

**9 October  
2020**

**EXPERIMENTAL CLIMATE MONITORING AND PREDICTION**

By: Nipuni Alahakoon, Chethana Chandrasiri, Chayana Gunathilake, Tuan Hadgie Lareef Zubair and Michael Bell<sup>1</sup> (FECT and IRI<sup>1</sup>)

**HIGHLIGHTS**

**Rainfall Forecast**



- The NOAA weekly rainfall forecast predicts up to 95 mm in Gampaha and Kegalle districts during 15<sup>th</sup> -21<sup>st</sup> Oct.

**Monitored Rainfalls**



- Between 31<sup>th</sup> Sep- 6<sup>th</sup> Oct up to 40 mm received in Kilinochchi, Mullaitivu and Jaffna districts.

**Monitored Wind**



- From 30<sup>th</sup> Sep - 6<sup>th</sup> Oct: North westerly winds up to 10 km/h were experienced in the southern half of the island.

**Monitored Sea Surface**

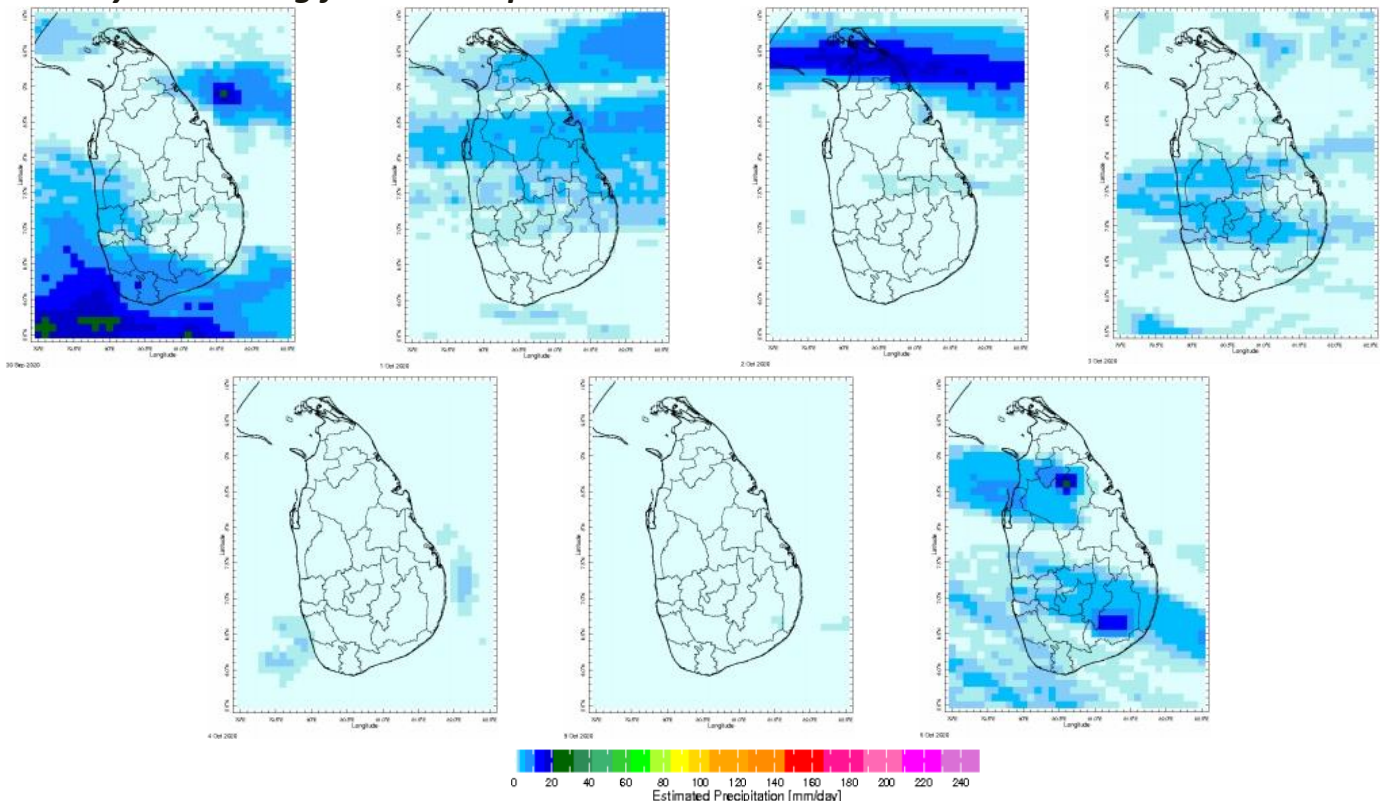


- 0.5<sup>o</sup>C above average sea surface temperature was observed in the seas around Sri Lanka.

**Monitoring**

**Rainfall**

**Weekly Monitoring from 30<sup>th</sup> September – 6<sup>th</sup> October**





## Federation for Environment, Climate and Technology

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Web Site <http://www.climate.lk>

Date	Daily Maximum Rainfall
30 <sup>th</sup> September	Up to 15 mm in Galle and Matara district.
1 <sup>st</sup> October	Up to 10 mm in Anuradhapura and Trincomalee districts.
2 <sup>nd</sup> October	Up to 40 mm in Kilinochchi, Mullaitivu and Jaffna districts.
3 <sup>rd</sup> October	Up to 5 mm in Puttalam, Kurunegala, Anuradhapura, Polonnaruwa, Batticaloa, Matale, Kandy, Nuwara Eliya, Gampaha. Colombo, Kegalle, Ratnapura, Badulla, Ampara and Moneragala districts.
4 <sup>th</sup> - 5 <sup>th</sup> October	No rainfall.
6 <sup>th</sup> October	Up to 30 mm in Anuradhapura district.

### ***Total Rainfall for the Past Week***

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

Below rainfall average up to 50 – 100 mm in Galle, Kalutara and Ratnapura districts; up to 25 – 50 mm in Matara, Colombo, Gampaha, Kegalle, Nuwara Eliya, Kandy, Matale, Moneragala, Kurunegala, Puttalam, Anuradhapura and Badulla districts; and up to 10 – 25 mm in Hambantota, Ampara, Polonnaruwa, Trincomalee, Batticaloa, Mannar, Vavuniya and Mullaitivu districts.

### ***Monthly Monitoring***

During September – Above average rainfall conditions up to 12 mm in Badulla and Moneragala districts; up to 8 mm in Mannar district; up to 5 mm in Ampara, Polonnaruwa, Batticaloa, Trincomalee, Anuradhapura, Kilinochchi, Mullaitivu, Vavuniya and Jaffna districts; up to 4 mm in Puttalam, Kurunegala, Gampaha, Matale, Kandy, Nuwara Eliya, Ratnapura and Hambantota districts; and up to 2 mm in Colombo, Kalutara, Galle, Matara and Kegalle districts.

### ***Ocean State (Text Courtesy IRI)***

#### ***Pacific sea state: September 30, 2020***

Equatorial Eastern Pacific SST decreased to near the La Niña threshold in Late -September, 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***

0.5 °C above average sea surface temperature was observed in the seas around Sri Lanka.



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## Predictions

### Rainfall

#### **14-day prediction: NOAA NCEP models**

**From 8<sup>th</sup> October – 14<sup>th</sup> October:** Total rainfall up to 95 mm in Ratnapura, Gampaha and Kegalle districts; up to 85 mm in Galle, Kalutara and Kurunegala districts; up to 75 mm in Matara and Puttalam districts; up to 65 mm in Nuwara Eliya, Kandy and Matale districts; up to 55 mm in Hambantota, Moneragala and Badulla districts; up to 25 mm in Ampara, Polonnaruwa and Anuradhapura districts; and up to 15 mm in Batticaloa, Trincomalee, Vavuniya, Mannar, Mullaitivu, Kilinochchi and Jaffna districts.

**From 15<sup>th</sup> October – 21<sup>th</sup> October:** Total rainfall up to 95 mm in Gampaha and Kegalle districts; up to 85 mm in Puttalam, Kurunegala, Galle and Ratnapura districts; up to 75 mm in Matara district; up to 65 mm in Nuwara Eliya, Kandy and Matale districts; up to 55 mm in Hambantota district; up to 45 mm in Moneragala and Badulla districts; up to 25 mm in Ampara, Polonnaruwa and Anuradhapura districts; and up to 15 mm in Batticaloa district.

#### **NOAA Model Forecast:**

**From 24<sup>th</sup> – 29<sup>th</sup> September:** Total rainfall up to 75 mm in Badulla district; up to 50 mm in Ampara, Moneragala, Ratnapura, Nuwara Eliya, Kandy, Matale, Polonnaruwa, Anuradhapura, Batticaloa, Trincomalee, Vavuniya, Mullaitivu, Kilinochchi and Jaffna districts; and up to 25 mm in Mannar, Puttalam, Kurunegala, Kegalle, Gampaha, Colombo, Kalutara, Galle, Matara and Hambantota districts.

### MJO based OLR predictions

#### **For the next 15 days:**

MJO shall slightly suppress during 7<sup>th</sup>-16<sup>th</sup> Oct and shall significantly suppress during 17<sup>th</sup>-22<sup>nd</sup> Oct.

<sup>1</sup> International Research Institute for Climate and Society, Columbia University Water Center, Earth Institute at Columbia University, New York.



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



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## Weekly Hydro- Meteorological Report for Sri Lanka

### Inside This Issue

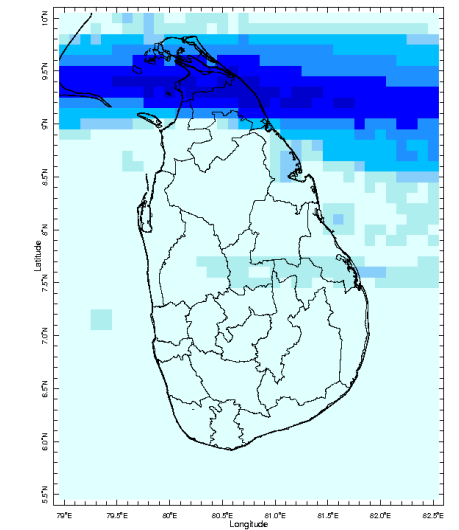
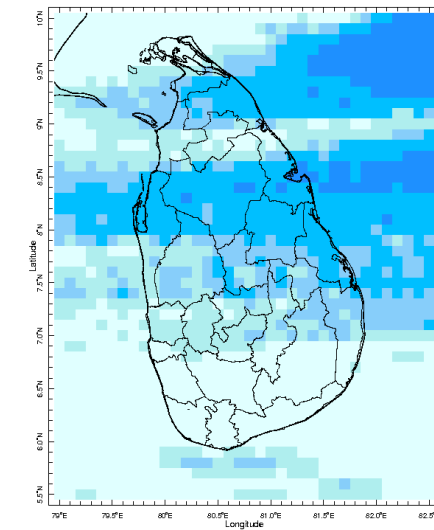
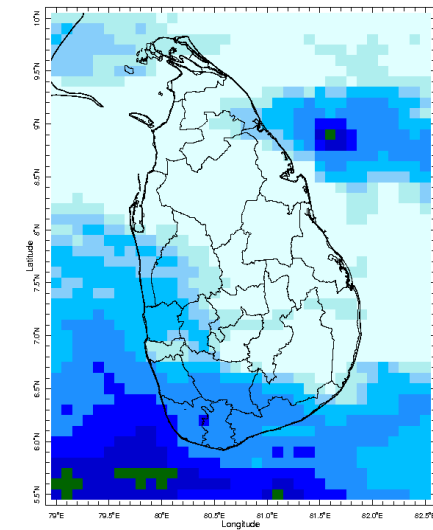
1. **Monitoring**
  - a. Daily Rainfall Monitoring
  - b. Weekly Rainfall Monitoring
  - c. Monthly Rainfall Monitoring
  - d. Dekadal (10 Day) Satellite Derived Rainfall Estimates
  - e. Weekly Temperature Monitoring
  - f. Weekly Wind Monitoring
  - g. Weekly Average SST Anomalies
2. **Predictions**
  - a. NCEP GFS Ensemble 1-14 day Rainfall Predictions
  - b. GFS (T574) Model Rainfall Forecast from RMSC New Delhi
  - c. WRF Model Rainfall Forecast from IMD Chennai
  - d. MJO Related OLR Forecast
  - e. Weekly Precipitation Forecast from IRI
  - f. Weekly Temperature Forecast
  - g. Weekly Wind Forecast
  - h. Seasonal Predictions from IRI

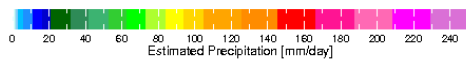
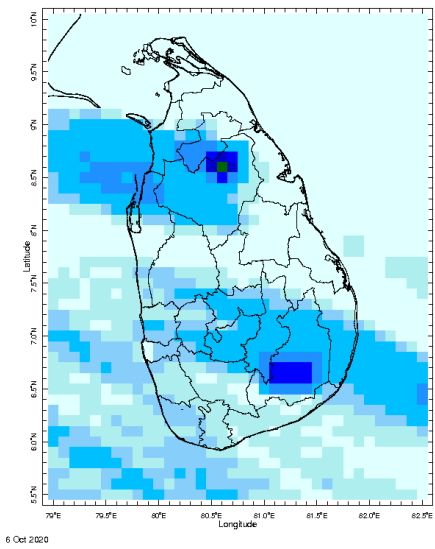
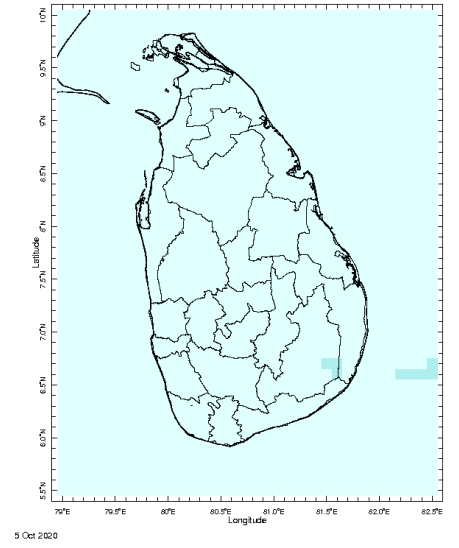
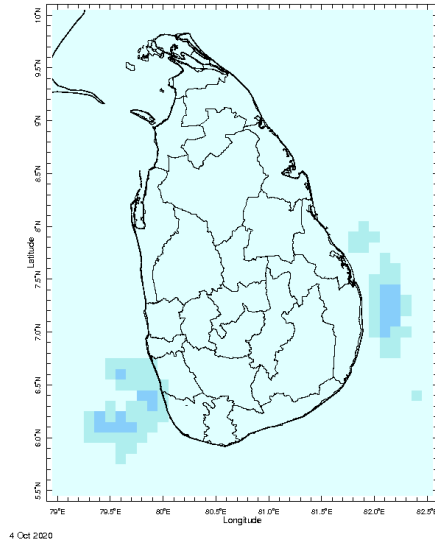
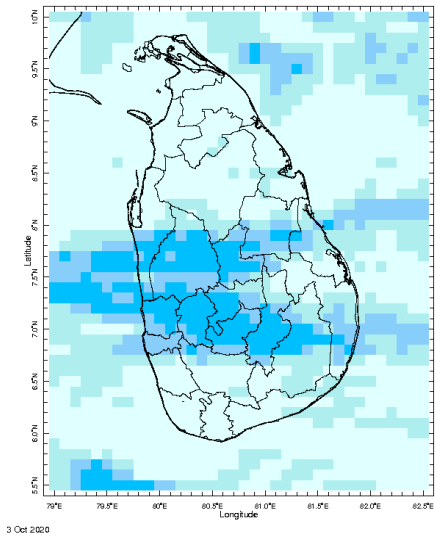


### MONITORING

#### Daily Rainfall Monitoring

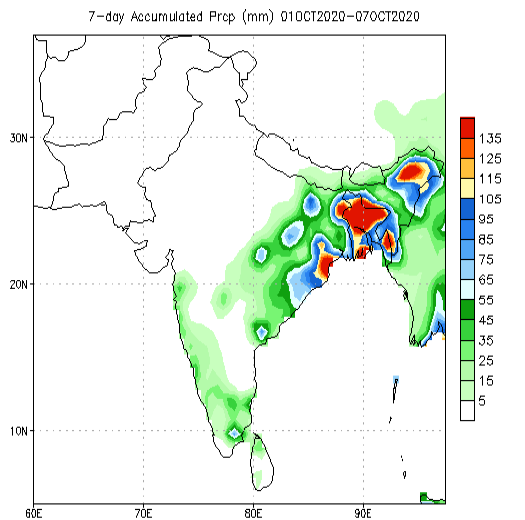
The following figures show the satellite observed rainfall in the last 7 days in Sri Lanka.



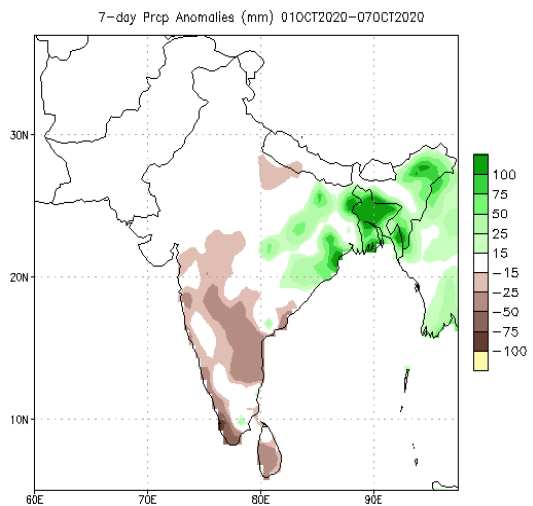
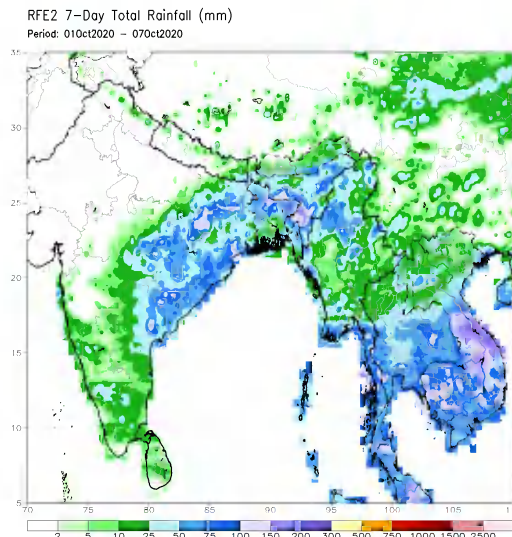


**Weekly Rainfall Monitoring**

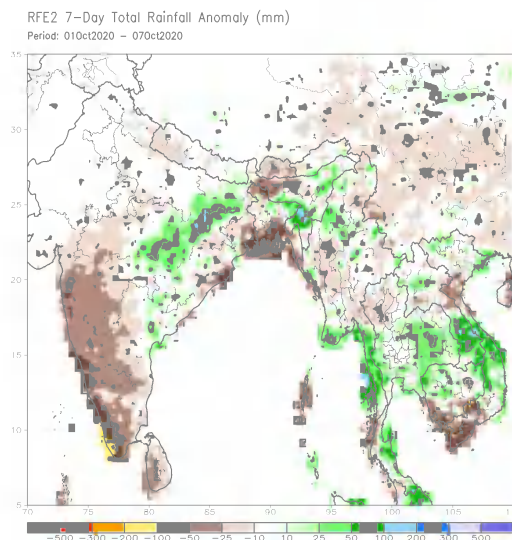
The following figures show the total satellite observed rainfall in the last week in Sri Lanka. The figure in the left is the total 7-day rainfall from NOAA Climate Prediction Center (CPC) Unified Precipitation Analysis and the figure in the right is the total 7-day rainfall from CPC RFE 2.0 Satellite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



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



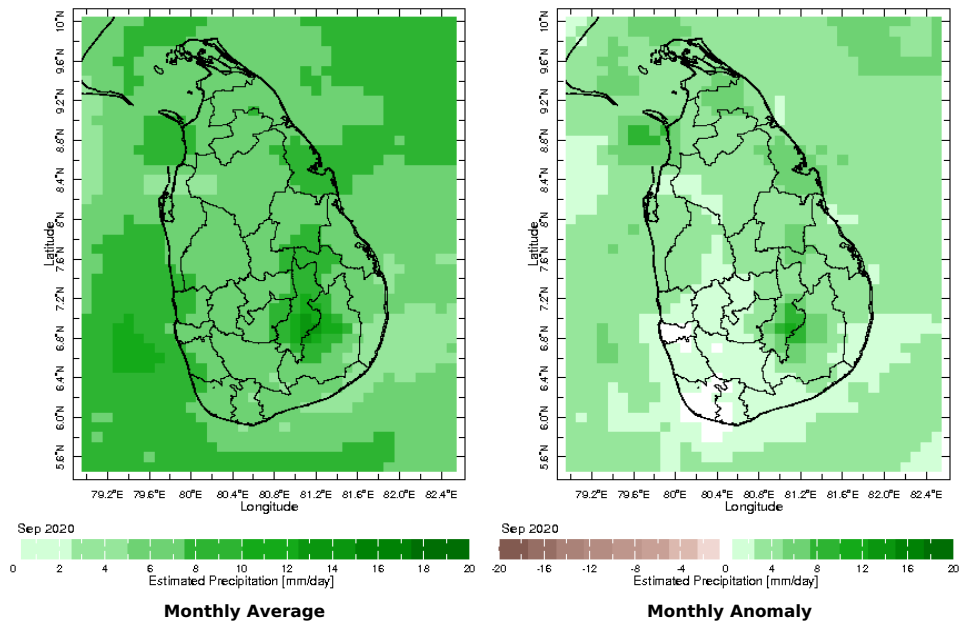
Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis  
Climatology (1981-2010)



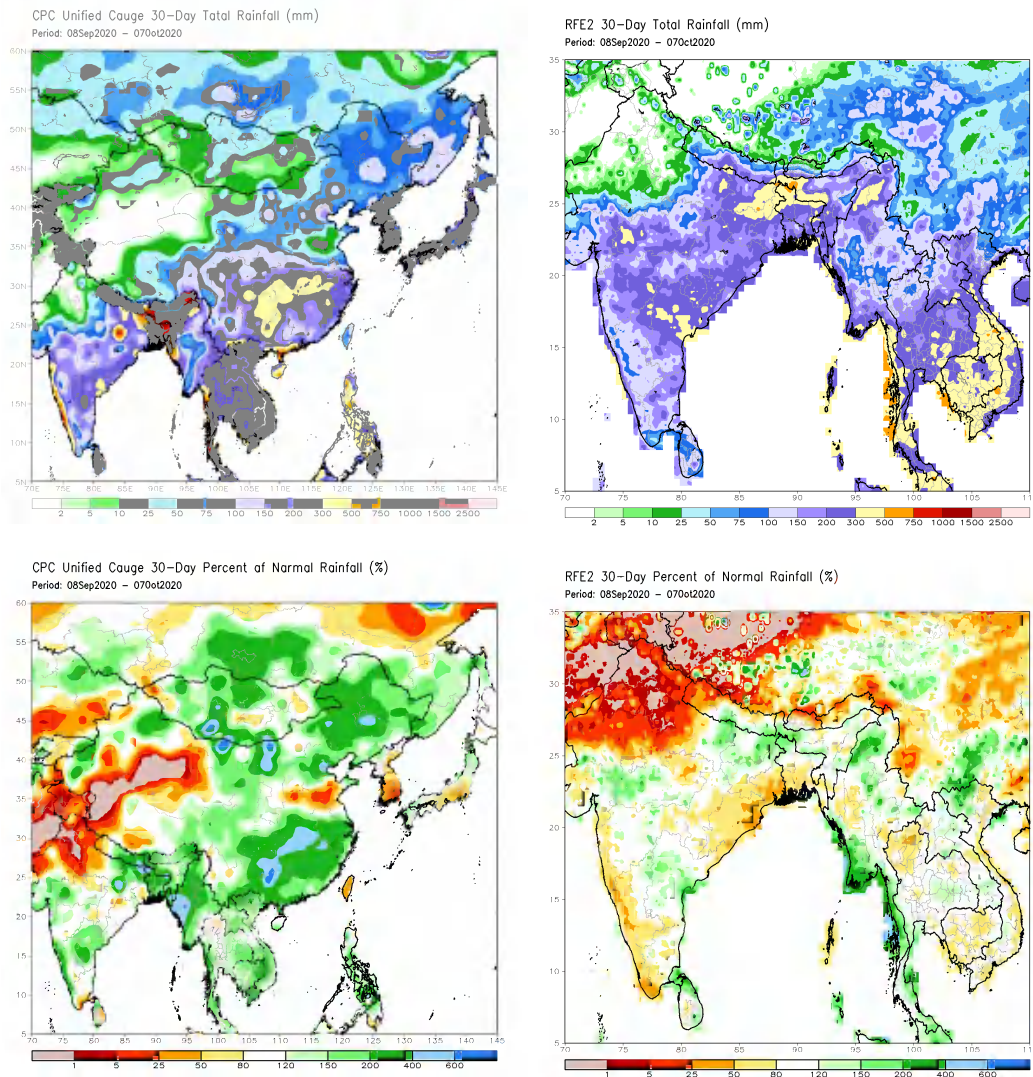
### Monthly Rainfall Monitoring

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



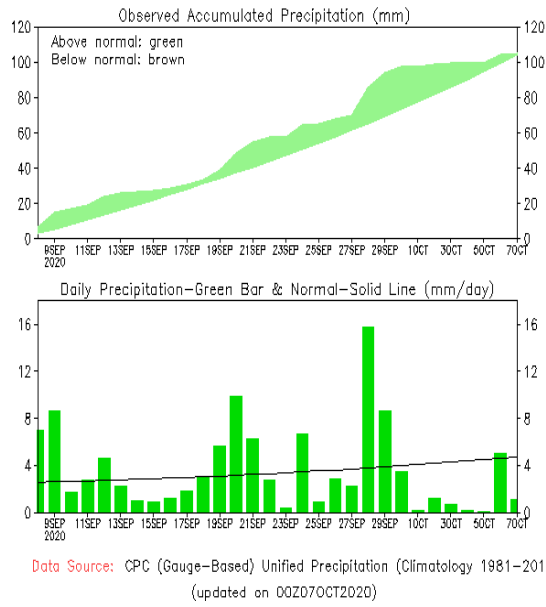


The figure in the top-left shows the total rainfall in the past 30 days from CPC Unified Precipitation Analysis while the figure in the top-right shows the total rainfall for the same period from RFE 2.0 Satellite Rainfall Estimates. The bottom two figures show the percentage of rainfall received in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

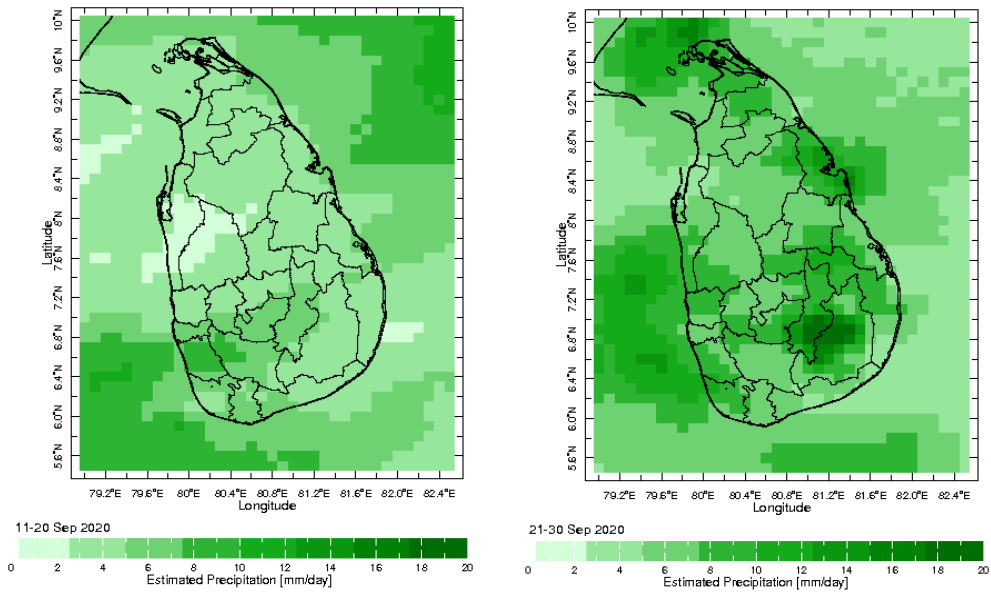


The following figure shows the observed accumulated rainfall (top) and daily observed rainfall (bottom) in Sri Lanka in the last 30 days.

## Sri-Lanka

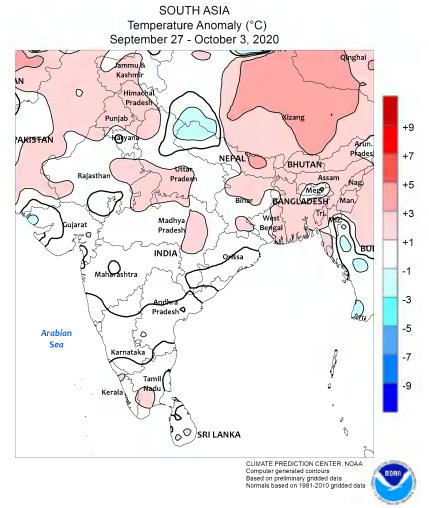
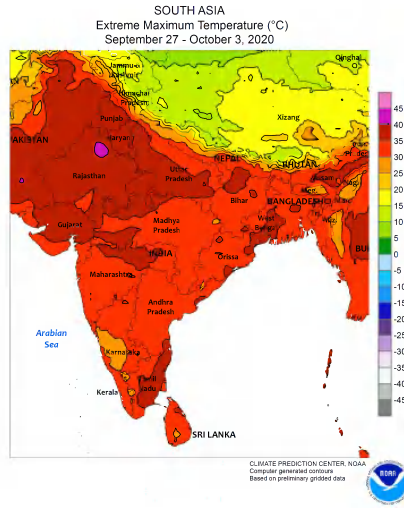
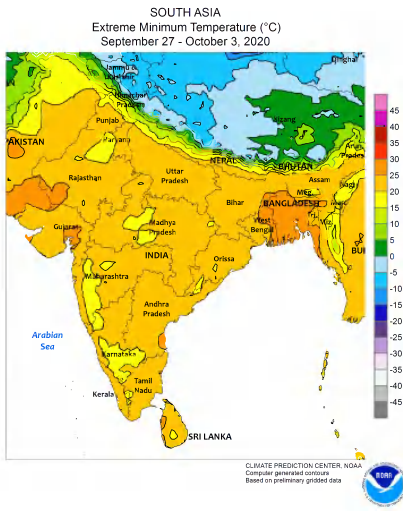


## Dekadal (10 Day) Satellite Derived Rainfall Estimates



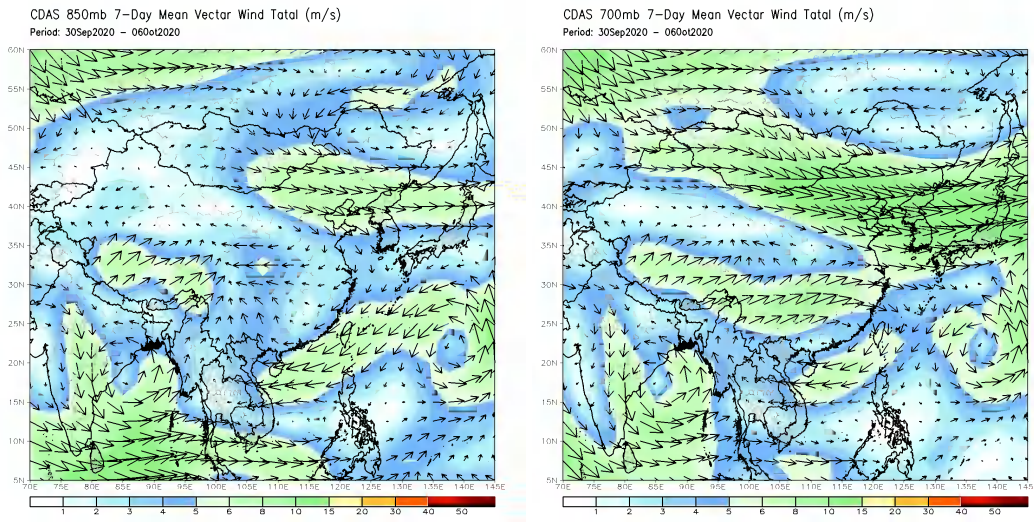
## Weekly Temperature Monitoring





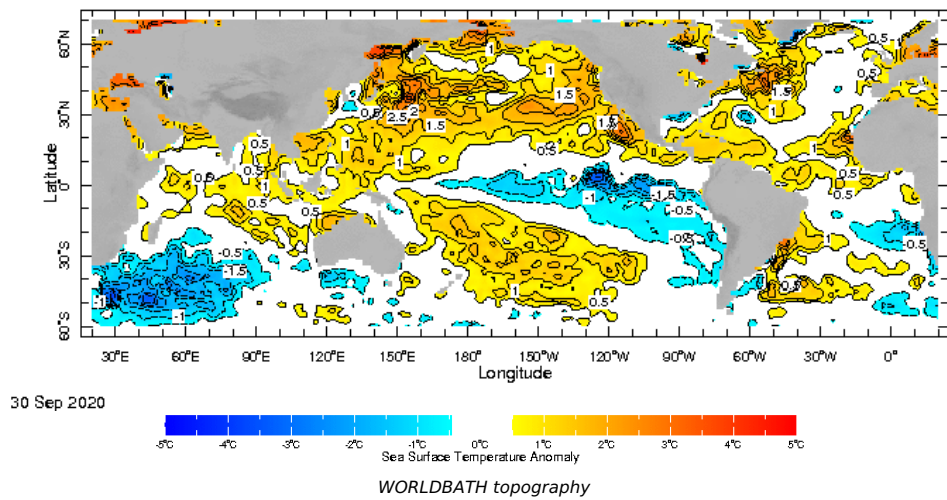
## Weekly Wind Monitoring

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.



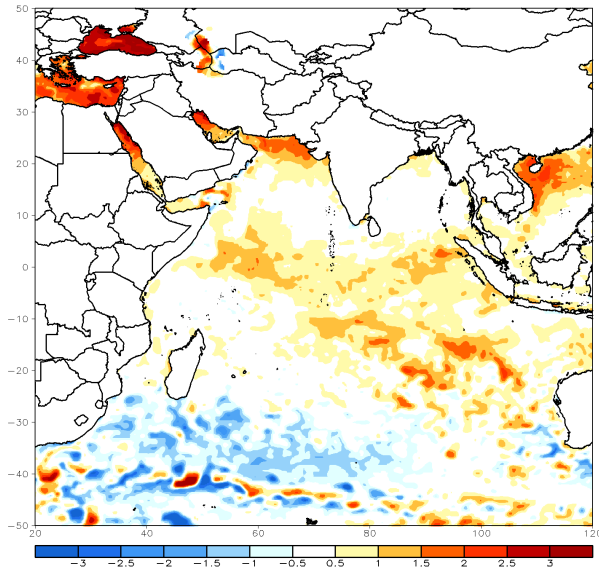
## Weekly Average SST Anomalies

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

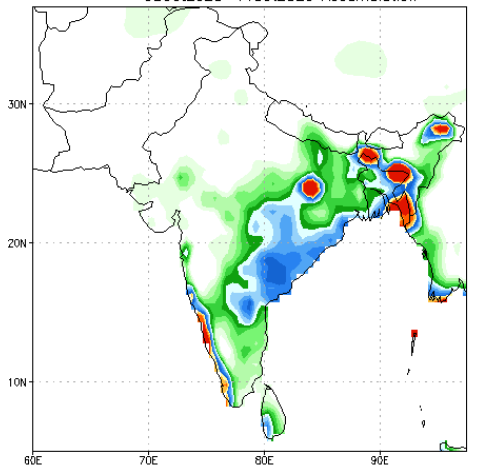
OI SST (v2) 7-Day Anomaly (C)  
 Period: 30Sep2020 - 06Oct2020



**PREDICTIONS**

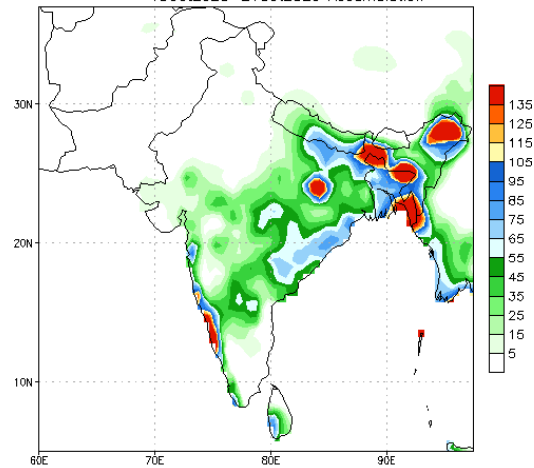
**NCEP GFS 1- 14 Day prediction**

NCEP GFS Ensemble Forecast 1-7 Day Precipitation (mm)  
 from: 08Oct2020  
 08Oct2020-14Oct2020 Accumulation



Bias correction based on last 30-day forecast error

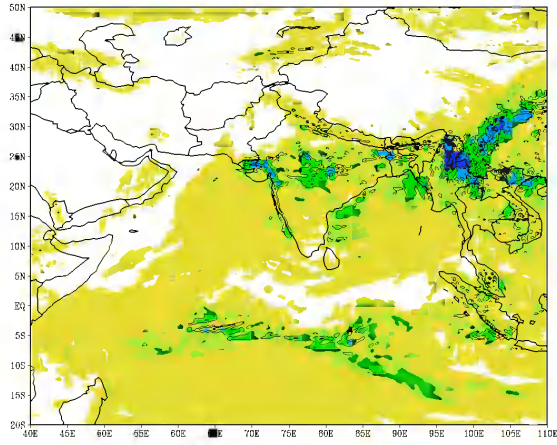
NCEP GFS Ensemble Forecast 8-14 Day Precipitation (mm)  
 from: 08Oct2020  
 15Oct2020-21Oct2020 Accumulation



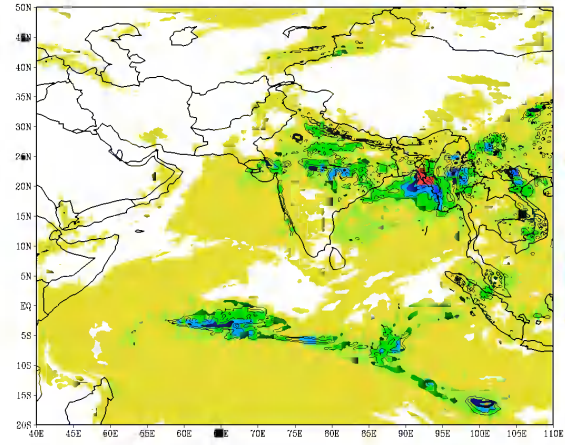
Bias correction based on last 30-day forecast error



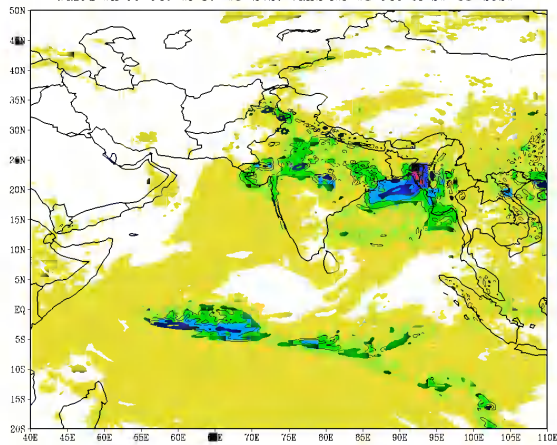
IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (24 HR)  
based on 00 UTC of 17-08-2020 valid for 03 UTC of 18-08-2020



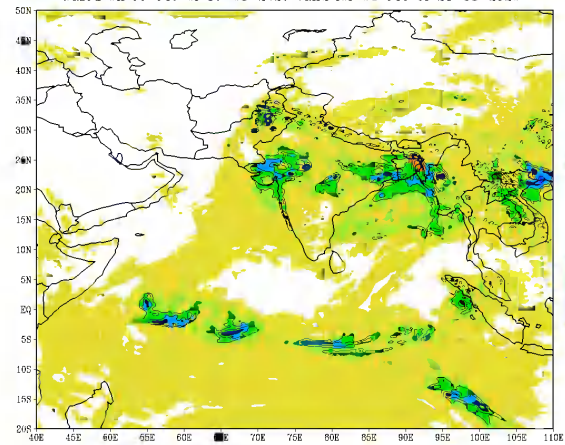
IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (48 HR)  
based on 00 UTC of 17-08-2020 valid for 03 UTC of 19-08-2020



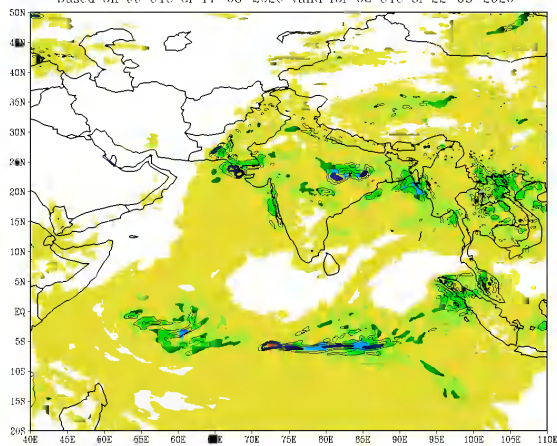
IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (72 HR)  
based on 00 UTC of 17-08-2020 valid for 03 UTC of 20-08-2020



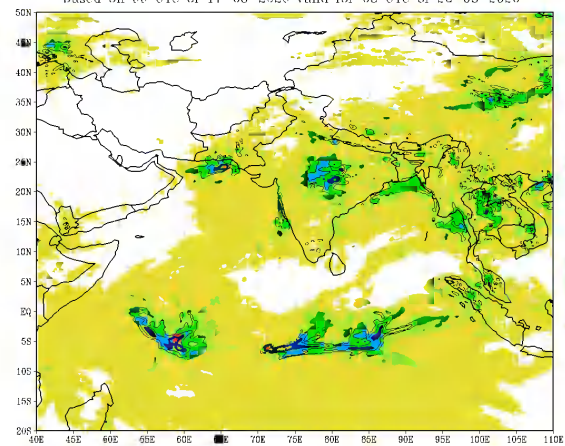
IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (96 HR)  
based on 00 UTC of 17-08-2020 valid for 03 UTC of 21-08-2020

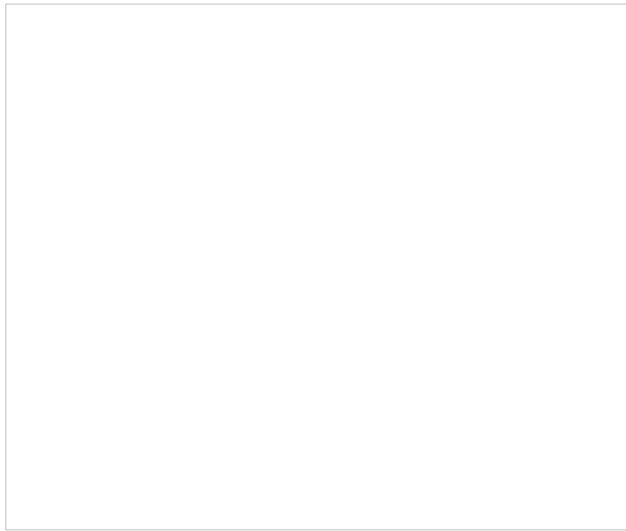


IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (120 HR)  
based on 00 UTC of 17-08-2020 valid for 03 UTC of 22-08-2020

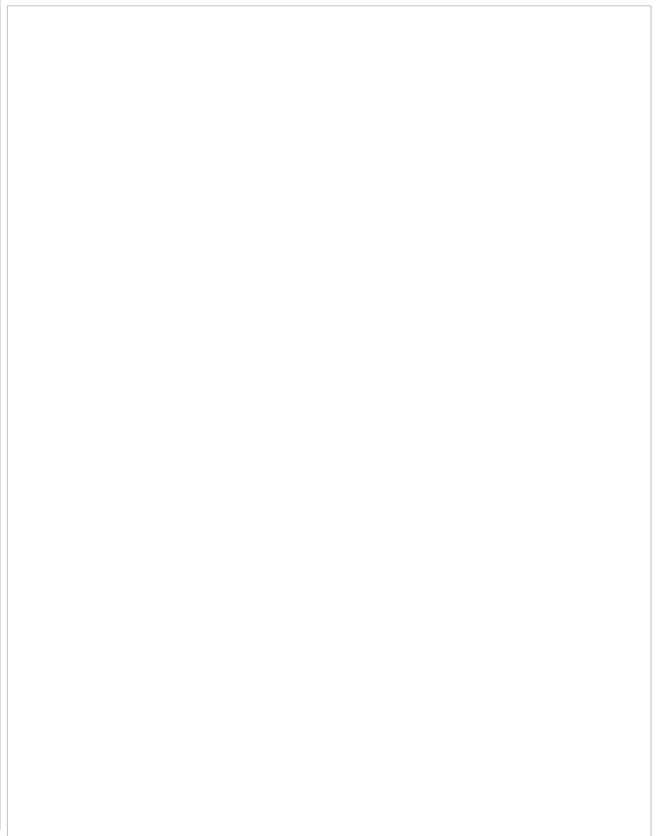


IMD :GFS MODEL(12 Km) RAINFALL (mm) FORECAST (144 HR)  
based on 00 UTC of 17-08-2020 valid for 03 UTC of 23-08-2020





**WRF Model Forecast (from IMD Chennai)**

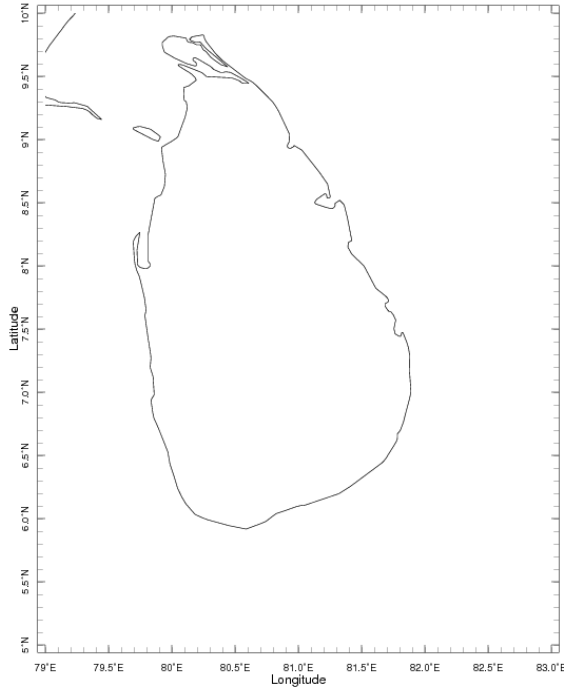


**Weekly Rainfall Forecast from IRI**

**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.**

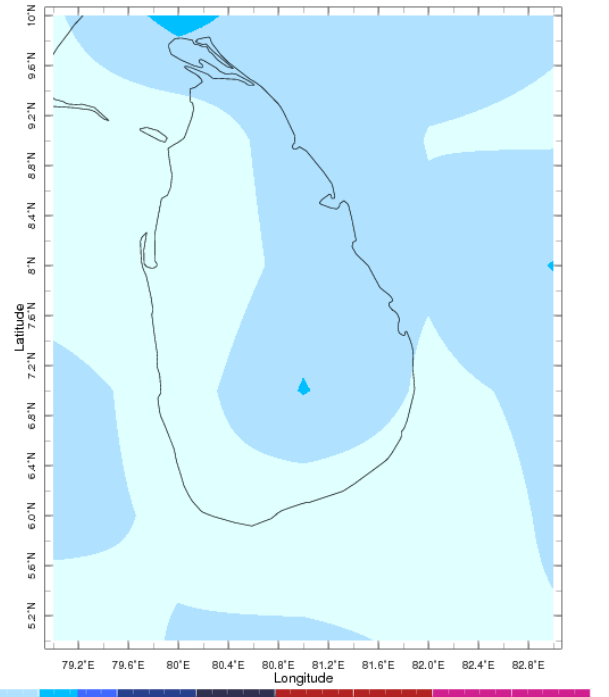


Forecast for 24-29 Sep 2020 Issued 0000 24 Sep 2020



Heavy Rainfall      Very Heavy Rainfall      Extremely Heavy Rainfall  
**Extreme Rainfall Forecast**

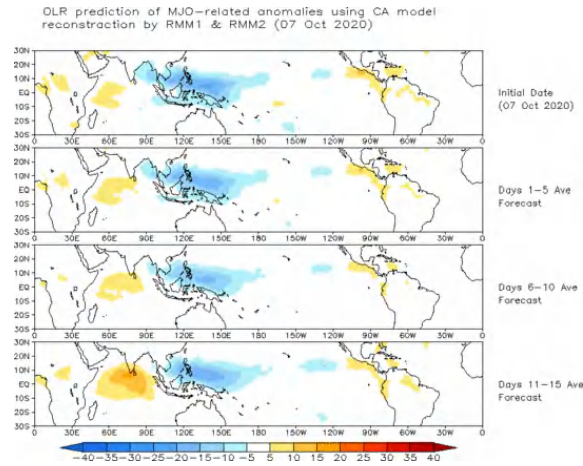
Forecast for 24-29 Sep 2020 Issued 0000 24 Sep 2020



0 50 100 150 200 250 300 350 400  
**Six-Day Total Precipitation Forecast [mm]**  
**Total Six Day Precipitation Forecast**

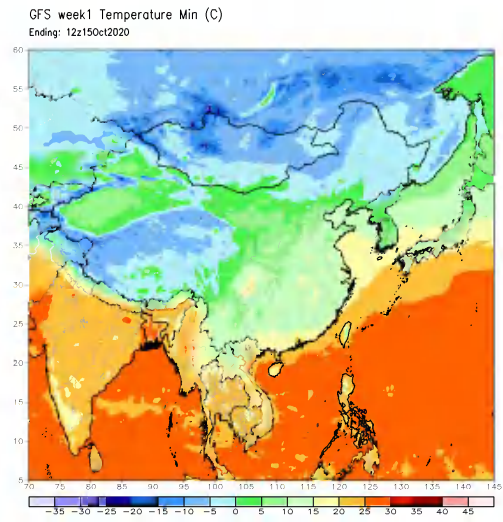
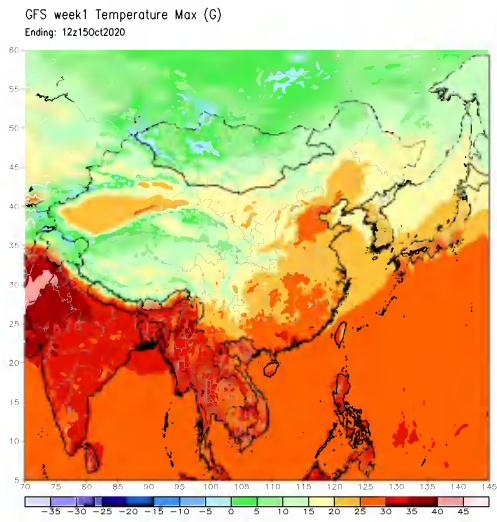
**Madden Julian Oscillation (MJO) related Outgoing Longwave Radiation (OLR) Forecast**

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.



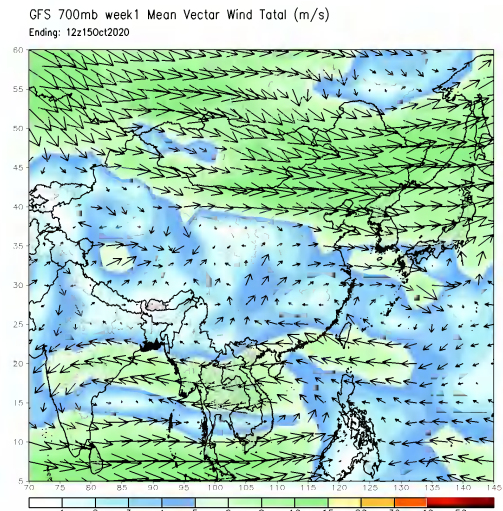
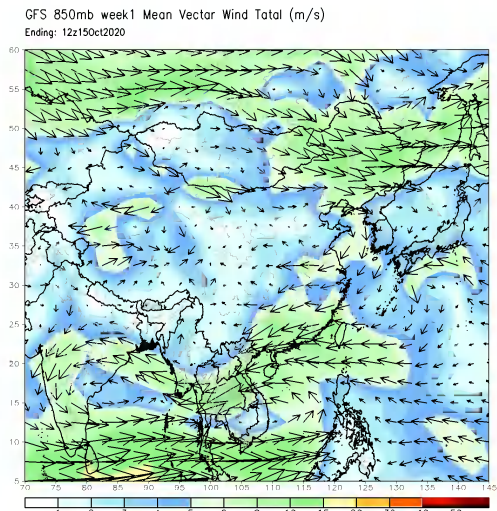
**Weekly Temperature Forecast**

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



## Weekly Wind Forecast

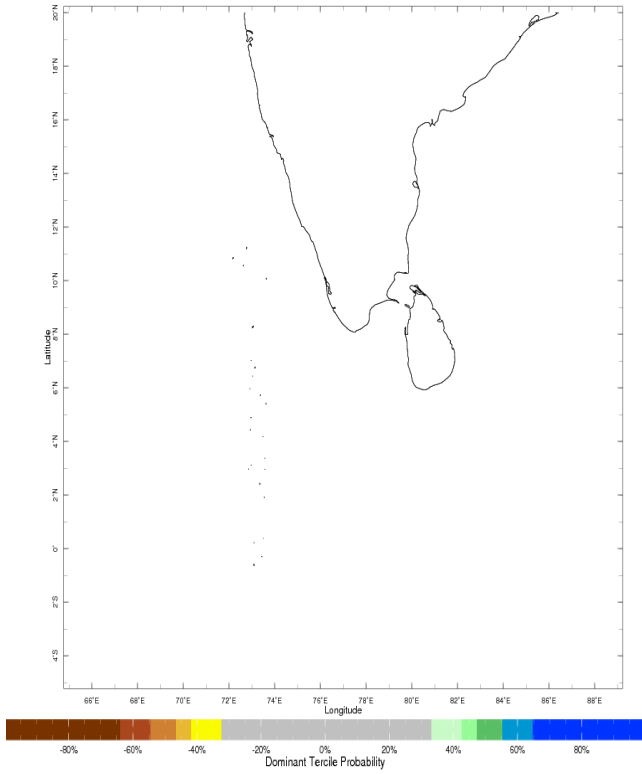
Weekly mean vector wind total prediction from the GFS model at 850 mb (left) and 700 mb (right) levels. (from NOAA CPC)



## Seasonal Rainfall and Temperature Forecast

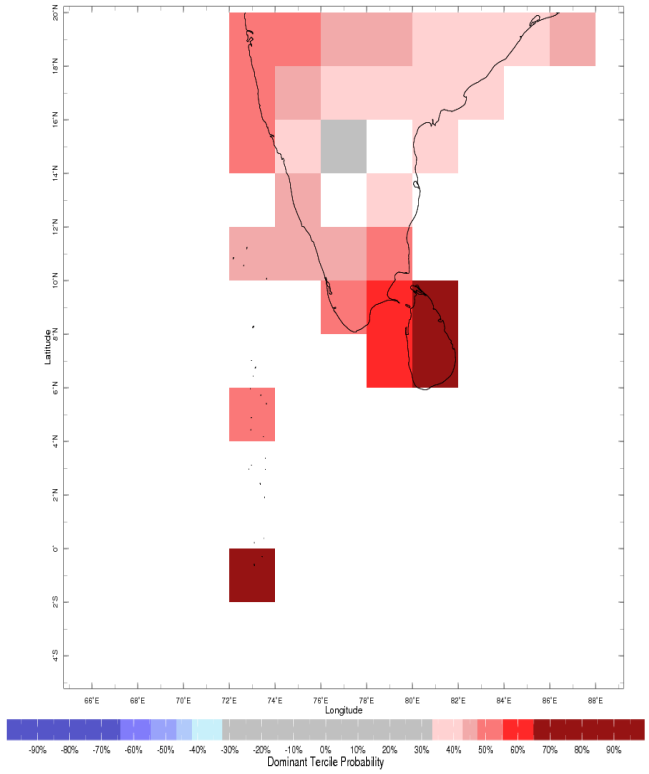
Following is the latest seasonal precipitation and temperature prediction for the next 3 months by the IRI. The color shading indicates the probability of the most dominant tercile -- that is, the tercile having the highest forecast probability. The color bar alongside the map defines these dominant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

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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