

## Experimental Climate Monitoring and Prediction

by: Prabodha Agalawatte, Shashini Rathnayake, Zeenas Yahiya,  
Lareef Zubair and Michael Bell (FECT and IRI<sup>1</sup>)

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### Highlights

Dry weather persisted in the country during 13<sup>th</sup>- 19<sup>th</sup> July and therefore the average rainfall deficit in the country has increased up to 60 mm. Heavy rainfall was only seen in Kantale/ Aralaganvila and Badulla areas. Above average rainfall was only received in Badulla region. Extreme rainfall was seen in the sea off the coast of Arugambay. Highest temperature was reported in the eastern side of the country while minimum temperature as usual was reported in Nuwara Eliya region. Reduced wind speed (only up to 20 km/h) was seen at the 700 mb level while up to 55 km/h wind was seen at the 850 mb level. NOAA NCEP and IRI CFS models does not expect much rainfall in the next two weeks but IMD WRF and GFS models predict heavy rainfall in Western and South-western regions in the next week. MJO is also expected to be present in the Indian ocean region which shall enhance rainfall condition in the country.

#### Monitoring

##### Rainfall

**Weekly Monitoring:** No rainfall was received by the entire island on the 13<sup>th</sup>. On the 14<sup>th</sup> Up to 50 mm rain was received by Bibile area and the surrounding areas received up to 40 mm rainfall. The entire country except the Northern province received up to 10 mm rainfall on the 15<sup>th</sup> while up to 40 mm rain was seen around Aralaganvila area. Light rainfall (up to 5 mm) continued in the entire country on the 16<sup>th</sup> as well. On the 17<sup>th</sup> Eastern and Central regions received rainfall. Heavy rainfall up to 40 mm was seen close to Badulla area while up to 90 mm Extremely heavy rainfall was seen in the sea off the coast of Arugambay. Rainfall ceased in the entire country on the 18<sup>th</sup>. Heavy rainfall (Up to 20 mm) was received by Kantale area on the 19<sup>th</sup>. During the week 13<sup>th</sup>- 19<sup>th</sup> July, rainfall received by the Western and South-western regions of the country was up to 50 mm below average. Above average rainfall was only received by Badulla region which was up to 50 mm.

**Monthly Monitoring:** Rainfall for the month of June was very low and below the historical average compared to the excessive rainfall in the previous month. The monthly average does not exceed 8mm in the entire island. Rainfall was mostly in the south western region of the country which totaled up to 75- 100 mm in the entire month. This amounts to only 50-80% of the usual rainfall for the month of June. Remaining part of the country received only 25-50% of the normal rainfall. With this, the average rainfall deficit in the entire country which was at 50 mm in the previous week had increased to 60 mm by this week (19<sup>th</sup> July).

##### Temperature

During the week from 10<sup>th</sup> – 16<sup>th</sup> July, the highest temperature of 35-40 °C was recorded in the eastern side of the island. The lowest temperature of 15-20 °C was recorded in Nuwara Eliya. For the period, the temperature was 1-3 °C above average in the whole country except around Nuwara Eliya which was cooler.

##### Wind

Up to 55 km/h wind was seen in the entire country at the 850 mb level. The wind speed at the higher 700 mb level dropped to around 20 km/h in the previous week.

##### Ocean State

###### **Pacific seas state: July 13, 2016**

During early July 2016 the tropical Pacific SST anomaly was slightly below zero, indicating ENSO-neutral conditions. The key atmospheric variables also indicate neutral ENSO conditions. This includes near-average upper and lower level tropical Pacific winds, as well as mainly near-normal cloudiness and rainfall patterns in the central and eastern equatorial Pacific. Most ENSO prediction models indicate neutral ENSO conditions during July, with likely development of La Niña (most likely weak) by late August or September, lasting through fall and into winter. (Text Courtesy IRI)

##### Indian Ocean State

Neutral SST anomaly was observed around Sri Lanka.

## Predictions

### Rainfall

**14-day prediction:** NOAA NCEP models predict up to 35 mm total rainfall in the South-western region of the country during 20<sup>th</sup>-26<sup>th</sup> July. There shall not any rainfall during 27<sup>th</sup> July- 2<sup>nd</sup> August in any part of the country.

**Weekly prediction:** IMD GFS model predicts 20 – 40 mm rain close to Chilaw on the 22<sup>nd</sup> and the 23<sup>rd</sup>. On the 24<sup>th</sup>, there shall be 40- 70 mm rain in the coastal region from Chilaw to Kalutara. Up to 130 mm rain is expected in the South-western sea on the 25<sup>th</sup> and up to 40 mm rain on the 26<sup>th</sup> in the same area. Less than 20 mm rain expected in the entire country on the 27<sup>th</sup>.

**IMD WRF & IRI Model Forecast:** According to the IMD WRF model, up to 124 mm of rainfall is expected in Ratnapura and Batticaloa areas and up to 65 mm of rainfall is expected in the surrounding areas on the 22<sup>nd</sup> July. Similar rainfall pattern is expected on the 23<sup>rd</sup> as well but the maximum rainfall shall be around 65 mm. During 20<sup>th</sup>- 25<sup>th</sup> July no extreme rainfall is expected in the country.

**Seasonal Prediction:** As per IRI Multi Model Probability Forecast for July to September, the total 3-month precipitation shall be climatological. The 3-month temperature has more than 70-80% likelihood in the entire country of being in the above-normal tercile during this period.

### Temperature

NOAA CPC GFS model predicts 35-40 °C maximum temperature along the coastal belt in the Eastern side of the country. Maximum temperature in Kurunegala, Kandy, Colombo and Matara areas will be 30-35 °C. For the same week maximum temperature of Kalutara, Galle and Ratnapura areas will be 25-30 °C. During the same week, minimum temperature is expected around Nuwara Eliya to be 15- 20 °C. The minimum temperature of Jaffna will be 25-30 °C and that of rest of the country will be 20-25 °C.

### Wind

At 850 mb level, up to 55 km/h westerly and north westerly wind is expected in lower half of the country while up to 40 km/h westerly wind is expected in northern half of the country. At 700 mb level up to 30 km/h westerly wind is expected in southern regions and up to 20 km/h wind expected in northern regions.

### MJO based OLR predictions

MJO shall be in the Indian Ocean region in the next 15 days and therefore it shall enhance rainfall in Sri Lanka.

<sup>1</sup> 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.

#### FECT BLOG

Past reports available at <http://fectsl.blogspot.com/> and <http://fectsl.wordpress.com/>

#### FECT WEBSITES

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



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## Weekly Hydro- Meteorological Report for Sri Lanka

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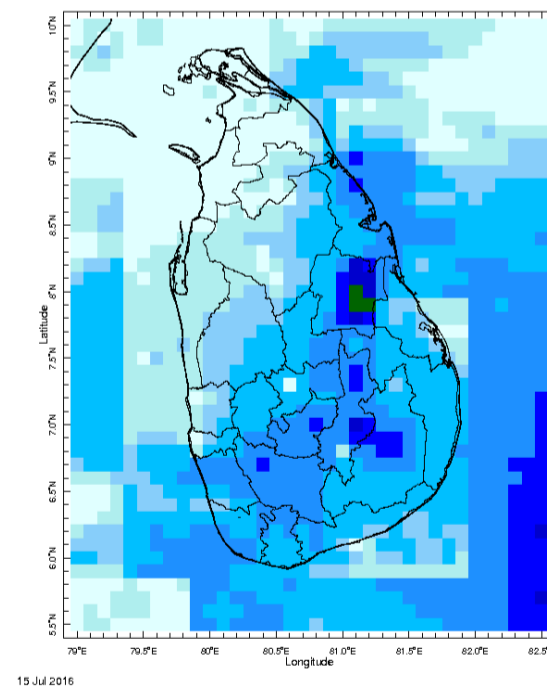
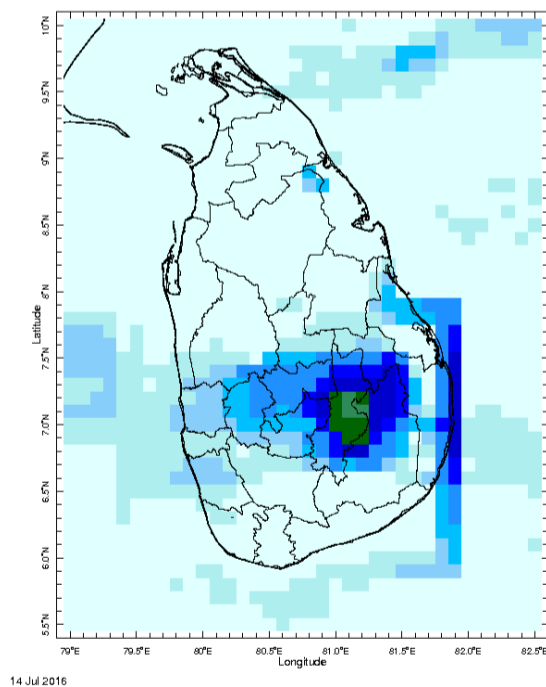
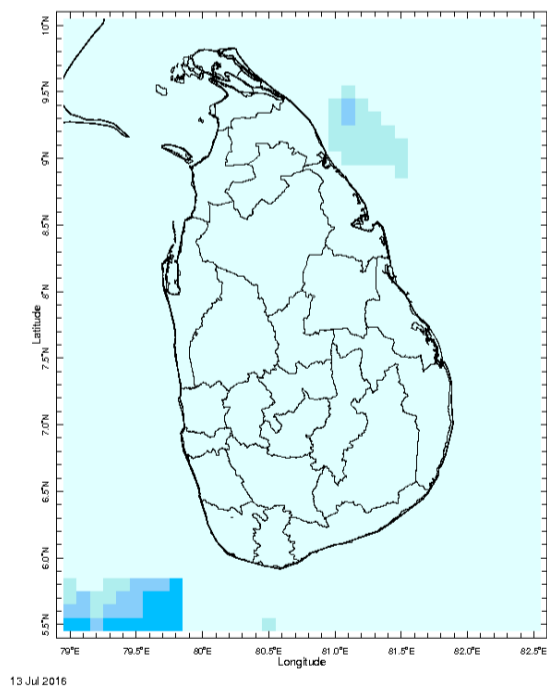
#### 2. Predictions

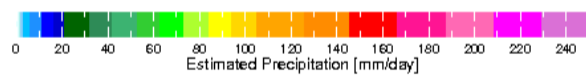
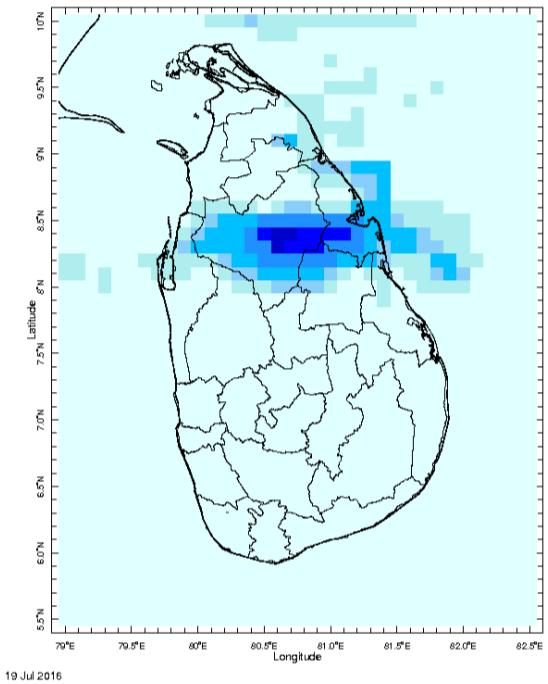
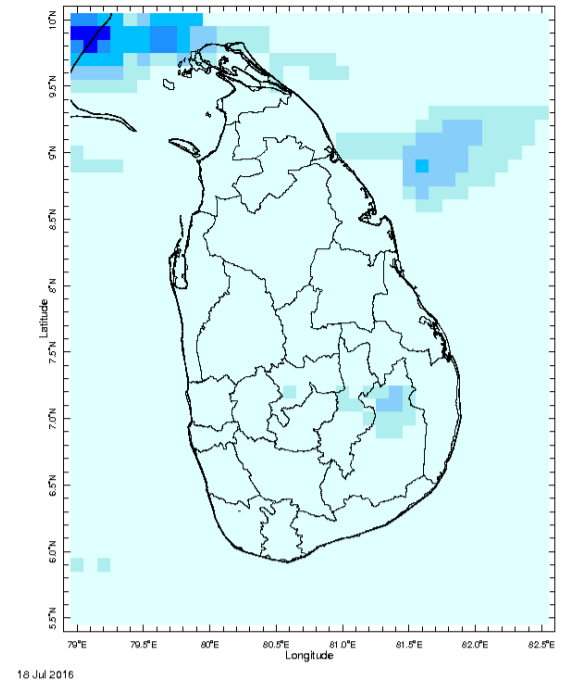
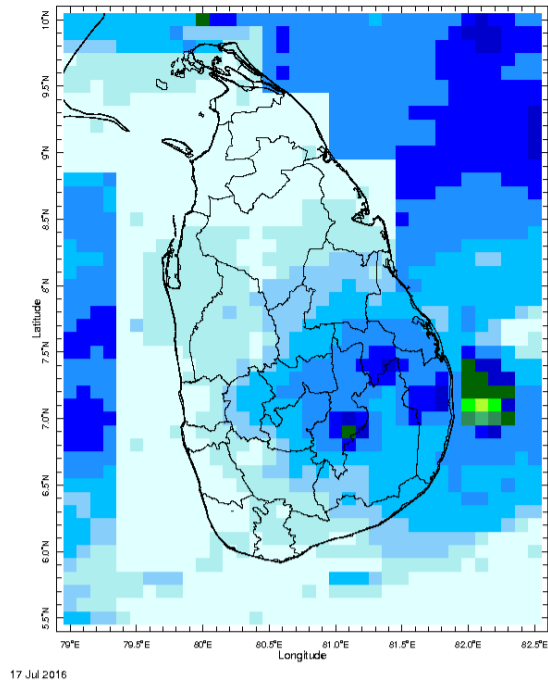
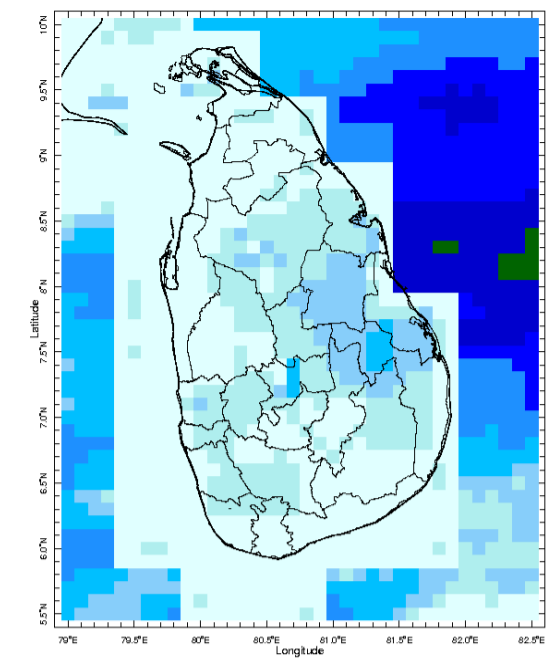
- a. NCEP GFS Ensemble 1-14 day Rainfall Predictions
- b. GFS (T574) Model Rainfall Forecast from RMSC New Delhi
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- e. Weekly Precipitation Forecast from IRI
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- g. Weekly Wind Forecast
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## MONITORING

### Daily Rainfall Monitoring

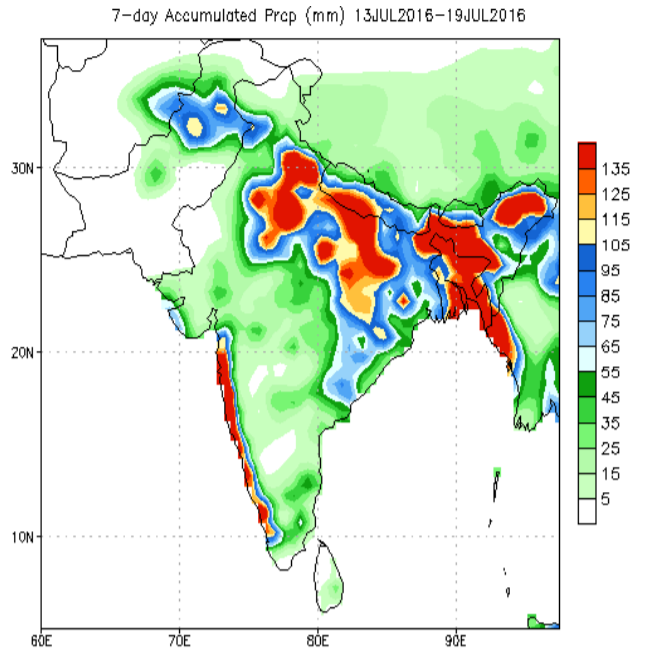
The following figures show the satellite observed rainfall in the last 7 days in Sri Lanka.



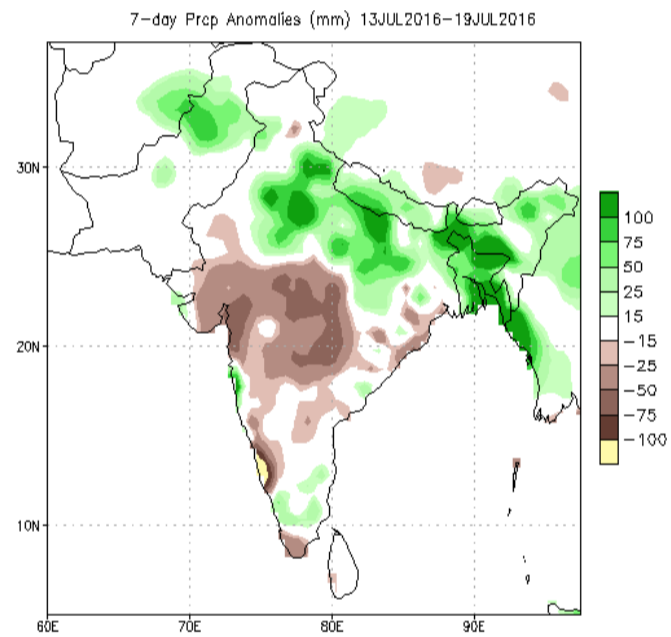
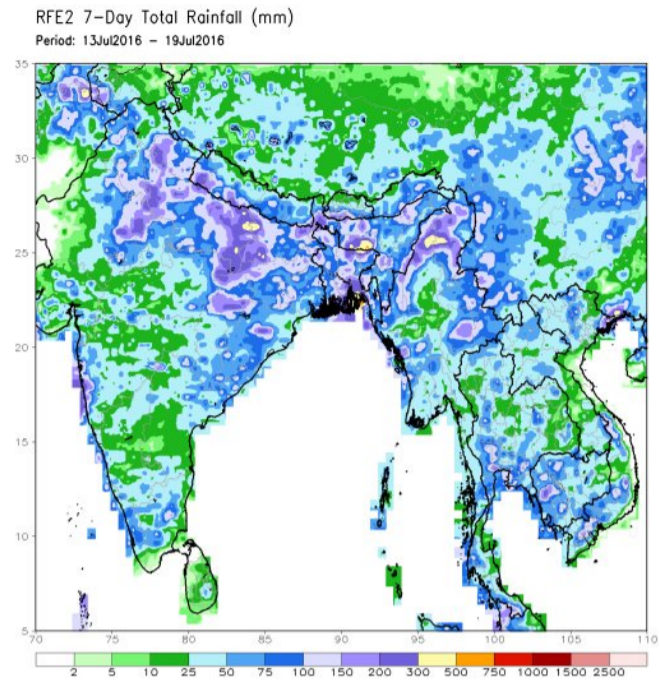


## Weekly Rainfall Monitoring

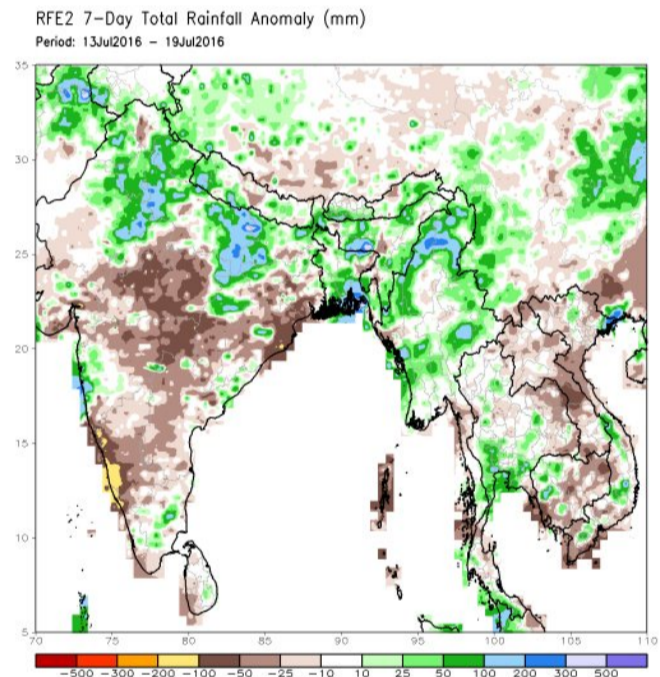
The following figures show the total satellite observed rainfall in the last week in Sri Lanka. The figure in the left is the total 7-day rainfall from NOAA Climate Prediction Center (CPC) Unified Precipitation Analysis and the figure in the right is the total 7-day rainfall from CPC RFE 2.0 Satellite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



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

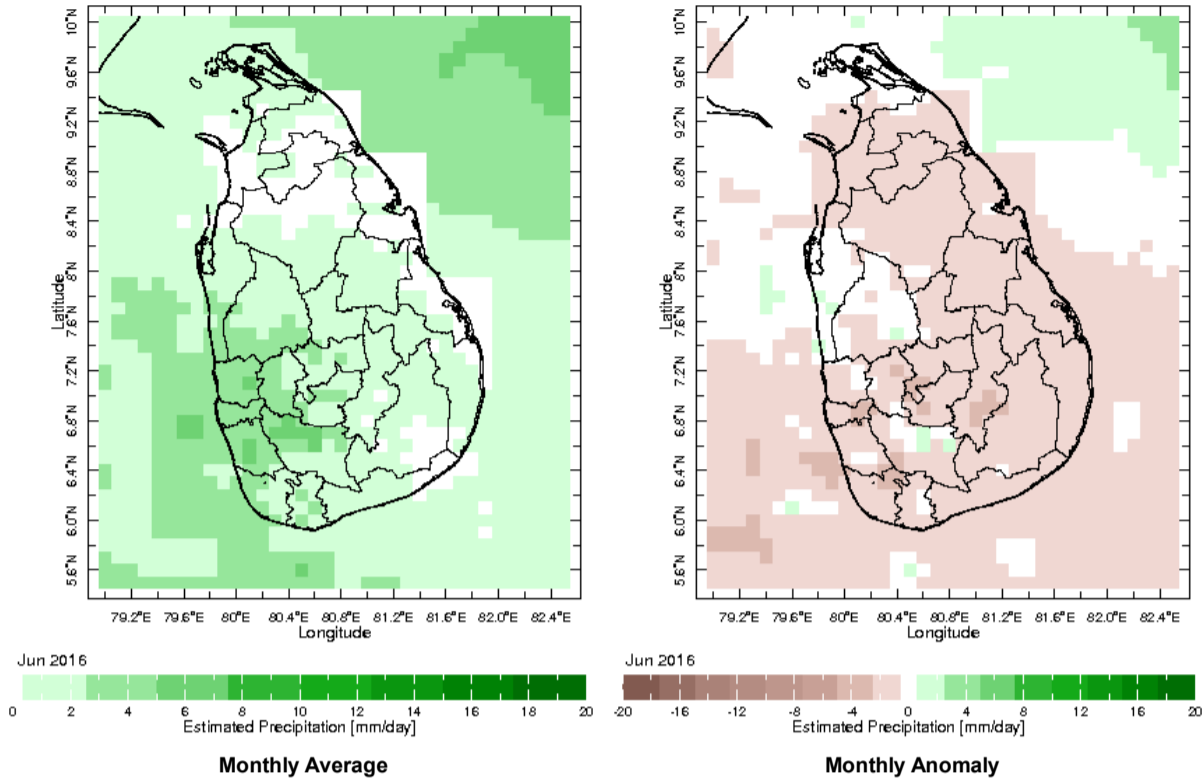


Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis Climatology (1981-2010)

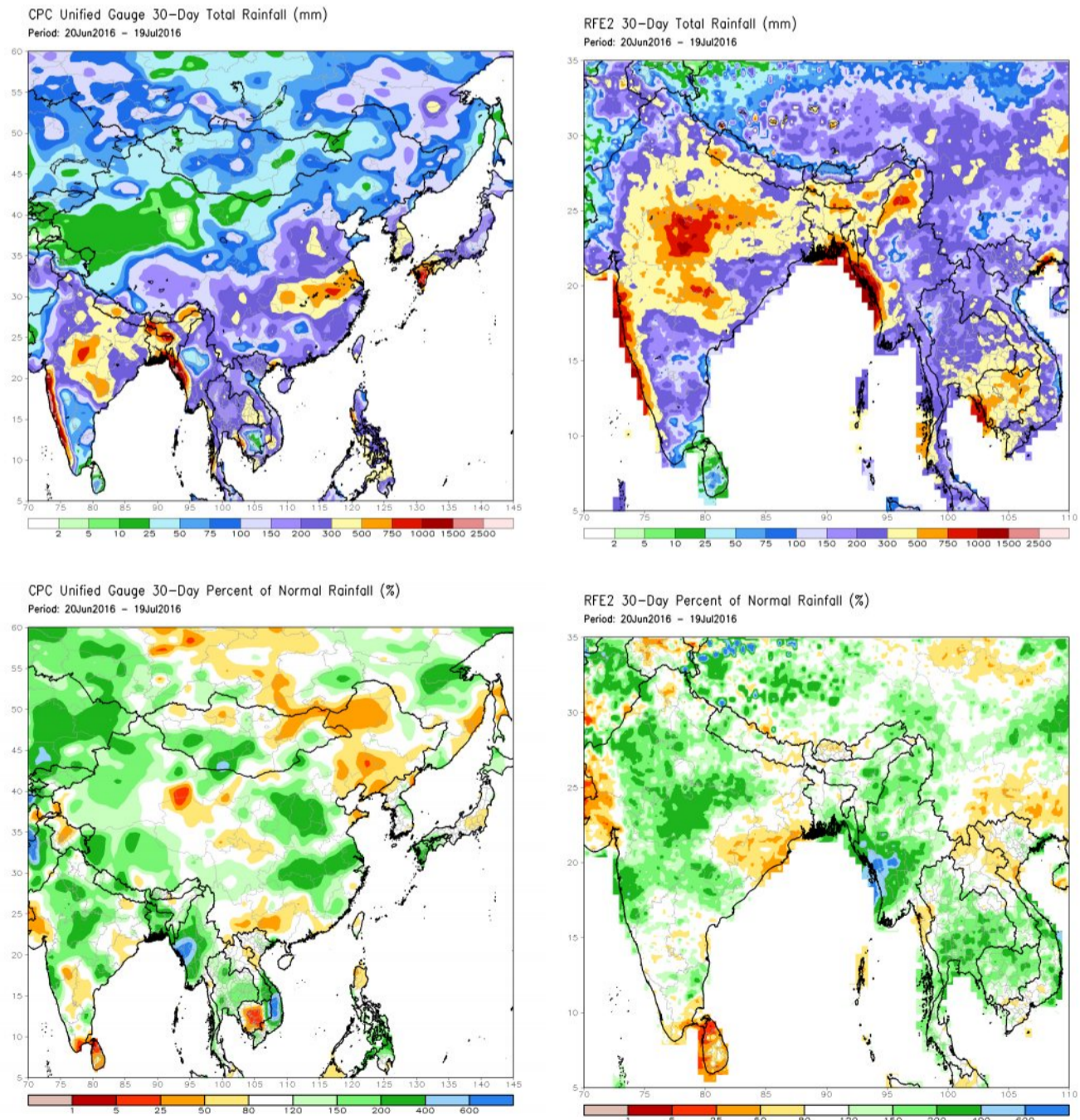


## Monthly Rainfall Monitoring

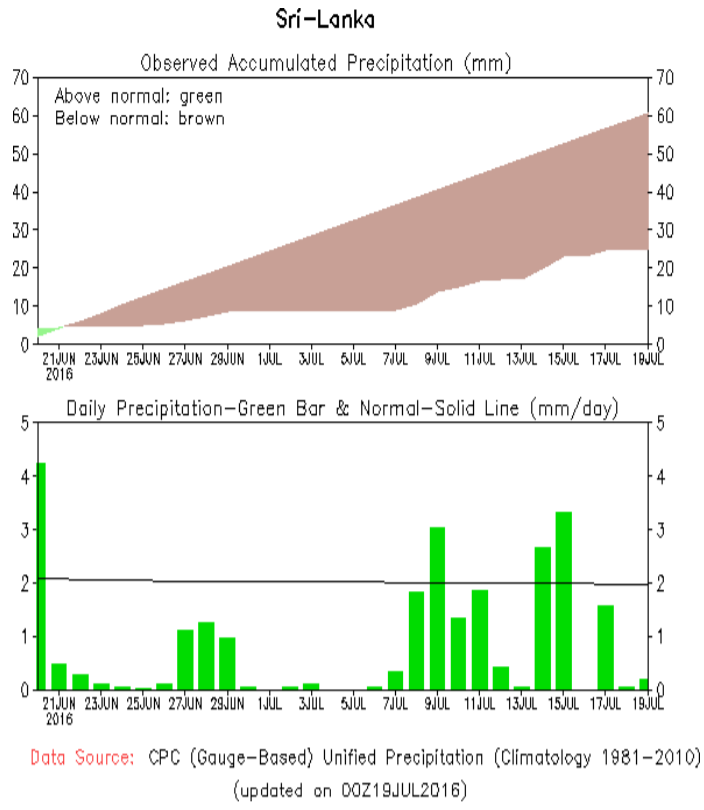
The figure in the left shows the average observed rainfall in the previous month. The rainfall anomaly in the previous month is shown in the figure to the right. The brown color in the anomaly figure shows places which received less rainfall than the historical average while the green color shows places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



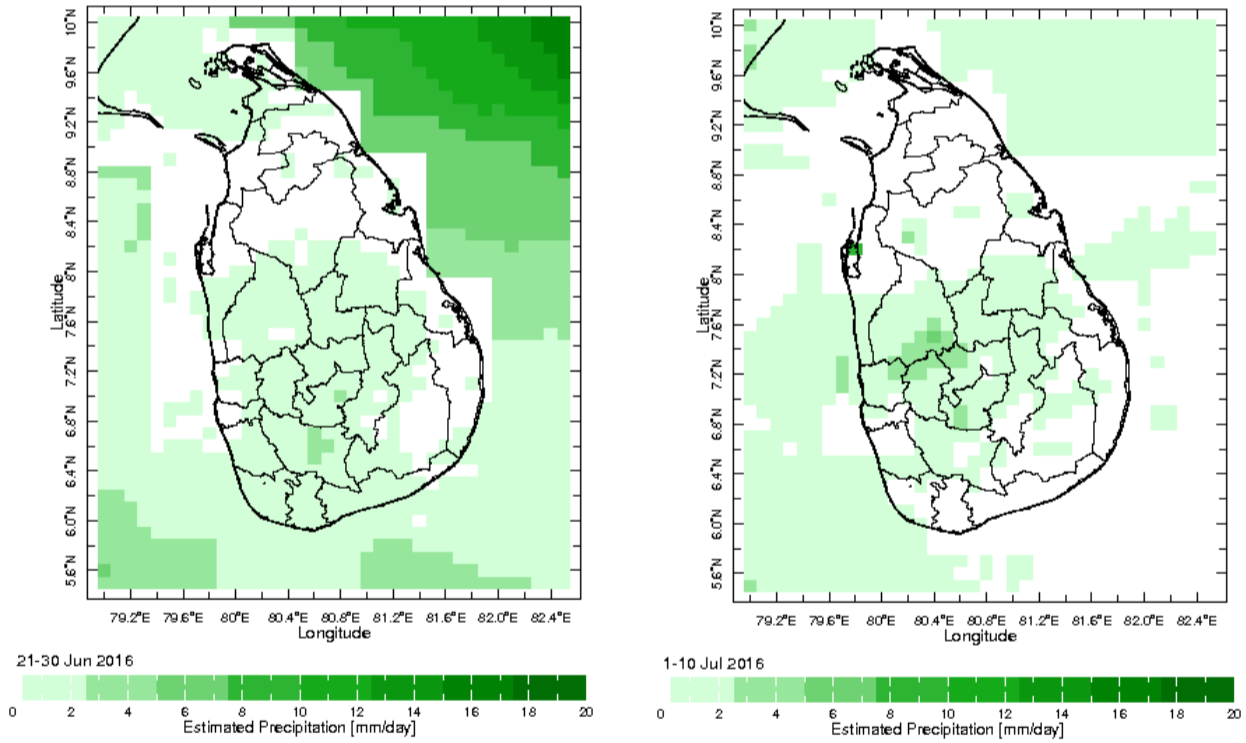
The figure in the top-left shows the total rainfall in the past 30 days from CPC Unified Precipitation Analysis while the figure in the top-right shows the total rainfall for the same period from RFE 2.0 Satellite Rainfall Estimates. The bottom two figures show the percentage of rainfall received in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



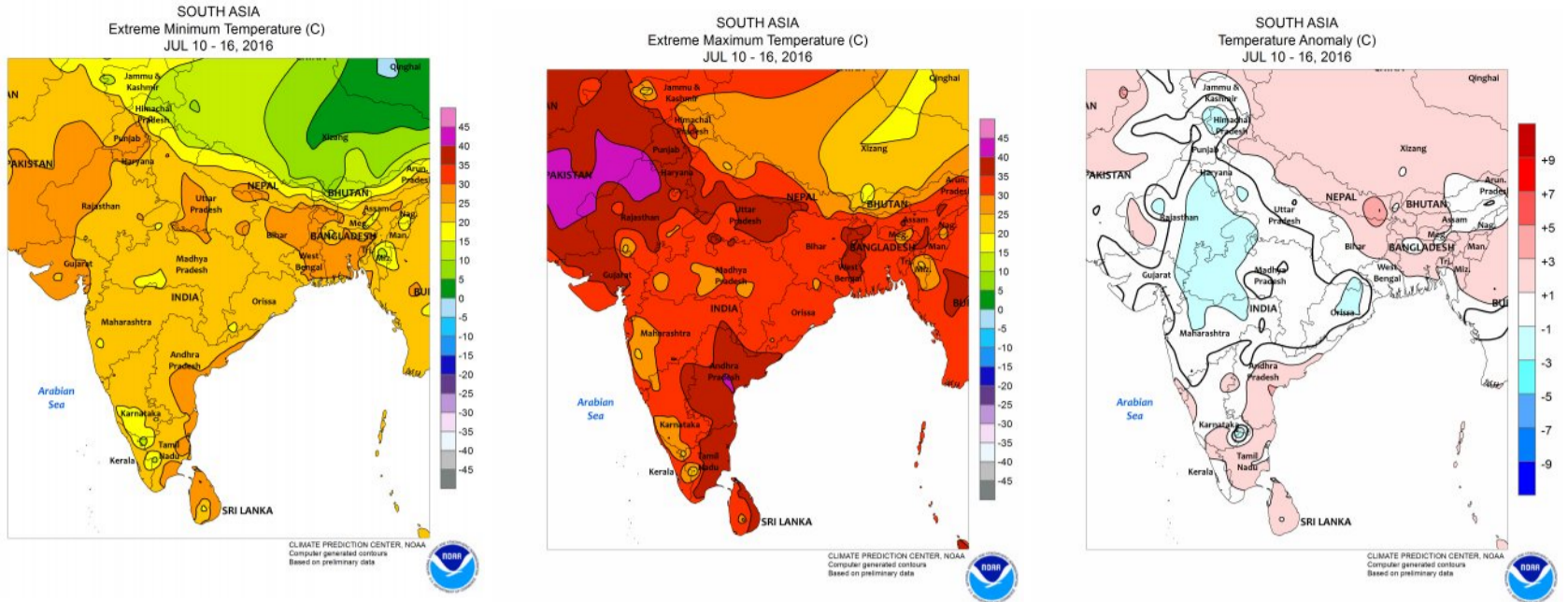
The following figure shows the observed accumulated rainfall (top) and daily observed rainfall (bottom) in Sri Lanka in the last 30 days.



**Dekadal (10 Day) Satellite Derived Rainfall Estimates**

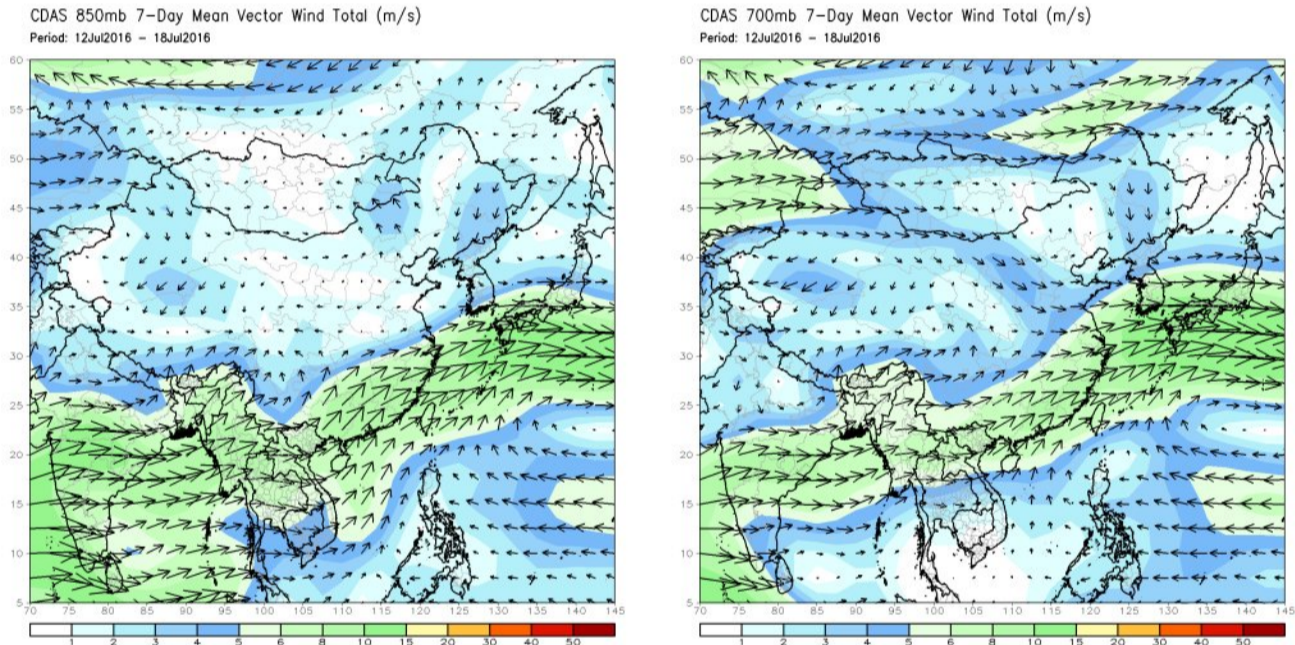


## Weekly Temperature Monitoring



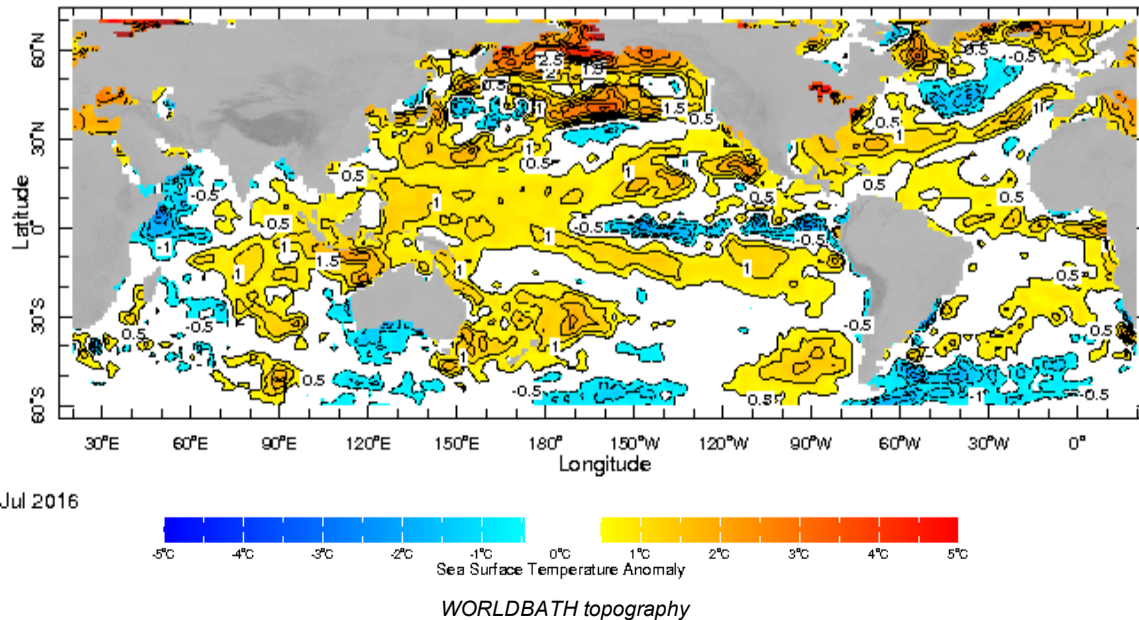
## Weekly Wind Monitoring

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.

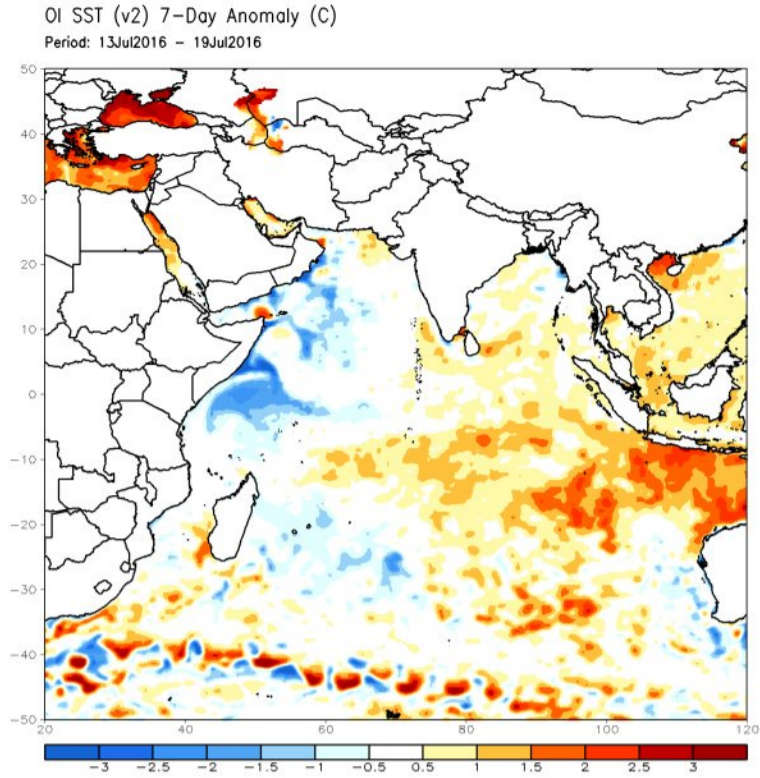


## Weekly Average SST Anomalies

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

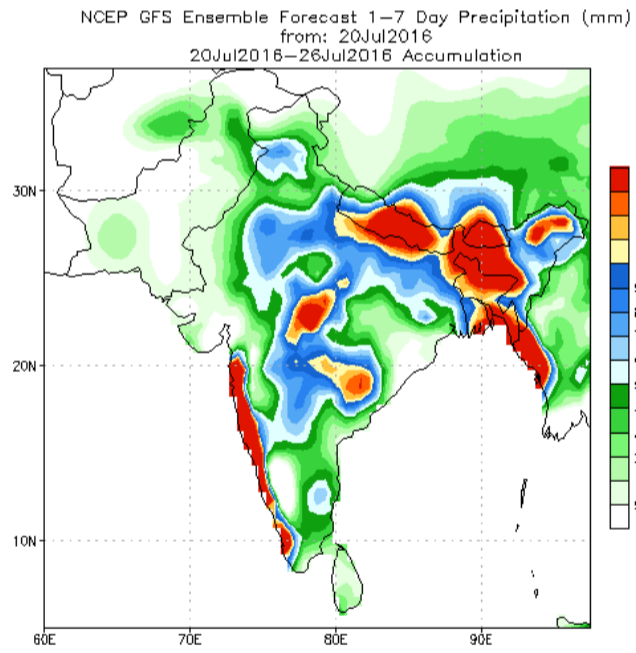




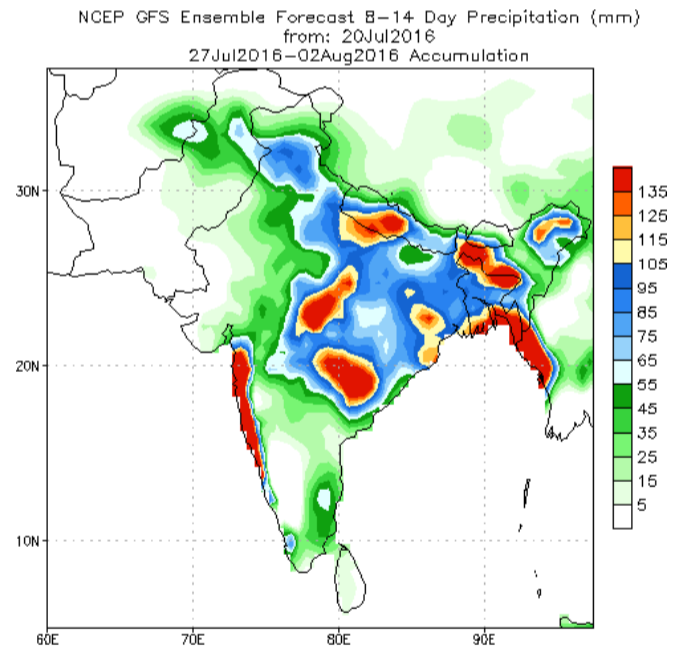


PREDICTIONS

NCEP GFS 1- 14 Day prediction

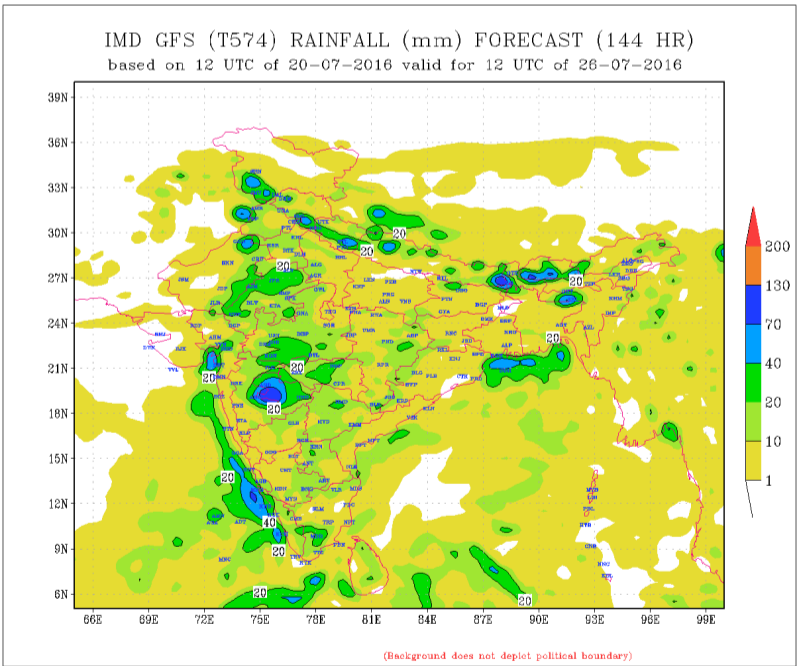
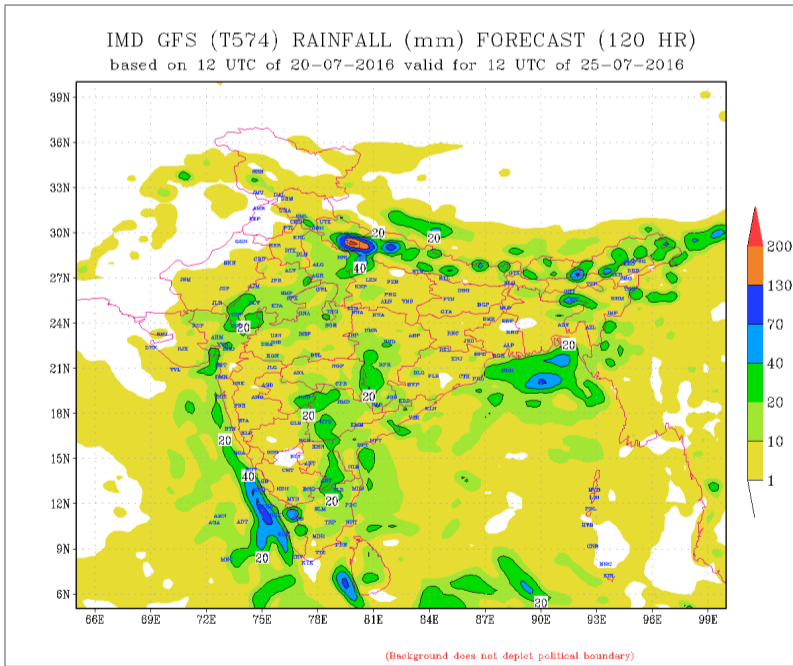
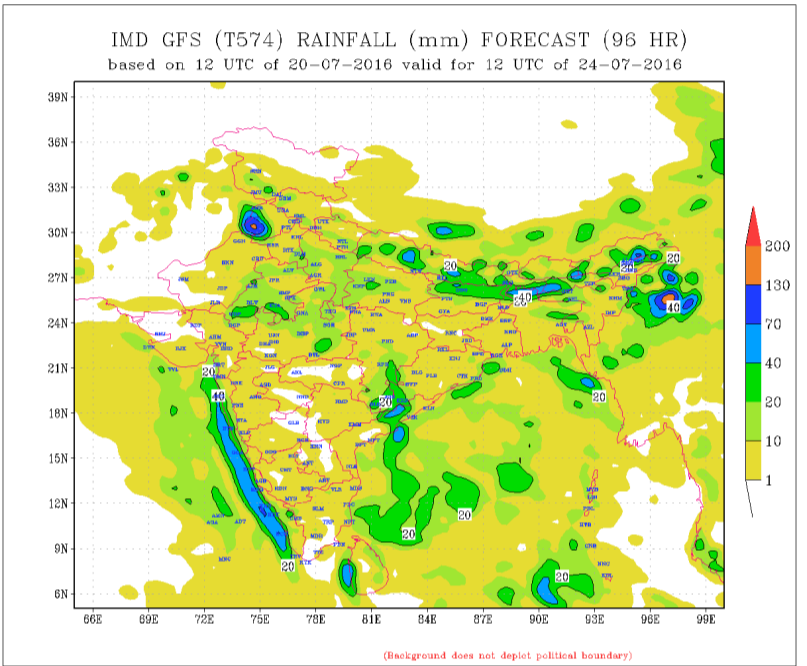
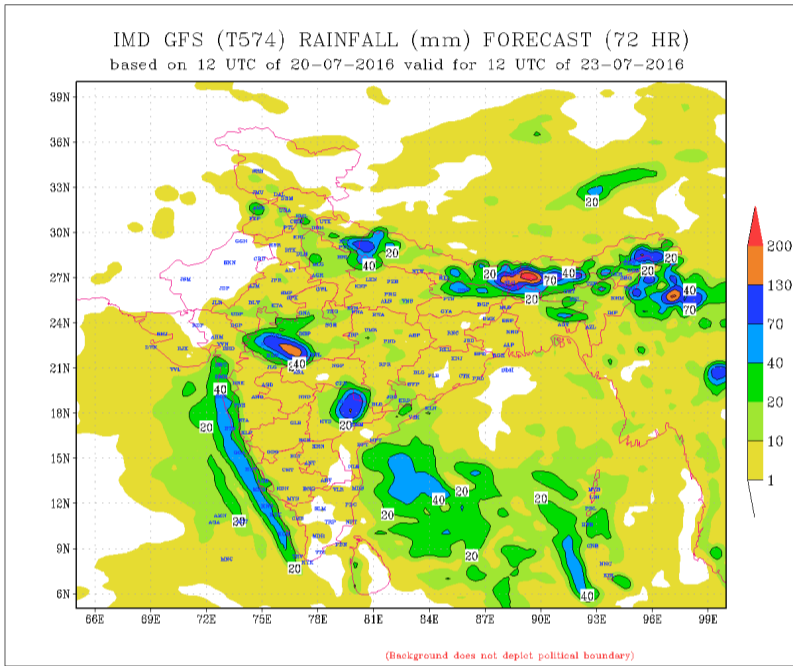
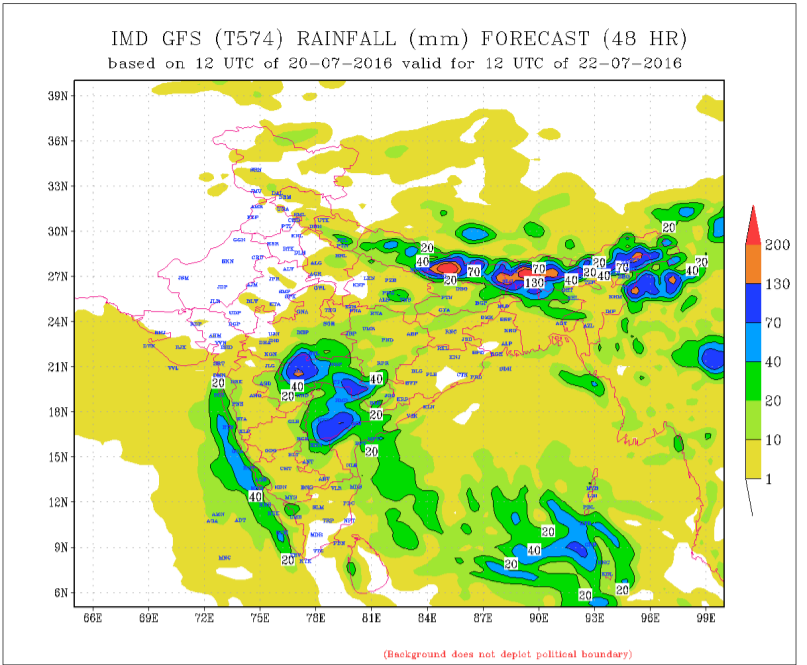
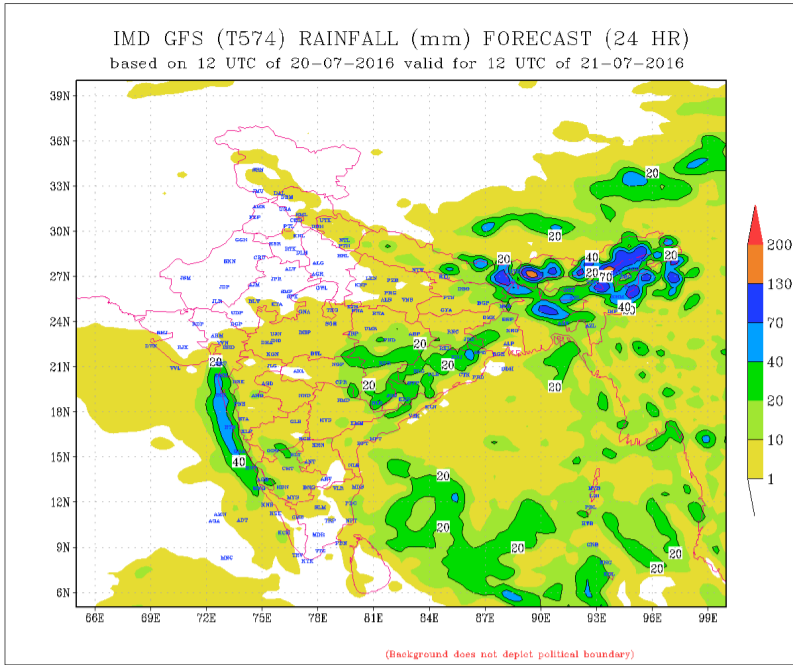


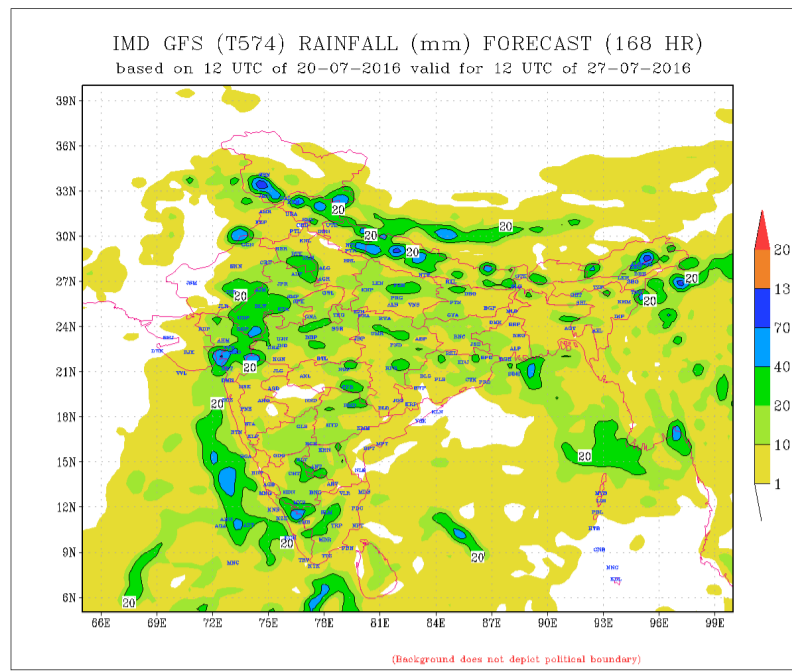
Bias correction based on last 30-day forecast error



Bias correction based on last 30-day forecast error

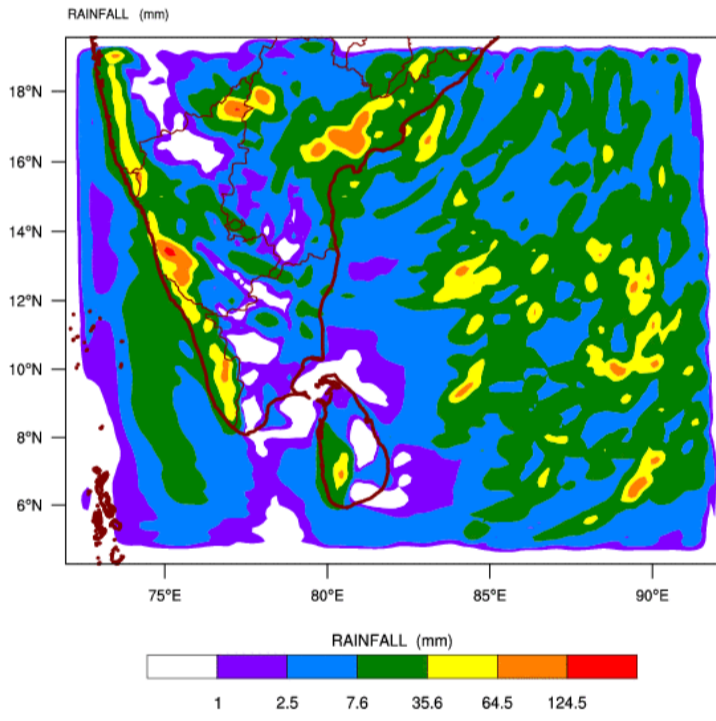
IMD GFS (T574) Model Rainfall Forecast from RMSC New Delhi, India



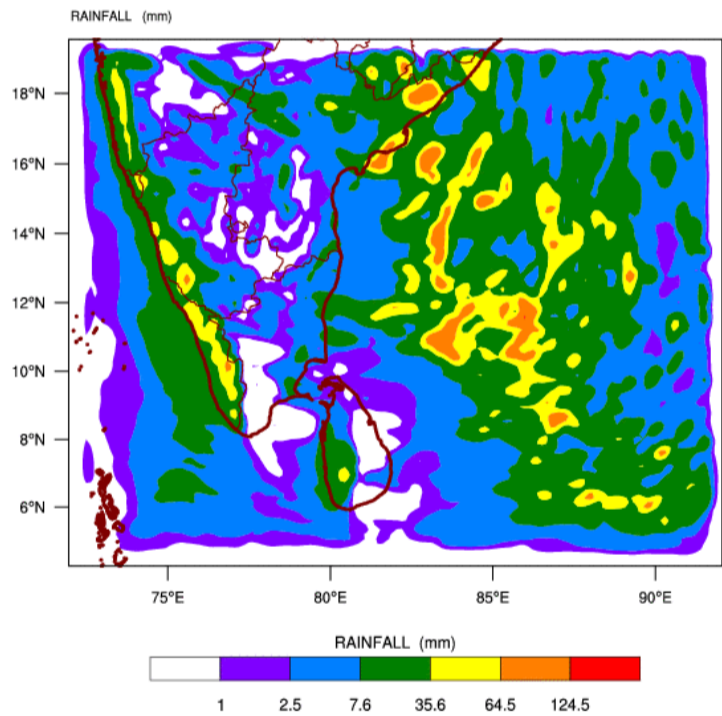


**WRF Model Forecast (from IMD Chennai)**

WRF MODEL FORECAST (48 HR.) RAINFALL(mm)\  
 based on 00 UTC of 20-07-2016 valid for 03 UTC of 22-07-2016

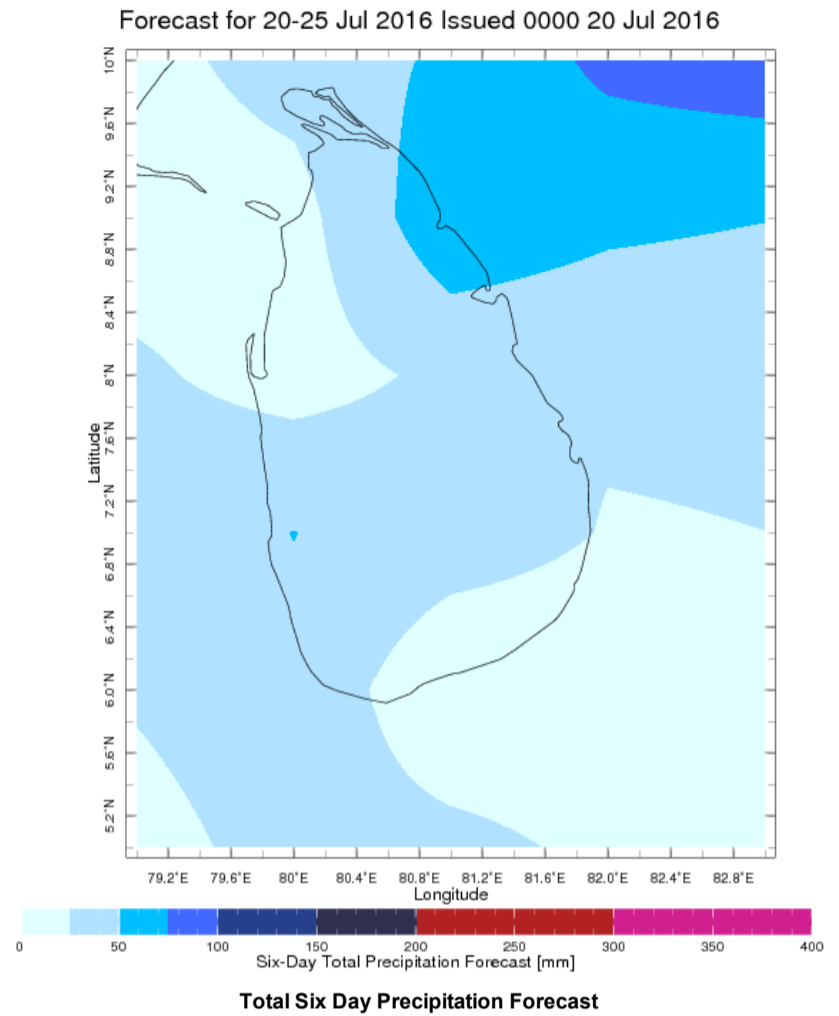
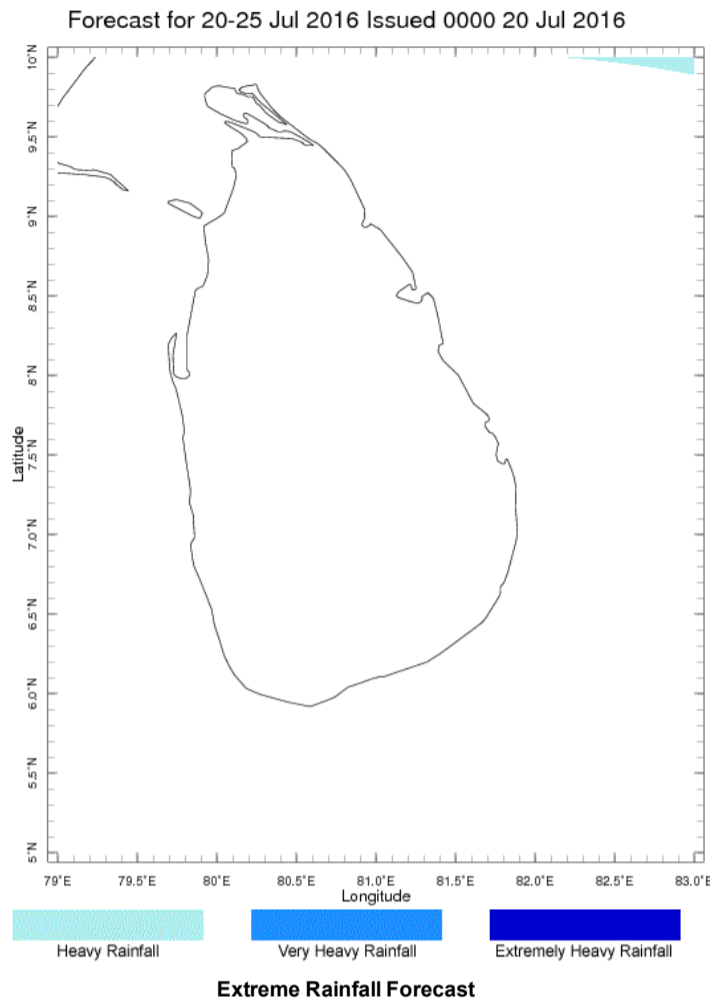


WRF MODEL FORECAST (72 HR.) RAINFALL(mm)\  
 based on 00 UTC of 20-07-2016 valid for 03 UTC of 23-07-2016



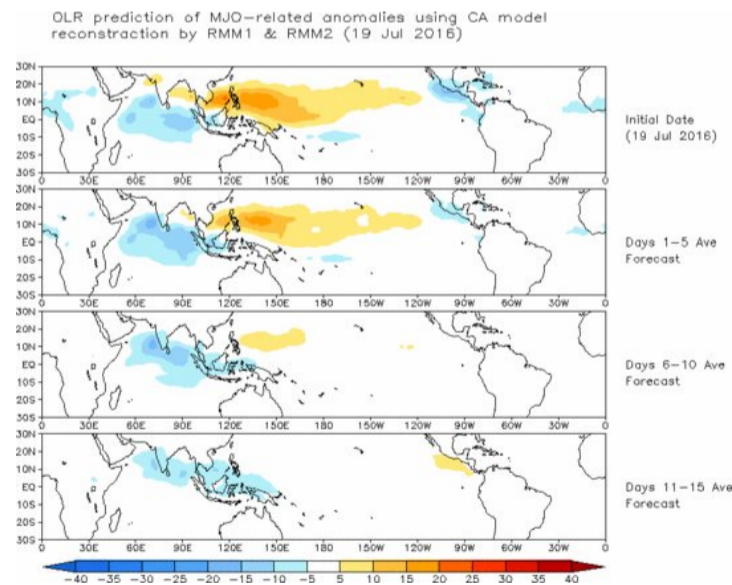
## Weekly Rainfall Forecast from IRI

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.



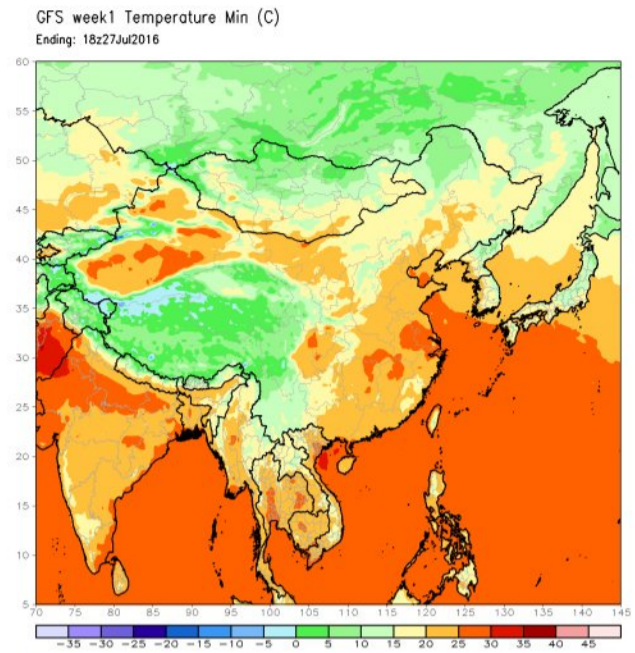
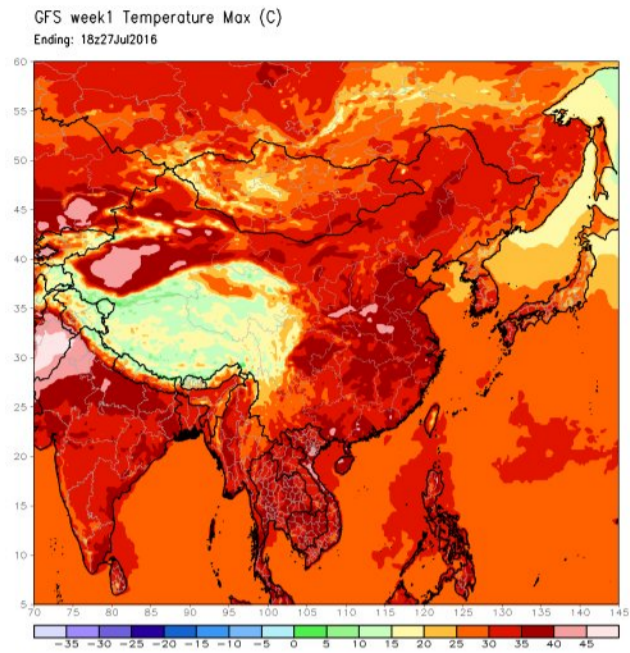
## Madden Julian Oscillation (MJO) related Outgoing Longwave Radiation (OLR) Forecast

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.



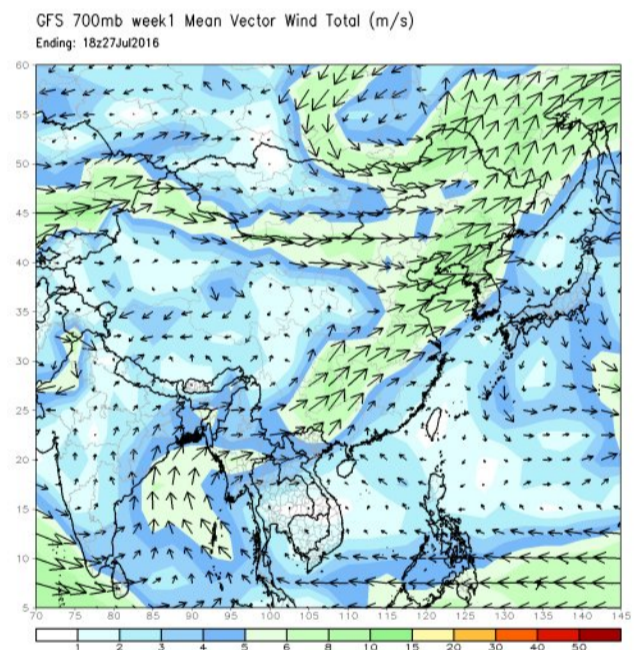
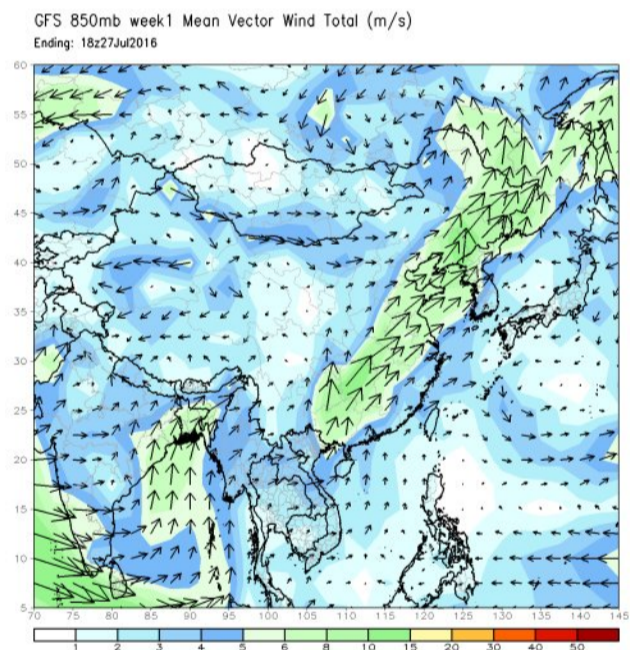
## Weekly Temperature Forecast

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



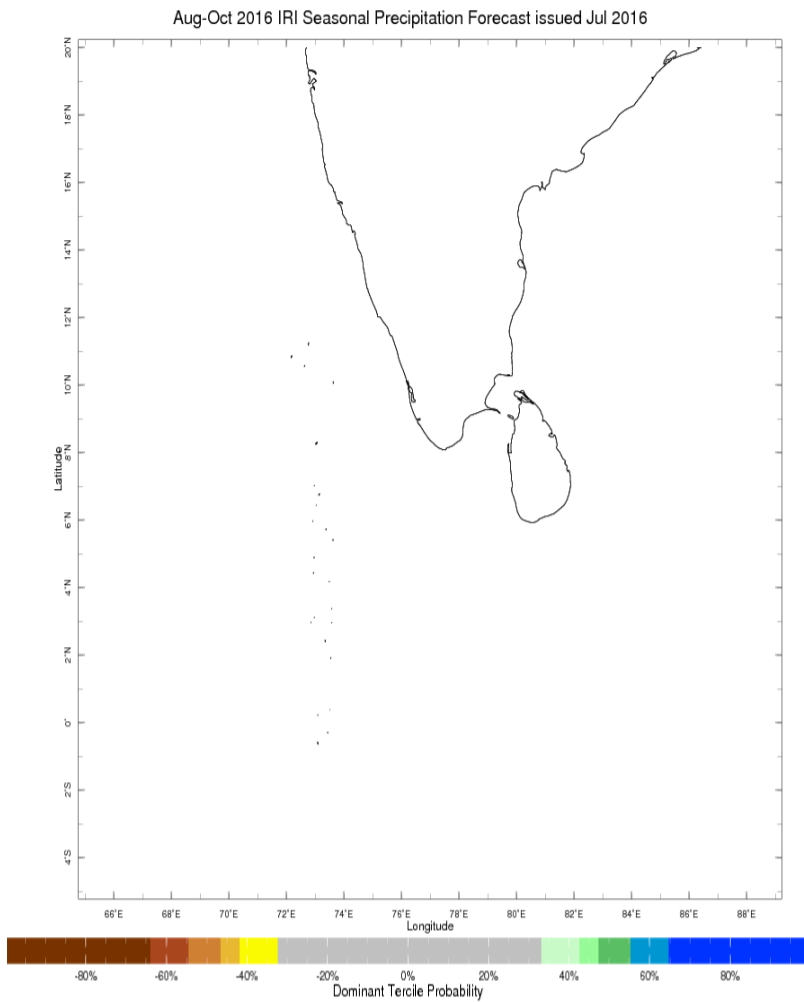
## Weekly Wind Forecast

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

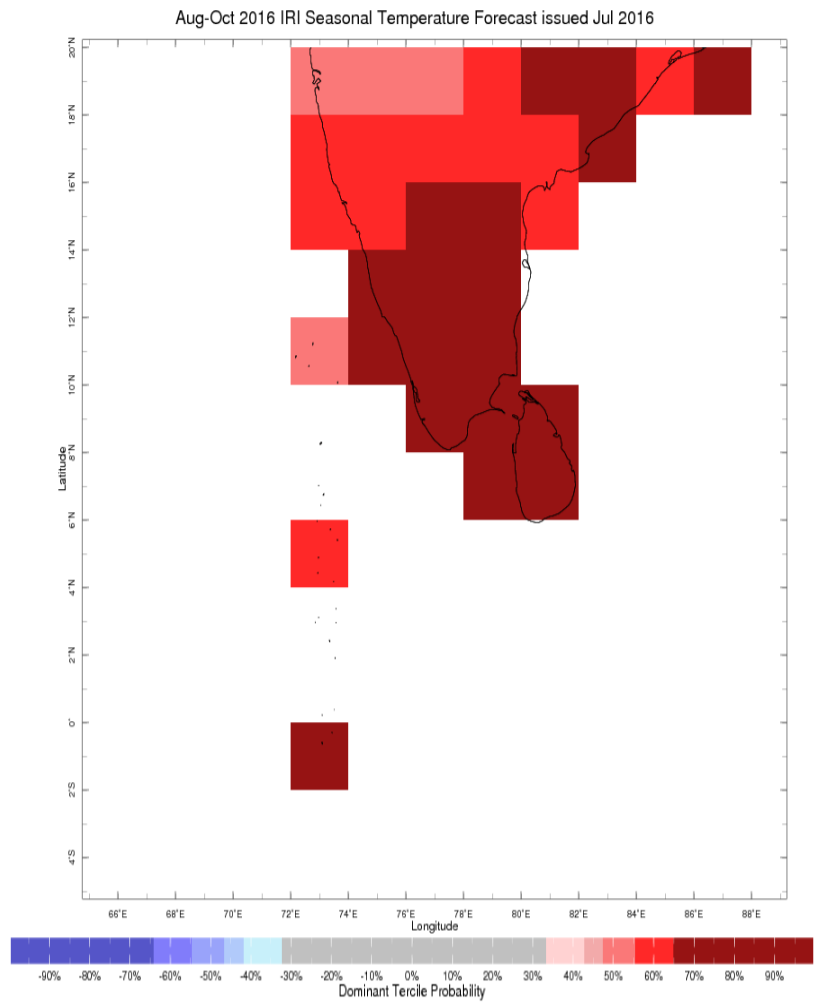


# Seasonal Rainfall and Temperature Forecast

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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