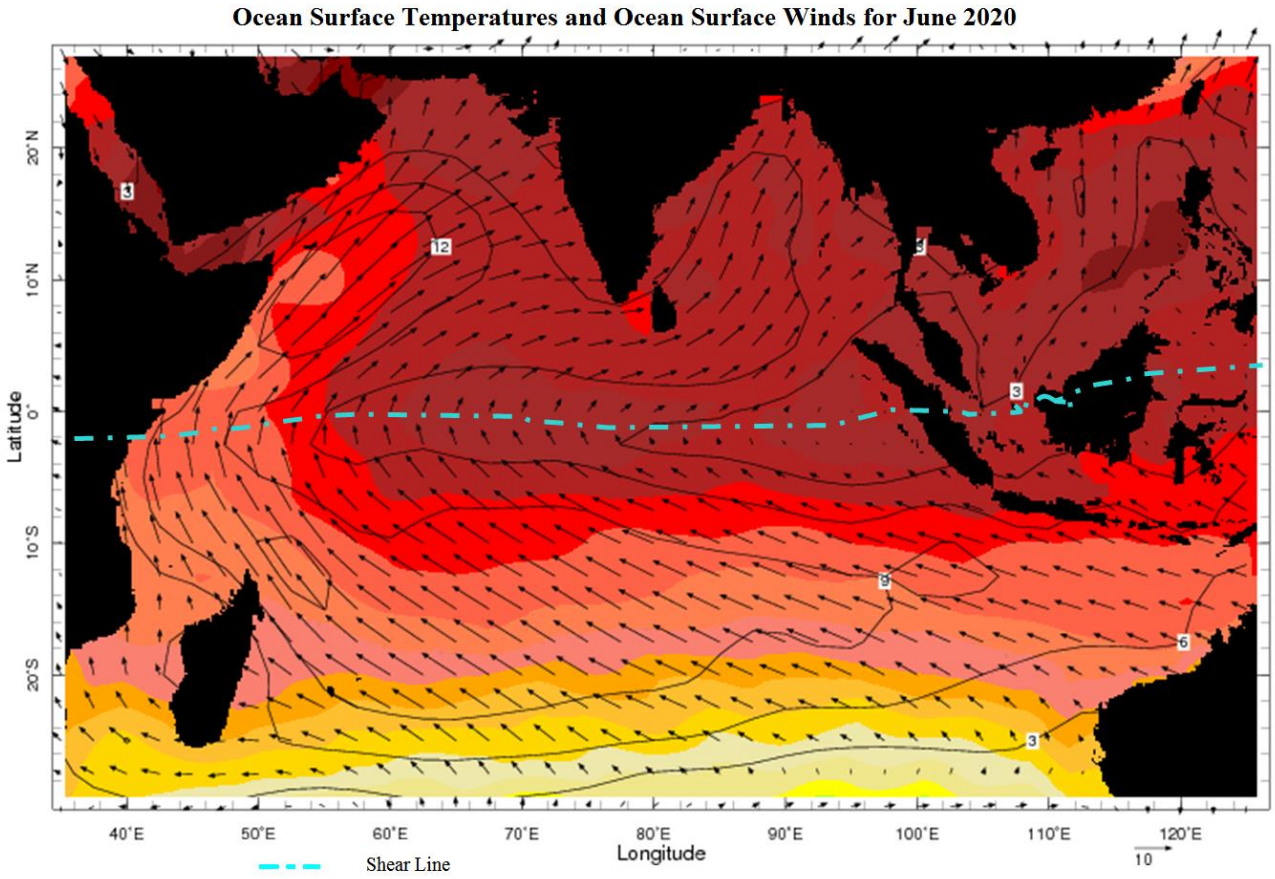


Fig 6: Ocean Surface Winds and Ocean Surface Temperature for June 2020

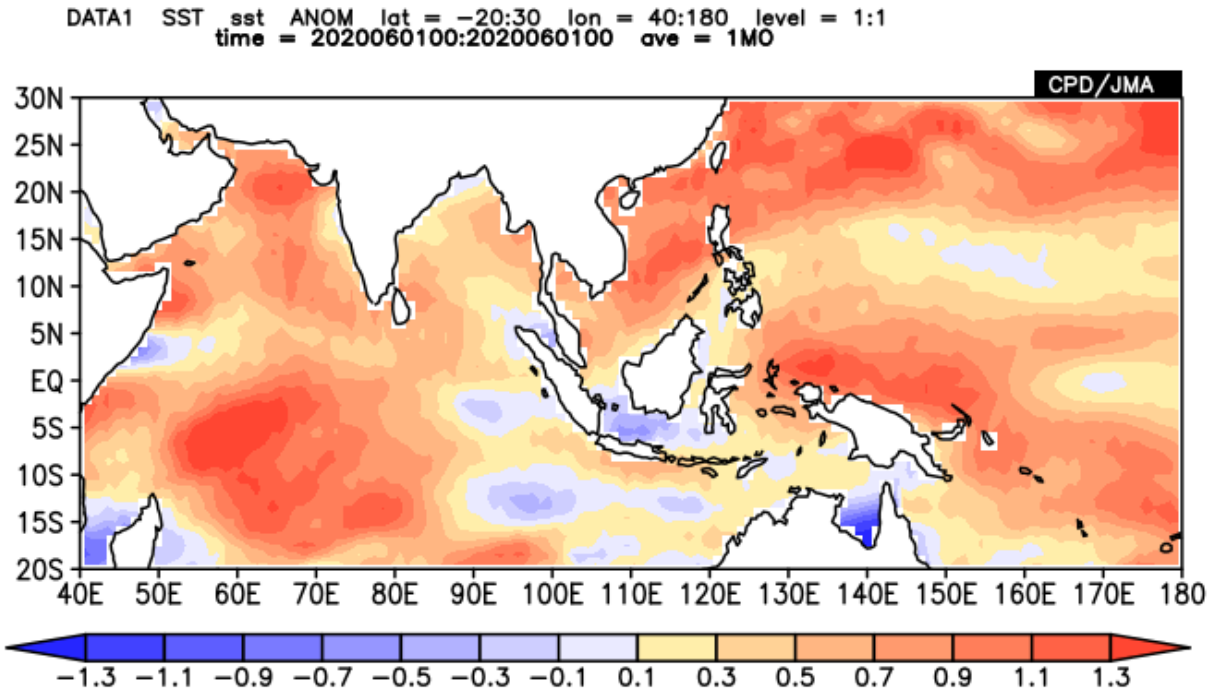


Fig 7: Sea Surface Temperature anomalies for June 2020

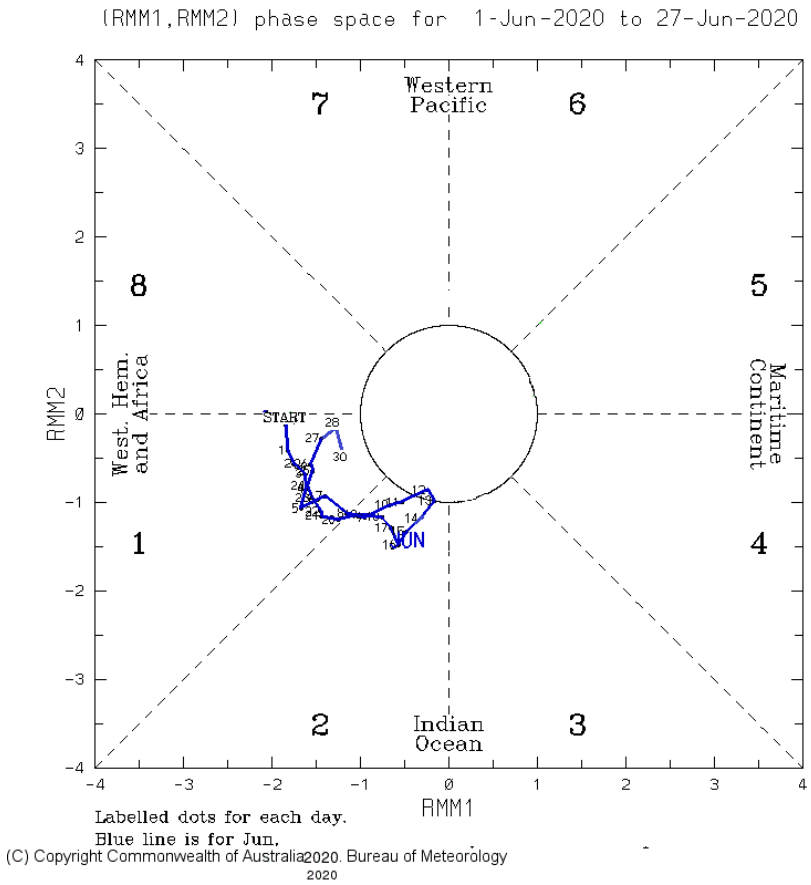


Fig 8 Phase diagram of MJO Index

**Surface pressure and winds:**The surface pressure was above average from 01 to 09 and about or below average during the rest of the month. Southwesterly pressure gradient was mild from 1 to 4, 12th to 13 and 26th . The pressure gradient was moderate on 5th, 8th to 11, 14 to 18th ,20 to 22, on 24th and 27 to 30, steep on 6 and 7 19. Pressure distribution was fairly even 23rd and 25th .

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 12) . Cyclonic circulation was appear in West central bay from 10 to 12th June

**At 700 hPa**, Westerly wind flow is dominated over the island. Anomalous southeasterly flow suggest that weakening of monsoon flow at 700mb level (Fig 13). Anomalous northeast southwest oriented ridge appeared over Sri Lanka. Cyclonic circulation was appear in West central bay from 10 to 12th June

Northwest southeast oriented shear zone appeared $17.5^0$N$60^0$E, $15^0$N$70^0$E, $11^0$N $75^0$E, $10^0$N$80^0$E and $10^0$N$85^0$E from 24th to 26th June.

**At 500 hPa,** Westerly wind flow is dominated over the island. Anomlous anti-cyclonic circulation appeared to the west of Sri Lanka and anomolous ridge evident to the east of Sri Lanka provide unfavourable condition for monsoon rain .

Cyclonic circulation was appear in West central bay from 10 to 12th June. Northwest southeast oriented shear zone appeared $15^0$N$65^0$E, $10^0$N$70^0$E and $7^0$N$85^0$E from 24th to 26th lies over Sri Lanka

**The 200 hpa** the upper tropospheric ridge was laid from $25^0$N$40^0$E to $25^0$N$100^0$E . Tropical easterly jet was appeared in the vicinity of Sri Lanka.

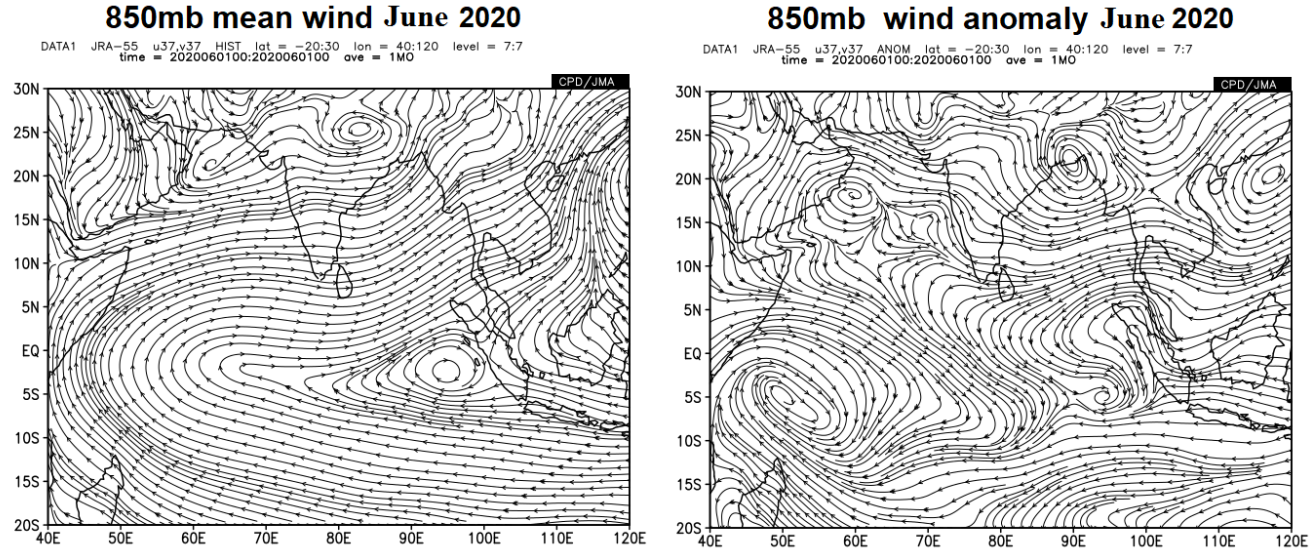


Fig. 9 Monthly average wind pattern at 850hpa level during the month of June2020 (JRA55)

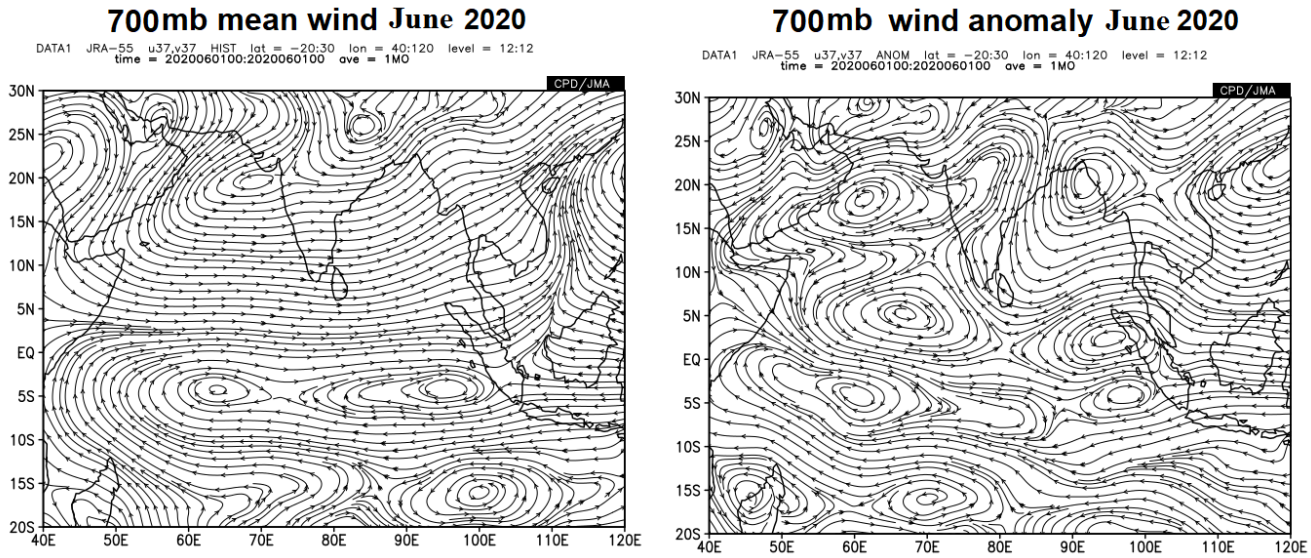


Fig. 10 Monthly average wind pattern at 700hpa level during the month of June 2020 (JRA55)

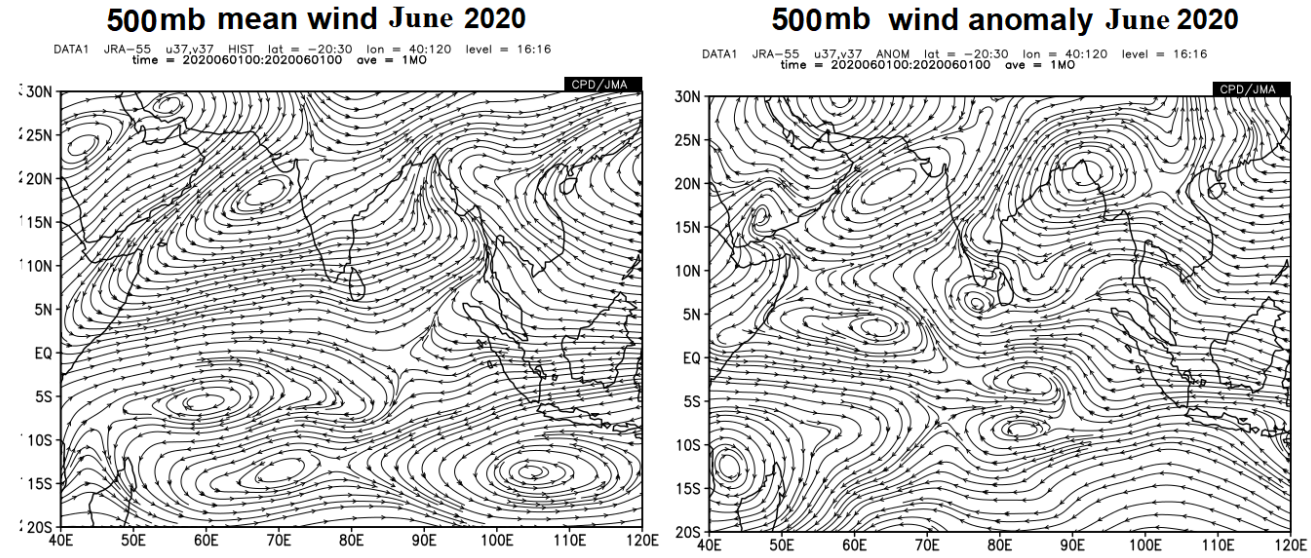


Fig. 11 Monthly average wind pattern at 500hpa level during the month of June 2020 (JRA55)

**Temperature Field:**

**The maximum temperatures in the day** were mostly 1-3$^0$C above normal in most places during the month of June 2020. However some stations reported below average maximum temperatures on 6$^{th}$ , 7 $^{th}$, 11 $^{th}$, 21$^{st}$ , 23$^{rd}$ , 26 $^{th}$ and 30 $^{th}$ (Fig.12). 4$^0$ to 5$^0$C above normal day temperatures were reported at NuwaraEliya on 01$^{st}$, at Hambantota from 14$^{th}$ to 15$^{th}$, 20$^{th}$, 22$^{nd}$ and 27$^{th}$ .

Highest recorded maximum temperature for the month of June 2020 was 38.2$^0$C at Pottuvil on 09$^{th}$ (Table 4a).

**Night minimum temperatures** over most parts were above normal especially during the second half of the month (Fig 13). However some stations reported below average minimum temperatures during the first and last week of the month. $2^0$ to $3^0$C above normal night temperatures were reported at Colombo and Ratmalana during most of the days . Lowest recorded minimum temperature for the month of June 2020 was $17.4^0$C at NuwaraEliya on 14th (Table 4b).

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

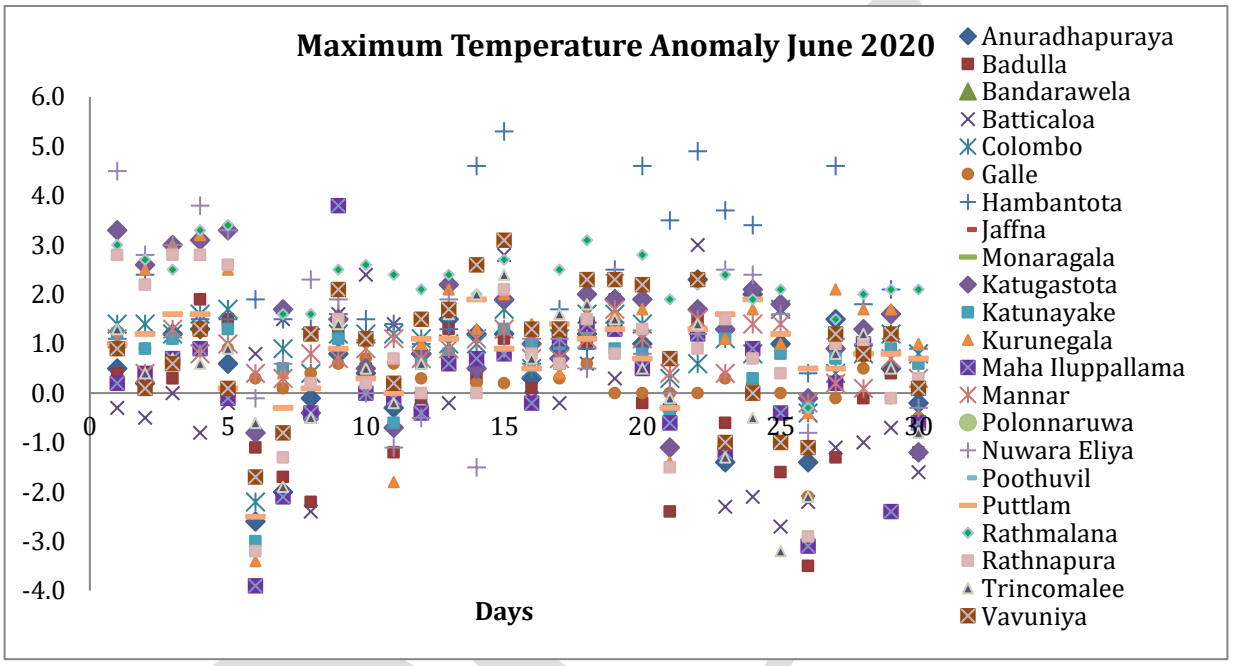


Fig 12 Maximum Temperature anomaly ($^0$C) for June 2020

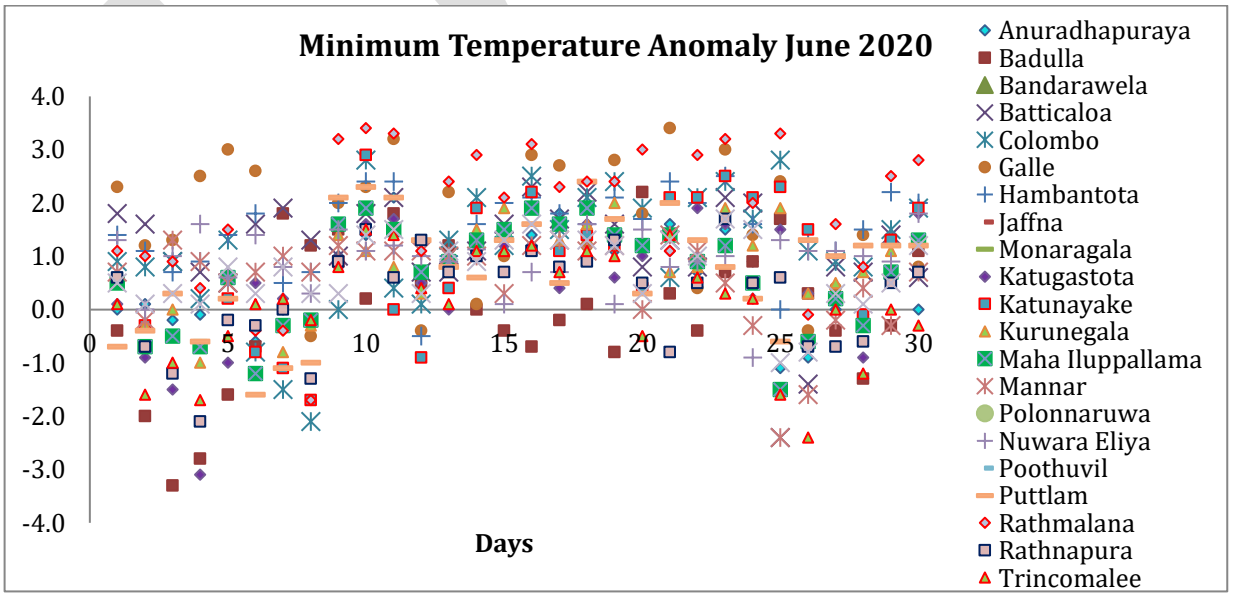


Fig 13 Minimum Temperature anomaly ($^0$C) for June 2020

Below average rainfall was reported from station located at southwestern quarter and in Puttalum Jaffna, Trincomalee, Kurunegala and Hambantota stations. Maximum percentage was reported from Maha Illuppallama 963.6% while minimum from Jaffna station (16.8%)(Table 2). Number of rainy days was about or above average except Bandarawela, Mannar, NuwaraEliya and Pottuwil (Fig 9). Even though the stations located in southwest quarter received less amount of rainfall than climatological average, most of the stations except NuwaraEliya reported about or above average rainy days indicating occurrence of light rains during June 2020 (Table 2).

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

Highest cumulative rainfall was 618 mm at Watawala . Highest rainfall received during 24hours, was 91.2 mm at Maradankadawala on 24th June.

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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 2,3, and 4.

Table 1 hazards caused during June 2020

| date | Lightning | Strong Winds | Heavy Rain | Cutting failure |
|---|---|---|---|---|
| 02 | | Kuliyapitiya east | | |
| 04 | | Kundasale | | |
| 05 | | Kurunegala | | |
| 06 | | Colombo | | |
| 07 | Nikaweratiya | Polgahawela | | |
| 09 | | Beliatta | | |
| 10 | | Welimada Gagaihalakorale | | |
| 11 | | Yatiyantota Higurakgoda | Mawathagame | |
| 13 | | Gagaihalakorale | | |
| 14 | | pathahewaheta Katuwana | Udapalatha | |
| 15 | | Karuwalagaswewa Puttalam Koralaipattu North | | |
| 16 | | Yatinuwara Gomarankadawela | | |
| 19 | | PasbageKorale Panvila Katuwana | | |
| 21 | | Udunuwara Beliatta Mawanella Ruwanwella(lightning) | | |

| | | | | |
|---|---|---|---|---|
| 22 | | Minipe Yatiyantota | | |
| 24 | | Tissamaharamaya Mawanella | | Soranathota |
| 25 | | Udunuwara Mawanella Badulla | | |
| 26 | | PasbageKorale | | Deraniyagala |
| 27 | | Ridimaliyadda Karachchi | | |
| 28 | | Haliela | | |

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).

| | Monthly Total rainfall(mm) | | | Monthly Total No of rainy Days | | |
|---|---|---|---|---|---|---|
| Meteorological station | 2020-June | Average | % | 2020-June | Average | % |
| Anuradhapuraya | 13.6 | 9.4 | 144.7% | 5 | 4 | 125.0% |
| Badulla | 144.0 | 29.3 | 491.5% | 4 | 2 | 200.0% |
| Bandarawela | 65.3 | 36.6 | 178.4% | 14 | 16 | 87.5% |
| Batticaloa | 37.5 | 23.9 | 156.9% | 21 | 17 | 123.5% |
| Colombo | 111.9 | 184.9 | 60.5% | 6 | 6 | 100.0% |
| Galle | 138.2 | 188.2 | 73.4% | 2 | 1 | 200.0% |
| Hambantota | 44.2 | 59.0 | 74.9% | 5 | | |
| Jaffna | 2.7 | 16.1 | 16.8% | 17 | 15 | 113.3% |
| Monaragala | 75.2 | | | 13 | 15 | 86.7% |
| Katugastota | 129.9 | 131.9 | 98.4% | 13 | 14 | 92.9% |
| Katunayake | 135.1 | 177.2 | 76.2% | 4 | 3 | 133.3% |
| Kurunegala | 95.4 | 153.0 | 62.4% | 3 | 1 | 300.0% |
| Maha Iluppallama | 134.9 | 14.0 | 963.6% | 3 | 1 | 300.0% |
| Mannar | 8.3 | 4.6 | 180.4% | 13 | 16 | 81.3% |
| Polonnaruwa | 42.6 | 9.9 | 430.3% | 5 | na | #VALUE! |
| Nuwara Eliya | 103.3 | 171.9 | 60.1% | 3 | 4 | 75.0% |
| Poothuvil | 39.4 | 5.2 | 757.7% | 12 | 16 | 75.0% |
| Puttlam | 39.0 | 44.7 | 87.2% | 22 | 21 | 104.8% |
| Rathmalana | 108.9 | 198.4 | 54.9% | 3 | 2 | 150.0% |
| Rathnapura | 328.0 | 412.2 | 79.6% | 3 | 1 | 300.0% |
| Trincomalee | 32.8 | 25.4 | 129.1% | 8 | | |
| Vavuniya | 58.1 | 11.2 | 518.8% | 5 | 4 | 125.0% |
| Mattala | 42.2 | | | 4 | 2 | 200.0% |

Table-03-Monthly Total Rainfall (mm) with 30 years (1961-1990) of their averages at Hydro catchment areas

| Hydro Catchment | June 2020 | Average | % (percentage of average) |
|---|---|---|---|
| Castlereigh | **334.5** | 630.9 | 53.0% |
| Norton | **532.6** | 866.3 | 61.5% |
| Maussakele | **319.5** | 530.1 | 60.3% |
| Canyon | **451.7** | 711.4 | 63.5% |
| Laksapana | **526.2** | 787.8 | 66.8% |
| Kotmale | **290.6** | 344.3 | 84.4% |
| Victoriya | **63.3** | 46.4 | 136.3% |
| Randenigala | **18.6** | 12.5 | 148.8% |
| Bowatenna | **71.3** | 33.8 | 211.3% |
| Ukuwela | **110.7** | 141.0 | 78.5% |
| Samanala Wewa | **45.5** | 714.7 | 6.4% |
| Maskeliya | **373.5** | 327.7 | 114.0% |
| Neboda | | 376.7 | |

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

| Table 4(a) - Extremes of Maximum Temperatures June 2020 | | | | |
|---|---|---|---|---|
| | Maximum | | | |
| | Value | Offsets (-) | Offsets (+) | Highest Std.Div |
| Value | 38.2$^0$C | 3.9 | 5.3 | ***1.82*** |
| Station | Pottuvil | MahaIluppallama | **Hambantota** | Pottuwil |
| Date | 09/06/2020 | 06/06/2020 | 15/06/2020 | |
| Table 4(b) -Extremes of Minimum Temperature June 2020 | | | | |
| | Minimum | | | |
| | Value | Offsets (-) | Offsets (+) | Highest Std.Div |
| Value | 17.4$^0$C | 3.3 | 3.4 | 1.76 |
| Station | NuwaraEliya | Badulla | Ratmalana/Galle | Polonnaruwa |
| Date | 14/06/2020 | 03/06/2020 | 10-06 /21-06 | |

Prepared by National Meteorological Centre (NMC)
Department of Meteorology