

## Experimental Climate Monitoring and Prediction

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15 September 2016

### Highlights

Mixed weather conditions were experienced in the previous week from 6<sup>th</sup>-12<sup>th</sup> September. Up to 10 mm of rainfall was recorded from the Eastern sea and several areas in the eastern side of the country during the first few days of the week. The highest rainfall for the period was recorded close to Walasmulla near the Matara Hambantota border. The minimum temperature of 20 °C was recorded from Nuwara Eliya district while the maximum temperature was recorded from the North Eastern and Eastern coastal areas to be between 35-40 °C. Up to 55 km/h north westerly winds were recorded in the Southern areas of the country. For the period from 14<sup>th</sup>-20<sup>th</sup> the NOAA NCEP model predicts dry weather conditions in the island. Up to 55 km/h north westerly wind is expected in the southern half of the country including the north western province. In Matale and Kurungela areas up to 55 km/h south westerly wind is expected.

#### Monitoring

##### Rainfall

**Weekly Monitoring:** On 7th of September North Eastern sea near Mullaitivu received rainfall up to 15 mm while Chundikulam and Vettilakenni of Jaffna district received up to 10 mm rainfall. A rainfall up to 5 mm was observed in surrounding areas of Chunnivil, Monniyakulam and Kokkavil. No significant rainfall was observed during the period 8th – 9th. On 10th coastal regions Gampaha, Colombo and Matara districts and nearby sea received up to 5 mm rainfall. Neighboring regions of Ambalangoda, Boossa, Unawatuna, Ahangama and Baddegama of Galle district received rainfall up to 10 mm. On 12th Ratnapura received up to 15 mm rainfall. For the past week, the RFE 2.0 tool shows rainfall between 10-25 mm in surrounding areas of Ratnapura. A below average rainfall of 25-50 mm is shown for the provinces Western and Sabaragamuwa and districts Galle, Nuwara Eliya, Kandy and Badulla. A below average rainfall of 10-25 mm is shown for the rest of the island except for the Northern Province.

**Monthly Monitoring:** Below average rainfall conditions were experienced in the entire island in the month of August except in Jaffna. Monthly average amount to 7 mm/day in Jaffna peninsula and Ratnapura town while everywhere else the rainfall did not exceed 5 mm/day. The CPC Unified Precipitation Analysis tool shows ~75 mm of total rainfall in Jaffna, ~50 mm of rainfall in Kilinochchi, Ratnapura and Matara areas.

##### Temperature

For the period from 4th-10th September the lowest temperature of 10-15 °C was recorded in Nuwara Eliya. The maximum temperature to be recorded was between 35-40 °C in the North and Eastern coastal belt. The maximum temperature of Kandy, Kegalle, Ratanapura, Badulla and Galle areas was 25-30 °C. The maximum temperature of rest of the country was between 30-35 °C. During this period an above average temperature of 0-3 °C was observed in Colombo and Ampara while in rest of the island the temperature was 0-1 °C above average.

##### Wind

At 850 mb level 35-55 km/h north westerly wind was experienced by the southern regions of the country while Central region including the North Central province experienced 30-35 km/h wind in the same direction. At 700 mb the entire country experienced north westerly wind with 30-35 km/h speed.

##### Ocean State

###### **Pacific sea state: September 8, 2016**

During mid-August 2016 the tropical Pacific SST anomaly was close to -0.5C, approaching the weak La Niña threshold. However, most key atmospheric variables continue to indicate neutral ENSO conditions. Although the upper level winds in the tropical Pacific are slightly suggestive of La Niña, the lower level winds remain near average. The Southern Oscillation index and the pattern of cloudiness and rainfall in the equatorial Pacific also indicate neutral ENSO despite a mild tilt toward La Niña. The collection of ENSO prediction models indicate SSTs most likely near the borderline of cool-neutral and weak La Niña from the present through fall and into winter. (Text Courtesy IRI)

###### **Indian Ocean State**

0.5 °C below average sea surface temperature was observed in the eastern and southern sea of Sri Lanka.

## Predictions

### Rainfall

**14-day prediction:** NOAA NCEP models predicts no rainfall in the entire island until 27<sup>th</sup> September except in Jaffna peninsula where up to 15 mm rain expected in each week.

**Weekly prediction:** IMD GFS model predicts dry weather conditions in the period from 15<sup>th</sup>-21<sup>st</sup> September. No rainfall is predicted in the entire country except on the 15<sup>th</sup>. On that day between 10-20 mm of rainfall is predicted in the western province, Galle district and adjacent sea, in the eastern sea close to Trincomalee as well as in the northern sea close to Jaffna peninsula.

**IMD WRF & IRI Model Forecast:** According to the IMD WRF model up to 35 mm of rainfall is expected in the western province, Kegalle, Ratnapura, Galle and Chilaw areas during the period from 14<sup>th</sup>-16<sup>th</sup>. During the same period less than 8 mm of rainfall is expected in rest of the north western province, Matara and Moneragala areas. On the 17<sup>th</sup> the rainfall that persisted in the Western province is shown to be constricted to Kalutara and Colombo districts and coastal areas in southern part of Puttalam district. The IRI model predicts no extreme weather conditions for the period from 14<sup>th</sup>-19<sup>th</sup>.

**Seasonal Prediction:** As per IRI Multi Model Probability Forecast for October to December, the total 3-month precipitation shall be climatological in the northern half of the island. However the southern half of the island has 30-40% likelihood of being in the below-normal tercile. 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 40-45 °C maximum temperature in the areas along the border of Eastern and Uva provinces. The maximum temperature along the coastal belt in the Eastern side of the country and in Polonnaruwa and Monaragala districts will be between 35-40 °C. The maximum temperature of Colombo, Kalutara, Galle and Ratnapura areas will be between 25-30 °C while in Kandy, Matale, Puttalam, Kurunegala and Matara districts the maximum temperature will be between 30-35 °C. For the same period minimum temperature is expected in Nuwara Eliya, Kandy and Badulla to be between 15-20 °C.

### Wind

The 850 mb level predicts up to 54 km/h north westerly wind in the western, central and southern regions of the country. Up to 36 km/h south westerly wind is expected for North Central province and Mannar district. The 700 mb level predicts up to 54 km/h westerly wind in the western regions of the country including North Central and Central provinces. Up to 36 km/h wind in the same direction is expected for the rest of the island.

### MJO based OLR predictions

MJO will be in the Indian Ocean in the next seven days and will enhance the rainfall conditions over 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

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## Weekly Hydro- Meteorological Report for Sri Lanka

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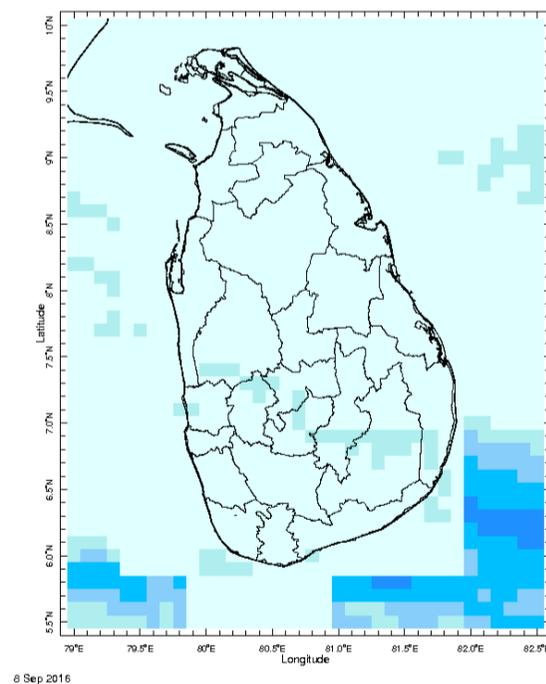
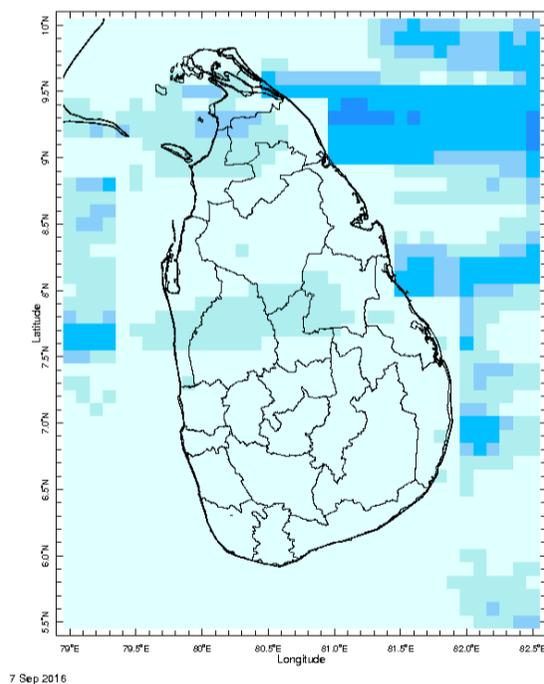
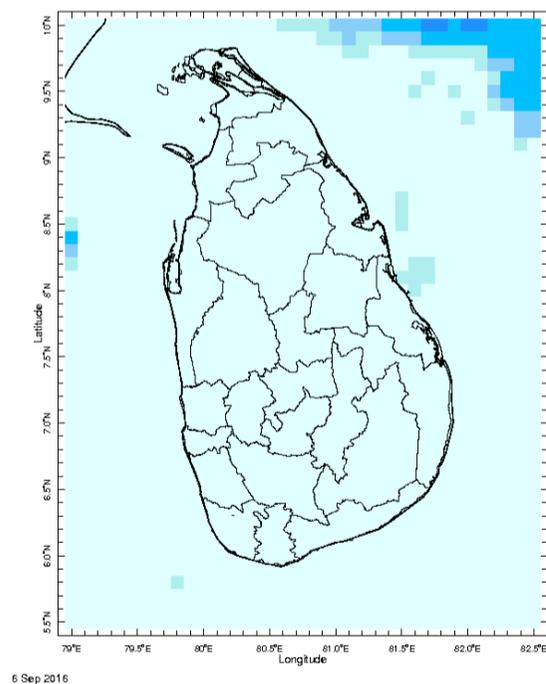
#### 2. Predictions

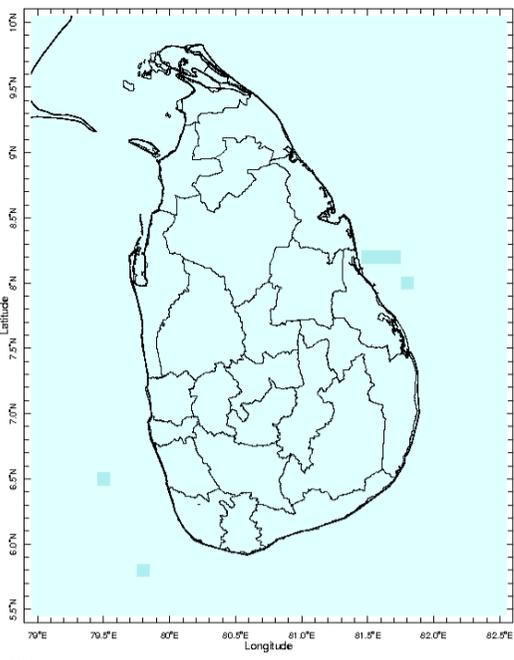
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## MONITORING

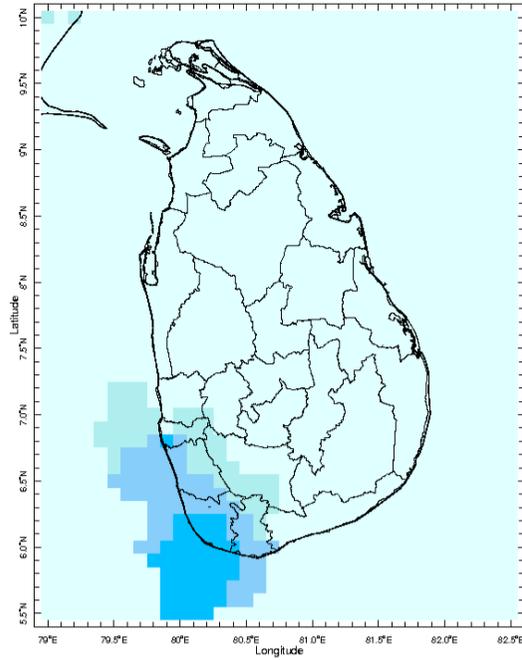
### Daily Rainfall Monitoring

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

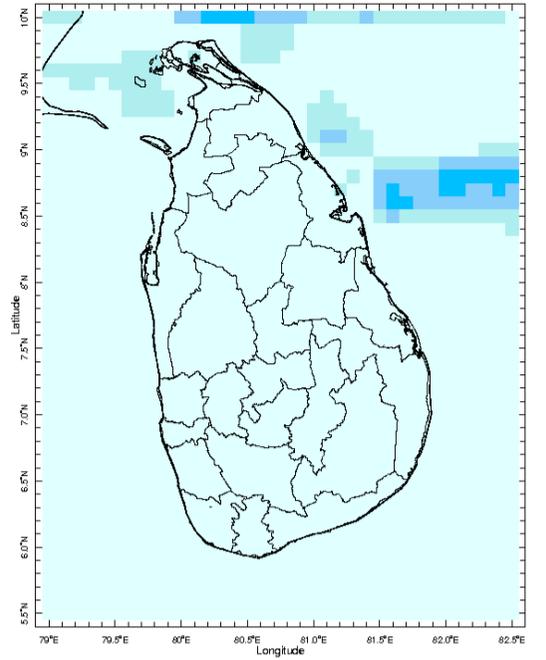




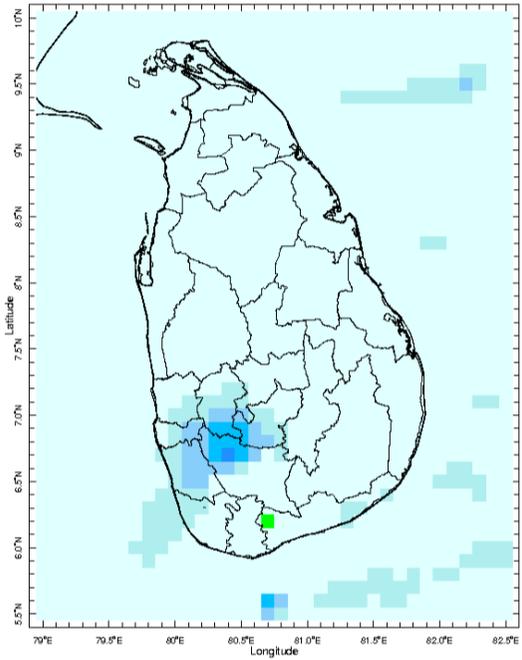
9 Sep 2016



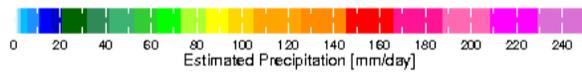
10 Sep 2016



11 Sep 2016

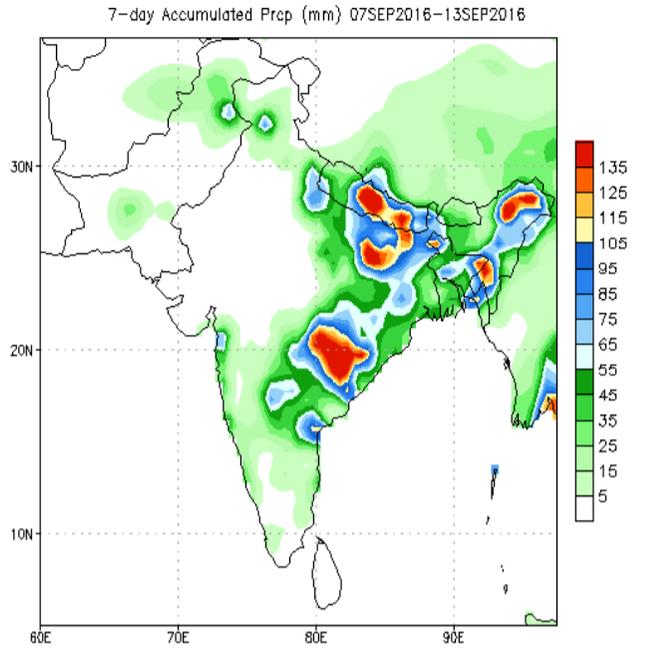


12 Sep 2016

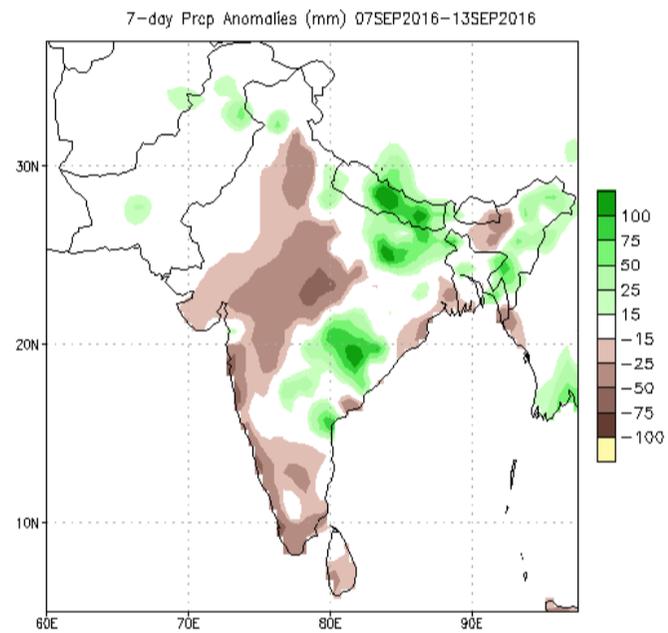
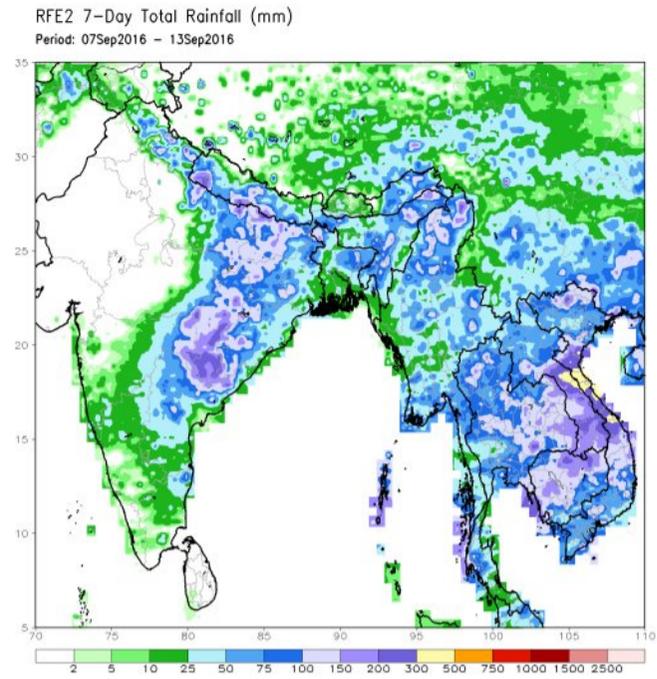


## Weekly Rainfall Monitoring

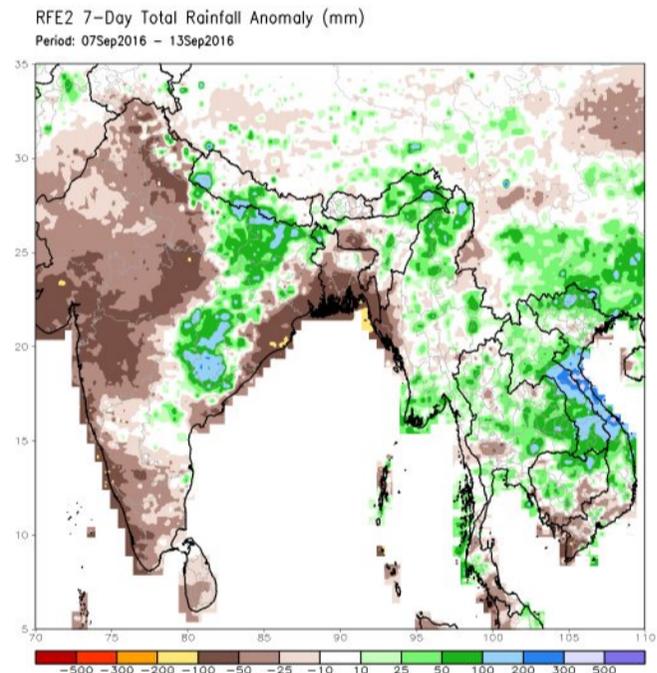
The following figures show the total satellite observed rainfall in the last week in Sri Lanka. The figure in the left is the total 7-day rainfall from NOAA Climate Prediction Center (CPC) Unified Precipitation Analysis and the figure in the right is the total 7-day rainfall from CPC RFE 2.0 Satellite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



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

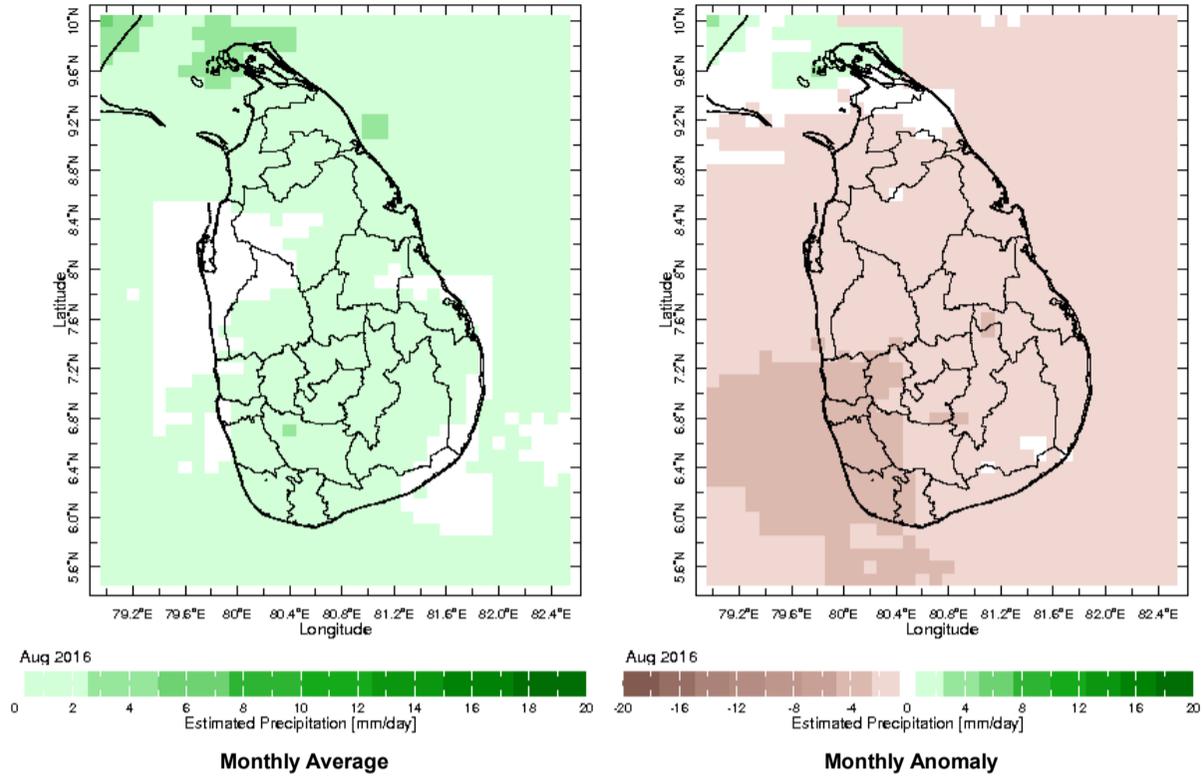


Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis  
Climatology (1981-2010)

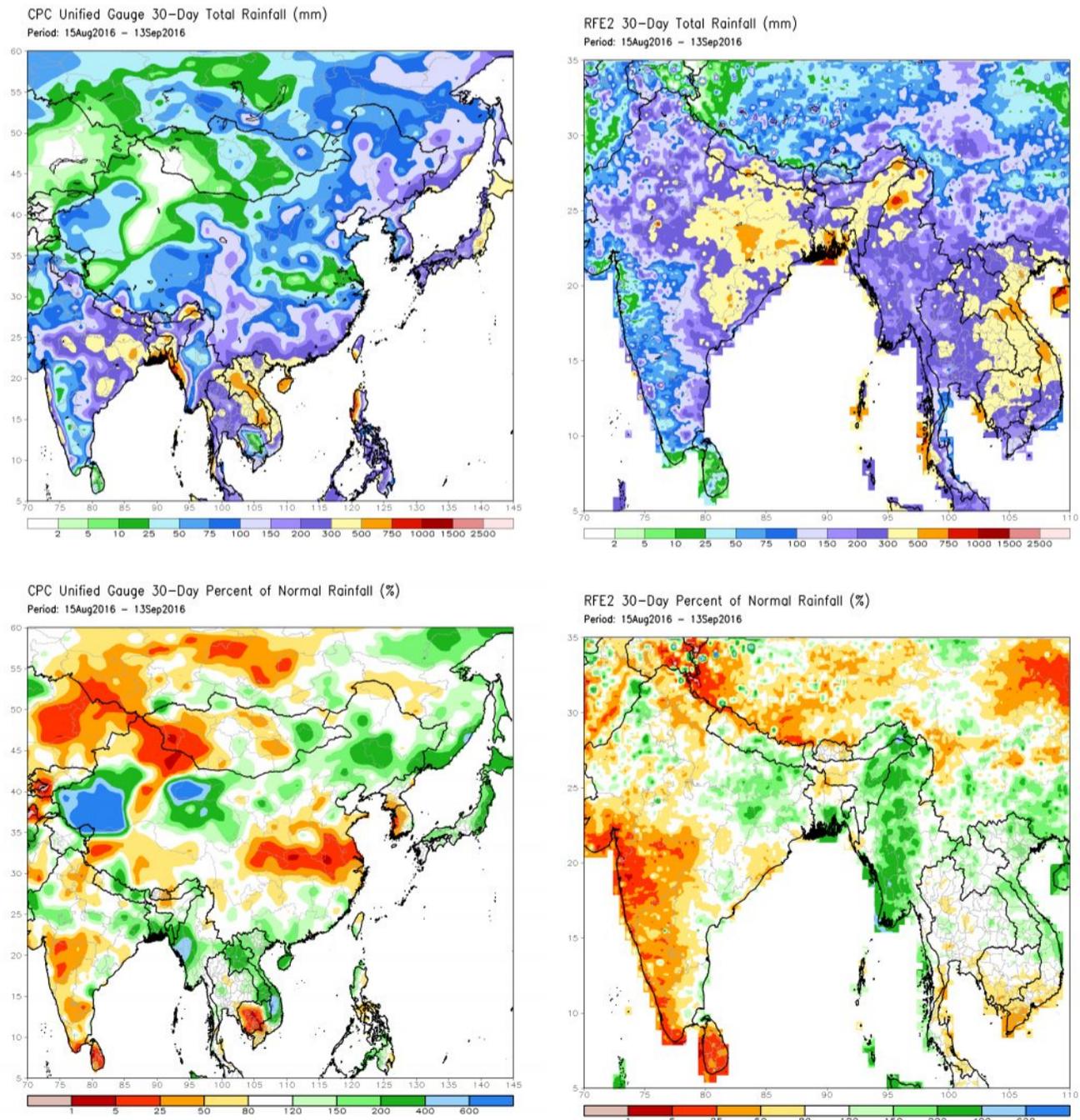


## Monthly Rainfall Monitoring

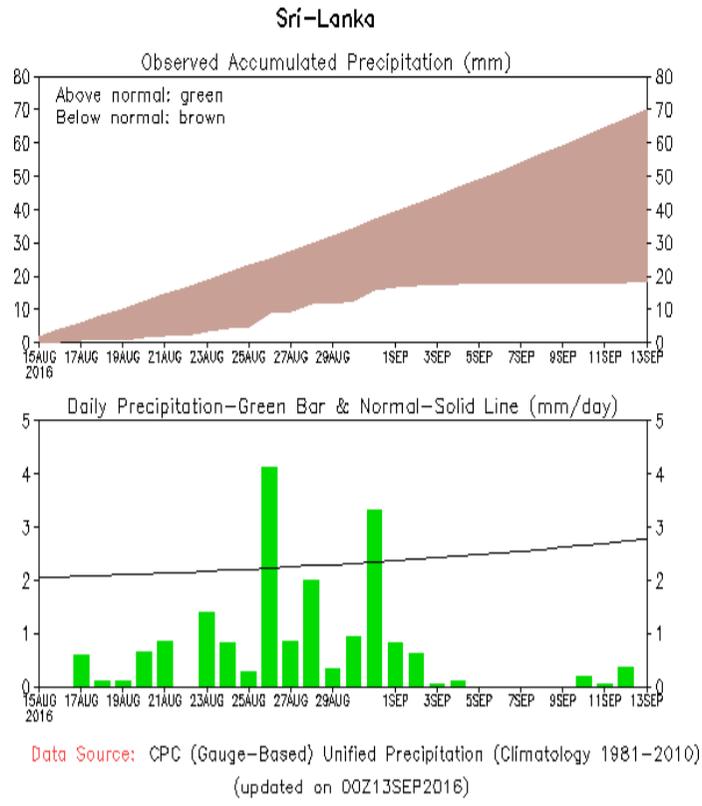
The figure in the left shows the average observed rainfall in the previous month. The rainfall anomaly in the previous month is shown in the figure to the right. The brown color in the anomaly figure shows places which received less rainfall than the historical average while the green color shows places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



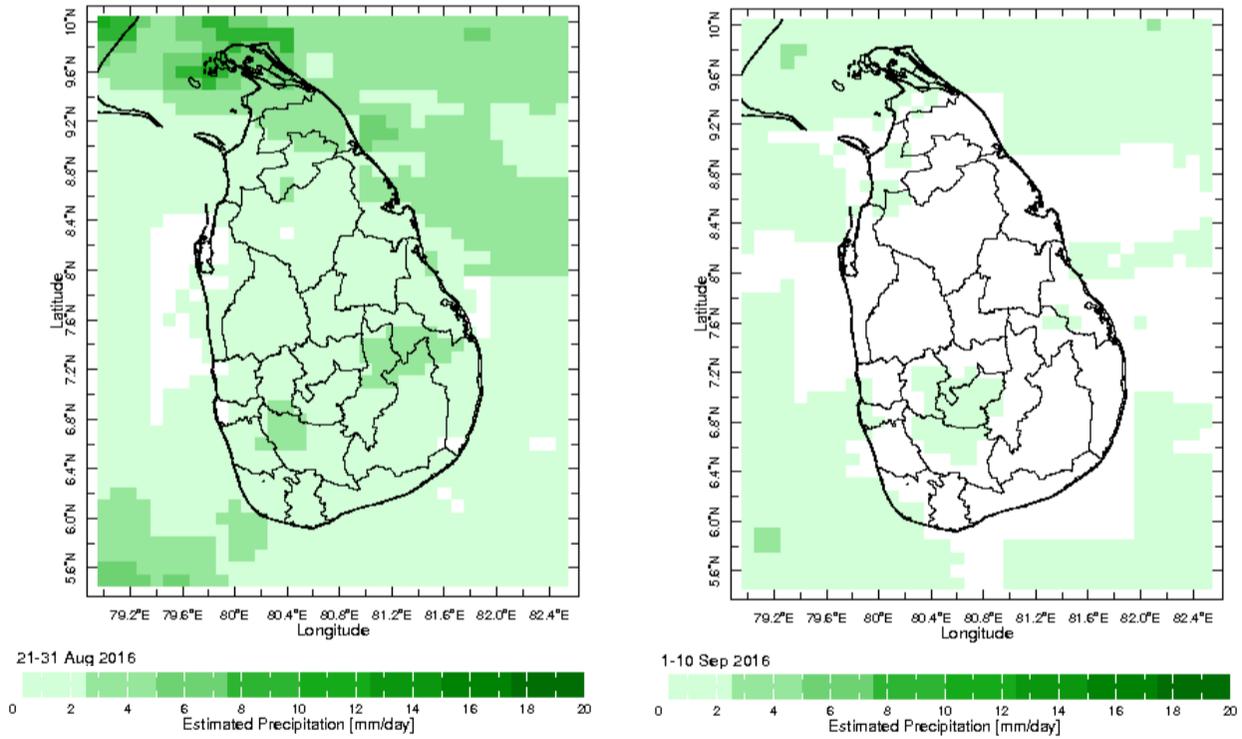
The figure in the top-left shows the total rainfall in the past 30 days from CPC Unified Precipitation Analysis while the figure in the top-right shows the total rainfall for the same period from RFE 2.0 Satellite Rainfall Estimates. The bottom two figures show the percentage of rainfall received in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



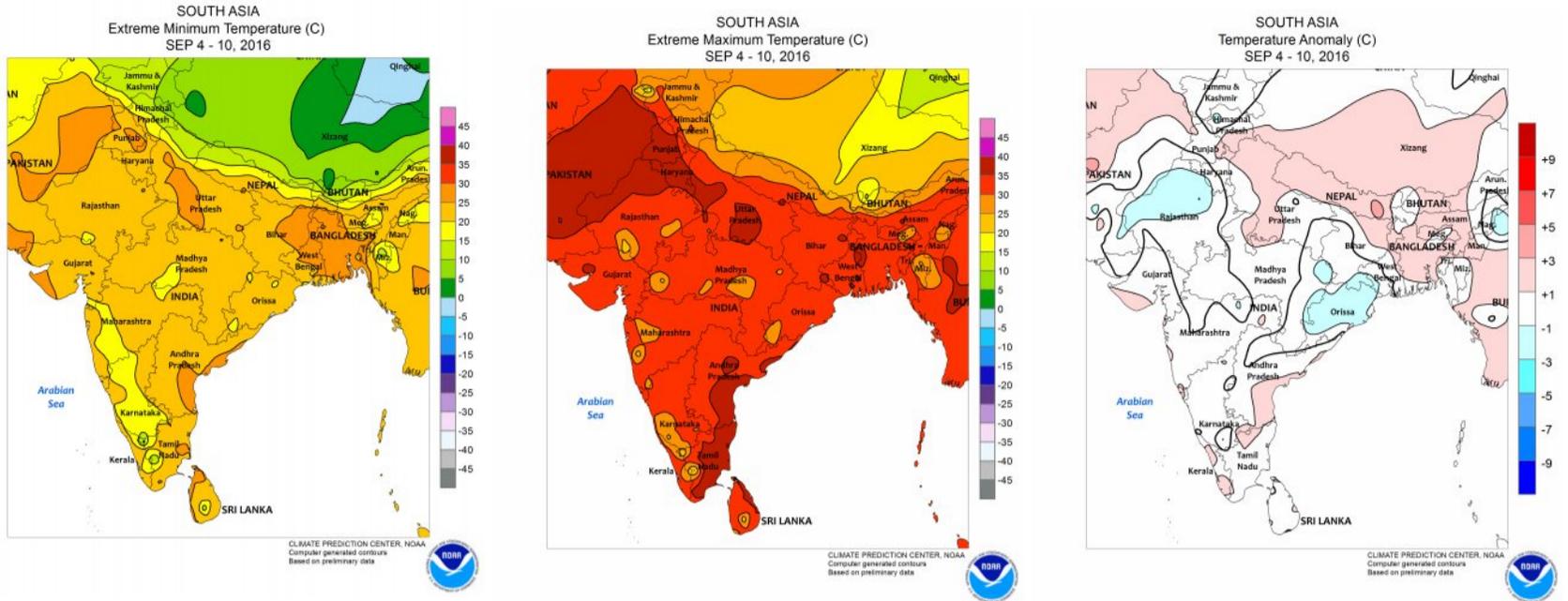
The following figure shows the observed accumulated rainfall (top) and daily observed rainfall (bottom) in Sri Lanka in the last 30 days.



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

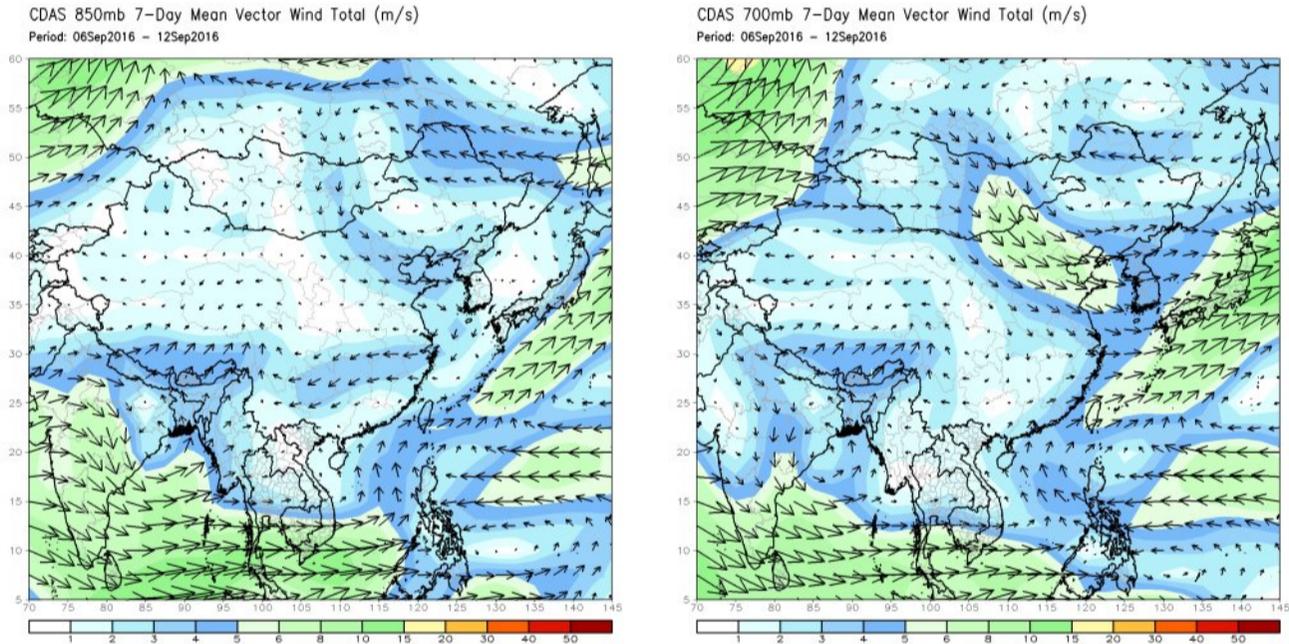


## Weekly Temperature Monitoring



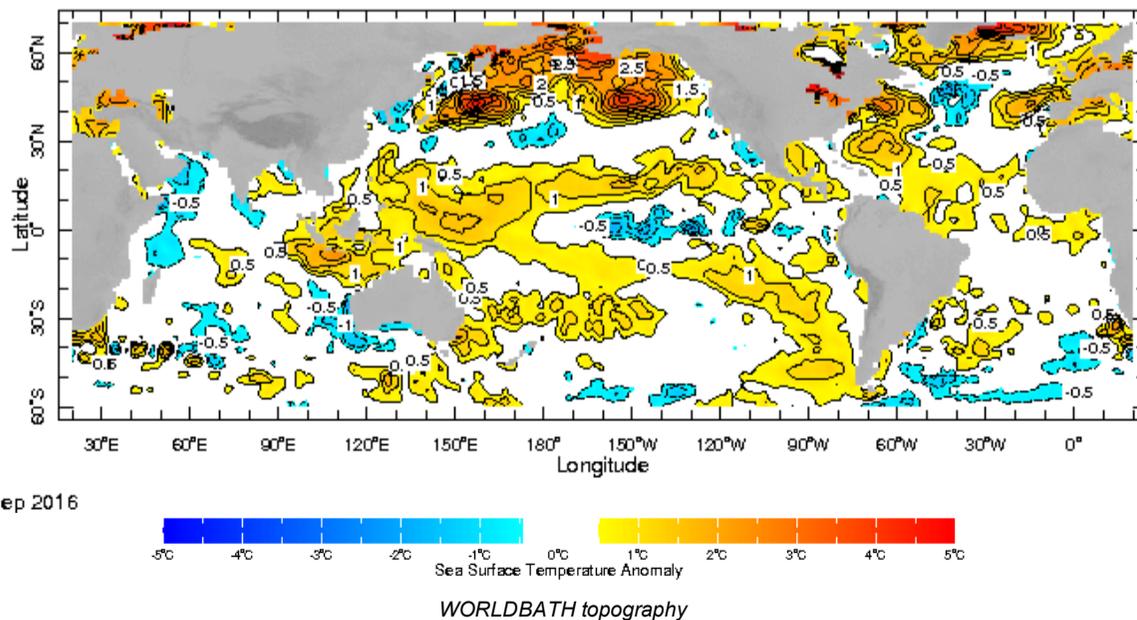
## Weekly Wind Monitoring

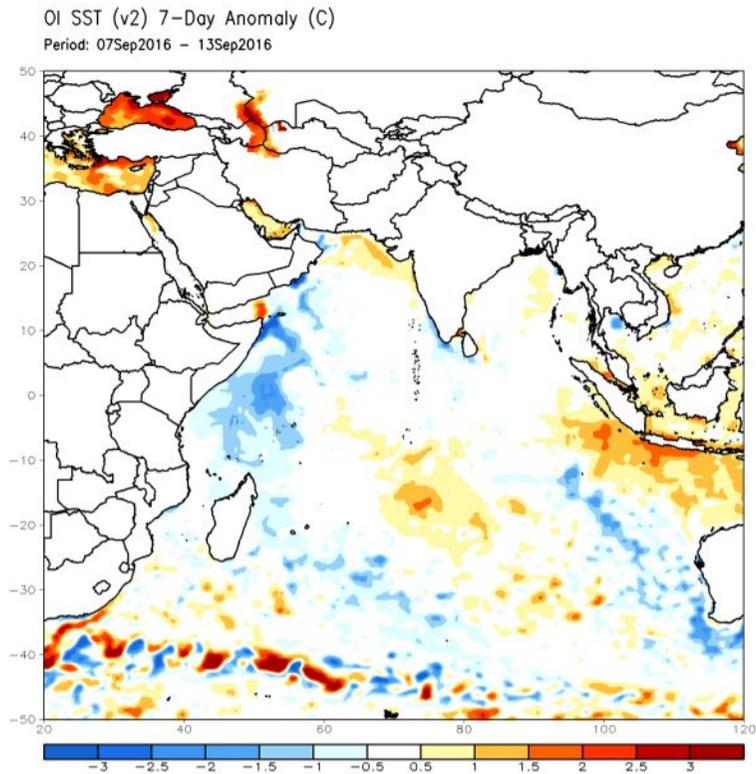
The following figures show the mean vector wind total of the past 7 days near Sri Lanka at two levels. The figure on the left shows 850 mb (~1500 m) level and the figure on the right shows 700 mb (~3000 m) level.



## Weekly Average SST Anomalies

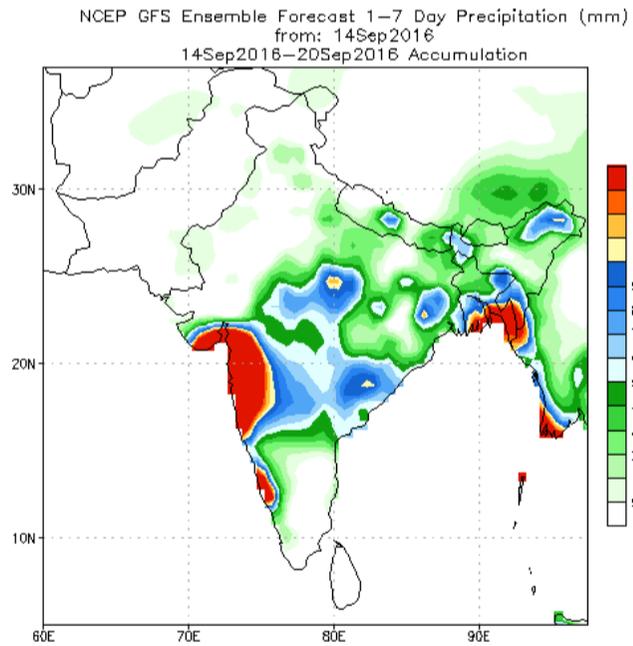
Weekly average Sea Surface Temperature (SST) anomaly in the world from NOAA NCEP



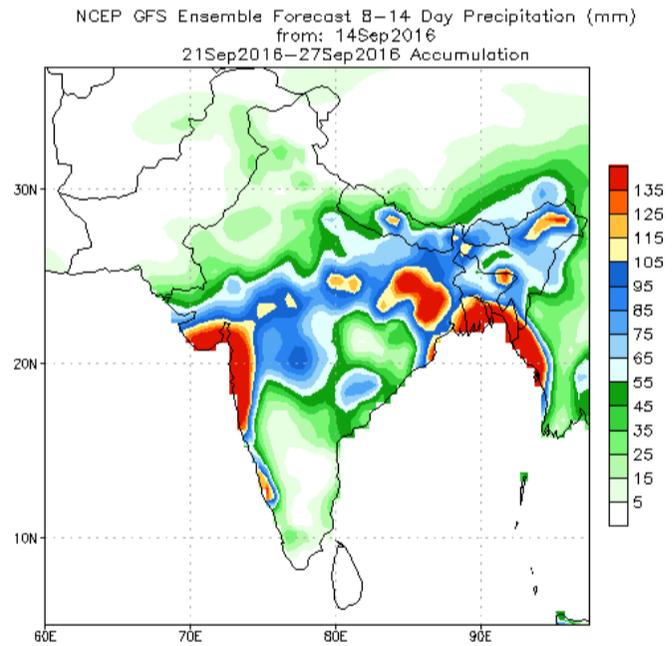


PREDICTIONS

NCEP GFS 1- 14 Day prediction

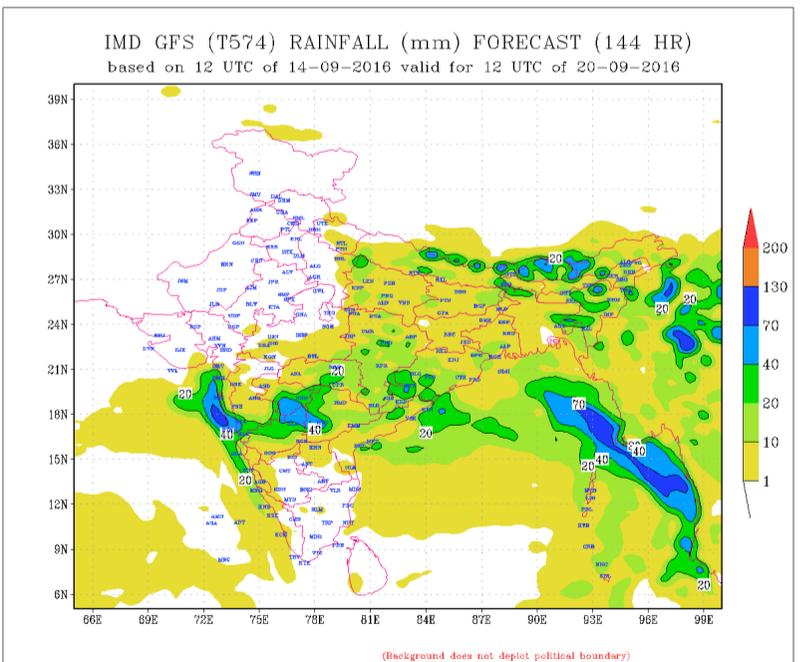
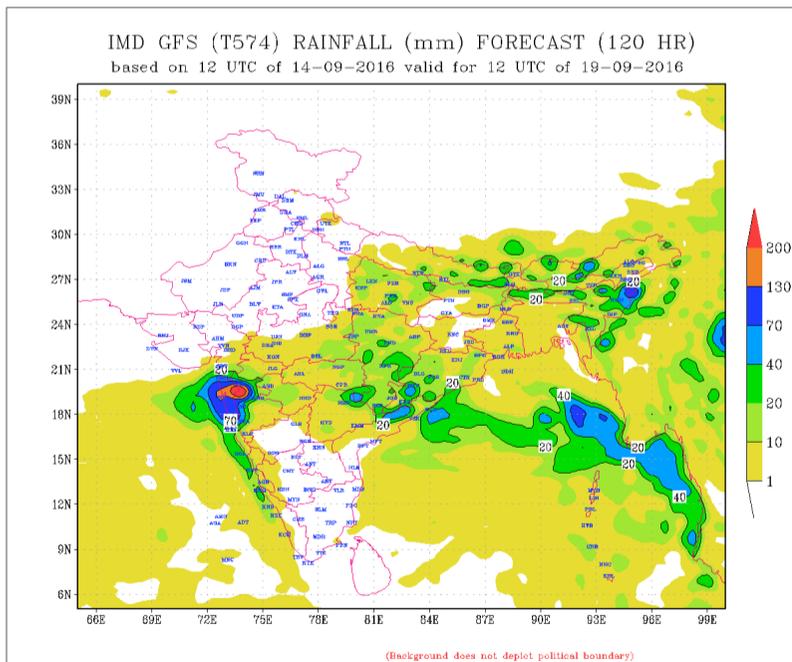
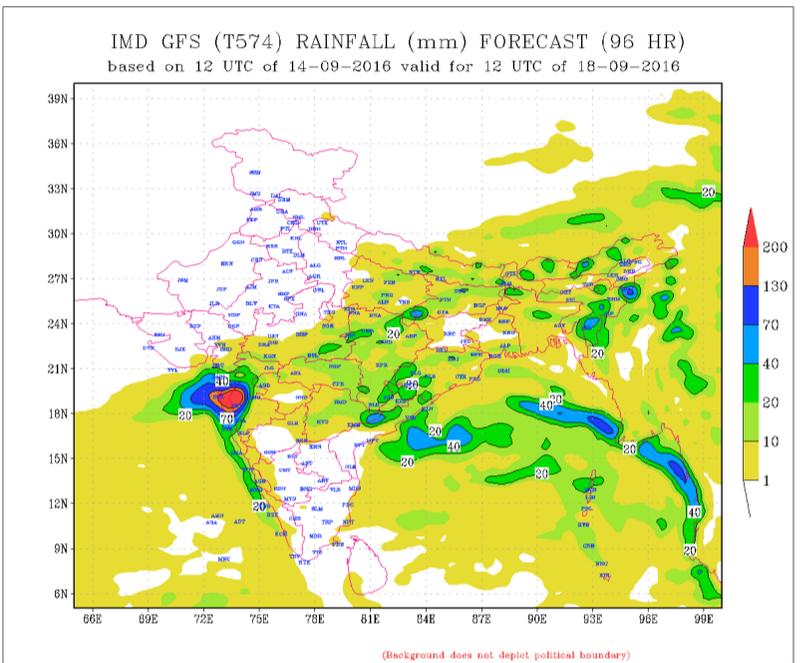
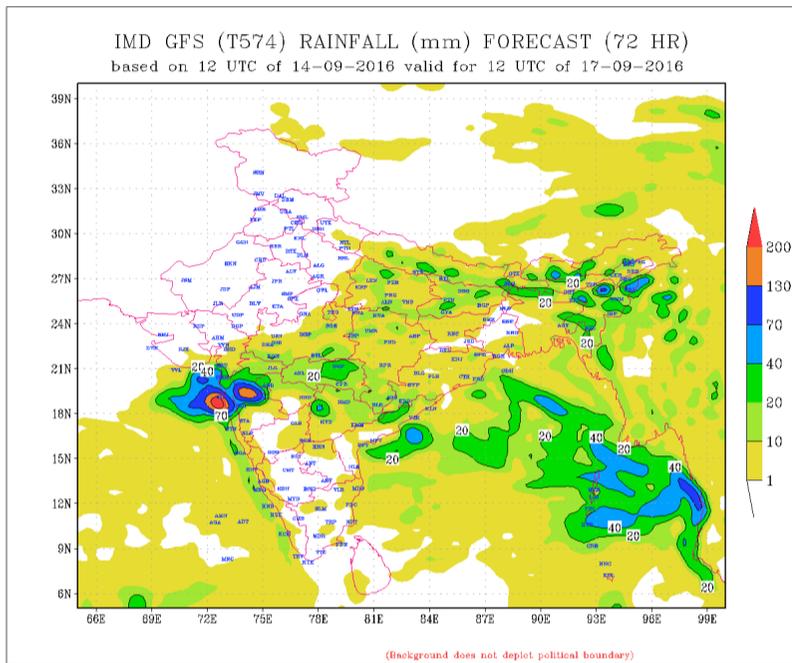
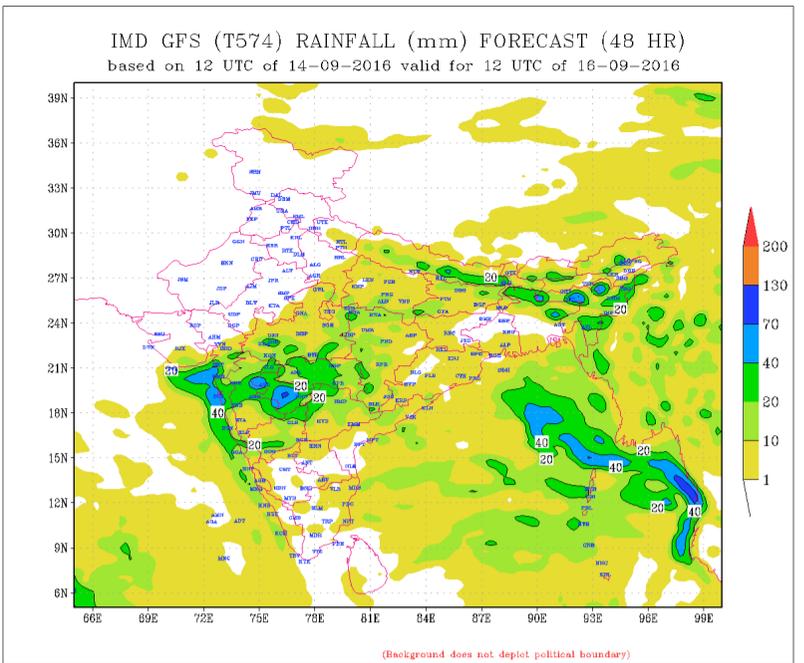
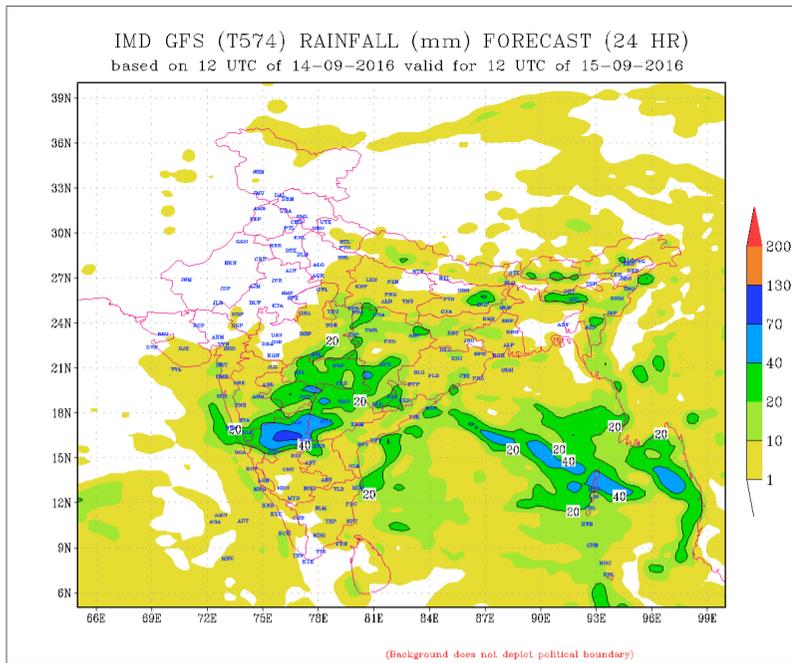


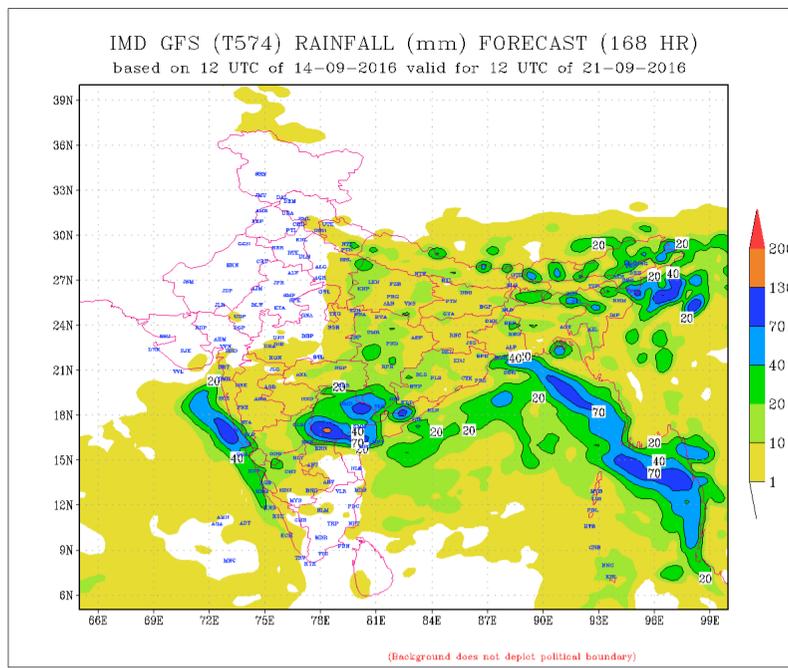
Bias correction based on last 30-day forecast error



Bias correction based on last 30-day forecast error

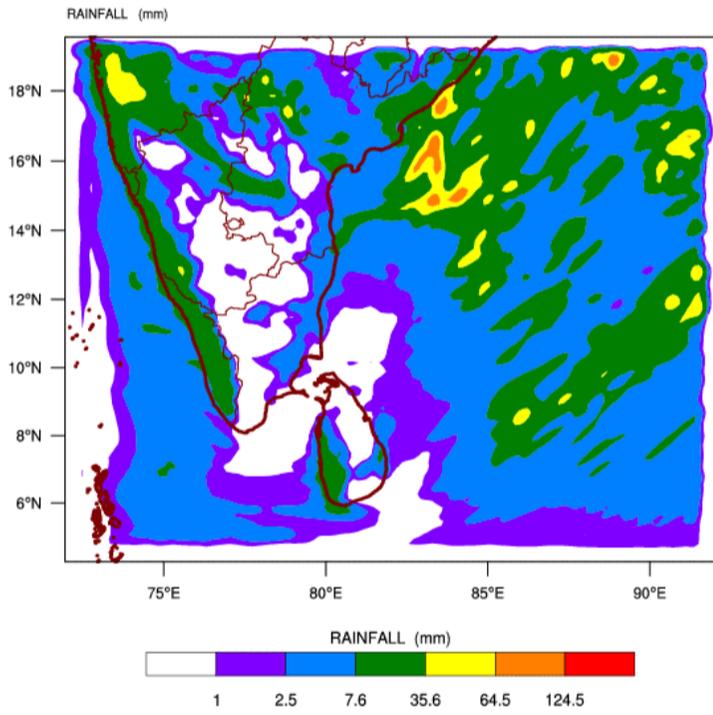
# IMD GFS (T574) Model Rainfall Forecast from RMSC New Delhi, India



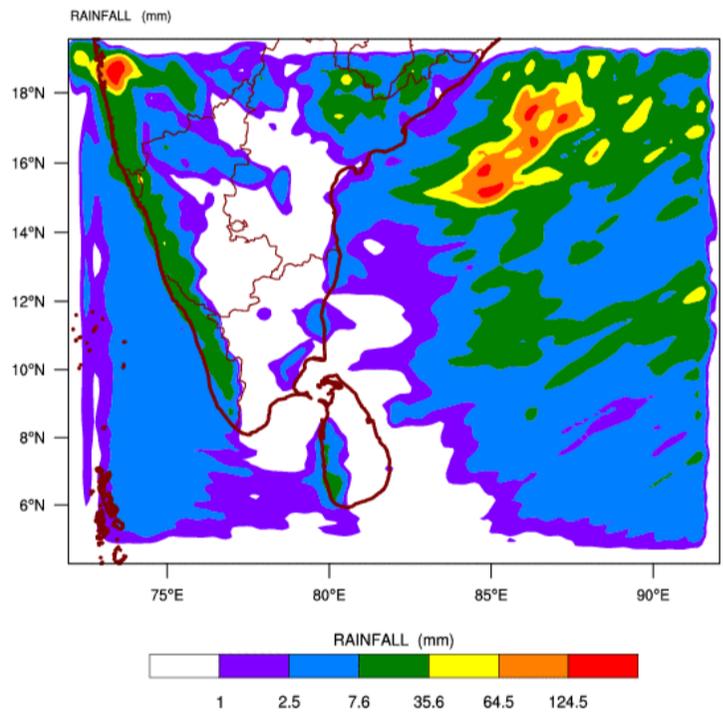


**WRF Model Forecast (from IMD Chennai)**

WRF MODEL FORECAST (48 HR.) RAINFALL(mm)\  
 based on 00 UTC of 14-09-2016 valid for 03 UTC of 16-09-2016

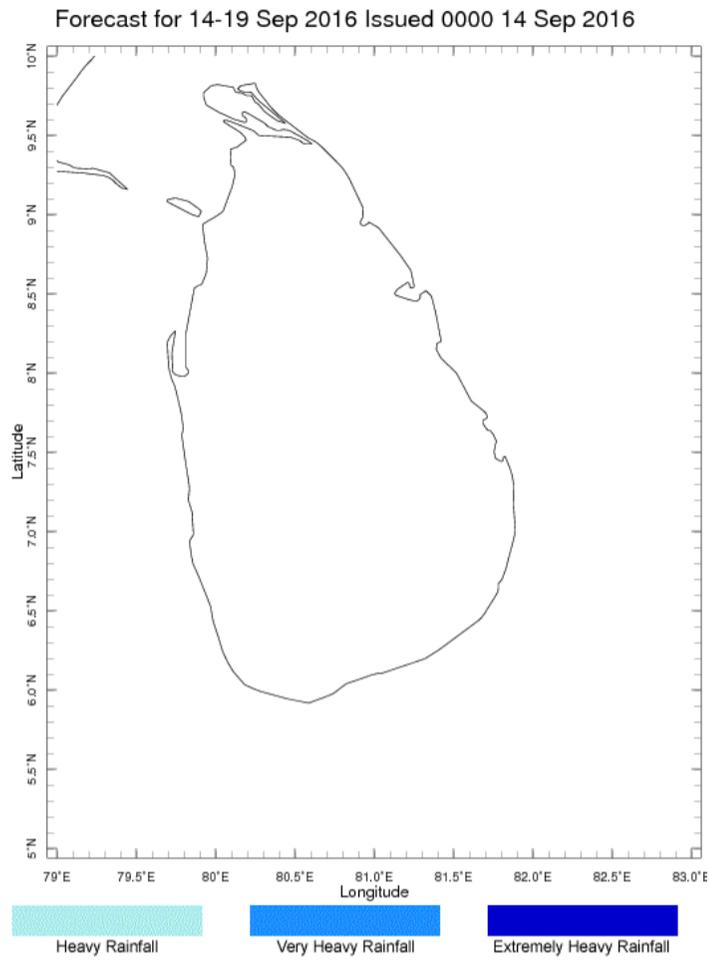


WRF MODEL FORECAST (72 HR.) RAINFALL(mm)\  
 based on 00 UTC of 14-09-2016 valid for 03 UTC of 17-09-2016

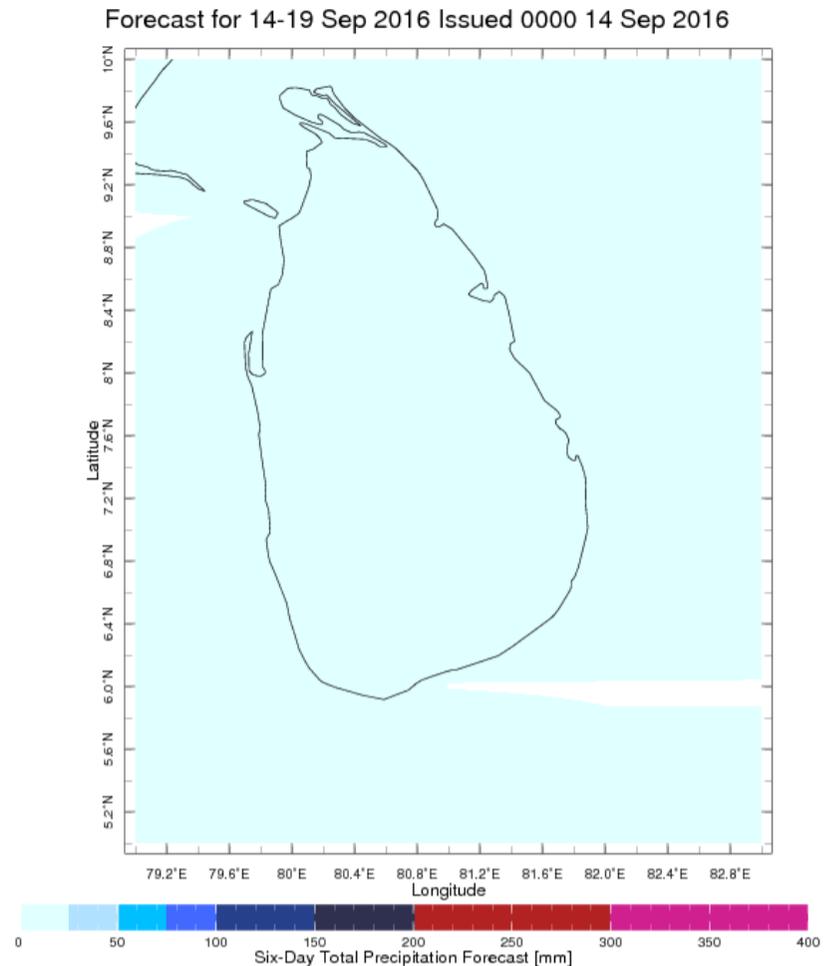


## Weekly Rainfall Forecast from IRI

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.



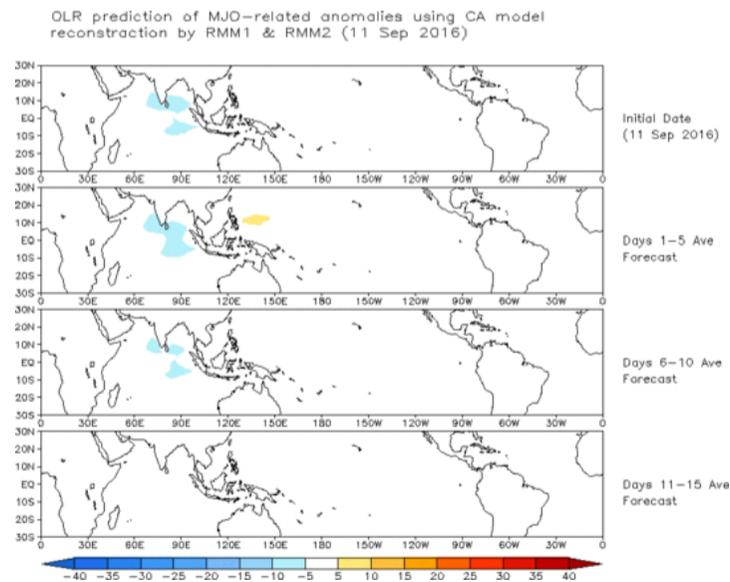
**Extreme Rainfall Forecast**



**Total Six Day Precipitation Forecast**

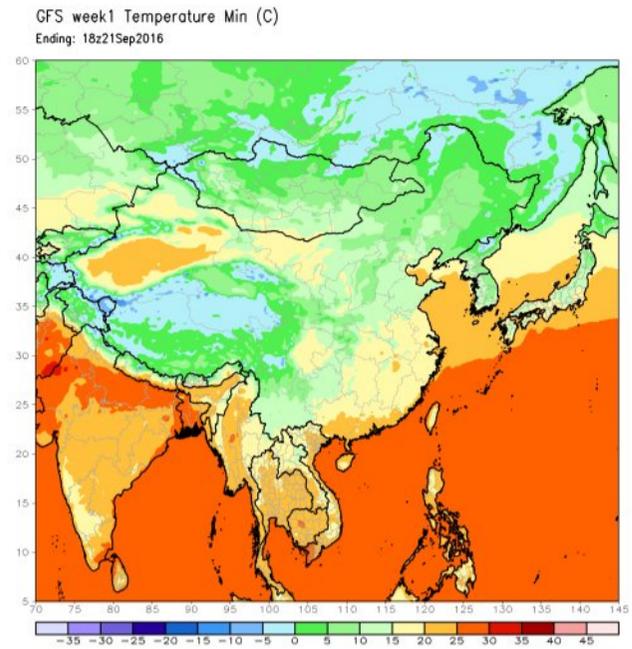
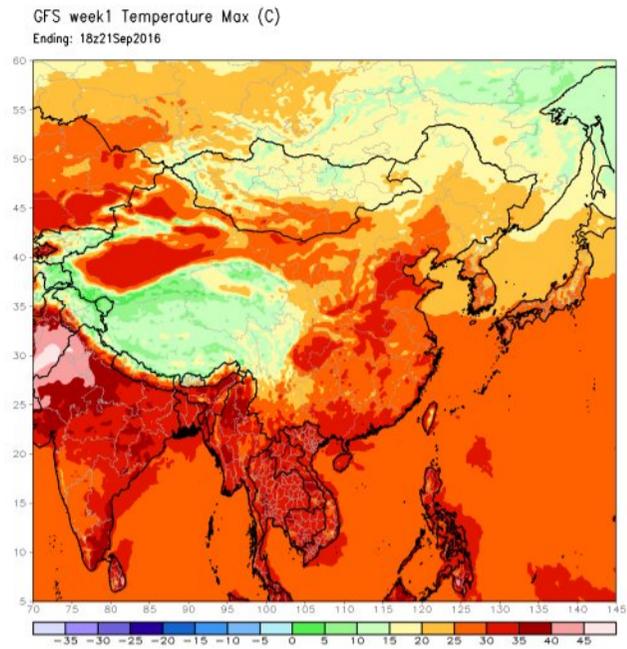
## Madden Julian Oscillation (MJO) related Outgoing Longwave Radiation (OLR) Forecast

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 anomalous OLR for the next 15 days from the Constructed Analogue (CA) model forecasts.



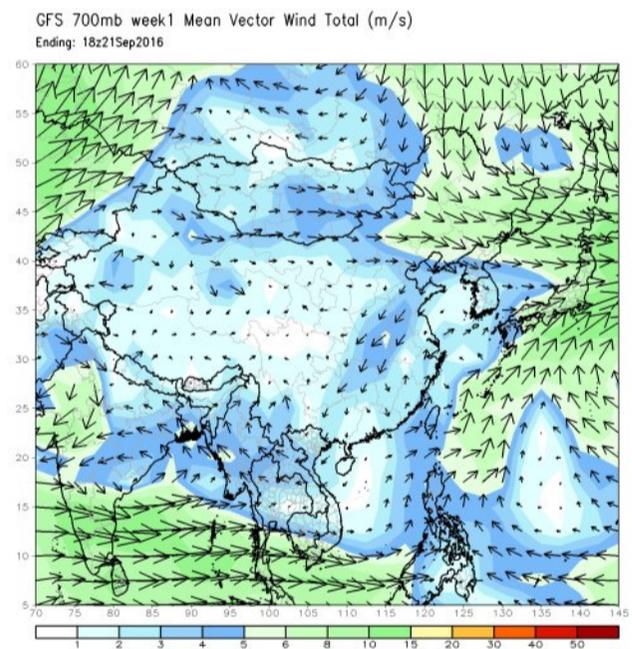
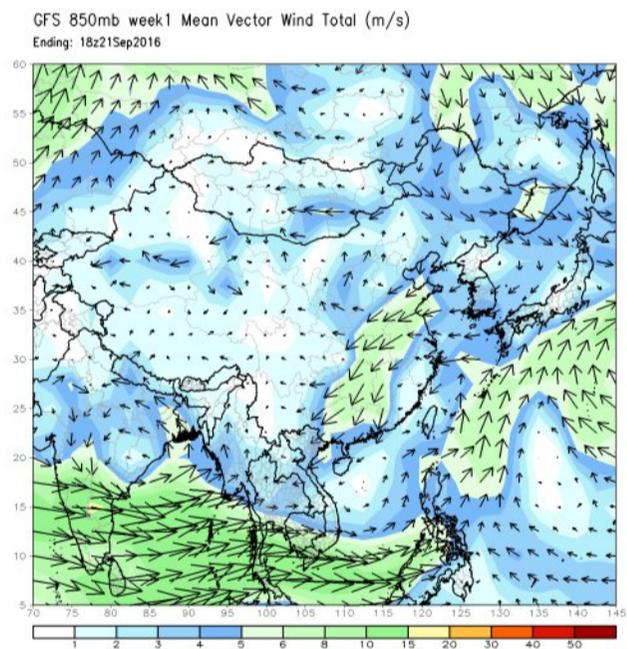
## Weekly Temperature Forecast

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



## Weekly Wind Forecast

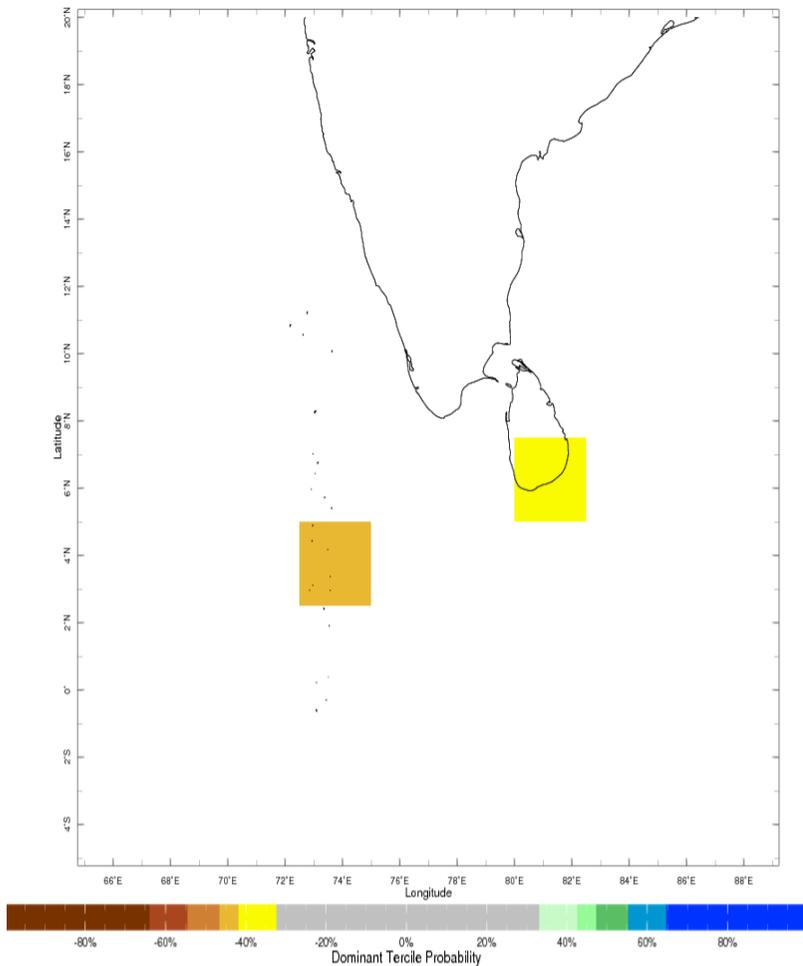
Weekly mean vector wind total prediction from the GFS model at 850 mb (left) and 700 mb (right) levels. (from NOAA CPC)



# Seasonal Rainfall and Temperature Forecast

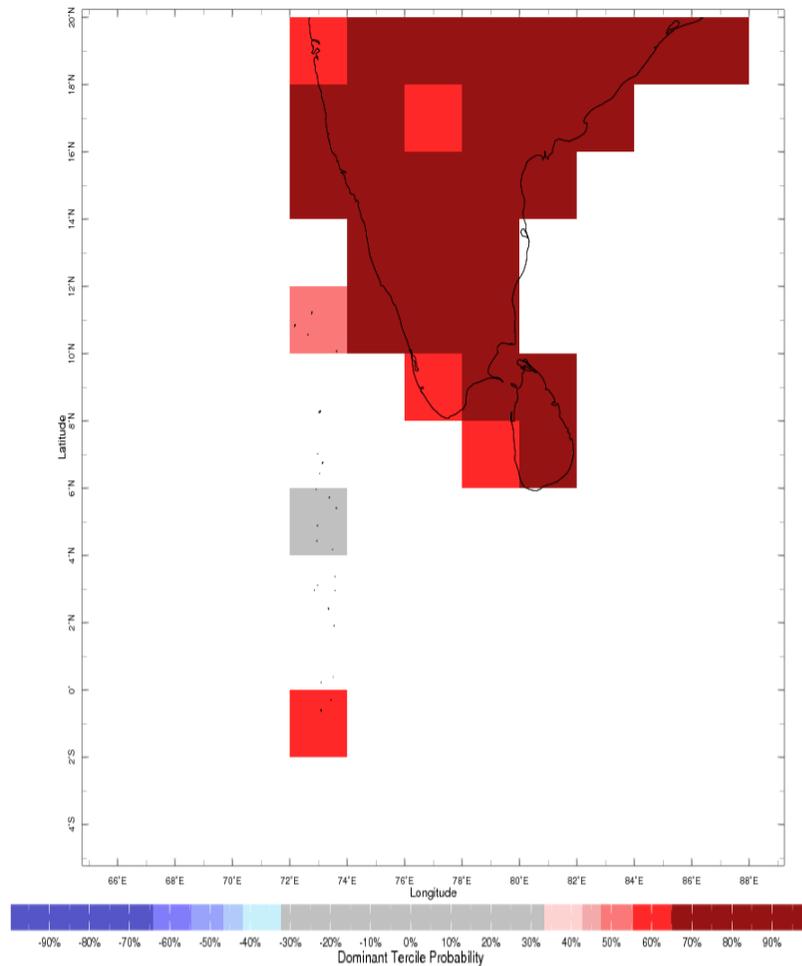
Following is the latest seasonal precipitation and temperature prediction for the next 3 months by the IRI. The color shading indicates the probability of the most dominant tercile -- that is, the tercile having the highest forecast probability. The color bar alongside the map defines these dominant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

Oct-Dec 2016 IRI Seasonal Precipitation Forecast issued Sep 2016



Precipitation Forecast

Oct-Dec 2016 IRI Seasonal Temperature Forecast issued Sep 2016



Temperature Forecast

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