



Federation for Environment, Climate and Technology

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**14 August
2020**

EXPERIMENTAL CLIMATE MONITORING AND PREDICTION

By: Piushani Ellegala, Chethana Chandrasiri, Chayana Gunathilake, Lareef Zubair and Michael Bell¹ (FECT and IRI¹)

HIGHLIGHTS

Rainfall Forecast



- The NOAA weekly rainfall forecast predicts up to 25 mm in all districts during 13 -18 August.

Monitored Rainfalls



- Between 6th - 12th August: up to 30 mm of rainfall was recorded in Western province and Matara district on 6th August; North Central province on 8th August.

Monitored Wind



- From 4th - 12th August: up to 10 km/h, western winds were experienced by the entire island.

Monitored Sea Surface



- 1 °C below average sea surface temperature was observed in the seas around Sri Lanka.

Monitoring

Rainfall

Weekly Monitoring

Date	Rainfall
6 th August	Up to 30 mm in Gampaha, Colombo, Kalutara, Galle and Matara districts; up to 20 mm in Kegalle, Ratnapura, and Hambantota districts; up to 15 mm in Kurunegala and Monaragala districts; and up to 10 mm in Nuwara Eliya district.
7 th August	Up to 15 mm in Kegalle, Kandy, Nuwara Eliya and Ratnapura districts; and up to 10 mm in Badulla district.
8 st August	Up to 30 mm in Vavuniya and Anuradhapura districts; up to 20 mm in Ratnapura and Matara districts; up to 15 mm in Hambantota, Galle, Nuwara Eliya, Badulla and Mannar districts; and up to 10 mm in Kalutara, Monaragala, Puttalam, Mullaitivu and Jaffna districts.
9 th August	Up to 20 mm in Galle, Matara, Vavuniya and Ratnapura districts; up to 15 mm in Jaffna, Mullaitivu, Kilinochchi, Trincomalee, Anuradhapura, Colombo, Gampaha, Kegalle, Nuwara Eliya, Kalutara, Hambantota, Badulla, Ampara, Mannar and Monaragala districts; up to 10 mm in Puttalam, Kurunegala, Polonnaruwa, Batticaloa, Matale and Kandy districts.
10 th August	No rainfall.
11 th August	Up to 10 mm in Galle, Ampara, Monaragala and Matara districts
12 th August	No Rainfall.



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Total Rainfall for the Past Week

The RFE 2.0 tool shows total up to 25-50 mm in Gampaha, Colombo, Kalutara, Galle, Matara, Ratnapura, Monargala and Kegalle districts; up to 10– 25 mm in Anuradhapura, Trincomalee, Jaffna, Polonnaruwa, Vavuniya, Mannar, Mullaitivu, Puttalam, Ampara, Badulla, Nuwara Eliya, Kandy, Hambantota and Batticaloa districts; and up to 5 – 10 mm in Kilinochchi, Kurunegala and Matale districts.

Above rainfall average up to 25-50 mm in Ratnapura and Matara districts and up to 10-25 mm in Vavuniya, Mannar, Anuradhapura, Gampaha, Colombo, Kegalle, Kalutara, Galle, Monaragala, and Hambantota districts. Below rainfall average up to 10-25 mm in Amapara and Badulla districts.

Monthly Monitoring

During August – 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.

Ocean State (Text Courtesy IRI)

Pacific sea state: August 5, 2020

SSTs in the east-central Pacific are in the cool-neutral range in early July, and the atmospheric variables were either ENSO-neutral or indicative of weak La Niña conditions. The average of the forecasts of many models for fall and winter slightly exceed the borderline of weak La Niña SST conditions. The official CPC/IRI outlook is similar to these model forecasts, calling for a likely continuation of ENSO-neutral in summer, with a 55% chance of La Niña for fall and 50% chance for continuing through winter. A La Niña watch is now posted.

Indian Ocean State

1 °C above average sea surface temperature was observed in the seas around Sri Lanka.

Predictions

Rainfall

14-day prediction: NOAA NCEP models

From 13th August – 19th August: Total rainfall up to 55 mm in Kegalle district; up to 45 mm in Colombo, Gampaha, Kandy, Nuwara Eliya, Ratnapura, Kalutara and Kurunegala districts; up to 35 mm in Matale, Badulla, Puttalam, Galle and Matara districts; and up to 25 mm in Anuradhapura, Polonnaruwa, Monaragala and Hambantota districts.

From 20th August – 26th August: Total rainfall up to 55 mm in Kegalle district; up to 45 mm in Colombo, Gampaha, Kandy, Nuwara Eliya, Ratnapura, Kalutara and Kurunegala districts; up to 35 mm



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in Matale, Badulla, Puttalam, Galle and Matara districts; and up to 25 mm in Anuradhapura, Polonnaruwa, Monaragala and Hambantota districts.

NOAA Model Forecast:

From 13th August – 18st August: Total rainfall up to 25 mm in all districts.

MJO based OLR predictions

For the next 15 days:

MJO shall suppress the rainfall during 12 - 21 August, neutral during 22-26 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 Irrigation.



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<http://www.climate.lk>
<http://www.tropicalclimate.org/>



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Weekly Hydro- Meteorological Report for Sri Lanka

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- g. Weekly Average SST Anomalies

2. Predictions

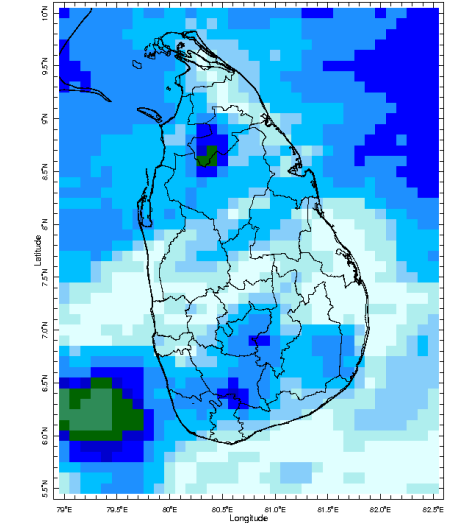
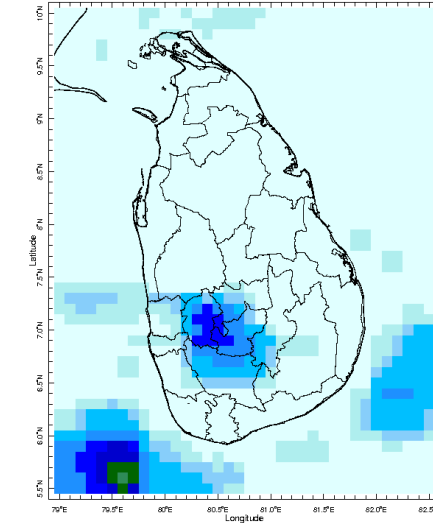
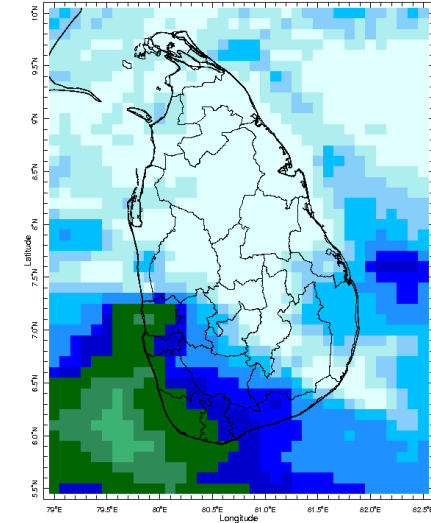
- a. NCEP GFS Ensemble 1-14 day Rainfall Predictions
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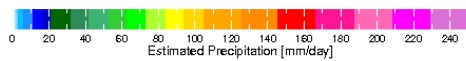
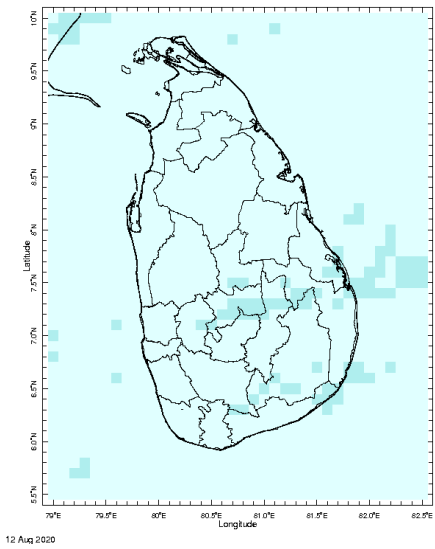
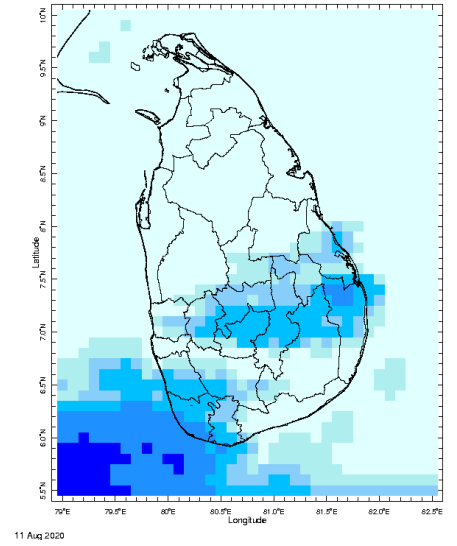
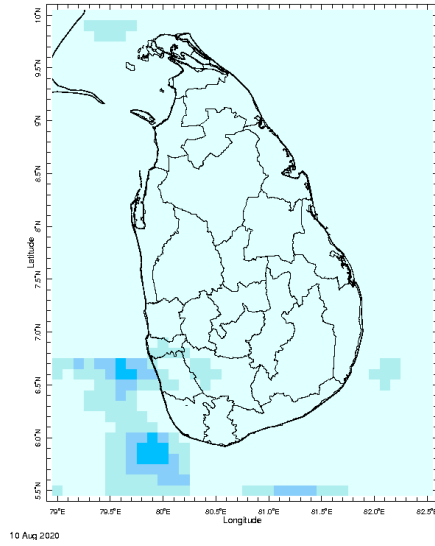
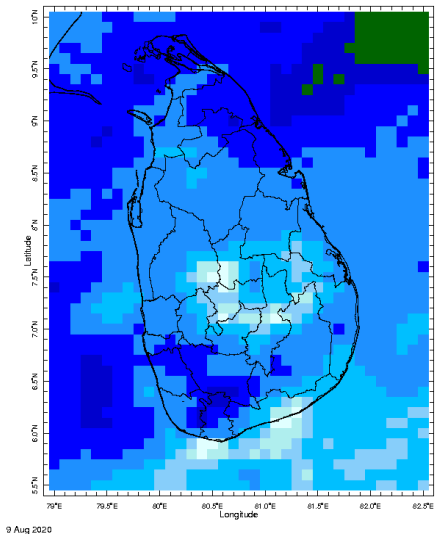


MONITORING

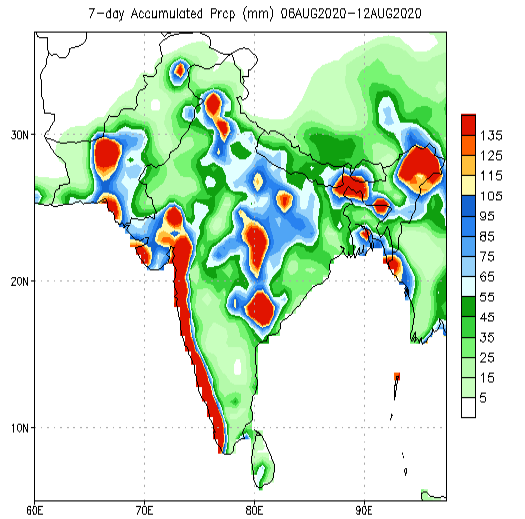
Daily Rainfall Monitoring

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

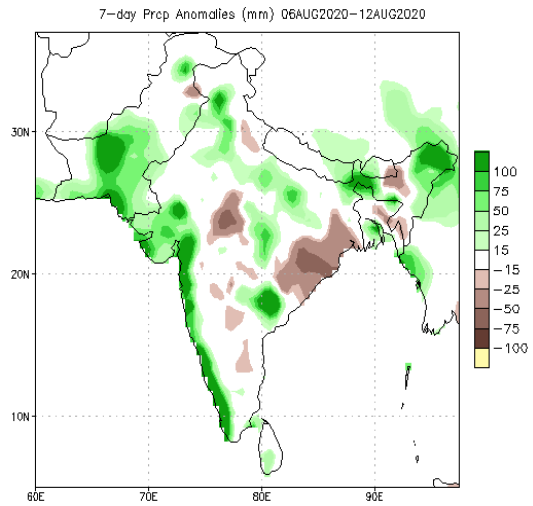
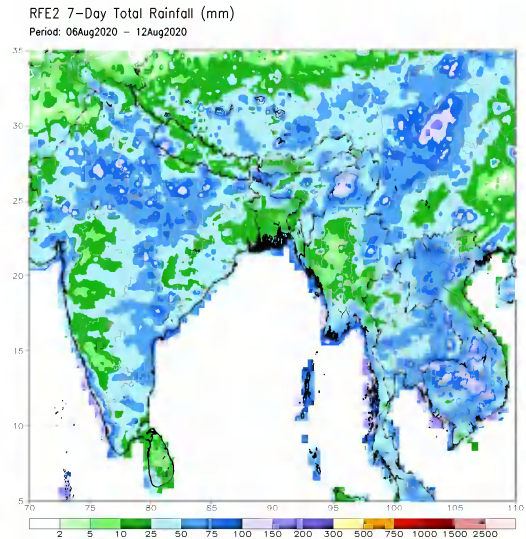




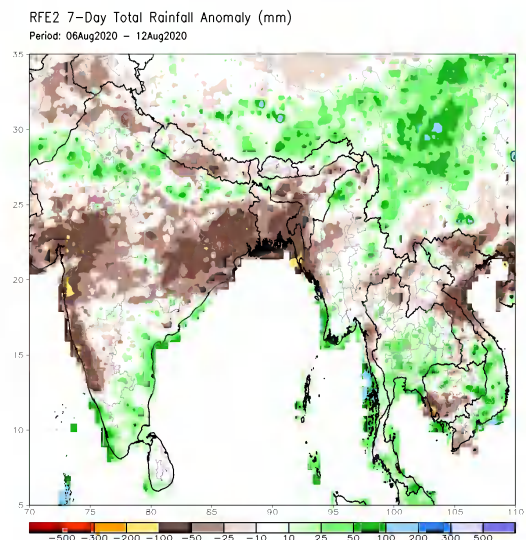
The following figures show the total satellite observed rainfall in the last week in Sri Lanka. The figure in the left is the total 7-day rainfall from NOAA Climate Prediction Center (CPC) Unified Precipitation Analysis and the figure in the right is the total 7-day rainfall from CPC RFE 2.0 Satellite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



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

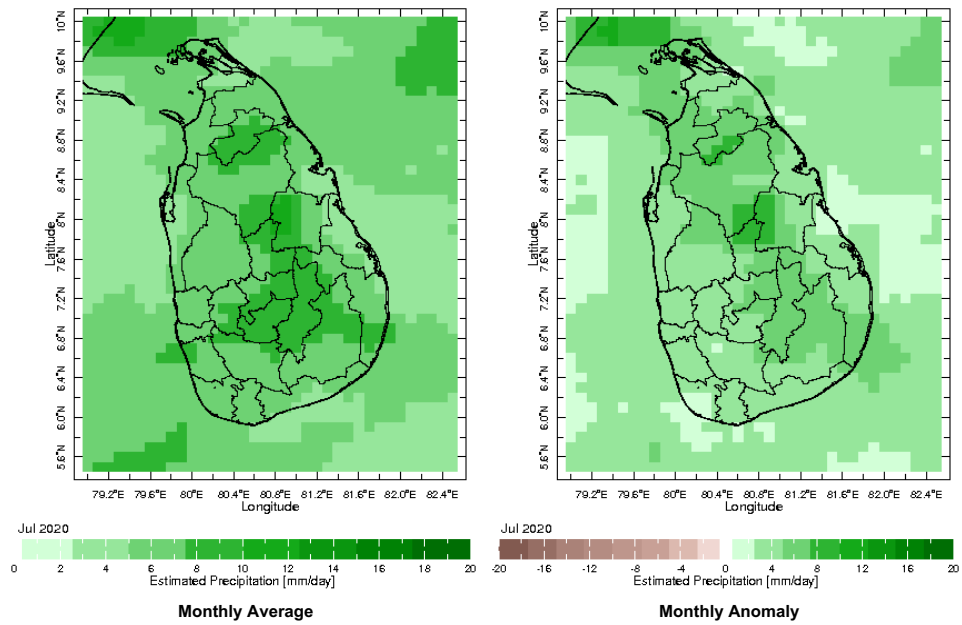


Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Climatology (1981-2010)

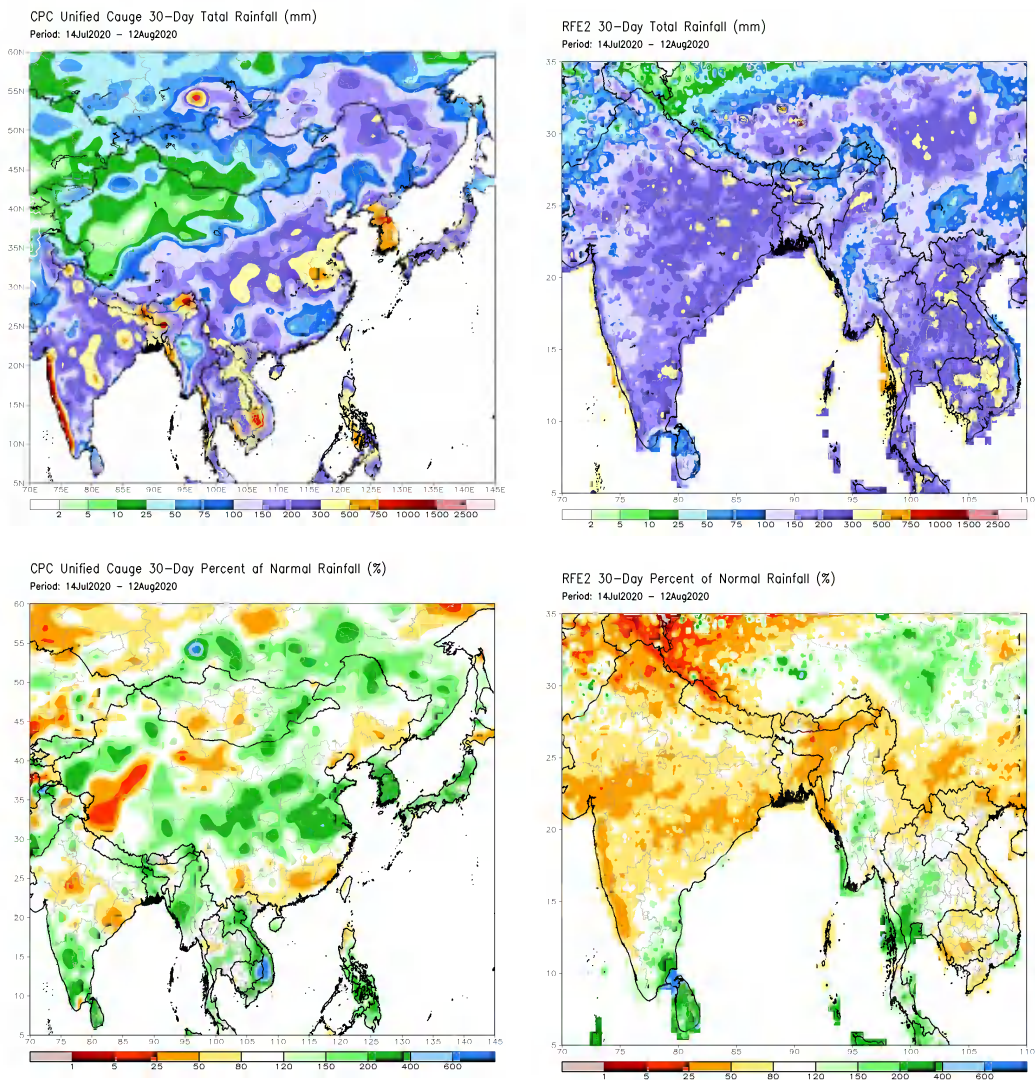


Monthly Rainfall Monitoring

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

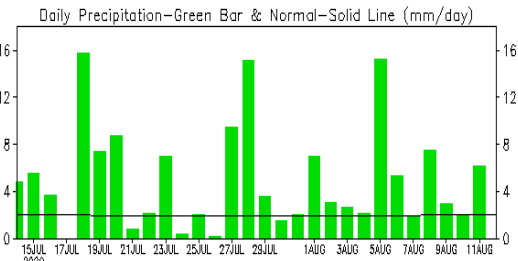
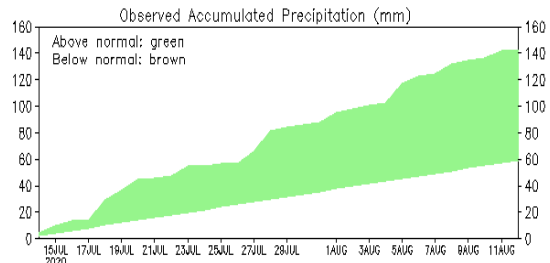


The figure in the top-left shows the total rainfall in the past 30 days from CPC Unified Precipitation Analysis while the figure in the top-right shows the total rainfall for the same period from RFE 2.0 Satellite Rainfall Estimates. The bottom two figures show the percentage of rainfall received in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



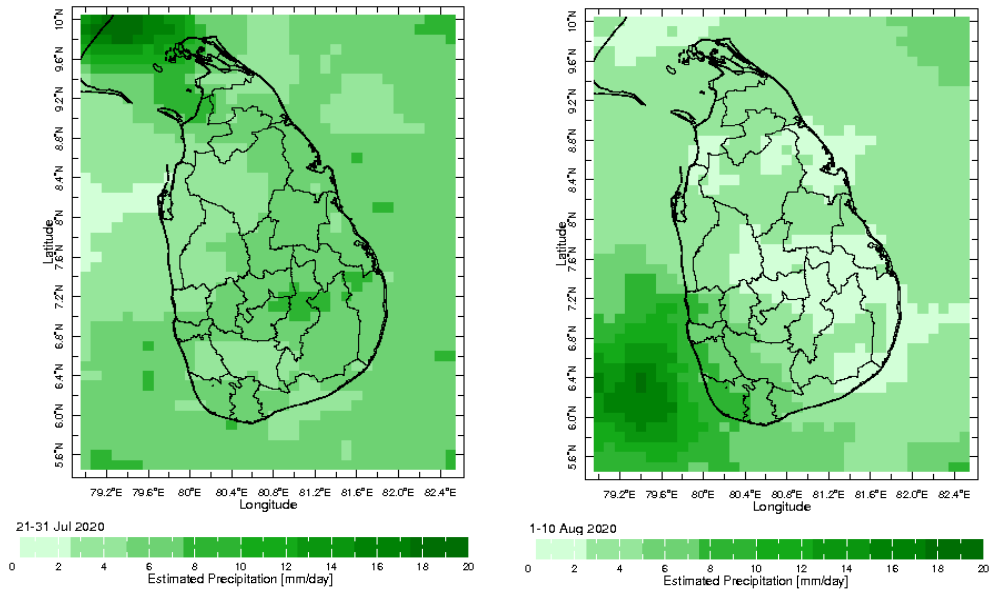
The following figure shows the observed accumulated rainfall (top) and daily observed rainfall (bottom) in Sri Lanka in the last 30 days.

Sri-Lanka

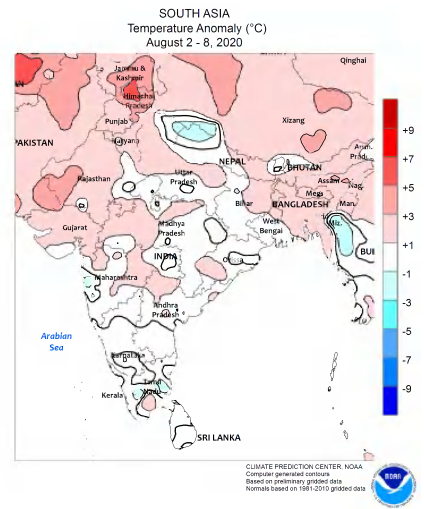
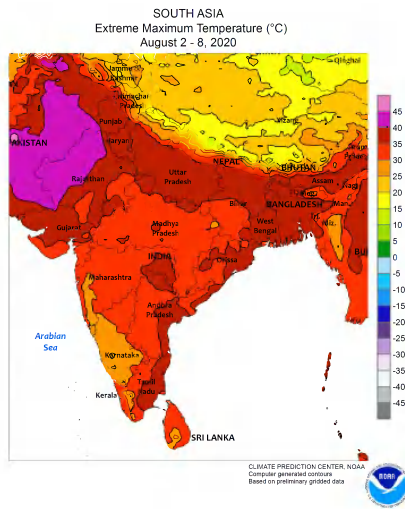
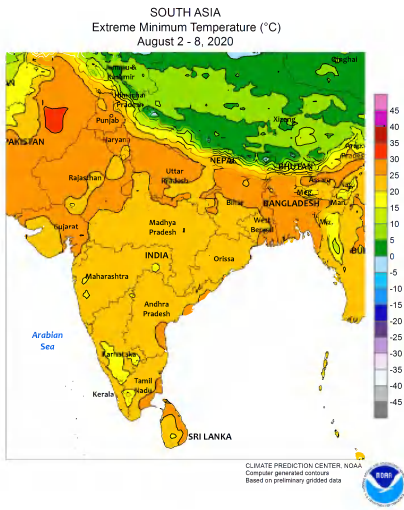


Data Source: CPC (Gauge-Based) Unified Precipitation (Climatology 1981-2010)
(updated on 00Z12AUG2020)

Dekadal (10 Day) Satellite Derived Rainfall Estimates

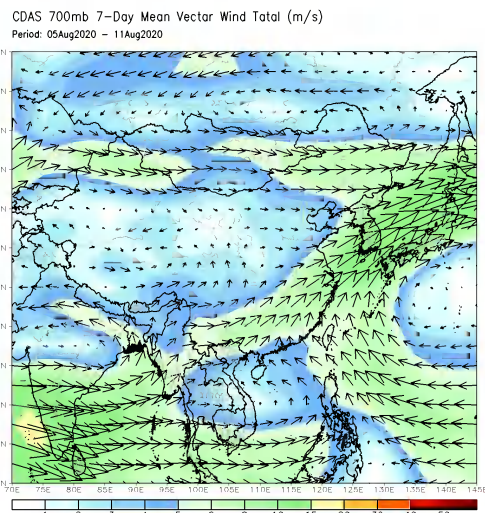
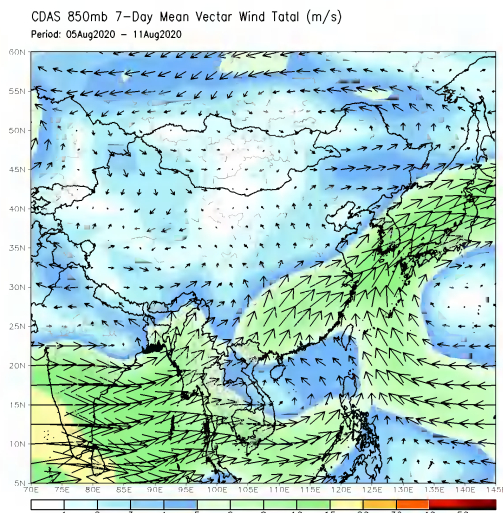


Weekly Temperature Monitoring



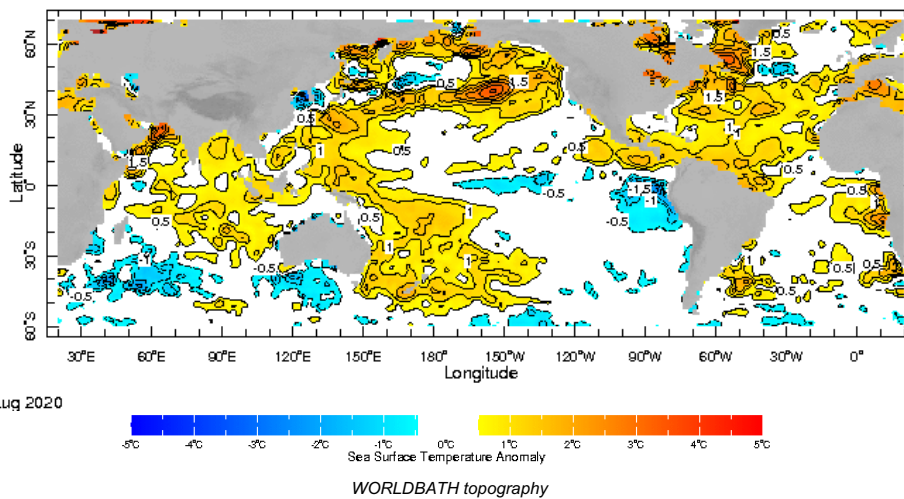
Weekly Wind Monitoring

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.



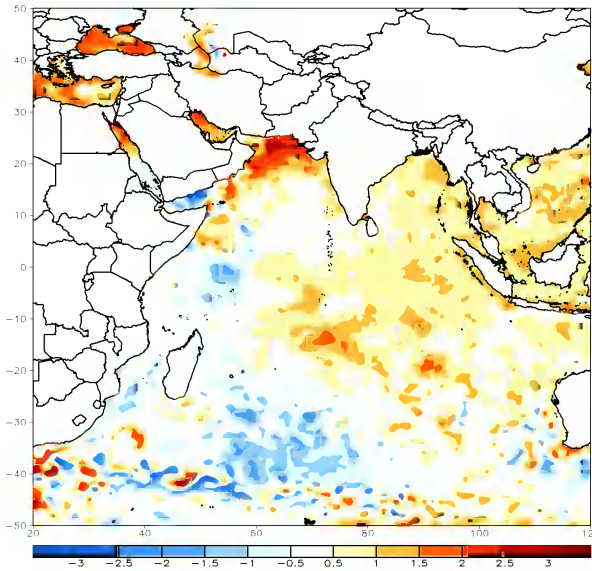
Weekly Average SST Anomalies

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



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

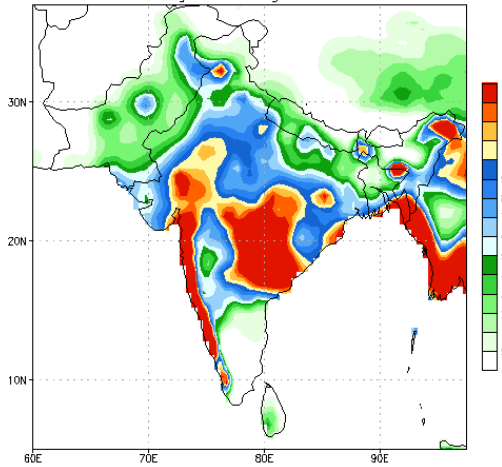
OI SST (v2) 7-Day Anomaly (C)
 Period: 06Aug2020 - 12Aug2020



PREDICTIONS

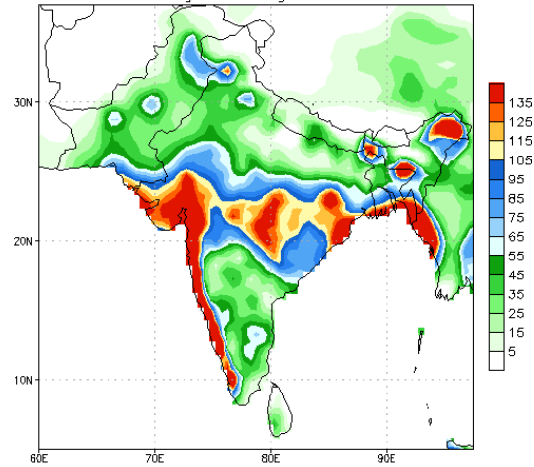
NCEP GFS 1- 14 Day prediction

NCEP GFS Ensemble Forecast 1-7 Day Precipitation (mm)
 from: 13Aug2020
 13Aug2020-19Aug2020 Accumulation



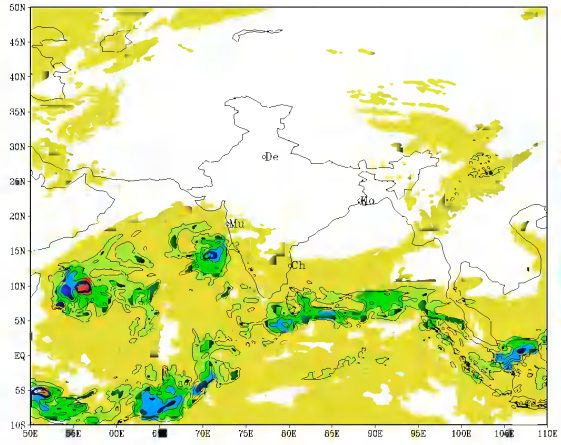
Bias correction based on last 30-day forecast error

NCEP GFS Ensemble Forecast 8-14 Day Precipitation (mm)
 from: 13Aug2020
 20Aug2020-26Aug2020 Accumulation

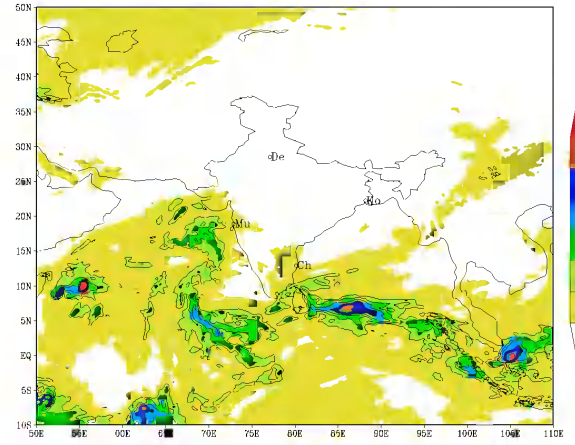


Bias correction based on last 30-day forecast error

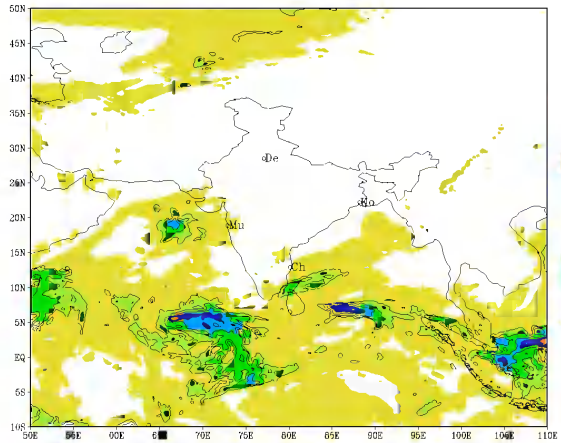
IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (24 HR)
based on 12 UTC of 03-12-2019 valid for 12 UTC of 04-12-2019



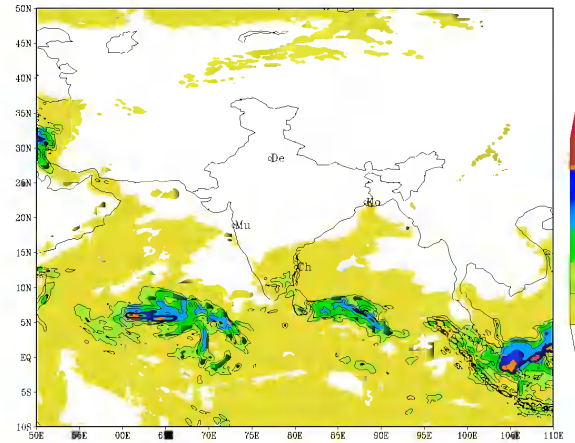
IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (48 HR)
based on 12 UTC of 03-12-2019 valid for 12 UTC of 05-12-2019



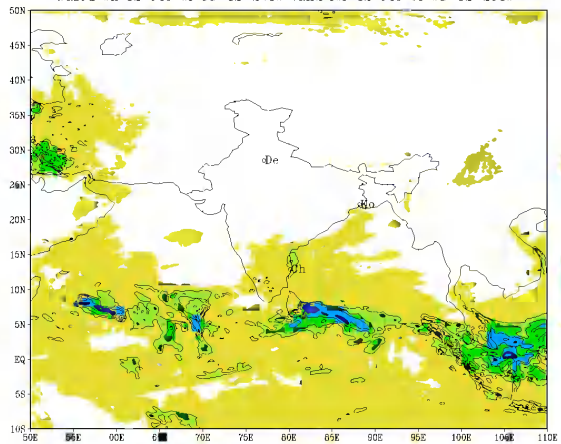
IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (72 HR)
based on 12 UTC of 03-12-2019 valid for 12 UTC of 06-12-2019



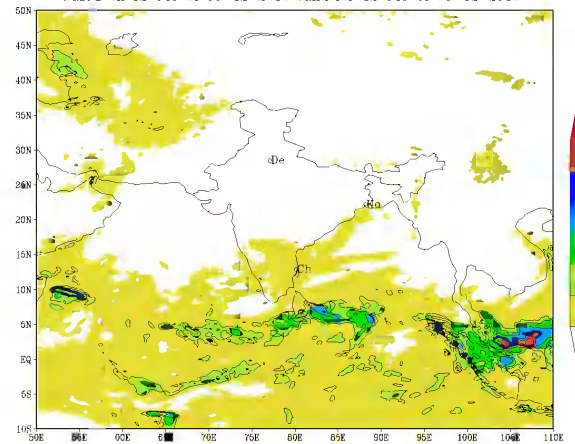
IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (96 HR)
based on 12 UTC of 03-12-2019 valid for 12 UTC of 07-12-2019

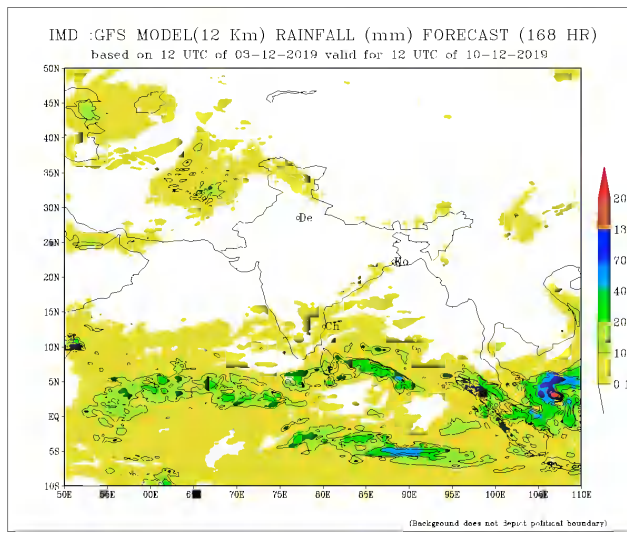


IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (120 HR)
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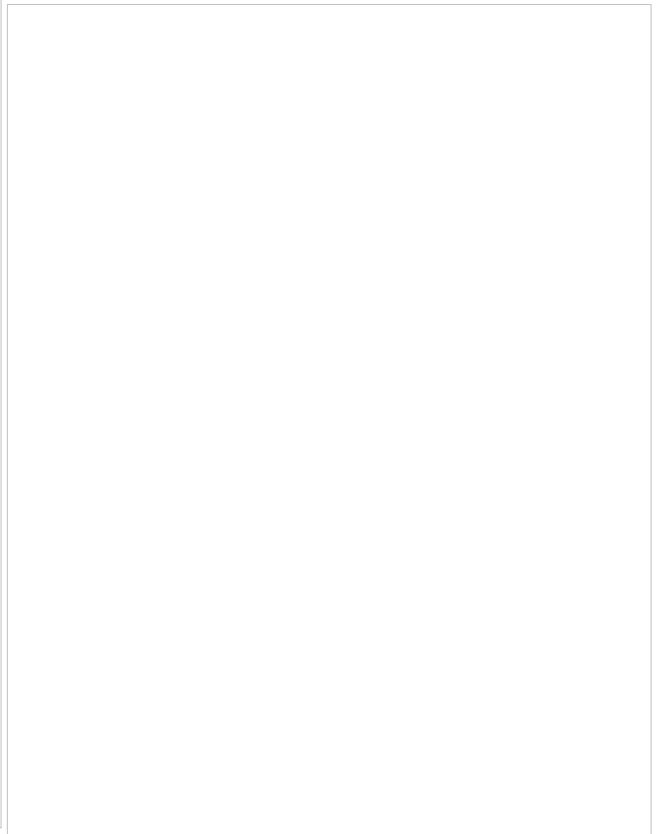
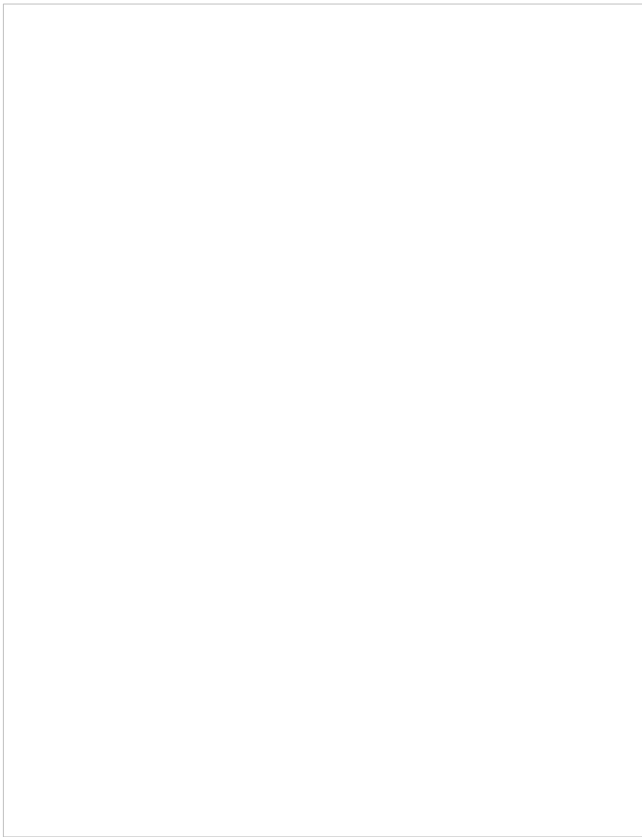


IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (144 HR)
based on 12 UTC of 03-12-2019 valid for 12 UTC of 09-12-2019





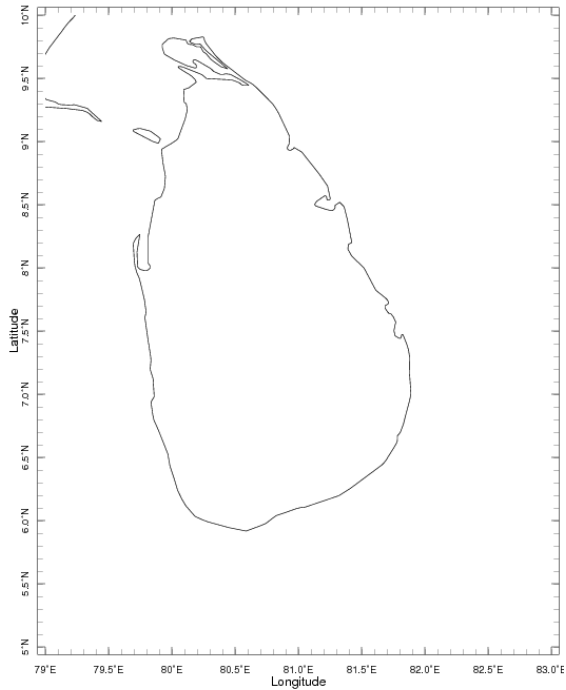
WRF Model Forecast (from IMD Chennai)



Weekly Rainfall Forecast from IRI

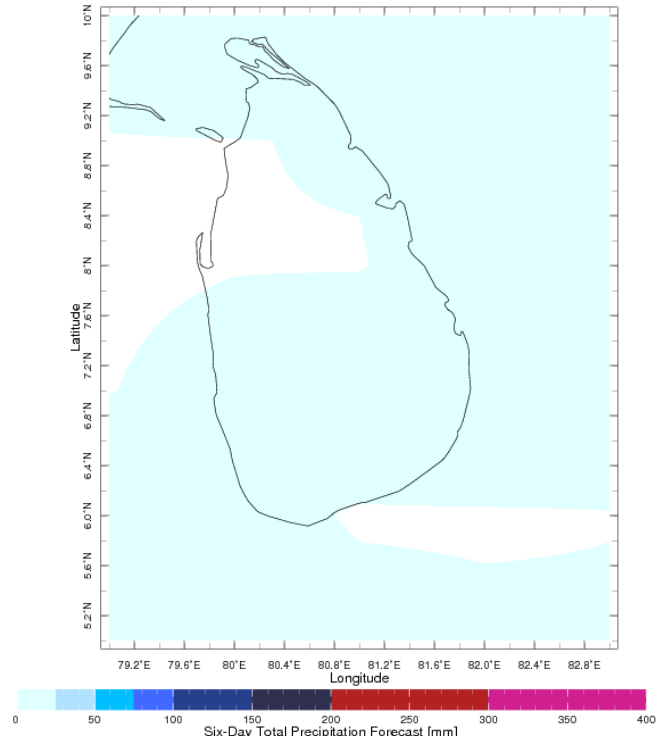
Total rainfall forecast from the IRI for next six days is provided in figures below. The figure to the left shows the expectancy of heavy rainfall events during these six days while the figure to the right is the prediction of total rainfall amount during this period.

Forecast for 13-18 Aug 2020 Issued 0000 13 Aug 2020



Extreme Rainfall Forecast

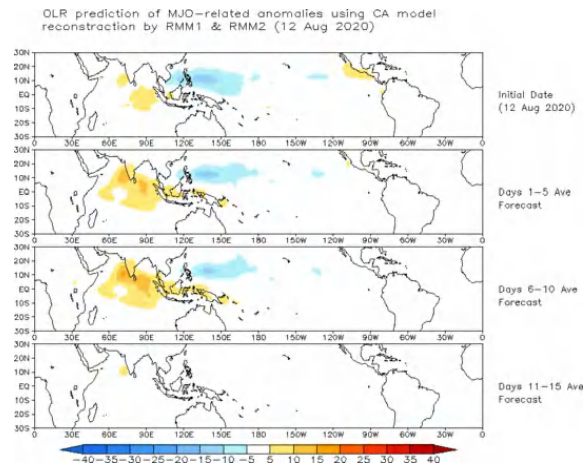
Forecast for 13-18 Aug 2020 Issued 0000 13 Aug 2020



Total Six Day Precipitation Forecast

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

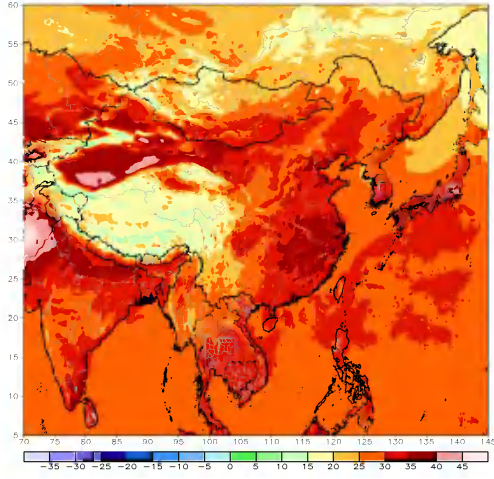
The Outgoing Longwave Radiation (OLR) is a proxy for rainfall. This can be used to identify convective rain clouds based on the MJO phase. Violet and Blue shading indicates enhanced tropical weather and Orange shading indicates suppressed conditions. The following figure shows the forecasts of MJO associated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



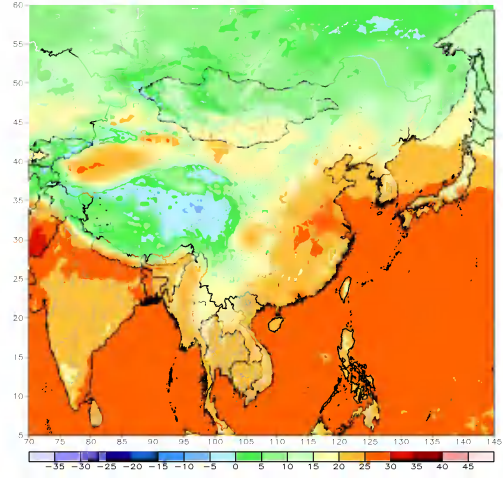
Weekly Temperature Forecast

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

GFS week1 Temperature Max (C)
Ending: 12z20Aug2020



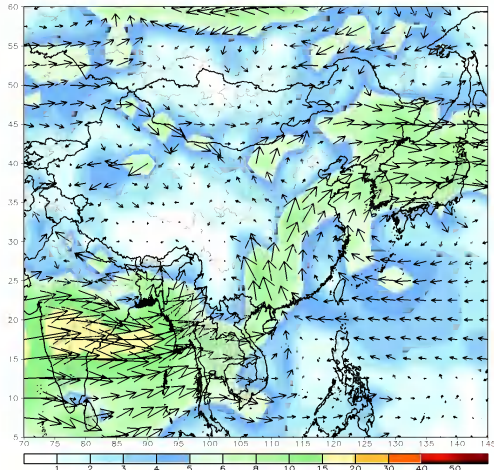
GFS week1 Temperature Min (C)
Ending: 12z20Aug2020



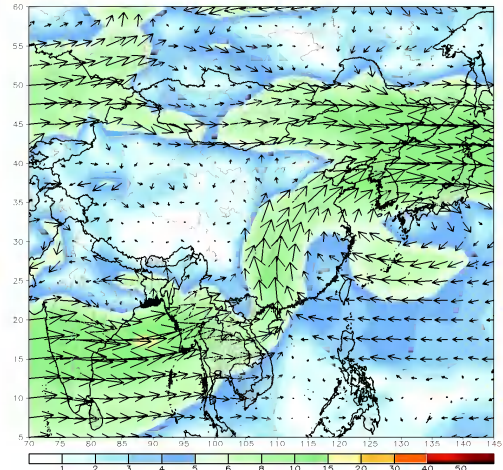
Weekly Wind Forecast

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

GFS 850mb week1 Mean Vector Wind Total (m/s)
Ending: 12z20Aug2020



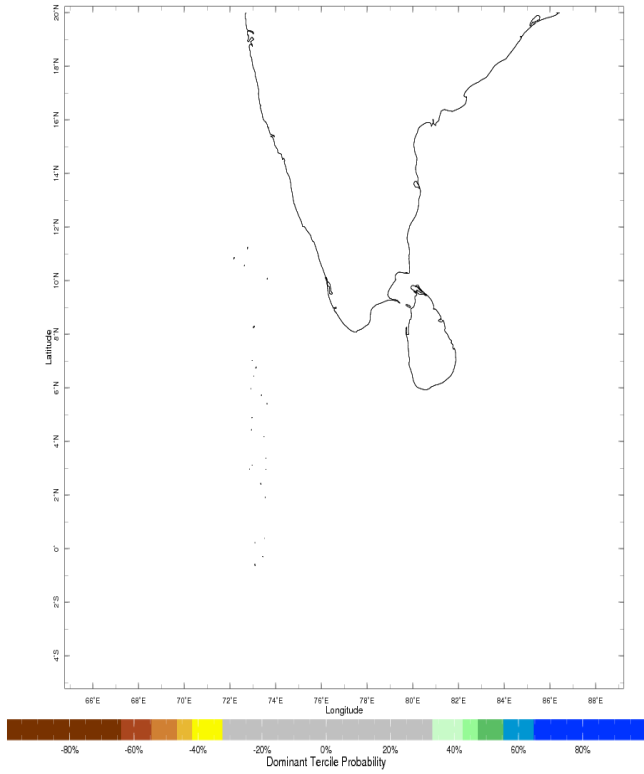
GFS 700mb week1 Mean Vector Wind Total (m/s)
Ending: 12z20Aug2020



Seasonal Rainfall and Temperature Forecast

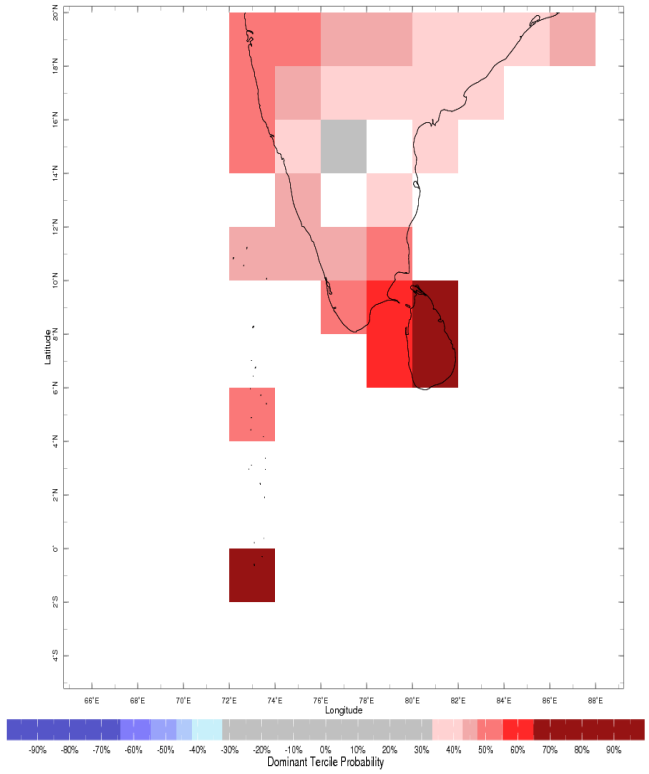
Following is the latest seasonal precipitation and temperature prediction for the next 3 months by the IRI. The color shading indicates the probability of the most dominant tercile -- that is, the tercile having the highest forecast probability. The color bar alongside the map defines these dominant 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%).

Apr-Jun 2017 IRI Seasonal Precipitation Forecast issued Mar 2017



Precipitation Forecast

Apr-Jun 2017 IRI Seasonal Temperature Forecast issued Mar 2017



Temperature Forecast

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