

Weather Synopsis –February 2023.

Northeast monsoon conditions were prevailed. Above normal rainfall was reported at most of the principal meteorological stations except Kurunegala and NuwaraEliya where below normal rainfall was reported (Fig 4). Maximum percentage was reported from Jaffna (426.7%) while minimum from Kurunegala (23.9%).

Below normal rainfall was reported from most of the hydro catchment stations except Maussakele, Canyon , Randanigala and Bowathenna where about normal rainfall was reported (Fig 6).

Highest cumulative rainfall was **510.4 mm** at Rufuskulam in Ampara District. Highest rainfall received during 24hours, was 237 mm at Sangamam Tank in Ampara District on 19th February.

A low pressure area has developed over southeast Bay of Bengal (BoB) and adjoining east equatorial Indian Ocean on 27th January. The system was intensified in to depression on 30th morning. The system initially moved west-northwestwards till 31st January and recurve gradually west-southwestwards crossed Sri Lanka coast between Batticaloa and Trincomalee during the evening of 1st February (Fig 1). The Madden Julian Oscillation (MJO) index was in phase 3 with amplitude more than 1, supporting enhancement of convective activity over Bay of Bengal (BoB) and intensification of the system. Kelvin waves, MJO and Equatorial Rossby waves over Equatorial Indian Ocean contributed towards organization of circulation and enhancement of convection over Southeast & adjoining Southwest BoB. Then the system has weakened in to a low-pressure area and emerge to sea areas off west of Sri Lanka on 03rd morning. The depression brought heavy falls over northern parts of the country on 01st , northcentral and southeastern parts on 02nd , southern parts on 03rd (Fig 2B). Strong gusty winds were experience in northeastern parts.

According to Disaster Management Centre, 306 Families, and 1038 people were affected. 193 houses were partly damaged, 15 small and medium enterprises were affected and 01 Critical Infrastructure were damaged following this event (Fig 2A).



Fig. 1 Observed Track of the Depression

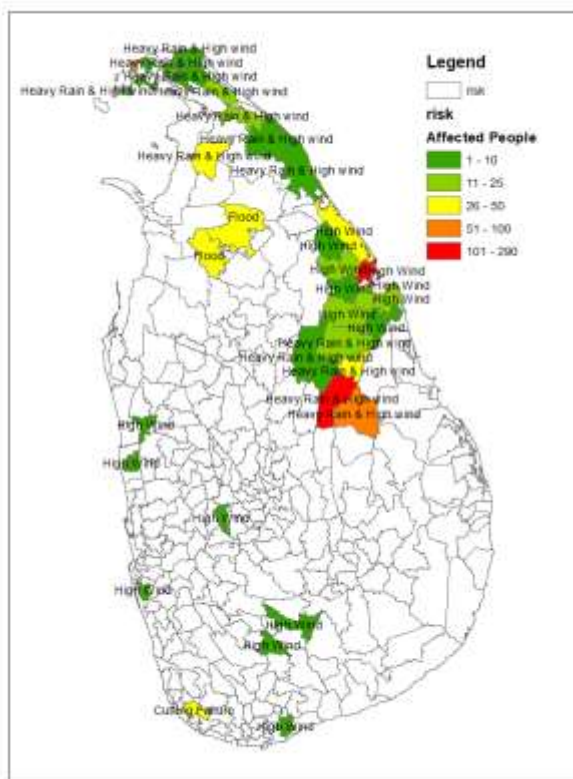


Fig 2A : Hazards caused and Affected people (shading) from the Depression

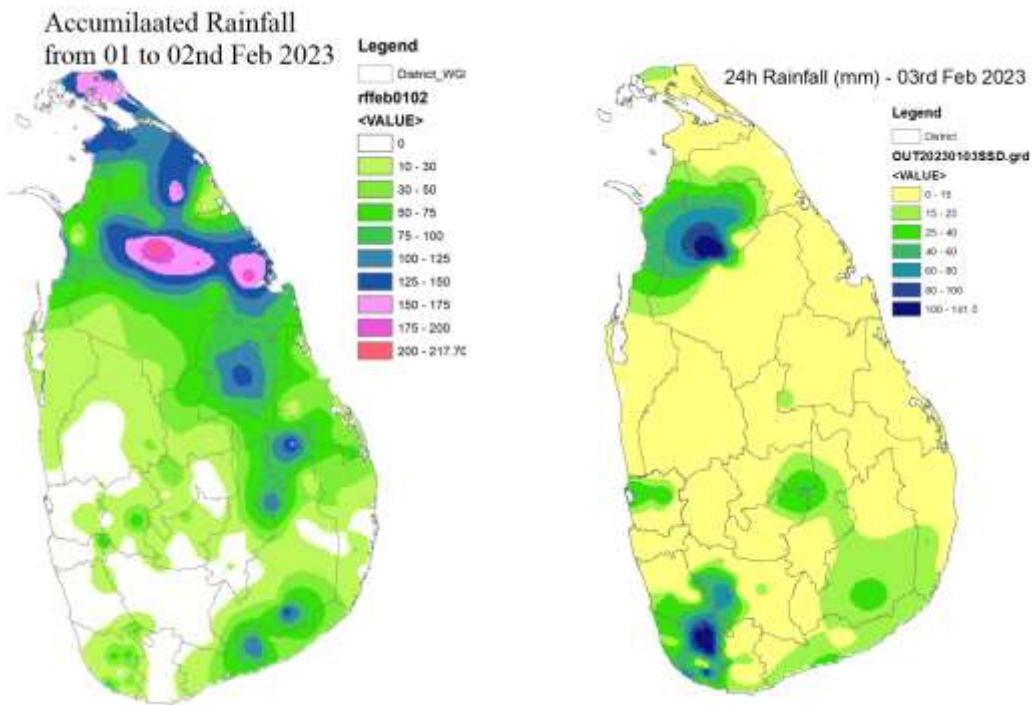


Fig 2B : Rainfall (Accumilated from 01 to 02nd (left)) and 24h Rainfall (mm) on 03rd February

Except for Isolated evening thunderstorms over southern parts, mainly dry weather was prevailed from 08th to 11th and on 21st . Mainly dry weather was reported from 12th to 17th ,and from 22nd to 23rd , on 26th . Showery conditions were enhanced over eastern and southeastern parts with evening thunderstorms over southwestern parts from 18th to 20th due to the passage of equatorial wave .

Higher Lightning density was reported in Thibirigasyaya, Ingiriya, ,Minuwangoda, Warakapola, Bulathsinhala, Niyagama, Palainda Nuwara, and Benthota during month of February (Fig 3)

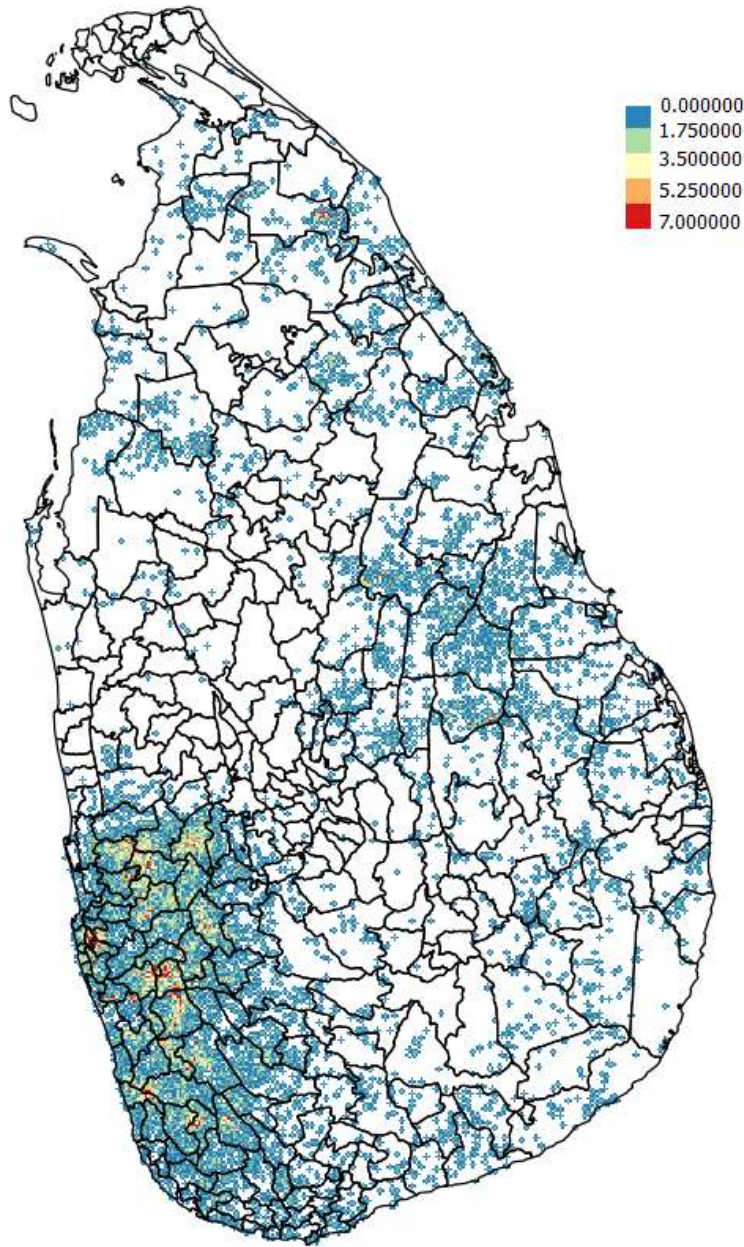


Fig 3: Lightning density map for February 2023

Table 1 stations received above 100mm rainfall during February 2023

| Date | Station | 24 hour Rainfall (mm) |
|------------------|----------------------|-----------------------|
| 01-February 2023 | NEDUNKERNI | 150 |
| 01-February 2023 | ACHCHIWELI | 148.3 |
| 01-February 2023 | PEDURUTUDUWA | 140.1 |
| 01-February 2023 | Chavakachcheri | 125 |
| 01-February 2023 | Trincomalee | 119.1 |
| 01-February 2023 | Jaffna | 118.5 |
| 01-February 2023 | WATER RESOURCE BOARD | 114.5 |
| 01-February 2023 | Oddusudan | 111.6 |
| 01-February 2023 | WELLIPUNAM | 108.3 |

| | | |
|------------------|-------------------------|-------|
| 02-February 2023 | Vavuniya | 189.2 |
| 02-February 2023 | Manaragala water supply | 146.8 |
| 02-February 2023 | Mahaoya | 145.8 |
| 02-February 2023 | Monaragala | 144.9 |
| 02-February 2023 | Kalavedi Ulpotha | 136.1 |
| 02-February 2023 | Palampoddar | 135.5 |
| 02-February 2023 | ULUKKULAM | 132 |
| 02-February 2023 | Mattla | 126.1 |
| 02-February 2023 | Bibile | 126 |
| 02-February 2023 | SHETTIKULAM | 112 |
| 02-February 2023 | Bandagiriya Tank | 105 |
| | | |
| 03-February 2023 | PODDIWELA FARM | 150 |
| 03-February 2023 | Hiniduma | 141.5 |
| | | |
| 19-February 2023 | Sagamam Tank | 237 |
| 19-February 2023 | Rufuskulam | 210.3 |
| 19-February 2023 | Akkaraipattu Irrigation | 148.5 |
| 19-February 2023 | Panama Tank | 113 |
| 19-February 2023 | Pothuvil | 107.2 |
| 19-February 2023 | Ekgaloya Tank | 100.5 |
| | | |
| 24-February 2023 | Kalatuwawa | 114 |
| 24-February 2023 | Labugama | 102.3 |

Maximum temperatures were mostly below normal during the first week due to the passage of depression. Above normal maximum temperatures were experienced during 3rd and 4th week except from 19th to 20th and on 28th when normal maximum temperatures were experienced. Night minimum temperatures over most parts were above normal during the month (Fig 14). However below normal night temperatures were experienced at some stations from 11th to 19th, on 22nd and during 26th to 27th.

Highest recorded maximum temperature for the month of February 2023 was 36.0°C at Ratnapura on 18th and the lowest recorded minimum temperature for the month of February 2023 was 6°C at Nuwara Eliya on 15th of February 2023.

During February 2023, below-average sea surface temperatures persisted but weakened across the central and eastern equatorial Pacific. The latest monthly Niño indices -0.4C for the Niño 3.4 region. Collectively, oceanic and atmospheric anomalies were consistent with ENSO-neutral conditions. Ocean Niño Index is -0.7 during December, January and February (NOAA Climate prediction Center). Neutral

IOD condition was observed during February 2023 (BoM, Australia). Sea surface waters in tropical Indian Ocean are warmer than average (Fig. 9)

The average position of the shear line was laid between 05°S 50°E, Equator 75°E, 01°N 90°E and Equator 70°E. The average position of the Inter-Tropical Convergence zone (ITCZ) was laid between 10°S 40°E, 09°S 80°E, 09°S 100°E and 10°S 100°E (Fig 8). Both shear line and ITCZ were fluctuated about 2° north and south of their average position .

Strong Madden-Julian Oscillation (MJO) was appeared in phase 3 during from 01st to 04th ; and propagated to phase 4 from 05th to 09th ; then to phase 5 and phase 6 from 10th to 15th. Strong Madden-MJO was persisted in phase 07 during the 3rd and 04th weeks except from 24th to 26th when MJO has weakened (Fig.10).

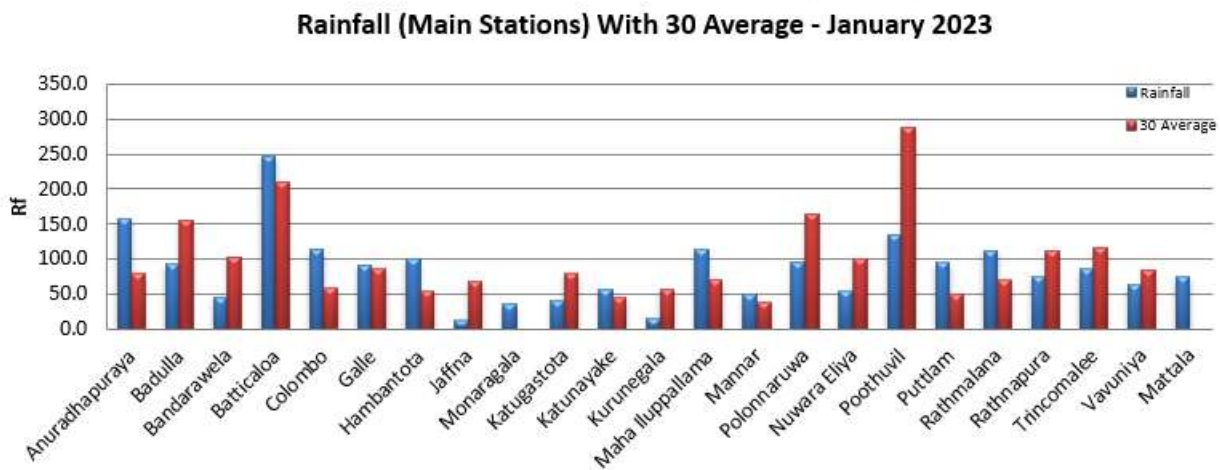


Fig 4: Monthly Total Rainfall(mm) with 30 years (1961-1990) of their averages at Main Meteorological stations areas during February 2023

Rain Days with 30 Avg- January 2023

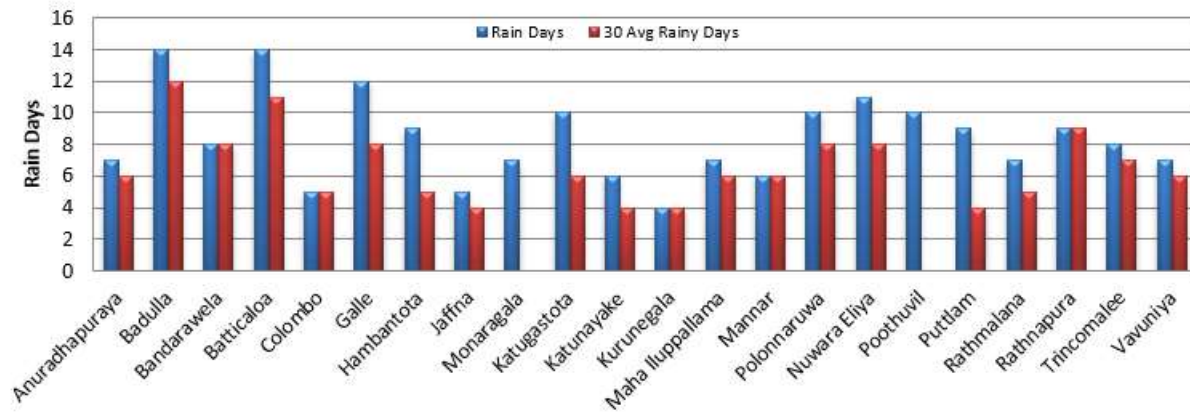


Fig 5: monthly total no of rainy days with 30 years(1961-1990) of their averages at main Meteorological stations during February 2023

Rainfall (Hydro catchment area) With 30 Average- January 2023

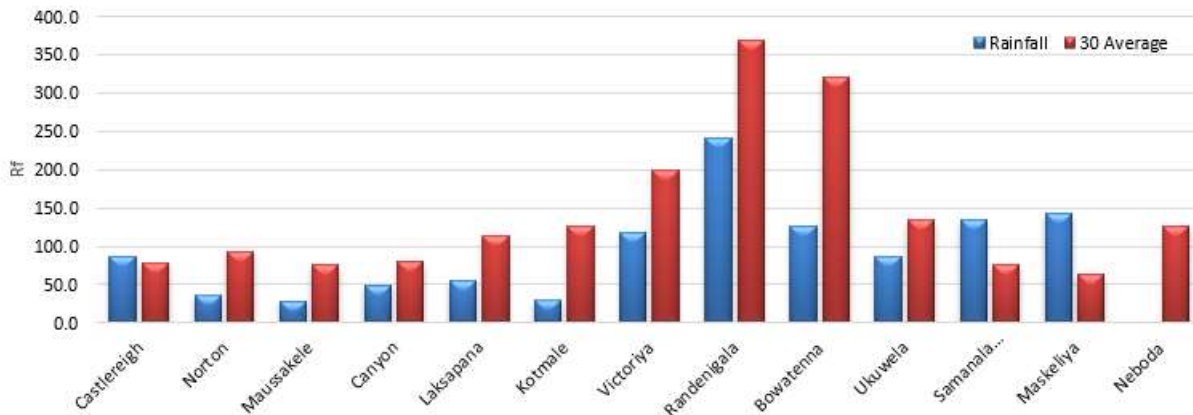


Fig 6: Monthly Total Rainfall(mm) with 30 years (1961-1990) of their averages at Hydro catchment areas during February 2023

Weather Systems

The Tropical cyclone "Freddy" was first developed as a disturbance on 04 February 2023 in the Australian region cyclone basin, the storm quickly intensified and became a severe tropical cyclone, and then into a very intense tropical cyclone, estimated 10-minute winds of 220 km/h (140 mph). Freddy made its first landfall in Madagascar. The storm rapidly weakened overland but re-strengthened in the Mozambique Channel. Shortly afterward, Freddy made second landfall in Mozambique, before rapidly weakening. Unexpectedly, the system managed to survive its visit in Mozambique and emerged back

over the channel on 1 March. Soon after, Freddy was intensified into a tropical cyclone crossed Mozambique and the storm gradually deteriorated and last noted on 14 March. Tropical Cyclone Freddy was an exceptionally long-lived, powerful, and deadly storm that traversed the southern Indian Ocean for more than five weeks in February and March 2023. Freddy is the longest-lasting tropical cyclone ever recorded worldwide (Fig 7).

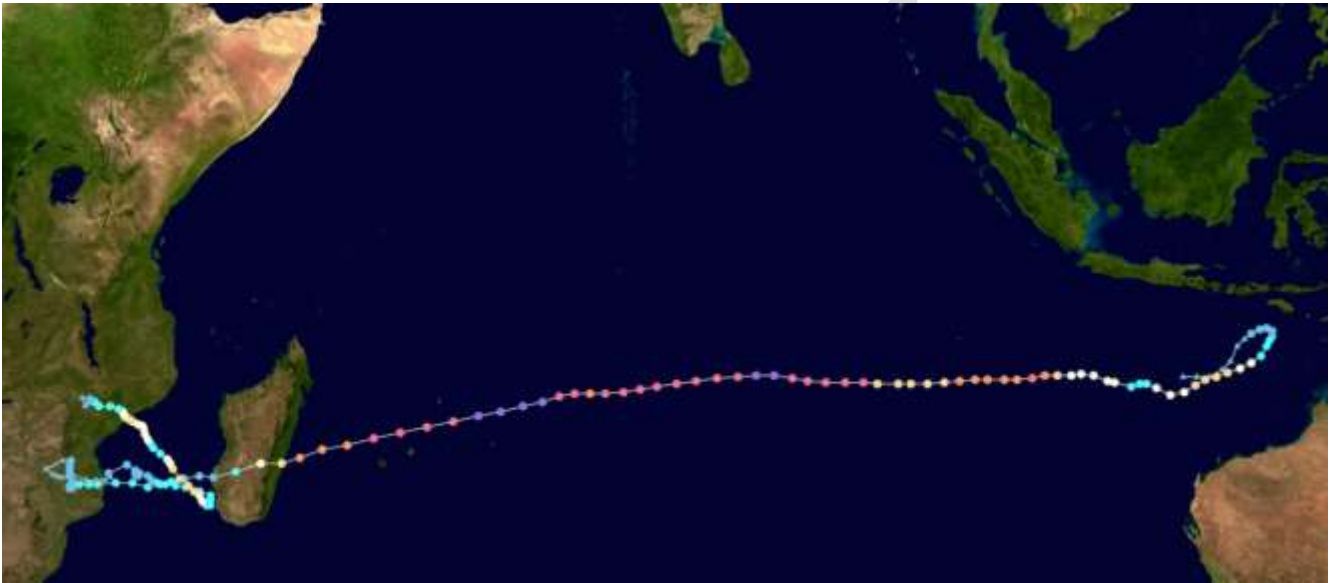


Fig 7 : Observed Track of the Tropical cyclone “Freddy”, the longest-lasting tropical cyclone ever recorded worldwide.

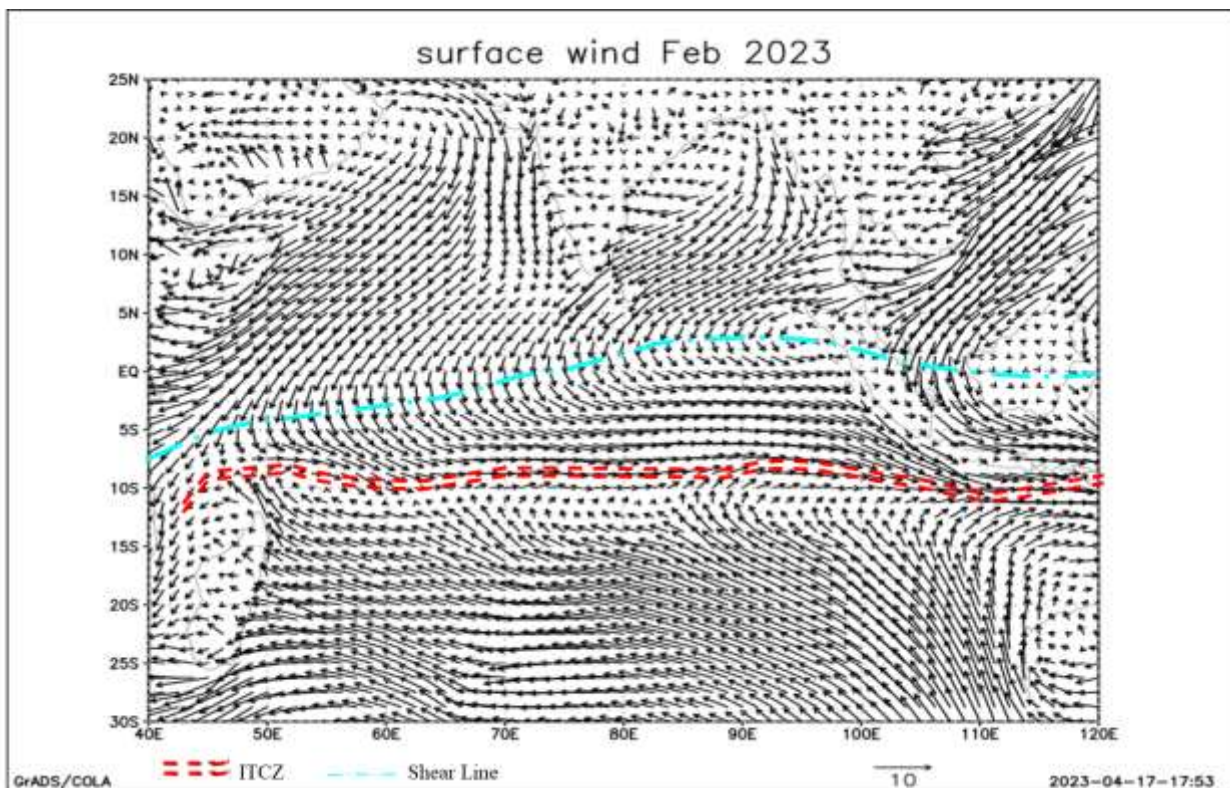


Fig 8: Ocean Surface Winds for February 2023

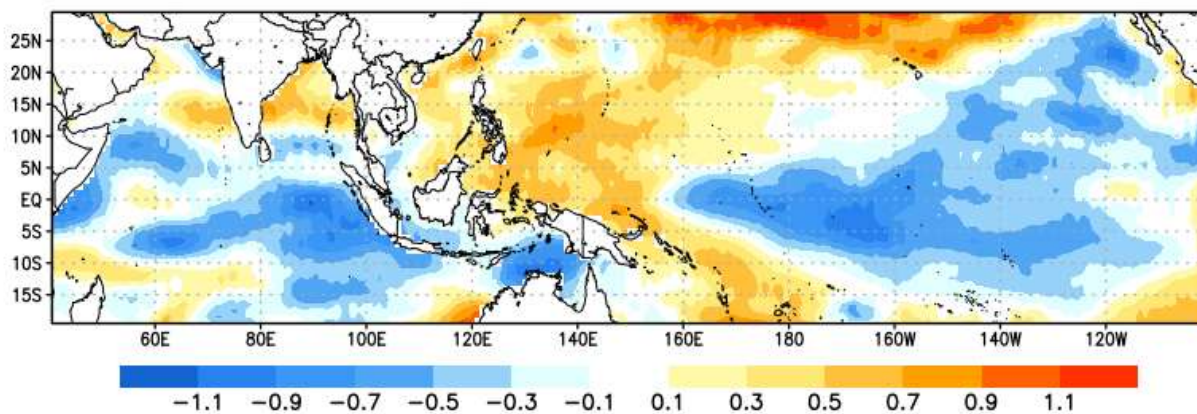
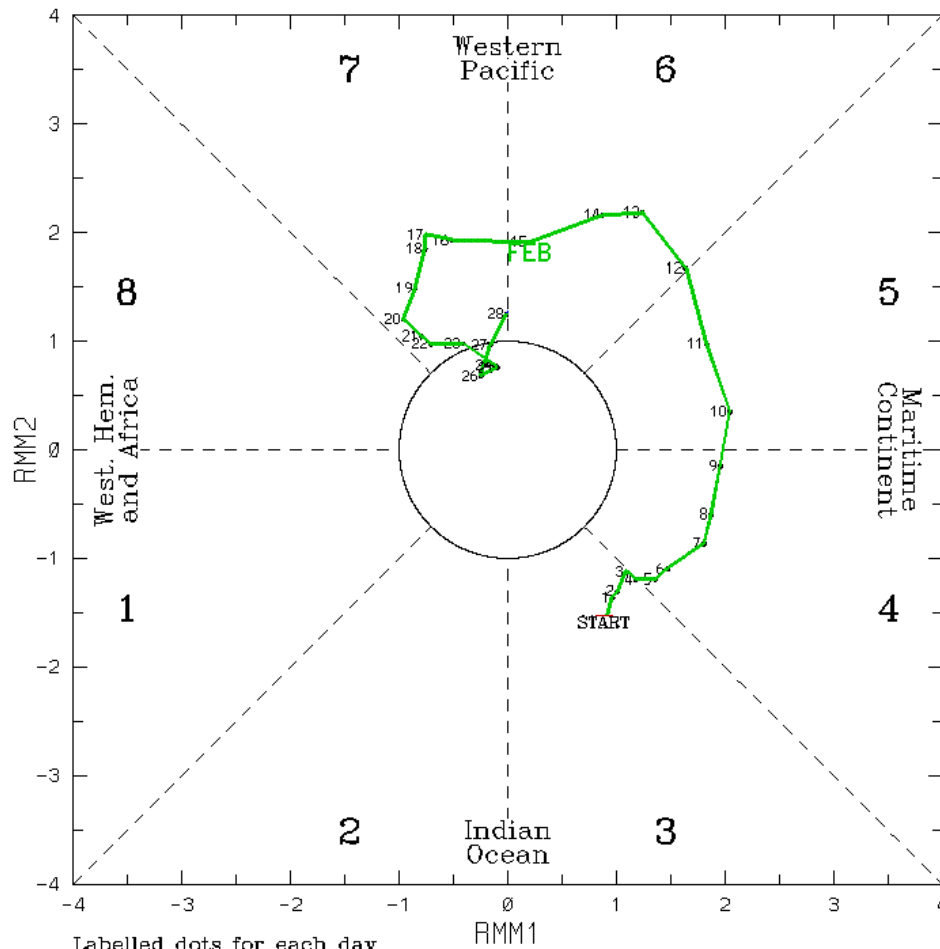


Fig 9: Sea Surface Temperature anomalies for February 2023

(RMM1,RMM2) phase space for 1-Feb-2023 to 28-Feb-2023



Labelled dots for each day.

Blue line is for Mar, green line is for Feb, red line is for Jan.

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2023

Fig 10: Phase diagram of MJO Index

Surface pressure and winds: The surface pressure was above average except from 01st to 09th, and from 15th to 16th when it was about or below average and on 22nd and on 23rd when above normal pressure were observed over northeastern parts and below normal pressures were observed over southwest parts. Pressure distribution was even or fairly even during most of February except on 01st, on 08th, on 16th, on 21st, on 22nd on 25th, on 26th and on 28th when mild pressure gradient was observed.

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

Upper winds:

At 850hPa, Northeasterly wind flow is dominated over the island. Anomalous cyclonic circulation appeared over Southeast of Sri Lanka provided favorable condition for cloud formation (Fig 11).

At 700 hPa, Northwesterly wind flow is dominated over the island. Anomalous east-west oriented trough to the south of Sri Lanka provided favorable condition for cloud formation (Fig 12).

At 500 hPa, Northwesterly wind flow is dominated over the island. Anomalous northeasterly winds across Sri Lanka indicate strengthening of monsoon flow at 500mb level (Fig 13)

The 200 hpa the upper tropospheric ridge was laid from $08^{\circ}\text{N}40^{\circ}\text{E}$, $14^{\circ}\text{N}60^{\circ}\text{E}$, $15^{\circ}\text{N}80^{\circ}\text{E}$, and $15^{\circ}\text{N}120^{\circ}\text{E}$.

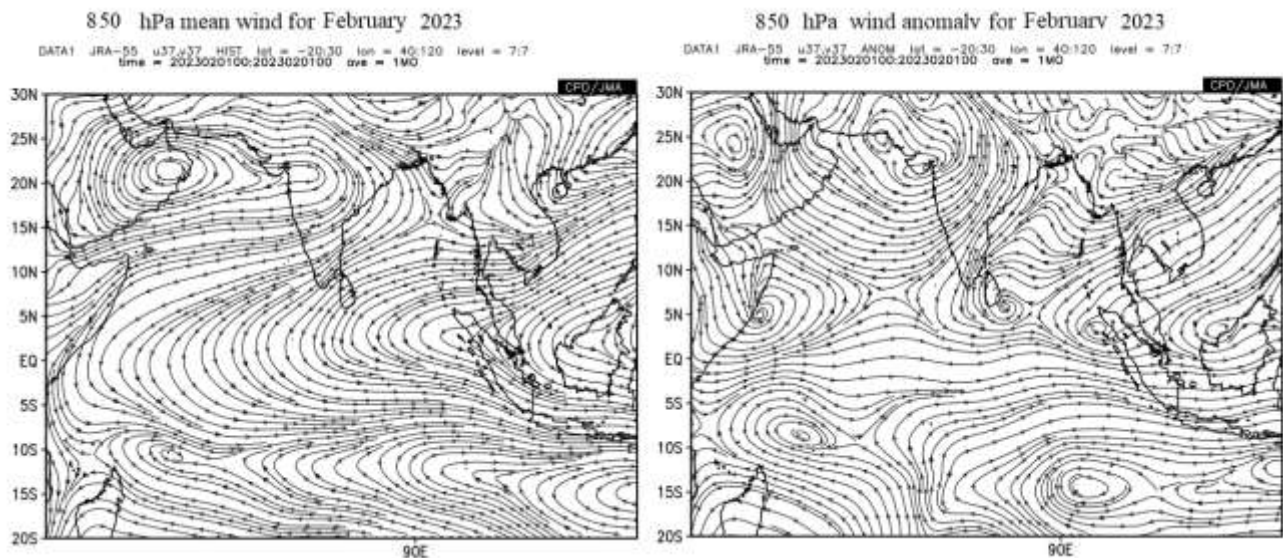


Fig. 11 Monthly average wind pattern at 850hpa level during the month of February 2023 (JRA55)

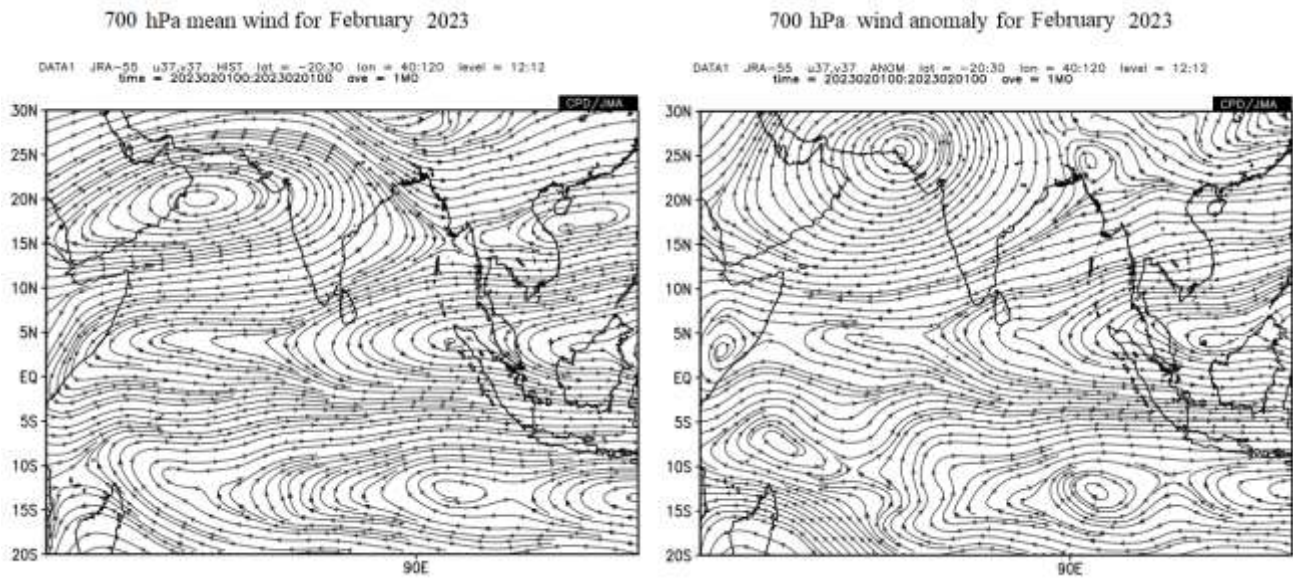


Fig. 12 Monthly average wind pattern at 700hpa level during the month of February 2023 (JRA55)

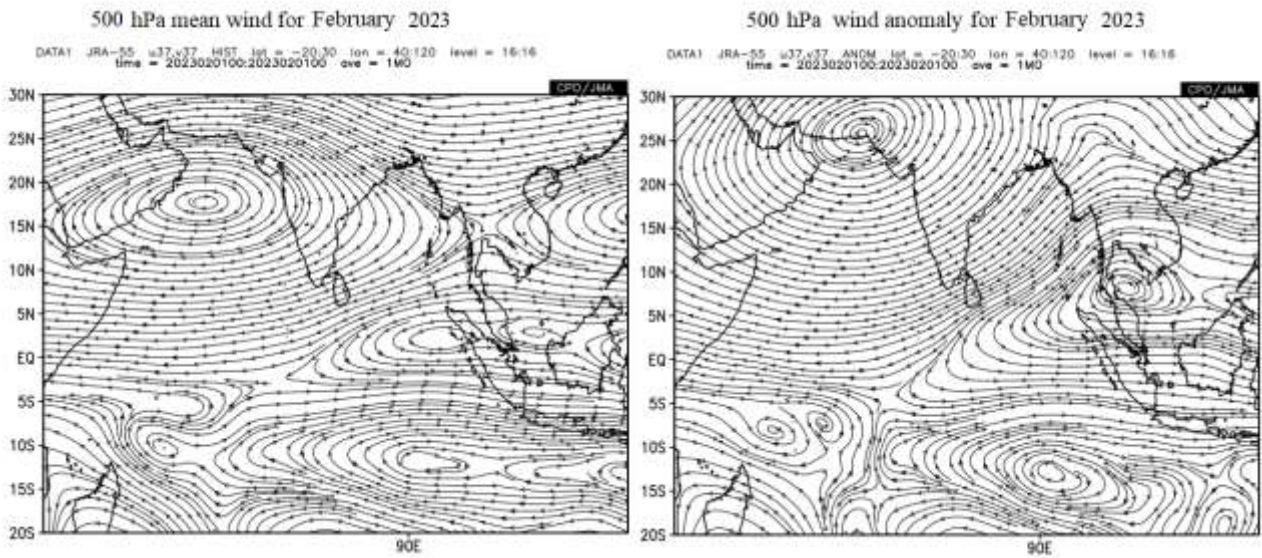


Fig. 13 Monthly average wind pattern at 500hpa level during the month of February 2023 (JRA55)

Temperature Field:

Maximum temperatures were mostly below normal during the first week due to the passage of depression. Above normal maximum temperatures were experienced during 3rd and 4th week except from 19th to 20th and on 28th when normal maximum temperatures were experienced. Highest recorded maximum temperature for the month of February 2023 was 36.0°C at Ratnapura on 18th (Table 3a).

Night minimum temperatures over most parts were above normal during the month (Fig 14). However below normal night temperatures were experienced at some stations from 11th to 19th, on 22nd and during 26th to 27th. The lowest recorded minimum temperature for the month of February 2023 was 6°C at Nuwara Eliya on 15th of February 2023 (Table 3b).

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

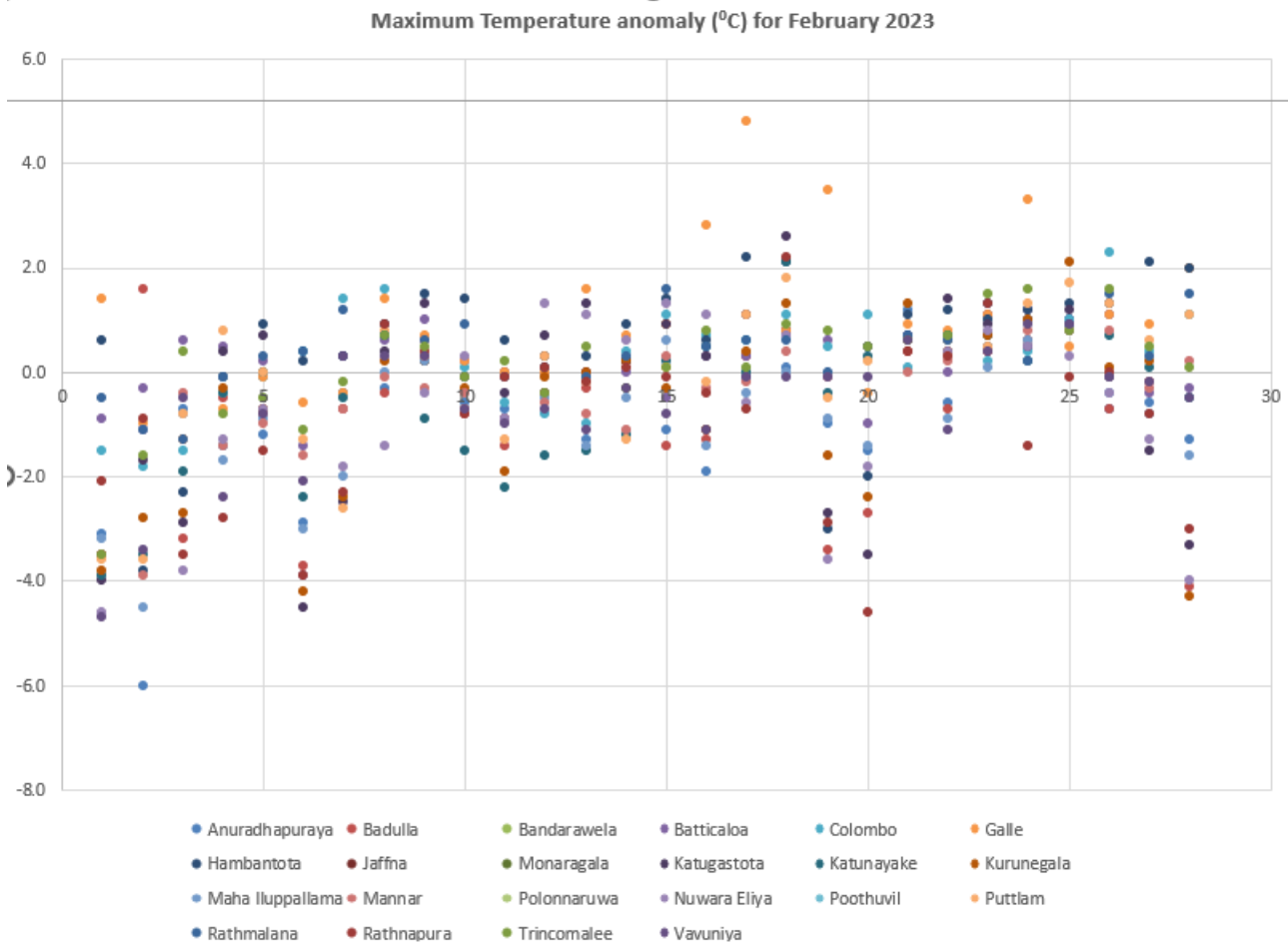


Fig 14 Maximum Temperature anomaly (°C) for February 2023

Minimum Temperature anomaly ($^{\circ}\text{C}$) for February 2023

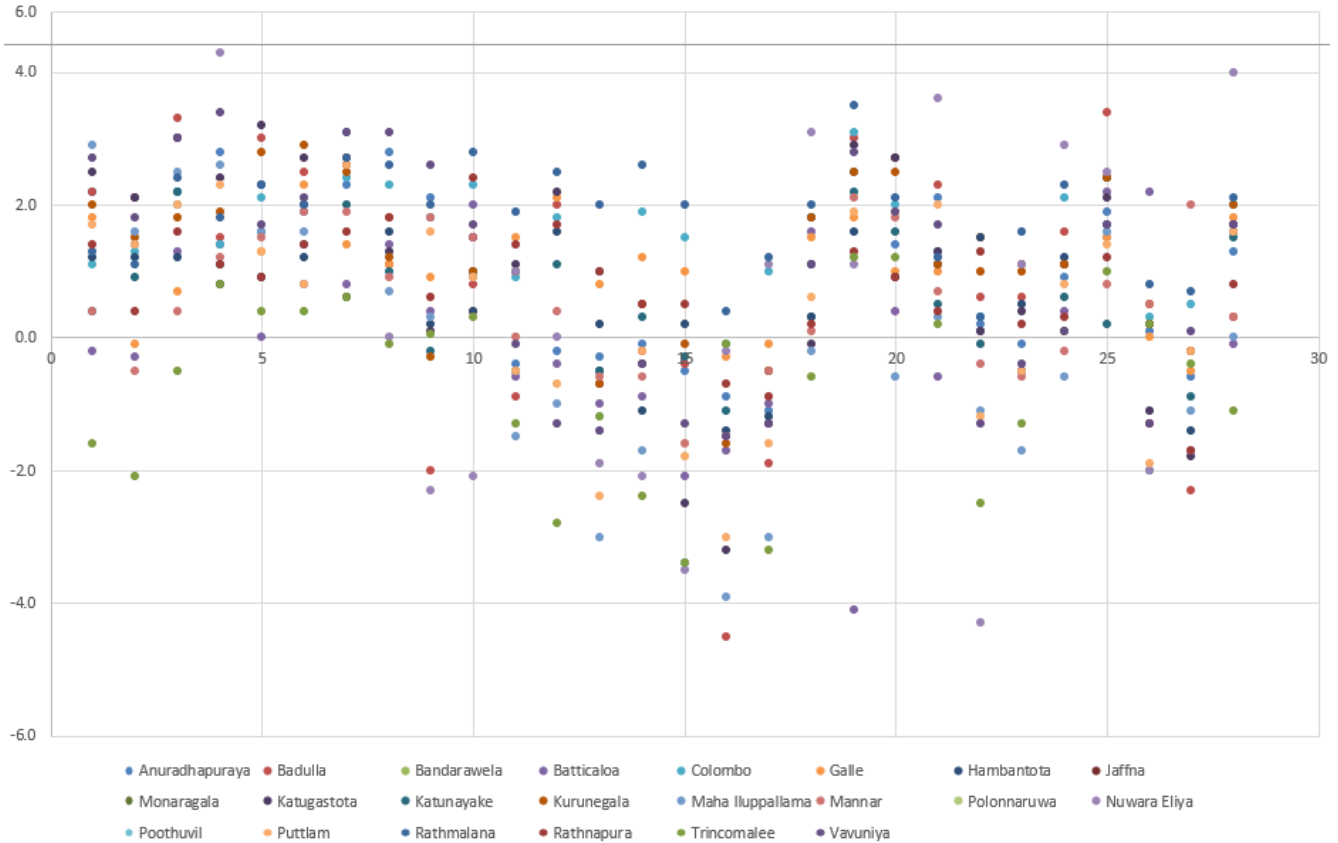


Fig 15 Minimum Temperature anomaly ($^{\circ}\text{C}$) for February 2023

Above normal rainfall was reported at most of the principal meteorological stations except Kurunegala and NuwaraEliya where below normal rainfall was reported (Fig 4). Maximum percentage was reported from Jaffna (426.7%) while minimum from Kurunegala (23.9%).

Below normal rainfall was reported from most of the hydro catchment stations except Maussakele, Canyon, Randanigala and Bowathenna where about normal rainfall was reported (Fig 6).

Highest cumulative rainfall was 510.4 mm at Rufuskulam in Ampara District. Highest rainfall received during 24hours, was 237 mm at Sangamam Tank in Ampara District on 19th February.

The monthly total rainfall at hydro catchment areas, total rainfall and the number of rain days at the principal meteorological stations, are shown in tables 1 and 2.

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

| Hydro Catchment | Jan 2023 | Average | % (percentage of average) |
|-----------------|----------|---------|---------------------------|
| Castlereigh | 41.2 | 76.6 | 53.8% |
| Norton | 28.0 | 90.4 | 31.0% |
| Maussakele | 61.6 | 68.1 | 90.4% |
| Canyon | 59.5 | 64.4 | 92.4% |
| Laksapana | 98.2 | 110.4 | 89.0% |
| Kotmale | 24.3 | 107.3 | 22.6% |
| Victoriya | 100.4 | 129.7 | 77.4% |
| Randenigala | 185.4 | 196.9 | 94.1% |
| Bowatenna | 239.5 | 220.9 | 108.4% |
| Ukuwela | 67.8 | 114.9 | 59.0% |
| Samanala Wewa | 64.0 | 100.5 | 63.7% |
| Maskeliya | 36.5 | 71.7 | 50.9% |
| Neboda | | 113.6 | |

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 | | |
|------------------------|----------------------------|---------|--------|--------------------------------|---------|--------|
| | 2023-Feb | Average | % | 2023-Feb | Average | % |
| Anuradhapuraya | 69.1 | 55.4 | 124.7% | 8 | 4 | 200.0% |
| Badulla | 129.4 | 103.1 | 125.5% | 12 | 7 | 171.4% |
| Bandarawela | 67.9 | 70.2 | 96.7% | 11 | 6 | 183.3% |
| Batticaloa | 196.0 | 128.4 | 152.7% | 12 | 7 | 171.4% |
| Colombo | 79.3 | 72.7 | 109.1% | 9 | 5 | 180.0% |
| Galle | 277.6 | 70.5 | 393.8% | 14 | 6 | 233.3% |
| Hambantota | 185.2 | 47.6 | 389.1% | 7 | 4 | 175.0% |
| Jaffna | 166.4 | 39.0 | 426.7% | 5 | 2 | 250.0% |
| Monaragala | 299.8 | | | 11 | | |
| Katugastota | 90.5 | 74.2 | 122.0% | 9 | 5 | 180.0% |
| Katunayake | 113.3 | 79.8 | 142.0% | 6 | 4 | 150.0% |
| Kurunegala | 23.6 | 98.8 | 23.9% | 8 | 4 | 200.0% |
| Maha Iluppallama | 93.2 | 56.8 | 164.1% | 9 | 4 | 225.0% |
| Mannar | 125.6 | 61.8 | 203.2% | 6 | 3 | 200.0% |
| Polonnaruwa | 290.4 | 123.2 | 235.7% | 11 | 5 | 220.0% |
| Nuwara Eliya | 57.2 | 77.7 | 73.6% | 10 | 7 | 142.9% |
| Pothuvil | 194.4 | 163.6 | 118.8% | 13 | na | |
| Puttlam | 42.2 | 43.1 | 97.9% | 7 | 4 | 175.0% |
| Rathmalana | 123.0 | 77.3 | 159.1% | 10 | 5 | 200.0% |
| Rathnapura | 166.4 | 137.0 | 121.5% | 13 | 9 | 144.4% |
| Trincomalee | 187.2 | 105.4 | 177.6% | 7 | 5 | 140.0% |
| Vavuniya | 236.2 | 62.5 | 377.9% | 5 | 4 | 125.0% |
| Mattala | 164.6 | | | 8 | | |

| Table 3(a) - Extremes of Maximum Temperatures | | | February | 2023 |
|--|---------------------|--------------|--------------|------------------|
| | Maximum | | | Highest Std. Div |
| | Value | Offsets | | |
| | | (-) | (+) | |
| Value | 36.0 ^o C | 6.0 | 4.8 | 2.47 |
| Station | Ratnapura | Anuradhapura | Galle | Mattala |
| Date | 18/02 | 02/02 | 17/02 | |
| Table 3(b) -Extremes of Minimum Temperature February2023 | | | | |
| | Minimum | | | Highest Std.Div |
| | Value | Offsets | | |
| | | (-) | (+) | |
| Value | 6 ^o C | 4.5 | 5.1 | 3.01 |
| Station | Nuwara Eliya | Badulla | Nuwara Eliya | NuwaraEliya |
| Date | 15/02 | 16/02 | 06/02 | |

Prepared by National Meteorological Centre(NMC)
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