Federation for Environment, Climate and Technology

c/o, Maintenance Office, Mahaweli Authority, Digana Village, Rajawella, Sri Lanka.
Phone (+94) 81-2376746, 2300415 E-mail: fectsl@gmail.com
Web Site http://www.climate.lk

7 August 2020

EXPERIMENTAL CLIMATE MONITORING AND PREDICTION

By: Piushani Ellegala, Chethana Chandrasiri, Nipuni Alahakoon, Chayana Gunathilake, Lareef Zubair and Michael Bell[1] (FECT and IRI[1])

HIGHLIGHTS

Rainfall Forecast

- *The NOAA weekly rainfall forecast predicts up to 75 mm in Gampaha, Colombo, Kalutara, Galle, Ratnapura and Kegalle districts during 5 - 10 August.*

Monitored Rainfalls

- *Between 29th July - 4th August: up to 30 mm of rainfall was recoreded in Jaffna district on 29th July.*

Monitored Wind

- *From 28 July - 3 August: up to 15 km/h, northwesterly winds were experienced by the entire island.*

Monitored Sea Surface

- *1.5 ^{0}C above average sea surface temperature was observed in the seas around Sri Lanka.*

Monitoring

Rainfall

Weekly Monitoring

Date	Rainfall
29th July	Up to 30 mm in Jaffna districts; and up to 10 mm in Anuradhapura and Trincomalee districts.
30th July	Up to 10 mm in Gampaha, Colombo, Kegalle, Ratnapura, Kandy, Nuwara Eliya, Badulla, Monaragala and Hambantota districts.
31st July	Up to 10 mm in Kegalle district.
1st August	Up to 15 mm in Galle district; and up to 10 mm in Gampaha, Colombo, Kalutara, Matara, Ratnapura, Kegalle, Batticaloa, Polonnaruwa, Matale, Kurunegala and Ampara districts.
2nd August	Up to 15 mm in Gampaha, Kalutara and Galle districts; and up to 10 mm in Puttalam, Kurunegala, Colombo, Kegalle, Ratnapura, and Nuwara Eliya districts.
3rd August	Up to 20 mm in Galle and Matara districts; up to 15 mm in Kalutara, Ratnapura, Hambantota districts; and up to 10 mm in Kandy, Nuwara Eliya, Badulla, Monaragala, Matale, Ampara, Polonnaruwa and Batticaloa districts.
4th August	Up to 15 mm in Anuradhapura, Polonnaruwa and Trincomalee districts; and up to

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Date	Rainfall
	10 mm in Galle, Matara, Hambantota, Monaragala, Badulla, Nuwara Eliya, Ampara, Batticaloa, Gampaha, Kegalle, Kandy, Matale, Kurunegala, Puttalam, Mannar, Vavuniya, Kilinochchi, Mullaitivu, Jaffna and Ratnapura districts.

Total Rainfall for the Past Week

The RFE 2.0 tool shows total up to 10– 25 mm in Anuradhapura, Trincomalee, Jaffna, Polonnauwa, Matale, Kurunegala, Puttalam, Colombo, Gampaha, Kalutara, Galle, Matara, Hambantota, Ratnapura, Ampara, Monaragala, Badulla, Nuwara Eliya, Kandy, Kegalle and Batticaloa districts; up to 5 – 10 mm in Kilinochchi, Mullaitivu, Vavuniya and Mannar, districts.

Above rainfall average up to 25-50 mm in Jaffna district. Below rainfall average up to 10-25 mm in Ratnapura district.

Monthly Monitoring

During July – Above average rainfall conditions up to 10 mm were experienced by Vavuniya, Polonnaruwa, Matale and Anuradhapura districts; up to 6 mm in Jaffna, Mannar, Mullaitivu, Kilinochchi, Puttalam, Trincomalee, Kurunegala, Kandy, Badulla, Ratnapura, Nuwara Eliya, Ampara, Monaragala and Hambantota districts and up to 4 mm in Gampaha, Colombo, Kalutara, Galle, Matara, Kegalle and Batticaloa districts.

Ocean State *(Text Courtesy IRI)*

Pacific sea state: July 29, 2020

SSTs in the east-central and central Pacific decreased to near the La Niña threshold in late July, and the atmospheric variables were either ENSO-neutral or indicative of weak La Niña conditions. The average of the forecasts of many models just short of the borderline of weak La Niña SST conditions through fall, becoming slightly weaker beginning in early winter. The official CPC/IRI outlook is somewhat similar to these model forecasts, calling for a likely continuation of ENSO-neutral in summer, with approximately equal chances of ENSO-neutral or La Niña for fall and winter.

Indian Ocean State

1.5 ^{0}C above average sea surface temperature was observed in the seas around Sri Lanka.

Predictions

Rainfall

14-day prediction: NOAA NCEP models

From 6th August – 12th August: Total rainfall up to 55 mm in Kalutara, Kegalle, Ratnapura, Galle and Matara, districts; up to 45 mm in Colombo, Gampaha, Kandy, Hambantota, Nuwara Eliya, Vavuniya and Mullaitivu districts; up to 35 mm in Matale, Kurunegala, Badulla, Puttalam, Monaragala,

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Trincomalee and Anuradhapura districts; and up to 25 mm in Mannar, Batticaloa, Polonnaruwa, Ampara and districts.

From 13th August – 19th August: Total rainfall up to 45 mm in Kalutara, Kegalle, Ratnapura, Gampaha and Colombo districts; up to 35 mm in Kurunegala, Anuradhapura, Matale, Kandy, Nuwara Eliya, Galle, Matara and Hambantota districts; up to 25 mm in Puttalam, Vavuniya, Mullaitivu, Trincomalee, Polonnaruwa, Ampara, Badulla and Monaragala districts.

NOAA Model Forecast:

From 5th August – 10st August: Total rainfall up to 75 mm in Gampaha, Colombo, Kalutara, Galle, Ratnapura and Kegalle districts; up to 50 mm in Puttalam, Kurunegala, Kandy, Matara, Hambantota, Jaffna, Kilinochchi, Mullaitivu and Nuwara Eliya.

MJO based OLR predictions

For the next 15 days:

MJO shall enhance rainfall during 5 - 9 August, neutral during 10-14 August and shall suppressed during 15 – 19 August.

[1] International Research Institute for Climate and Society, Earth Institute at Columbia University, New York.
Official hydro-meteorological statements are provided by the Sri Lanka Department of Meteorology and Department of

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Weekly Hydro- Meteorological Report for Sri Lanka

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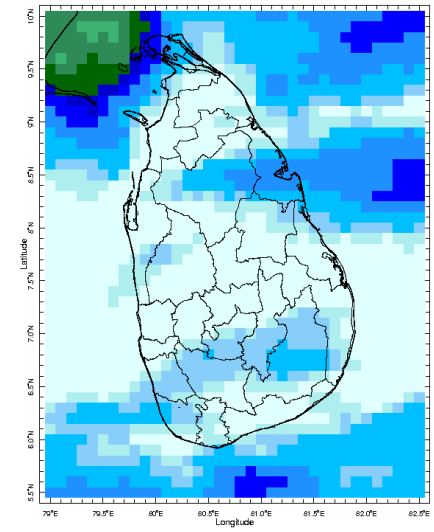
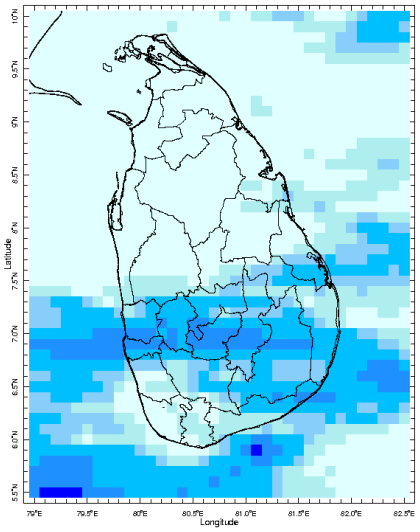
MONITORING

Daily Rainfall Monitoring

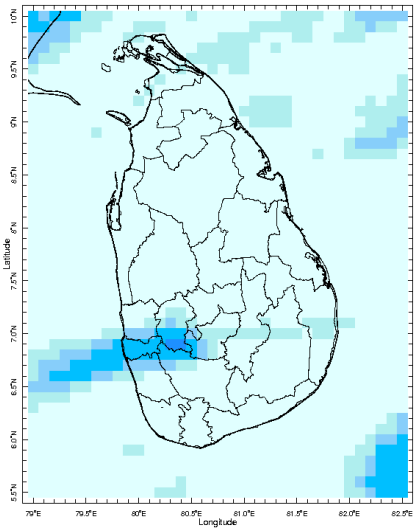
The following figures show the satellite observed rainfall in the last 7 days in Sri Lanka.



29 Jul 2020



30 Jul 2020



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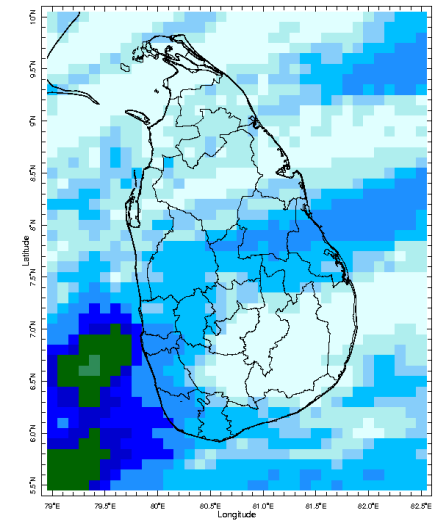
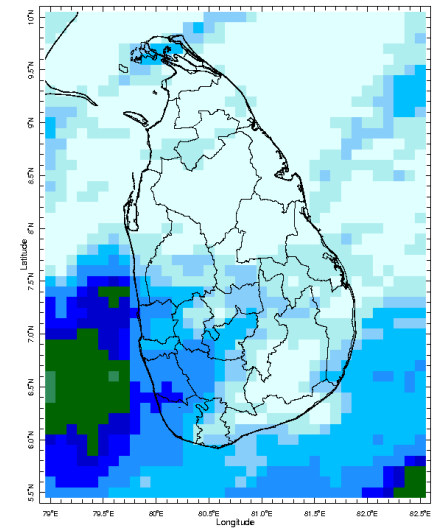


1 Aug 2020



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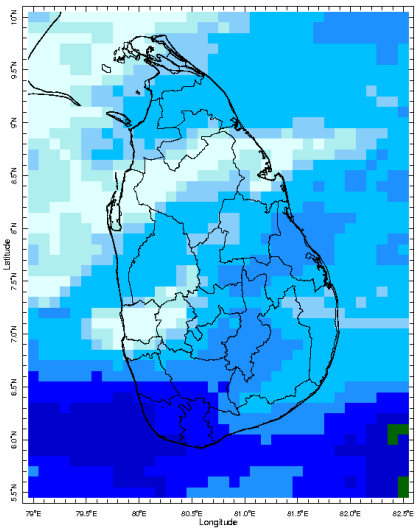
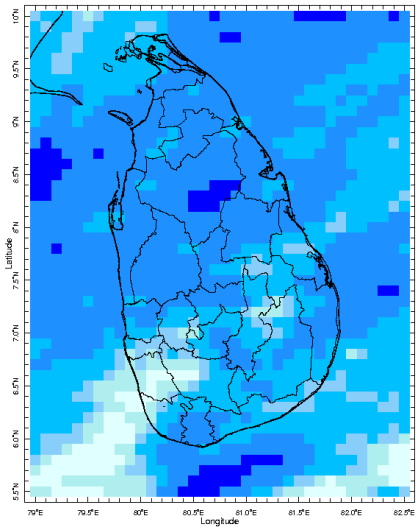


3 Aug 2020



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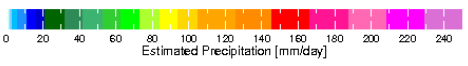
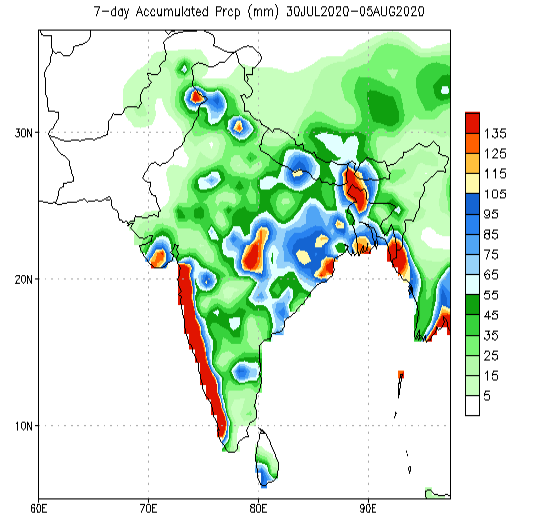
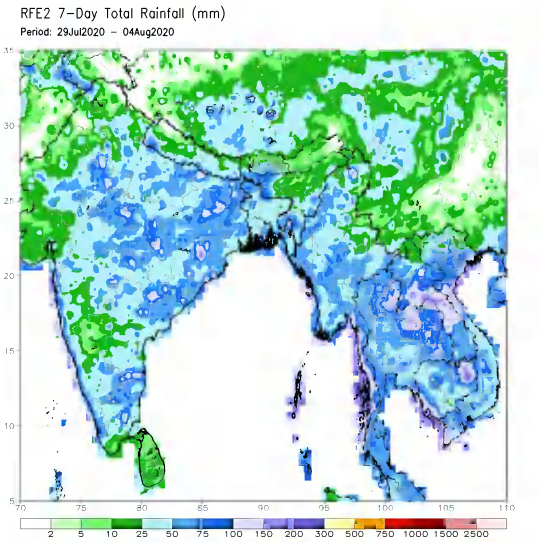


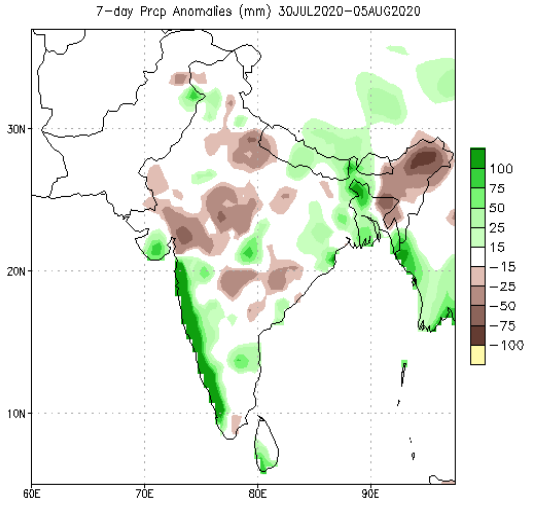
Weekly Rainfall Monitoring

The following figures show the total satellite observed rainfall in the last week in Sri Lanka. The figure in the left is the total 7-day rainfall from NOAA Climate Prediction Center (CPC) Unified Precipitation Analysis and the figure in the right is the total 7-day rainfall from CPC RFE 2.0 Satellite Rainfall Estimates. The bottom two figures are the respective anomalies.

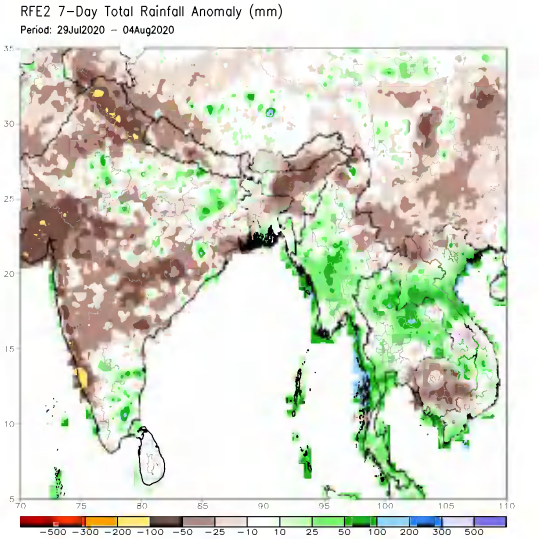


Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis



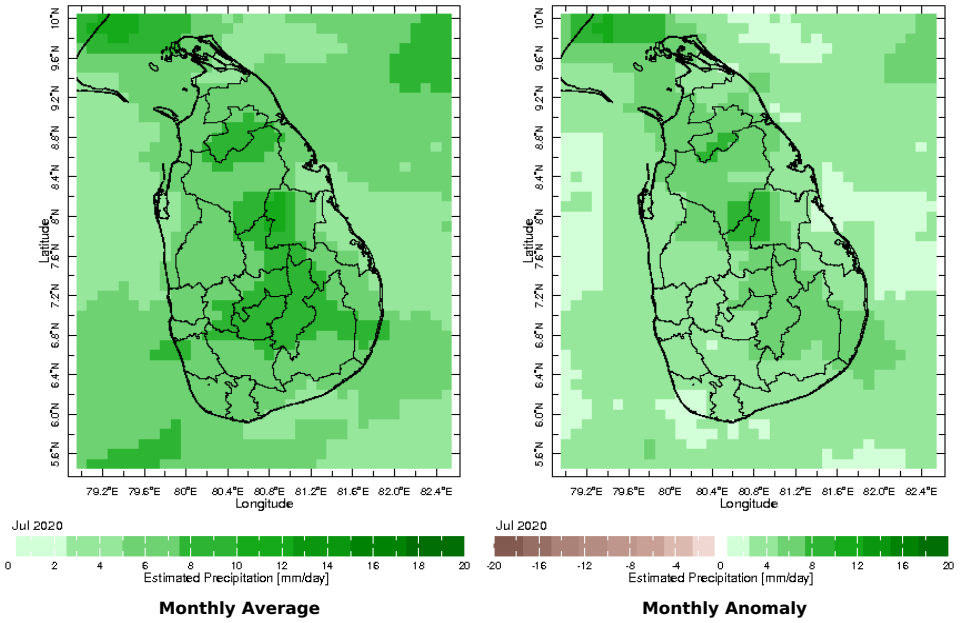


Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis Climatology (1981-2010)

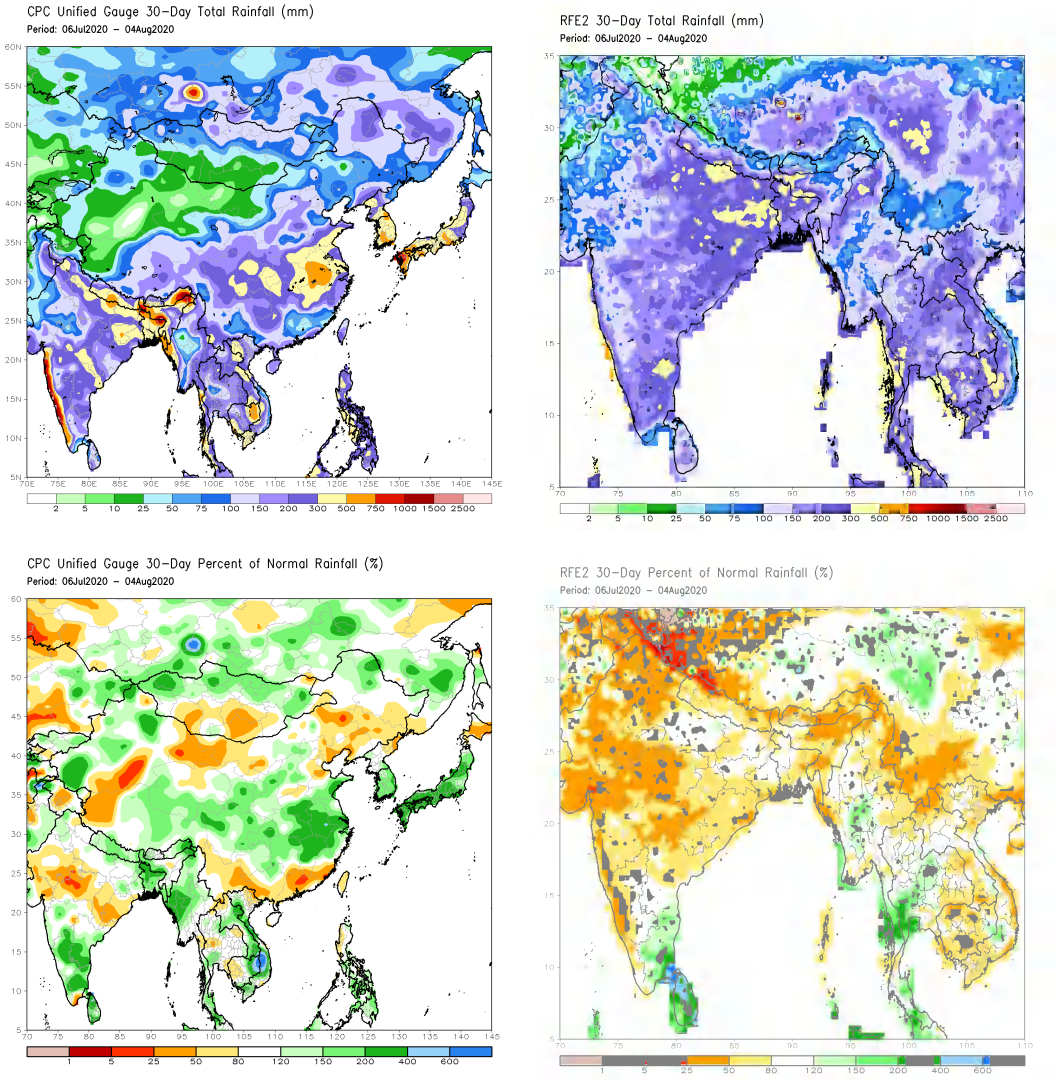


Monthly Rainfall Monitoring

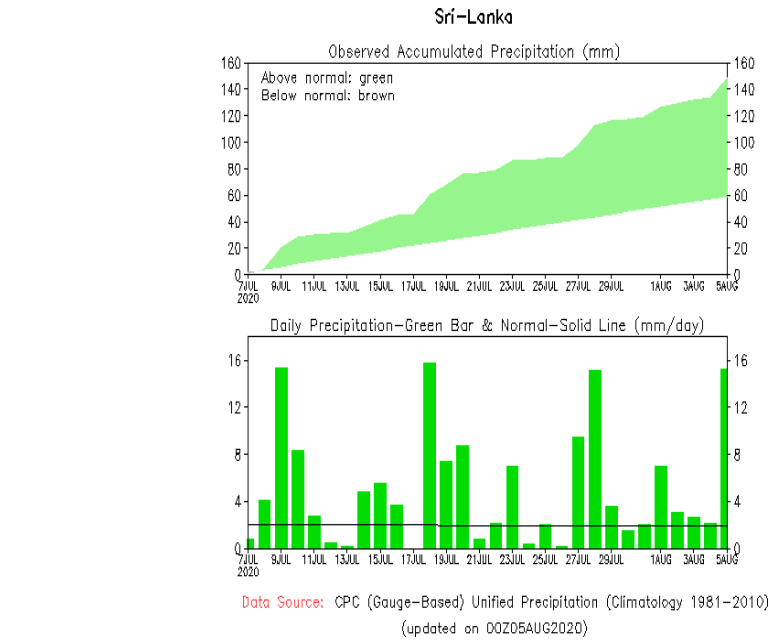
The figure in the left shows the average observed rainfall in the previous month. The rainfall anomaly in the previous month is shown in the figure to the right. The brown color in the anomaly figure shows places which received less rainfall than the historical average while the green color shows places with above average rainfall. Darker shades show higher magnitudes in rainfall



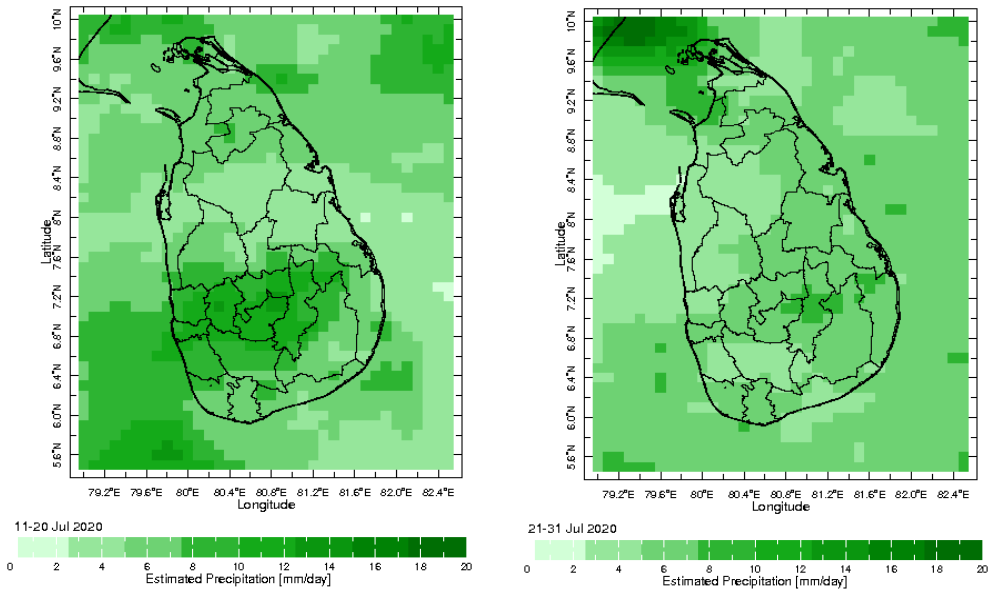
The figure in the top-left shows the total rainfall in the past 30 days from CPC Unified Precipitation Analysis while the figure in the top-right shows the total rainfall for the same period from RFE 2.0 Satellite Rainfall Estimates. The bottom two figures show the percentage of rainfall received in the past 30 days compared to normal rainfall in this period.



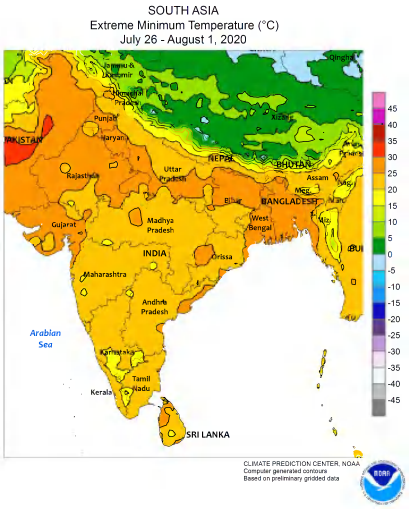
The following figure shows the observed accumulated rainfall (top) and daily observed rainfall (bottom) in Sri Lanka in the last 30 days.

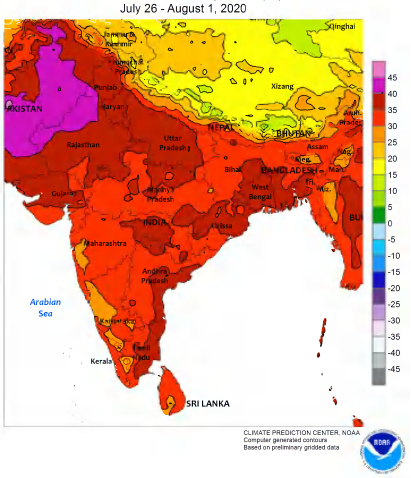


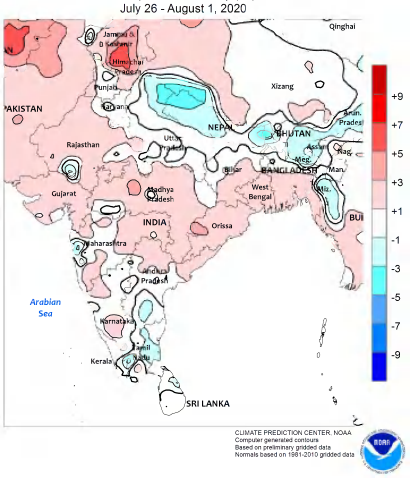
Dekadal (10 Day) Satellite Derived Rainfall Estimates



Weekly Temperature Monitoring

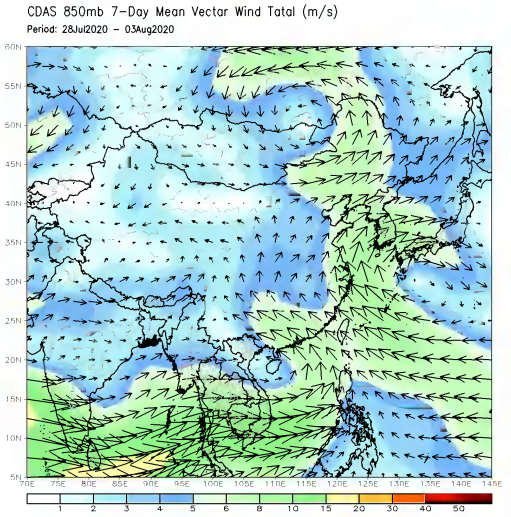


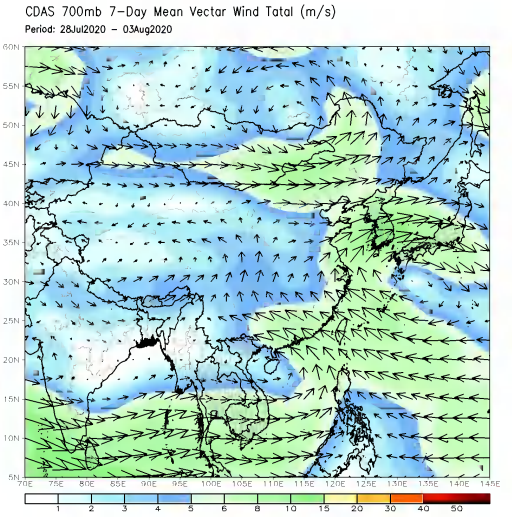




Weekly Wind Monitoring

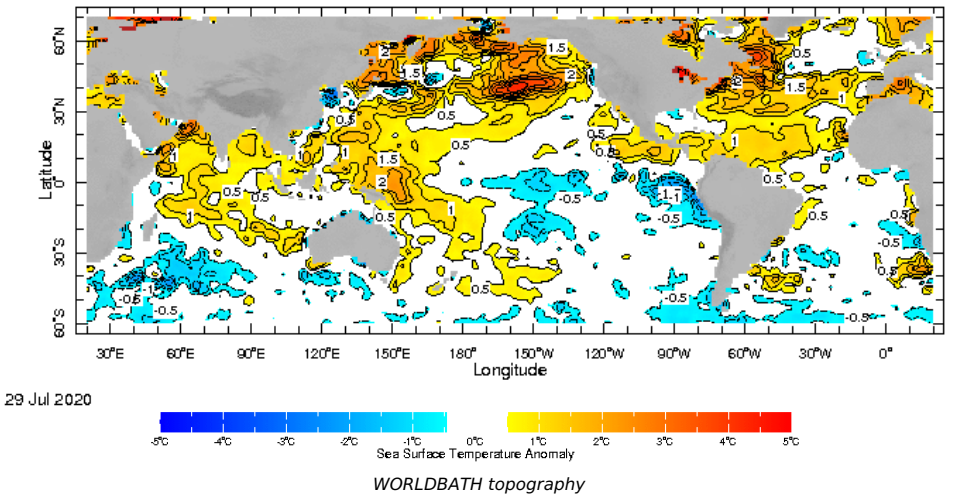
The following figures show the mean vector wind total of the past 7 days near Sri Lanka at two levels. The figure on the left shows 850 mb (~1500 m) level and the figure on the right shows 700 mb (~3000 m) level.





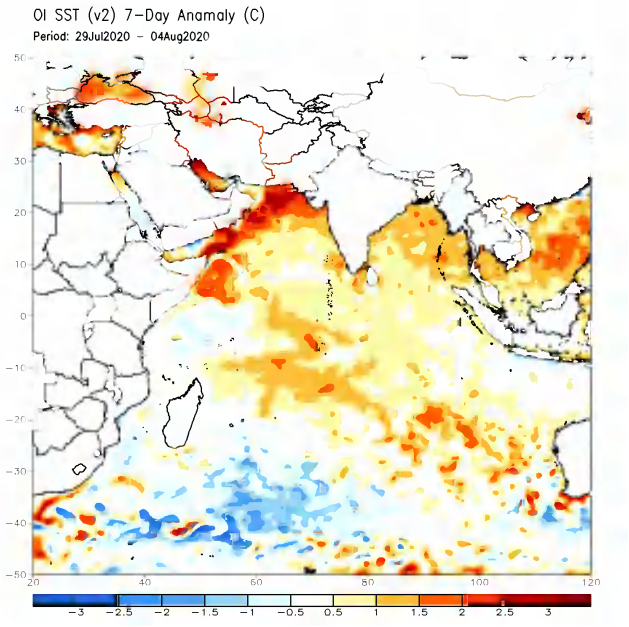
Weekly Average SST Anomalies

Weekly average Sea Surface Temperature (SST) anomaly in the world from NOAA NCEP



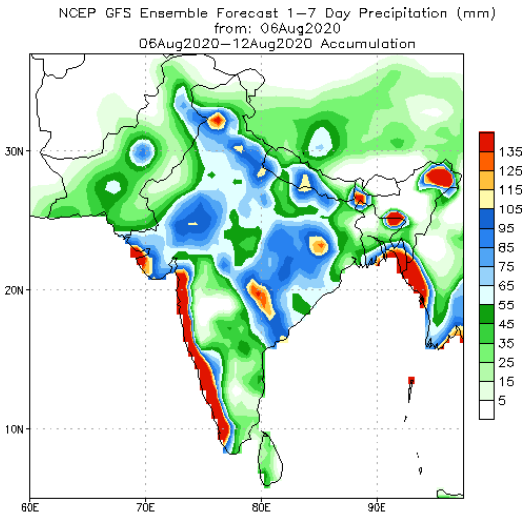
WORLDBATH topography

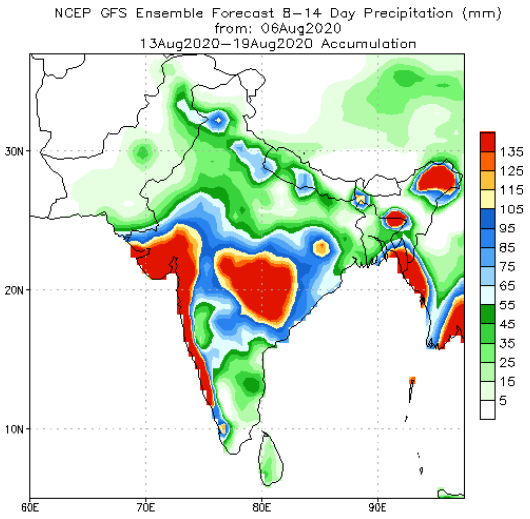
Optimum Interpolated Sea Surface Temperature Anomaly in the Indian Ocean from NOAA CPC



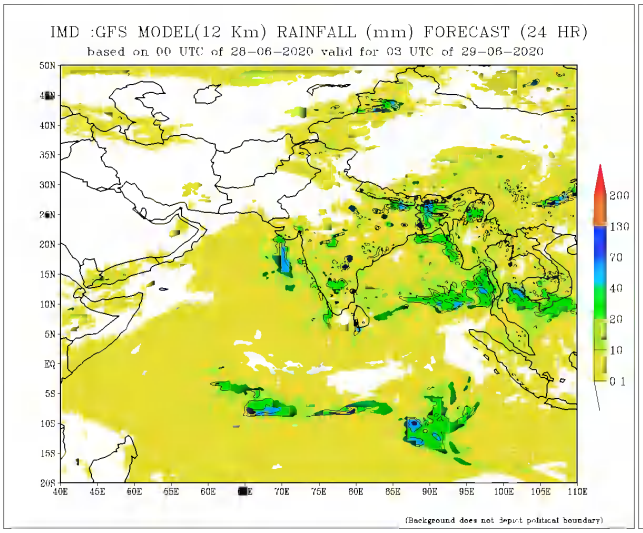
PREDICTIONS

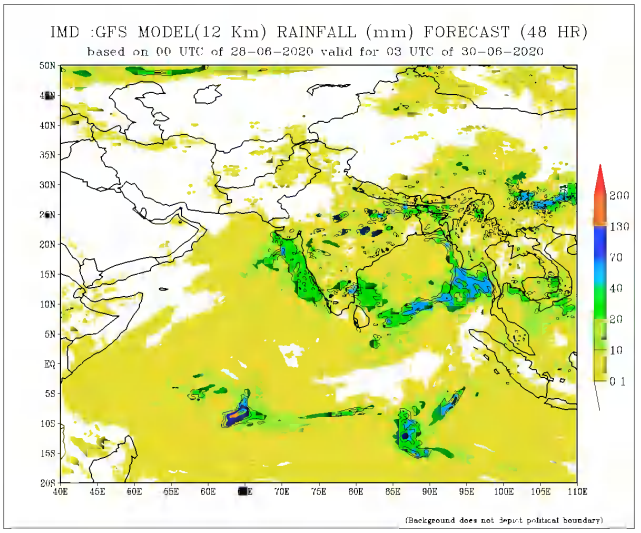
NCEP GFS 1- 14 Day prediction

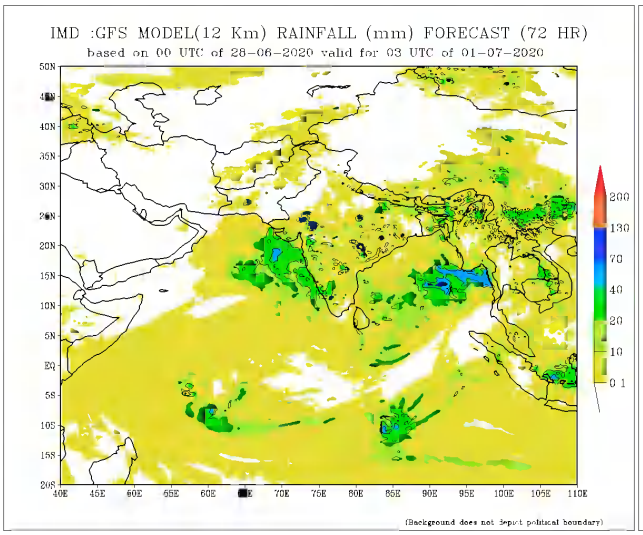




IMD GFS (T574) Model Rainfall Forecast from RMSC New Delhi, India


IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (24 HR)
based on 00 UTC of 28-06-2020 valid for 03 UTC of 29-06-2020
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (48 HR)
based on 00 UTC of 28-06-2020 valid for 03 UTC of 30-06-2020
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (72 HR)
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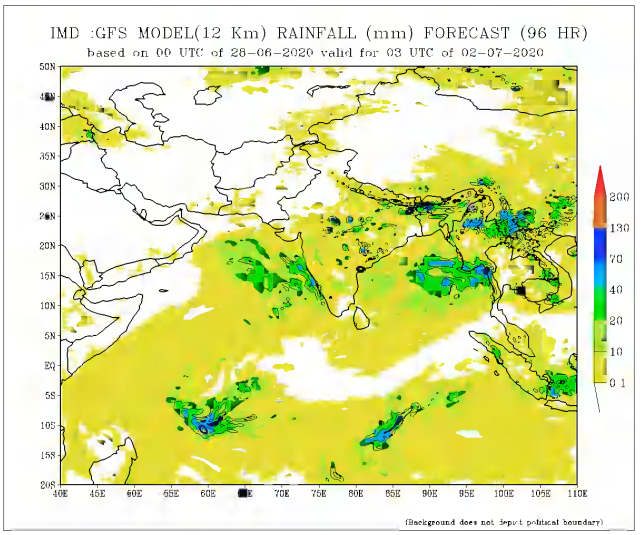
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (96 HR)
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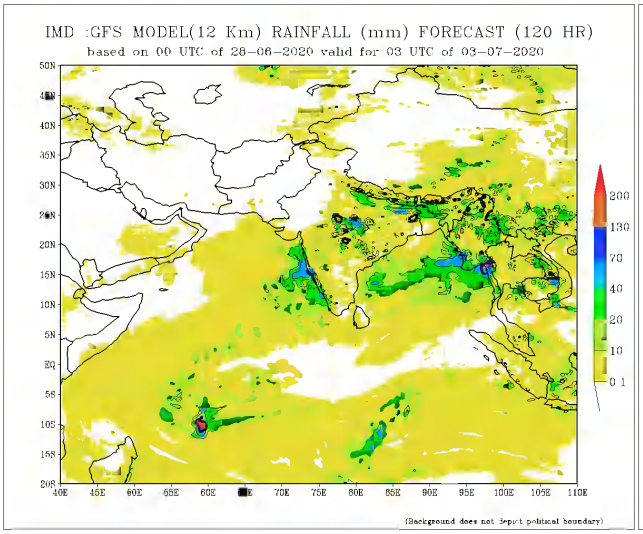
(Background does not depict political boundary)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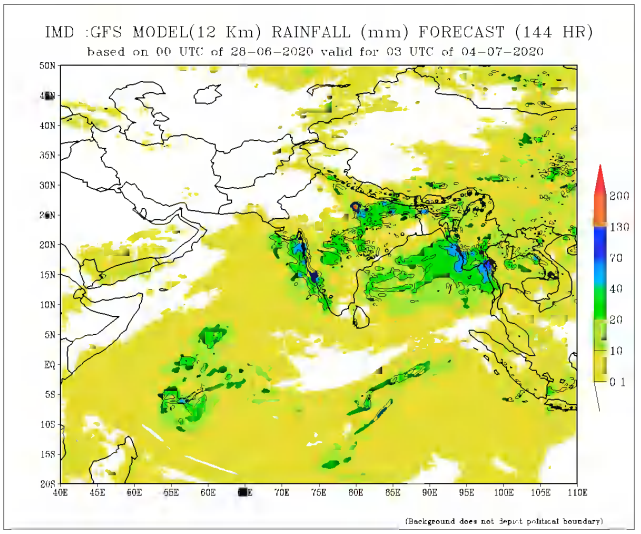
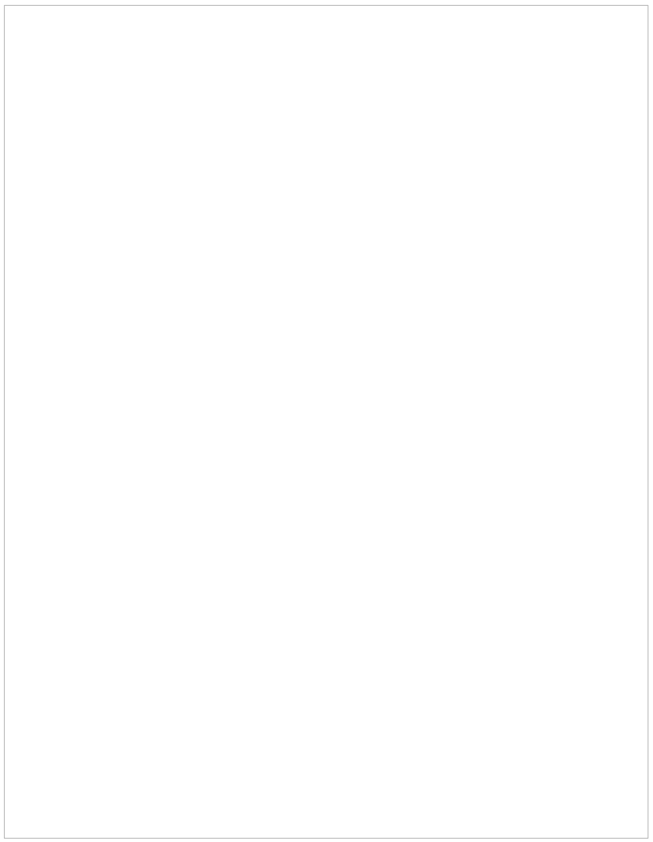
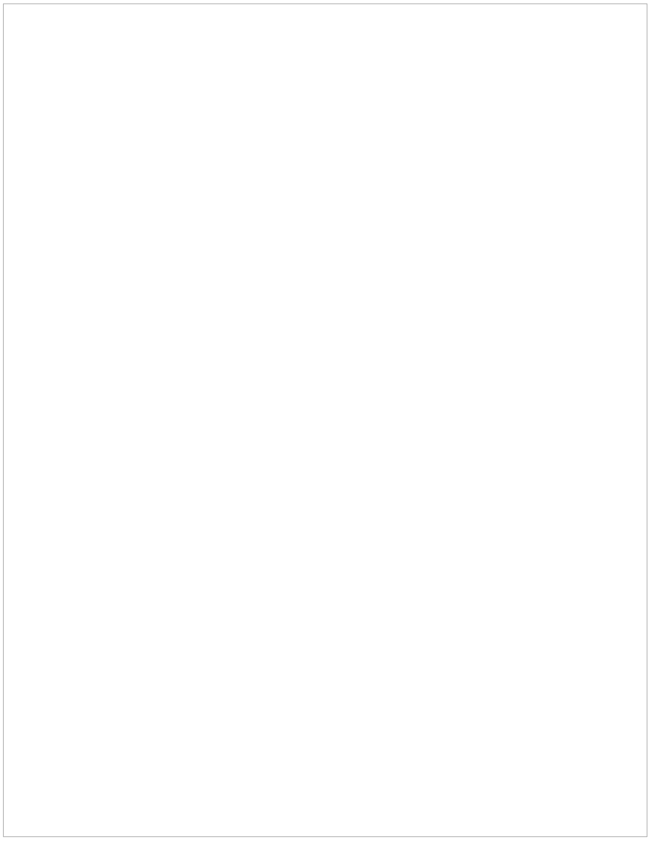
(Background does not depict political boundary)


IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (144 HR)
based on 00 UTC of 28-06-2020 valid for 03 UTC of 04-07-2020
(Background does not depict political boundary)

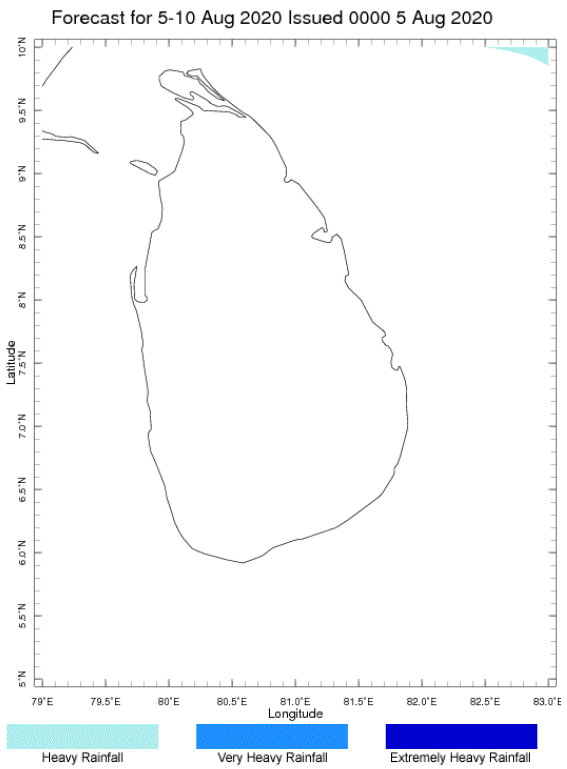
WRF Model Forecast (from IMD Chennai)



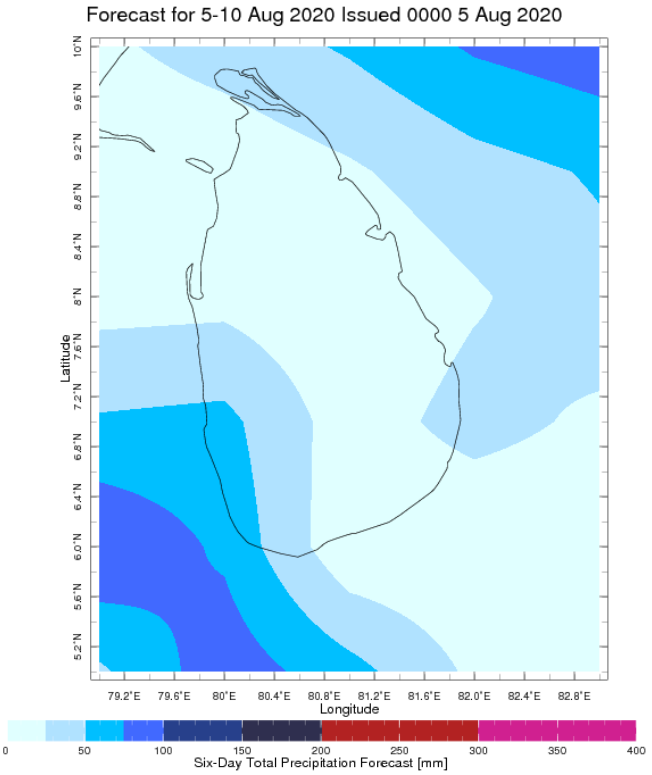


Weekly Rainfall Forecast from IRI

Total rainfall forecast from the IRI for next six days is provided in figures below. The figure to the left shows the expectancy of heavy rainfall events during these six days while the figure to the right is the prediction of total rainfall amount during this period.



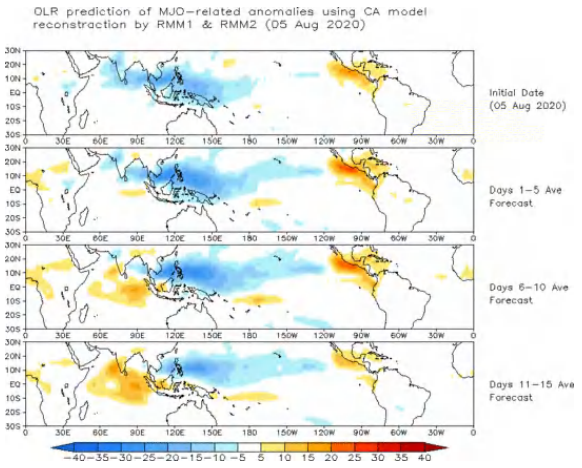
Extreme Rainfall Forecast



Total Six Day Precipitation Forecast

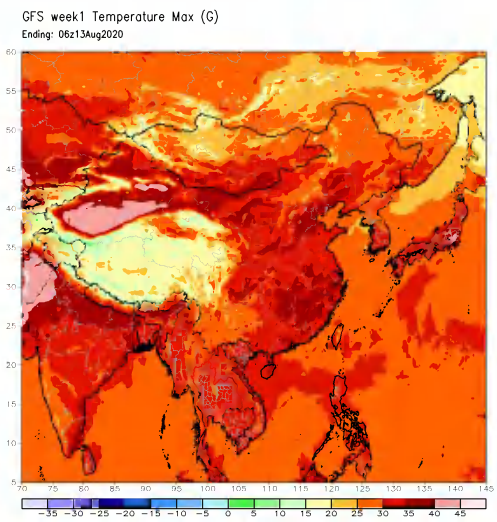
Madden Julian Oscillation (MJO) related Outgoing Longwave Radiation (OLR) Forecast

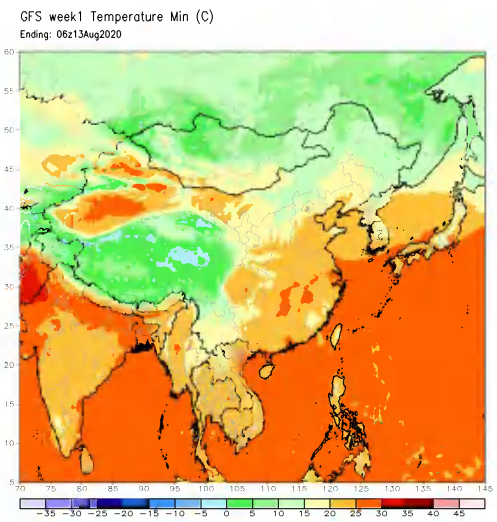
The Outgoing Longwave Radiation (OLR) is a proxy for rainfall. This can be used to identify convective rain clouds based on the MJO phase. Violet and Blue shading indicates enhanced tropical weather and Orange shading indicates suppressed conditions. The following figure shows the forecasts of MJO associated anomolous OLR for the next 15 days from the Constructed Analogue (CA) model forecasts.



Weekly Temperature Forecast

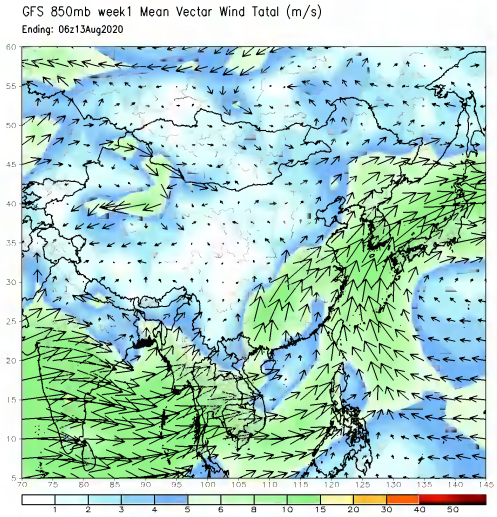
Weekly Minimum and Maximum Temperature prediction from the GFS model (from NOAA CPC)

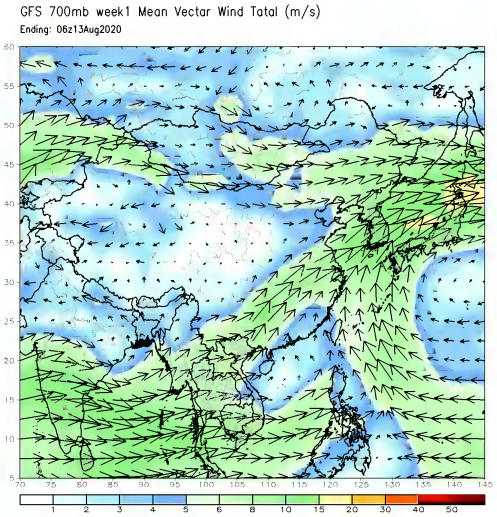




Weekly Wind Forecast

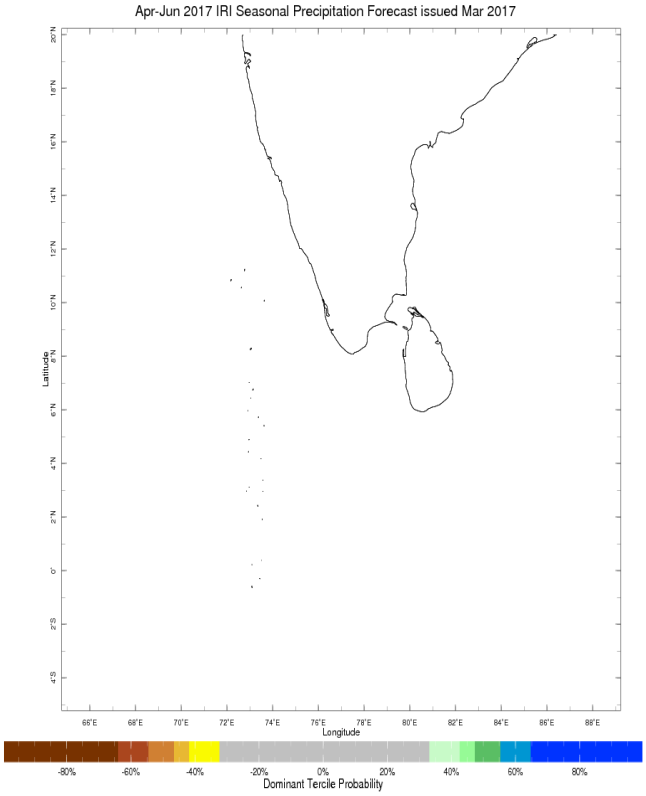
Weekly mean vector wind total prediction from the GFS model at 850 mb (left) and 700 mb (right) levels. (from NOAA CPC)



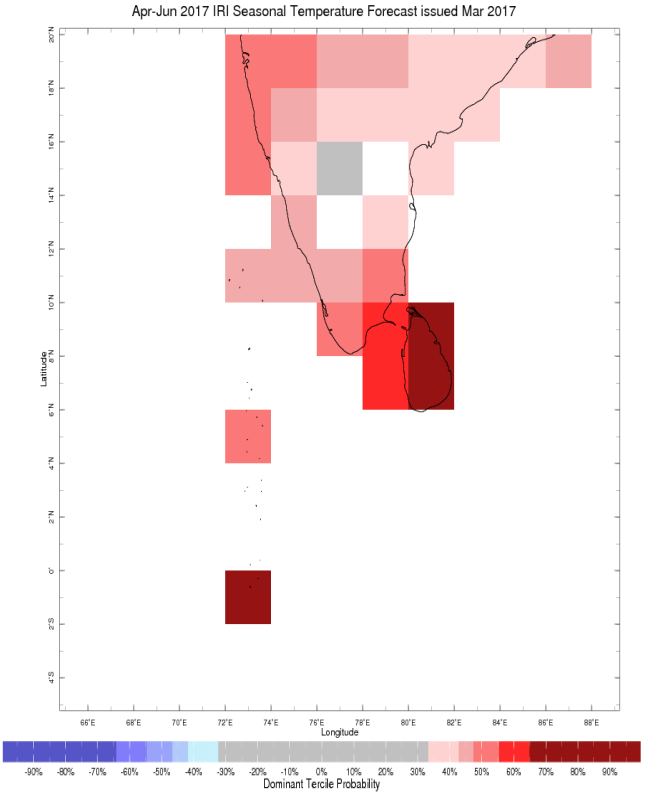


Seasonal Rainfall and Temperature Forecast

Following is the latest seasonal precipitation and temperature prediction for the next 3 months by the IRI. The color shading indicates the probability of the most dominant tercile -- that is, the tercile having the highest forecast probability. The color bar alongside the map defines these dominant tercile probability levels. The upper side of the color bar shows the colors used for increasingly strong probabilities when the dominant tercile is the above-normal tercile, while the lower side shows likewise for the below-normal tercile. The gray color indicates an enhanced probability for the near-normal tercile (nearly always limited to 40%).



Precipitation Forecast



Temperature Forecast

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