

## Experimental Climate Monitoring and Prediction

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### Highlights

A slight increase of rain was experienced for the period from 10-16<sup>th</sup> August compared to the previous week. Up to 30 mm of rainfall was recorded close to Jaffna on 10<sup>th</sup> while rainfall between 10-20 mm was recorded in several parts of the island over the next few days. The lowest temperature was recorded in Nuwara Eliya to be between 15-20 °C while the maximum temperature was recorded in the eastern and northern coastal belt to be between 35-40 °C. Up to 55 km/h north westerly wind was recorded in the southern half of the country. For the week from 18<sup>th</sup>-24<sup>th</sup> August rainy weather is expected in the western province and the adjoining sea. On 19<sup>th</sup> up to 40 mm of rainfall is expected close to Kalutara and Beruwala while on 24<sup>th</sup> up to 40 mm of rainfall is expected in the Western province. Up to 55 km/h north westerly wind is expected in the southern half of the country.

#### Monitoring

##### Rainfall

**Weekly Monitoring:** On 10<sup>th</sup> of August sea near the Jaffna Peninsula received rainfall up to 30 mm. The surrounding areas near the Monaragala and Badulla district border including Bandarawela, Monaragala and Badulwewa received rainfall up to 10 mm. No significant rainfall was observed in the entire island during the period from 11<sup>th</sup>-13<sup>th</sup> August. On 14<sup>th</sup> rainfall up to 20 mm was observed in Avissawella, Deraniyagala and Kithulgala regions of Kegalla district and Watawela and Kotmale regions of Nuwara Eliya district. Dry weather conditions prevailed during 15<sup>th</sup> and 16<sup>th</sup> of August. For the past week, the RFE 2.0 tool shows rainfall in some regions of Kegalle and Nuwara Eliya districts where Ruwanwella, Avissawella, Kithulagala, Watawela, Kothmale and Nuwara Eliya received rainfall between 10-25 mm. It also shows below average rainfall of 25-50 mm in Kalutara and adjacent areas and below average rainfall of 10-25 mm in the rest of Western province, Galle and Matara districts of Southern province and some of the areas in Sabaragamuwa province. A similar anomaly is shown in the bordering regions of Badulla and Ampara districts and Polonnaruwa and Batticaloa districts.

**Monthly Monitoring:** Considering the dry weather condition that prevailed in the month of June, the rainfall for the month of July was comparatively high. The RFE 2.0 tool shows a total rainfall of ~150 mm close to Vavuniya and Ratnapura town, ~100 in several places of Badulla district and surrounding areas of Ratnapura town. It also shows ~75 mm of rainfall in central province, Badulla district, Kalutara, Galle, and Anuradhapura districts and the southern sea.

##### Temperature

For the period from 7<sup>th</sup>-13<sup>th</sup> August the lowest temperature was recorded in Nuwara Eliya to be between 15-20 °C. The maximum temperature was recorded in the North and Eastern coastal belt to be between 35-40 °C. The maximum temperature of Kandy, Colombo, Kurunegala, Galle and Matara areas were 30-35 °C. During this period an above average temperature of 0-1 °C was observed in North Central and Eastern provinces while in rest of the island the temperature was 1-3 °C above average.

##### Wind

At 850 mb level 35-55 km/h north westerly wind was experienced by the southern half of the country while 30-35 km/h north westerly wind was experienced by the northern half including Matale, Kurunegala and Ampara districts. At 700 mb level north westerly wind was experienced all over the country with speed less than 20 km/h.

##### Ocean State

###### **Pacific seas state: August 11, 2016**

During early August 2016 the tropical Pacific SST anomaly was close to -0.5C, approaching the weak La Niña threshold. However, key atmospheric variables mainly continue to indicate neutral ENSO conditions. This includes near-average upper and lower level tropical Pacific winds and Southern Oscillation Index. The cloudiness and rainfall patterns in the equatorial Pacific also indicate neutral ENSO, but drier-than-average conditions near the dateline suggest a weak tendency toward La Niña. Most ENSO prediction models indicate cool-neutral conditions during August, with development of weak La Niña slightly favored for September/October, lasting through fall and into winter. (Text Courtesy IRI)

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

0.5 °C above normal sea surface temperature was observed in the north eastern sea of Sri Lanka.

## Predictions

### Rainfall

**14-day prediction:** NOAA NCEP models predicts 15-25 mm rainfall in the eastern side of Galle district including Yakkalamulla and Udugama areas, Moragala and Migahatenna areas close to Matugama for the period from 17-23<sup>rd</sup> August. During the same period up to 15 mm of rainfall is expected in Colombo, Ratnapura and Matara districts and the southern region of Kegalle district. For the period from 24<sup>th</sup>-30<sup>th</sup> August, between 45-55 mm of rainfall is expected in Matara district and adjacent sea, eastern side of Galle district, Jaffna district and the adjacent sea while between 35-45 mm of rainfall is expected in Kilinochchi, Mullaitivu, northern region of Trincomalee district including Pulmoddai, southern region of Ratnapura district and the eastern side of Hambantota district including Ganegoda. During the same period the rest of Ratnapura district, Colombo, Moneragala, Haputale, Mannar, Vavuniya and the rest of Trincomalee district may experience between 25-35 mm of rainfall while the rest of North Central province, Gampaha, Kegalle, Nuwara Eliya, Badulla and Ampara districts may receive up to 25 mm of rainfall.

**Weekly prediction:** IMD GFS model predicts rainy weather conditions in the western province for the week from 18<sup>th</sup>-24<sup>th</sup> August. On 18<sup>th</sup> up to 20 mm of rainfall is expected in Colombo and Gampaha districts, coastal areas of Kalutara district and the adjacent sea. On 19<sup>th</sup> 20-40 mm of rainfall is expected close to Kalutara and Beruwala and up to 20 mm of rainfall is expected in the rest of Western province, Galle and Matara districts and the adjacent sea. Up to 20 mm of rainfall is expected in western province, Galle district and the adjacent sea on 20<sup>th</sup>. On 21<sup>st</sup> the coastal areas of the Kalutara district and the adjacent sea, Trincomalee town and adjacent sea shall experience up to 20 mm of rainfall. Up to 40 mm of rainfall is expected in western sea close to Kalutara and Beruwala on 22<sup>nd</sup>. On the same day, the rest of the western province, Galle district and the rest of the western sea shall experience between 10-20 mm of rainfall. Between 20-40 mm of rainfall is expected close to Bentota on 23<sup>rd</sup> while the rest of western province, Galle district and western sea shall experience up to 20 mm of rainfall. The rainfall is expected to be intensified in 24<sup>th</sup> and up to 40 mm of rainfall is expected in Kalutara, Galle, southern region of Colombo and the western sea and between 10-20 mm of rainfall is expected in the surrounding areas.

**IMD WRF & IRI Model Forecast:** According to the IMD WRF model, up to 65 mm of total rainfall is predicted close to Gampaha and up to 35 mm of rainfall is predicted in the rest of western province, Kurunegala, Galle and Kegalle districts for the period from 17-19<sup>th</sup>. From 17-20<sup>th</sup>, up to 65 mm of rainfall is predicted close to Horana.

**Seasonal Prediction:** As per IRI Multi Model Probability Forecast for August to October, 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 and in Kilinochchi, Mullaitivu, Polonnaruwa and Anuradhapura districts. The maximum temperature of Colombo, Kalutara, Galle and Kegalle areas will be between 25-30 °C while in Kandy, Matale, Puttalam, Kurunegala and Matara districts the temperature will be between 30-35 °C. For the same period minimum temperature is expected in Nuwara Eliya and Badulla to be between 15-20 °C.

### Wind

The 850 mb level predicts up to 54 km/h north westerly wind in the southern part of the country including Kurunegala, Kandy and Moneragala areas while up to 36 km/h north westerly and westerly wind is expected in the central region of the country and also in Ampara and Batticaloa areas. The 700 mb level predicts up to 36 km/h north westerly winds in the entire island except for Northern Province.

### MJO based OLR predictions

MJO will be in the western Pacific Ocean in the next seven days and shall suppress 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/>

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## Weekly Hydro- Meteorological Report for Sri Lanka

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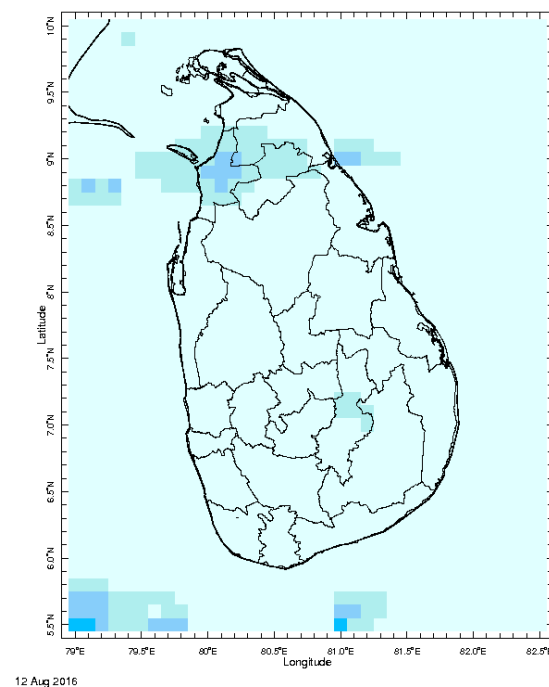
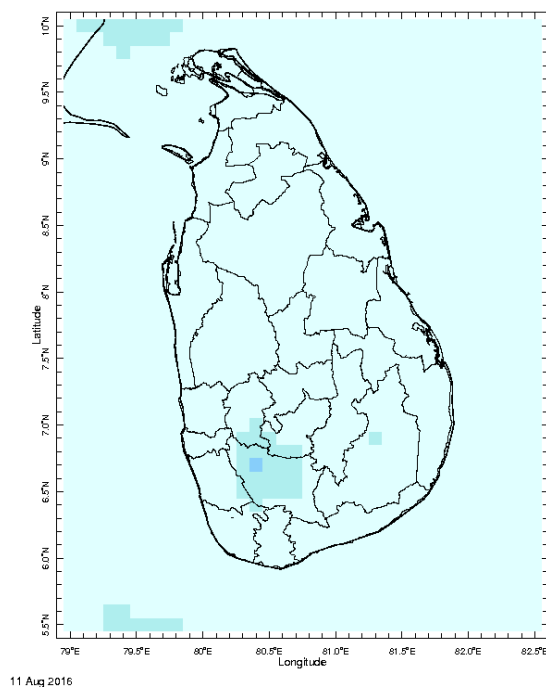
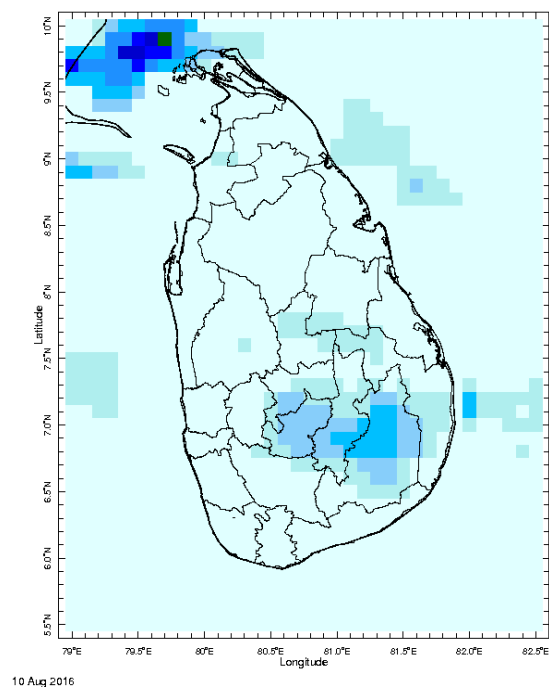
#### 2. Predictions

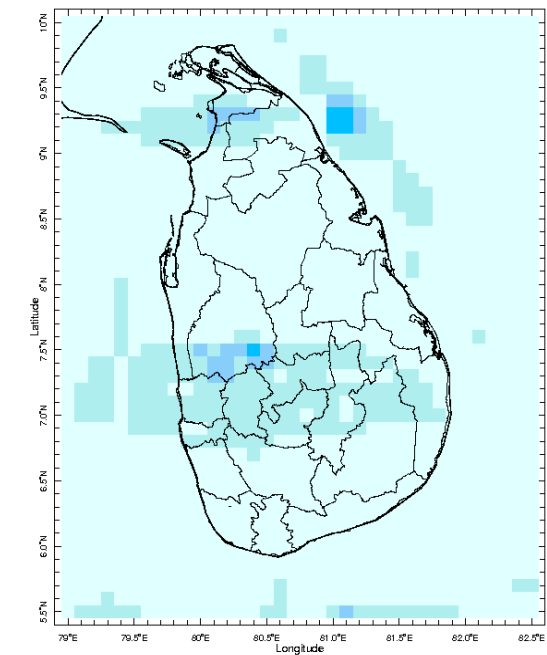
- NCEP GFS Ensemble 1-14 day Rainfall Predictions
- GFS (T574) Model Rainfall Forecast from RMSC New Delhi
- WRF Model Rainfall Forecast from IMD Chennai
- MJO Related OLR Forecast
- Weekly Precipitation Forecast from IRI
- Weekly Temperature Forecast
- Weekly Wind Forecast
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## MONITORING

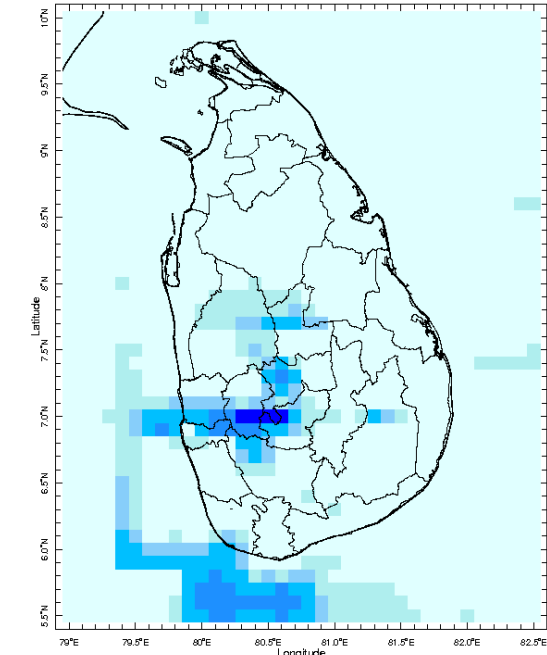
### Daily Rainfall Monitoring

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

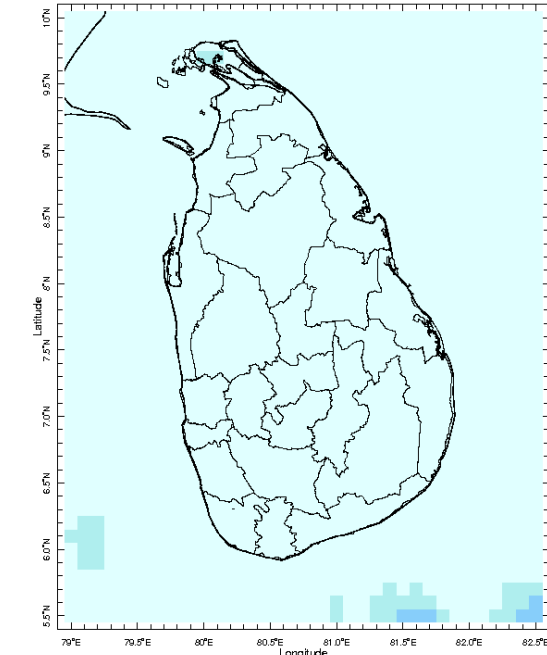




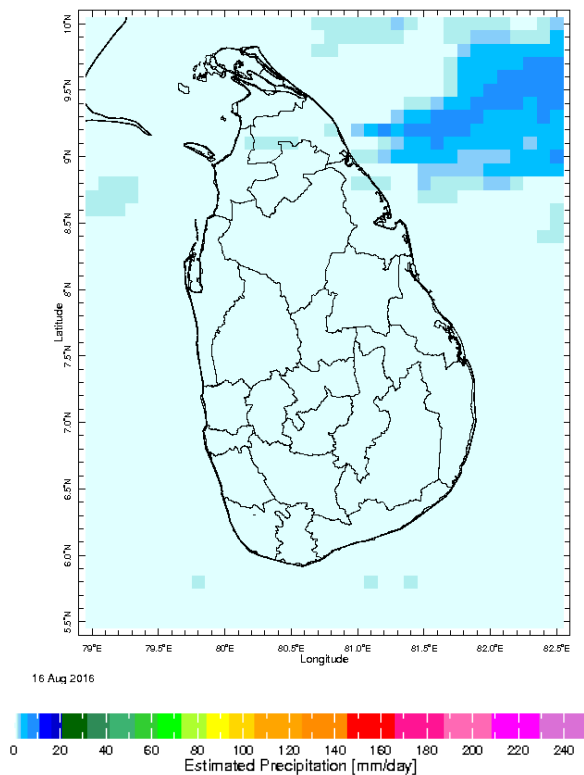
13 Aug 2016



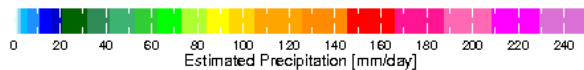
14 Aug 2016



15 Aug 2016

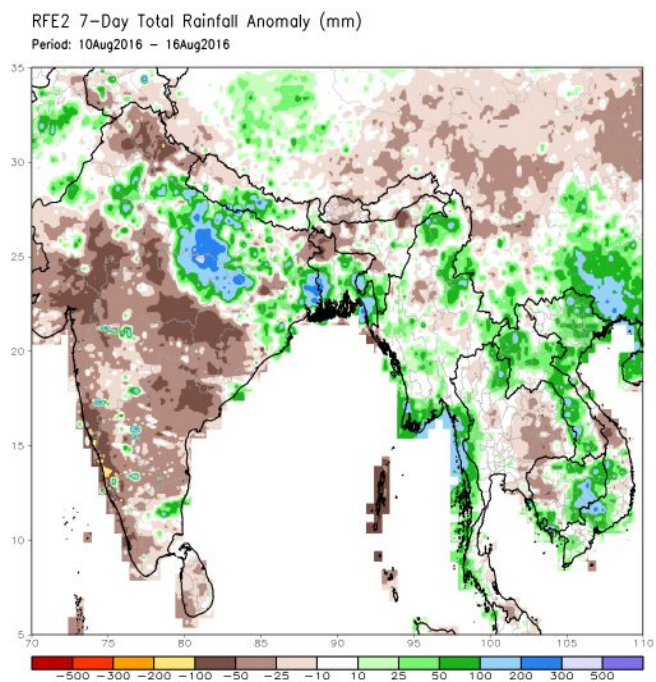
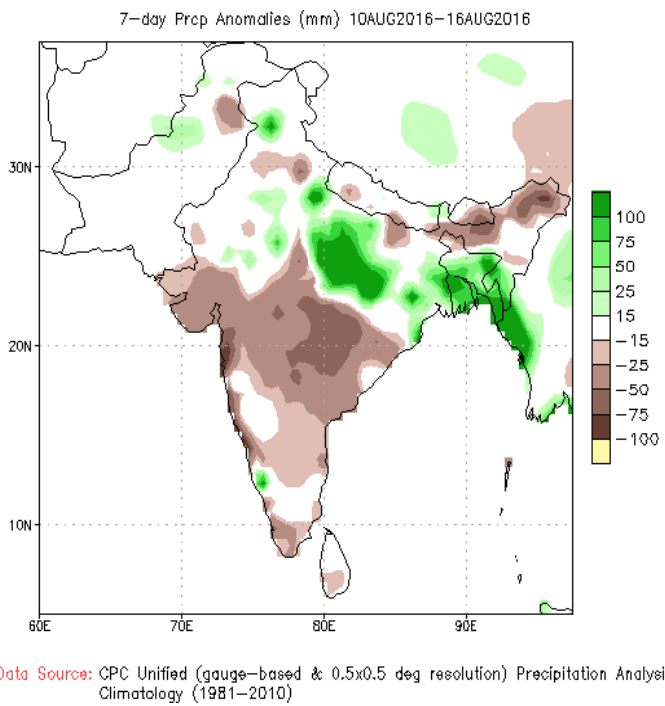
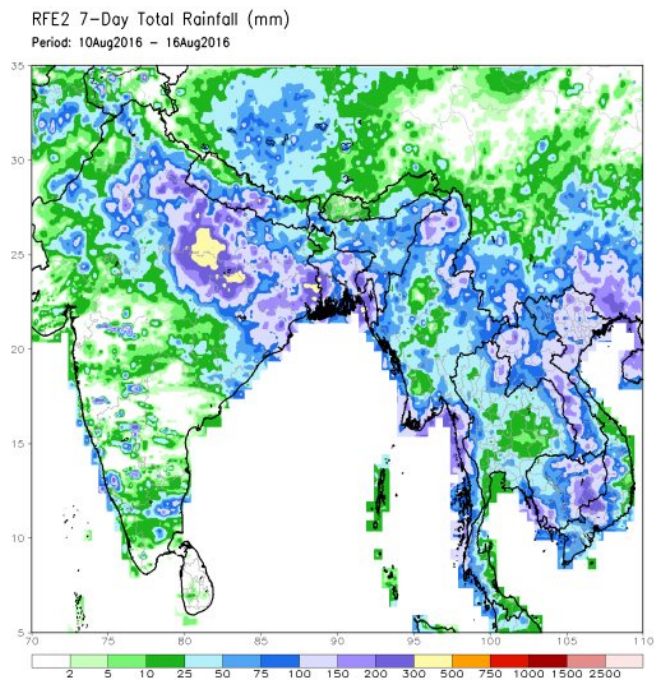
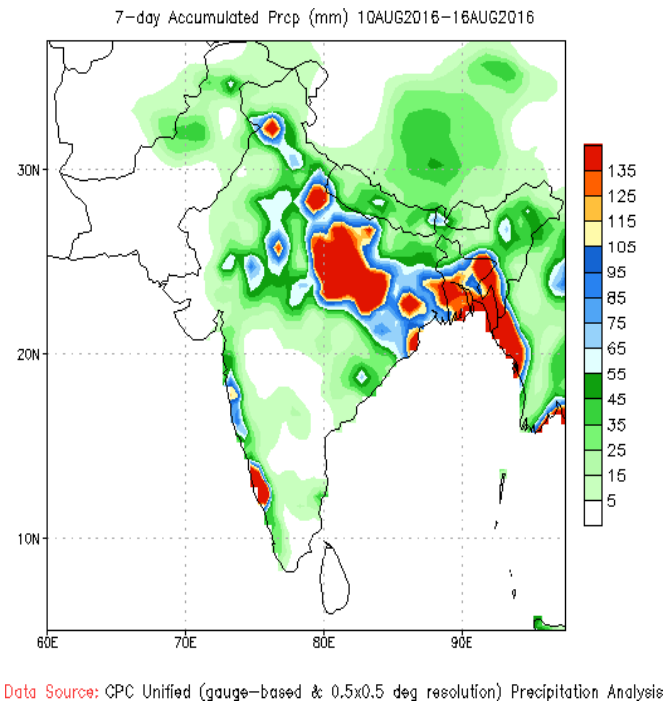


16 Aug 2016



Weekly Rainfall Monitoring

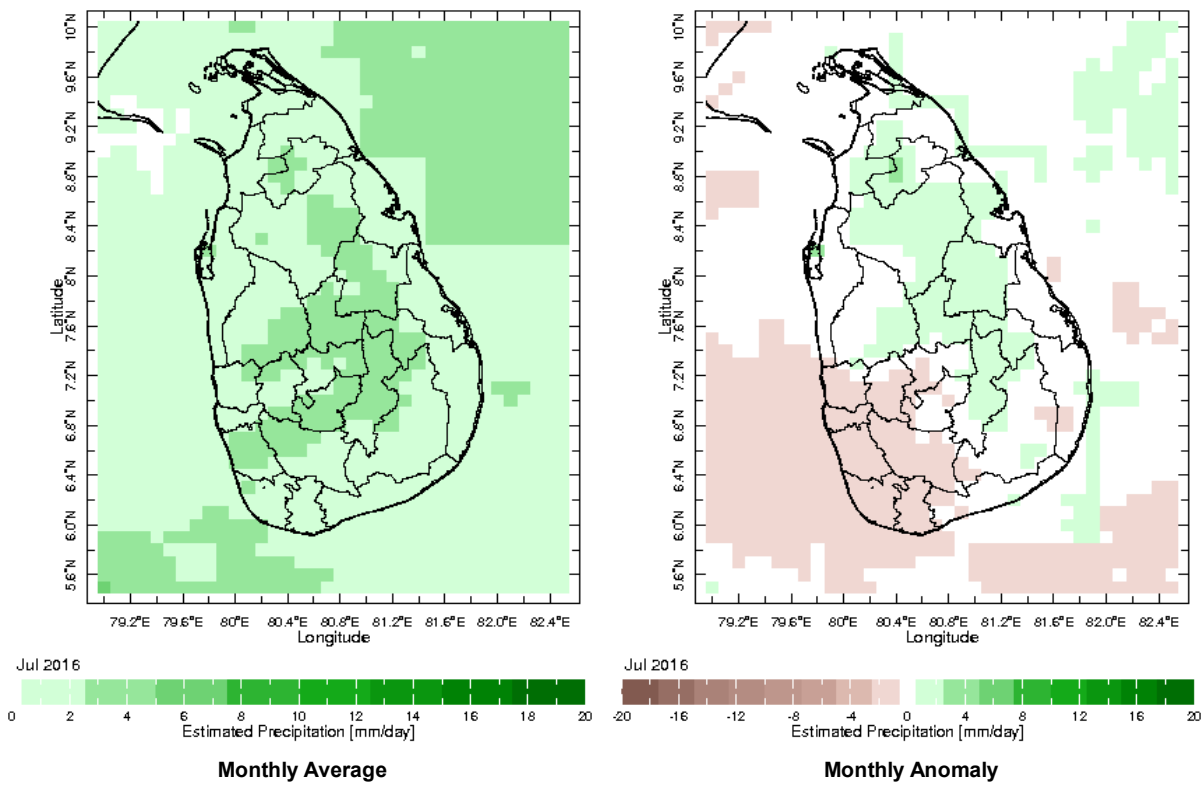
The following figures show the total satellite observed rainfall in the last week in Sri Lanka. The figure in the left is the total 7-day rainfall from NOAA Climate Prediction Center (CPC) Unified Precipitation Analysis and the figure in the right is the total 7-day rainfall from CPC RFE 2.0 Satellite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



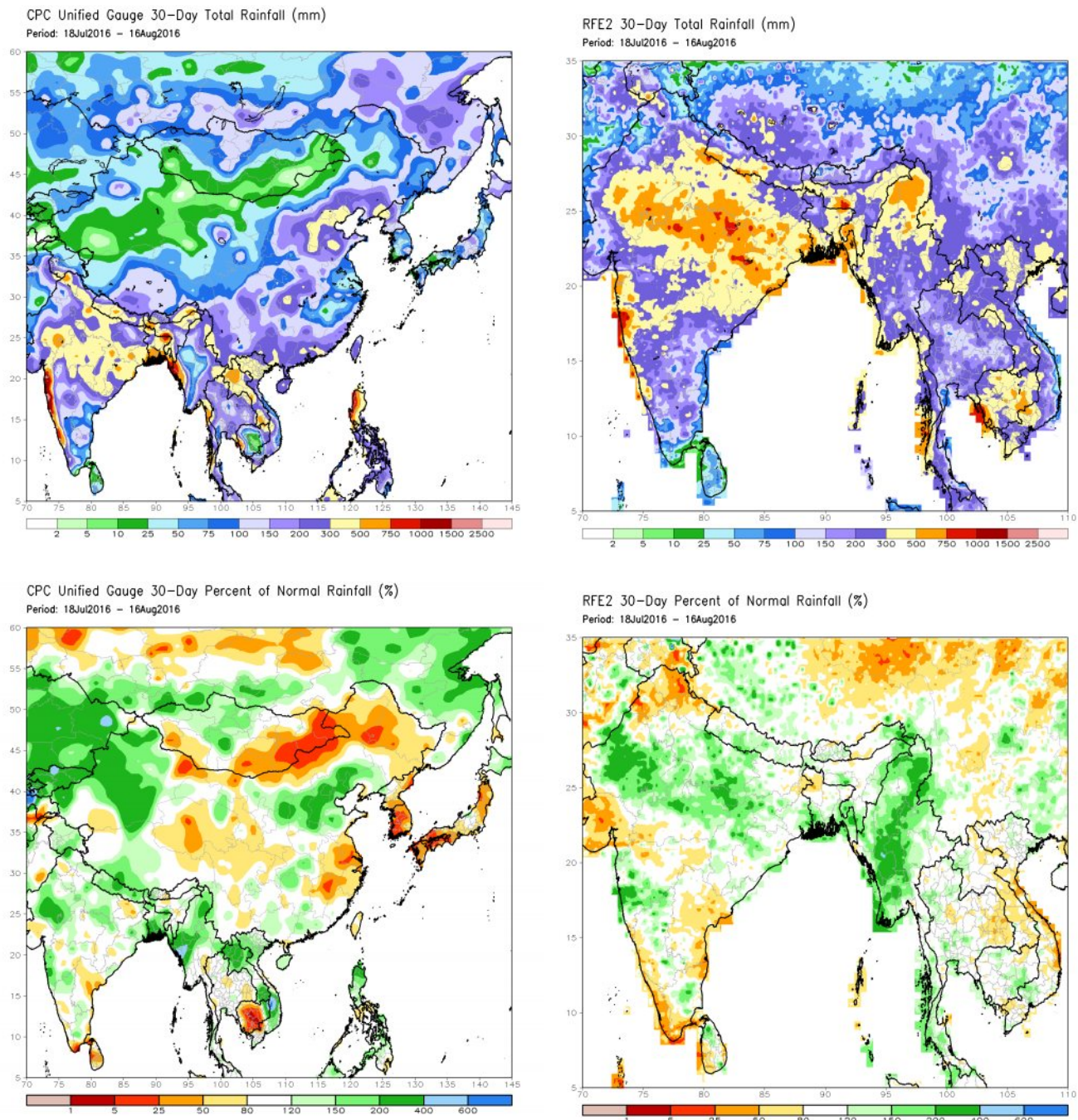


Monthly Rainfall Monitoring

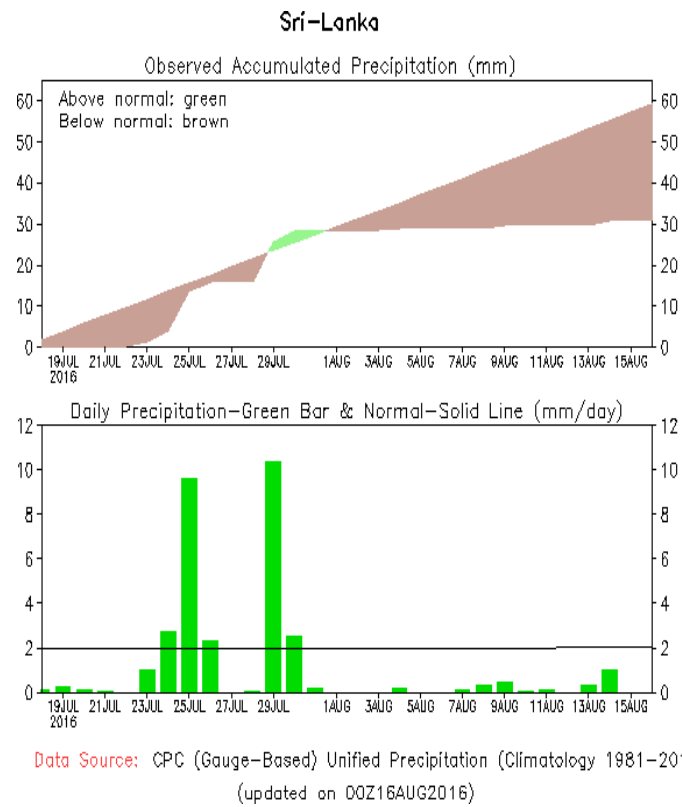
The figure in the left shows the average observed rainfall in the previous month. The rainfall anomaly in the previous month is shown in the figure to the right. The brown color in the anomaly figure shows places which received less rainfall than the historical average while the green color shows places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



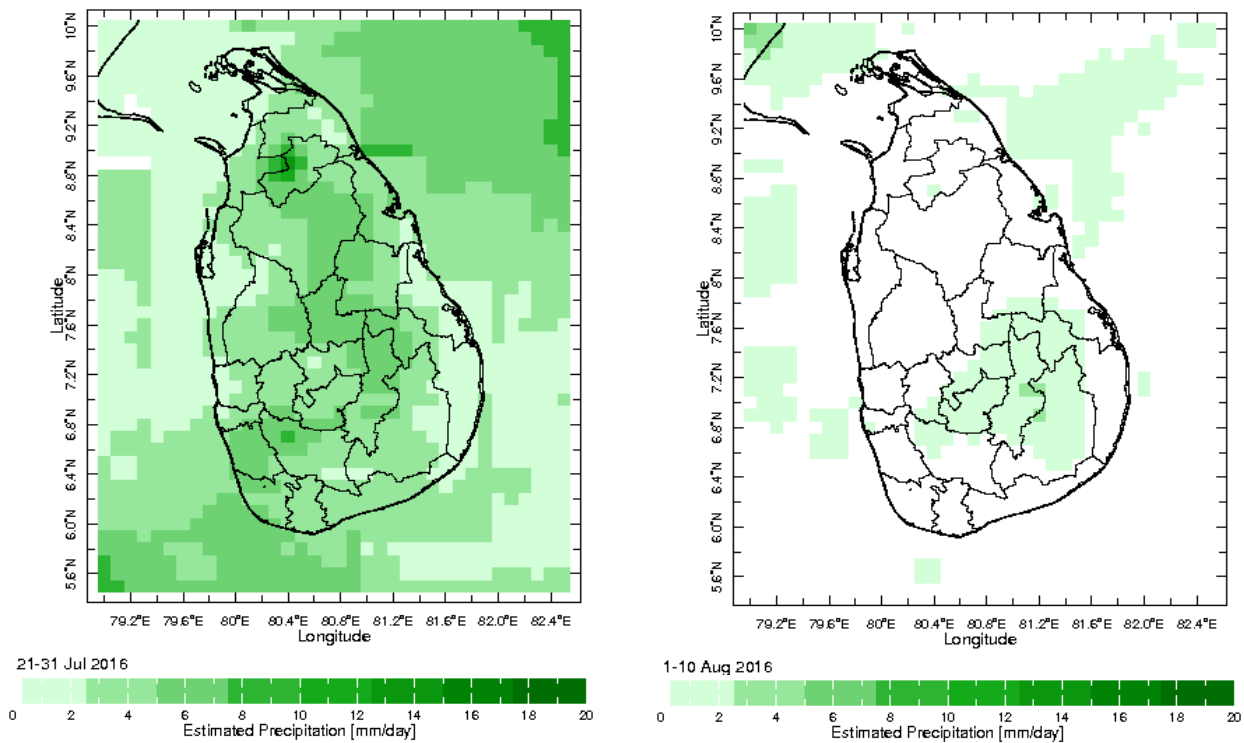
The figure in the top-left shows the total rainfall in the past 30 days from CPC Unified Precipitation Analysis while the figure in the top-right shows the total rainfall for the same period from RFE 2.0 Satellite Rainfall Estimates. The bottom two figures show the percentage of rainfall received in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

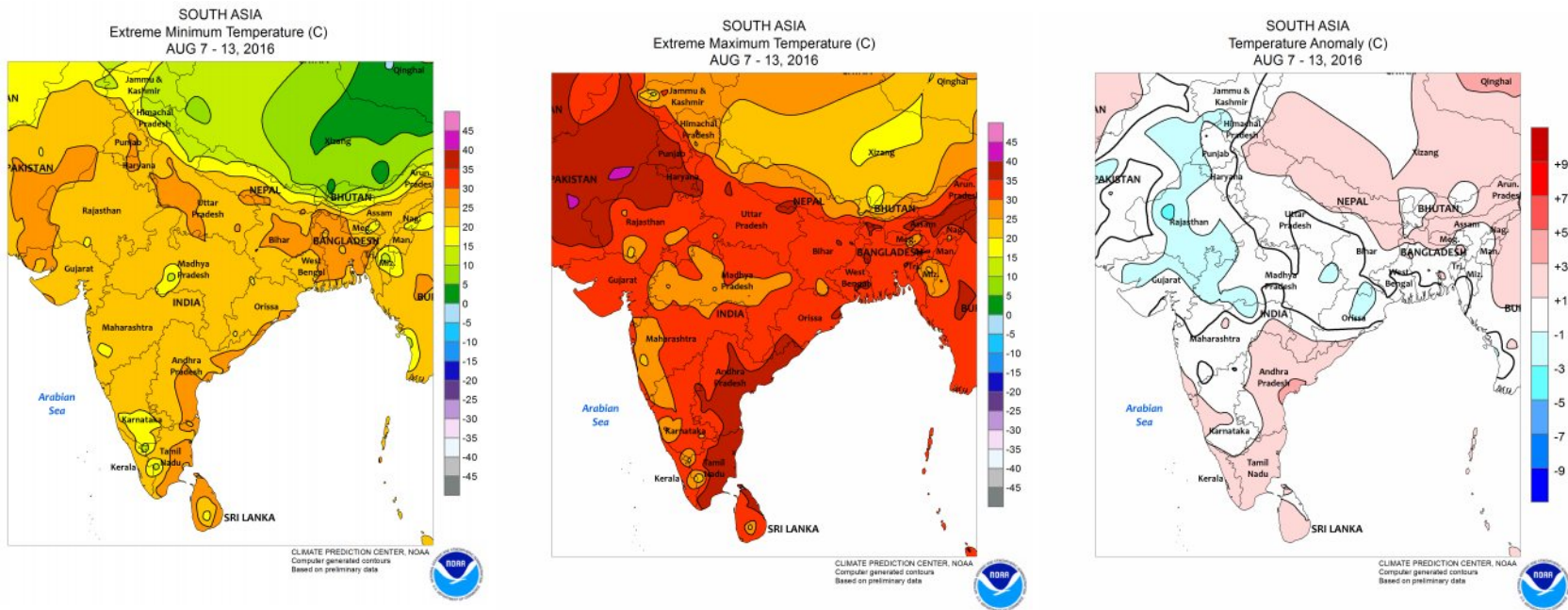


**Dekadal (10 Day) Satellite Derived Rainfall Estimates**



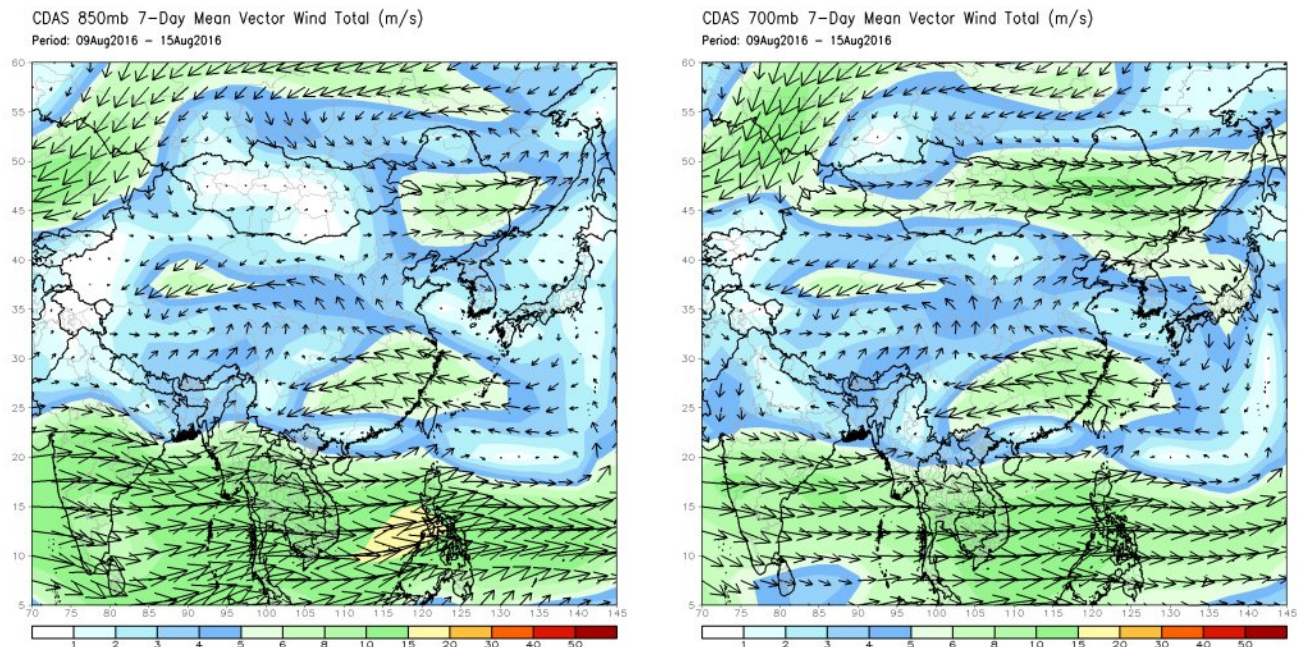


Weekly Temperature Monitoring



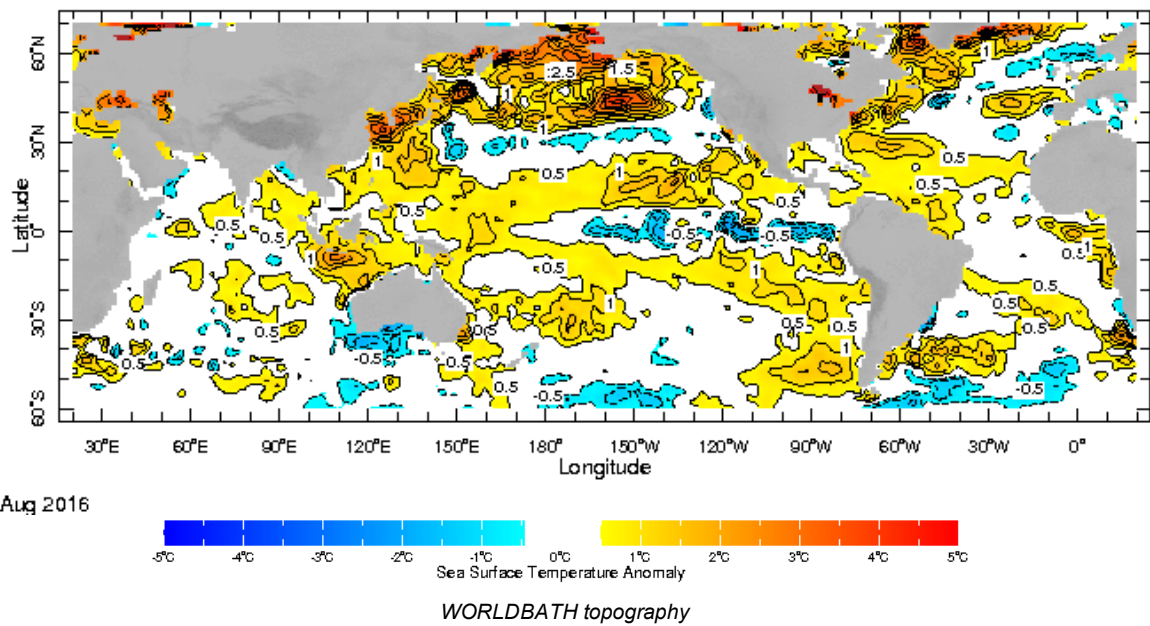
Weekly Wind Monitoring

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.

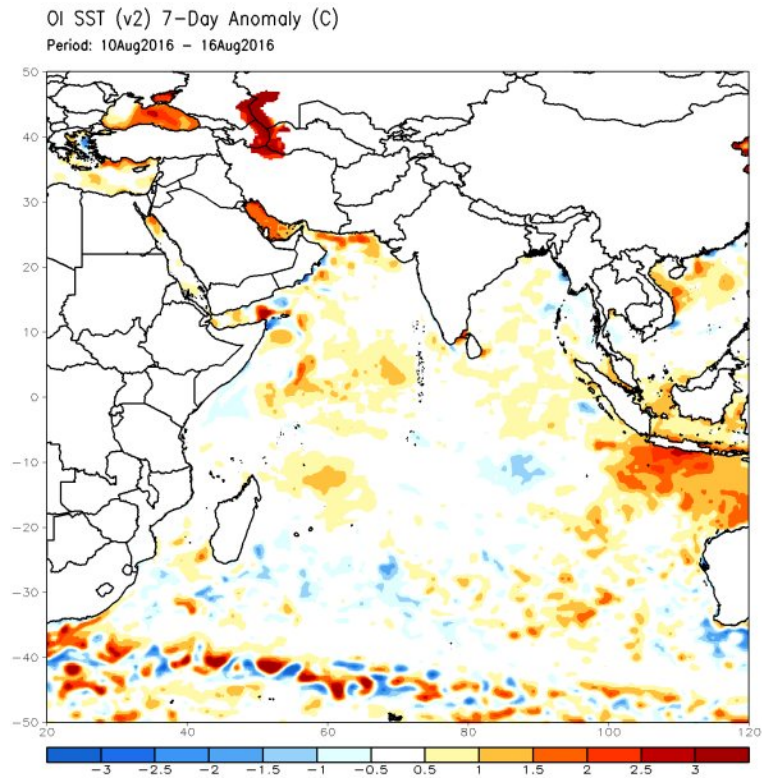


Weekly Average SST Anomalies

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

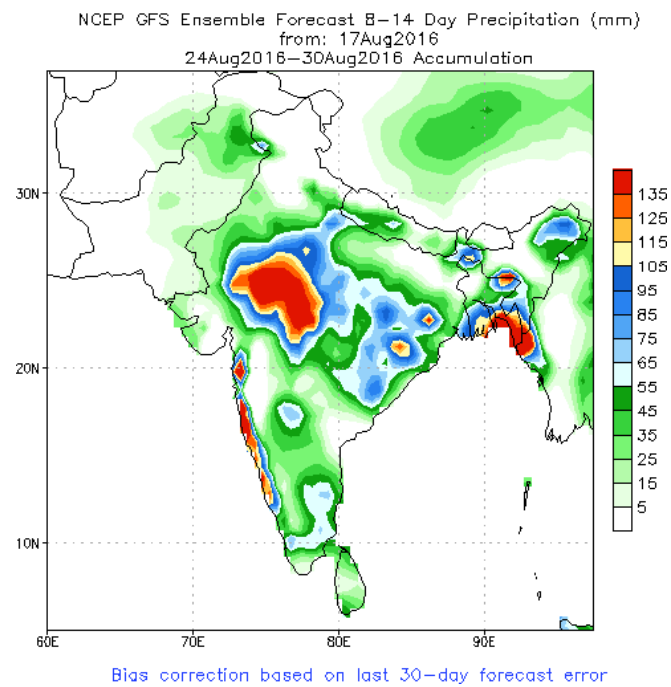
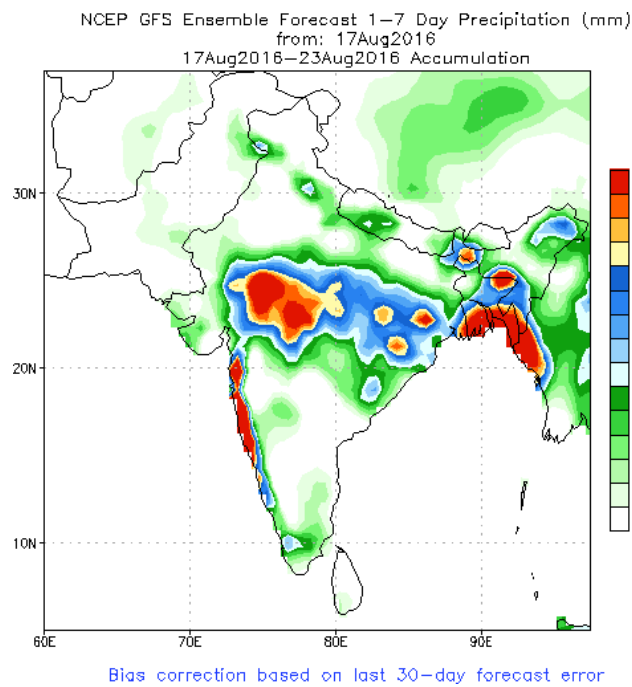


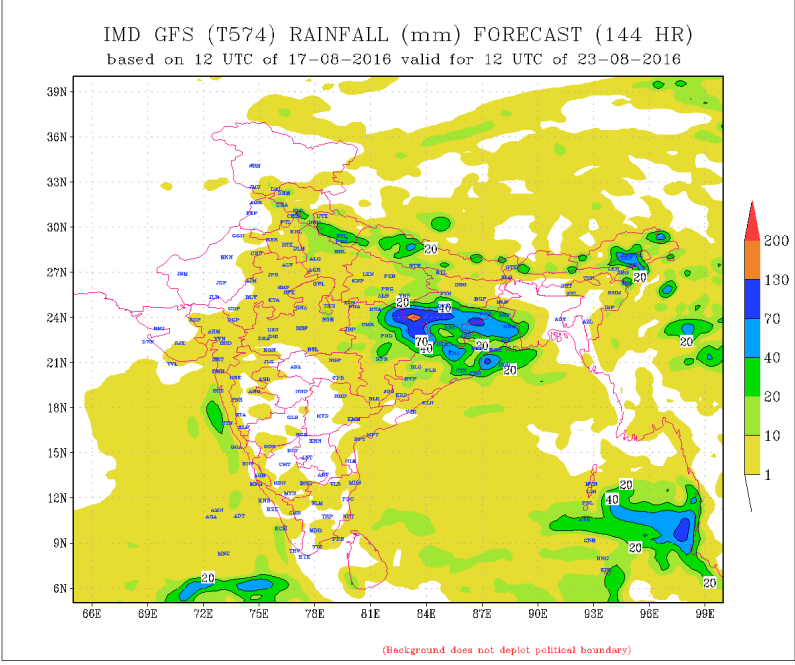
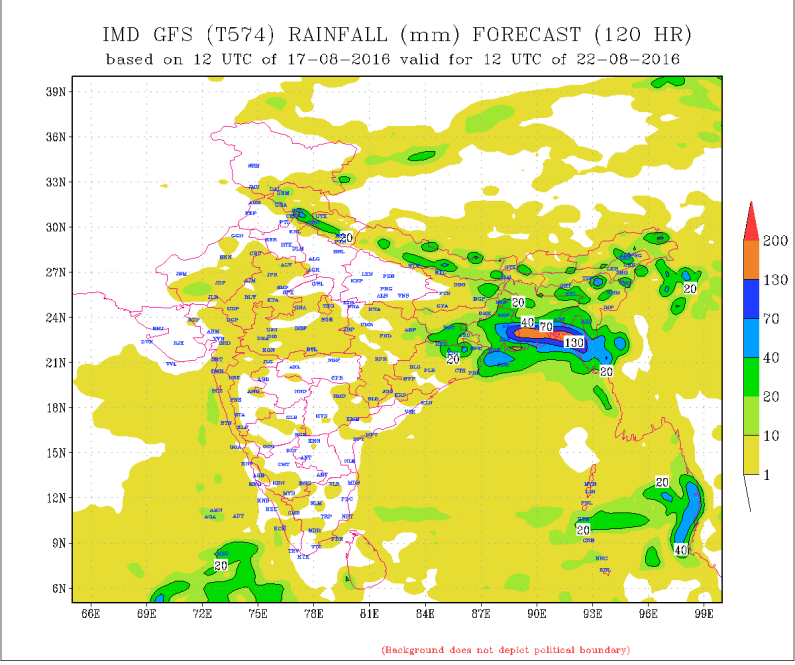
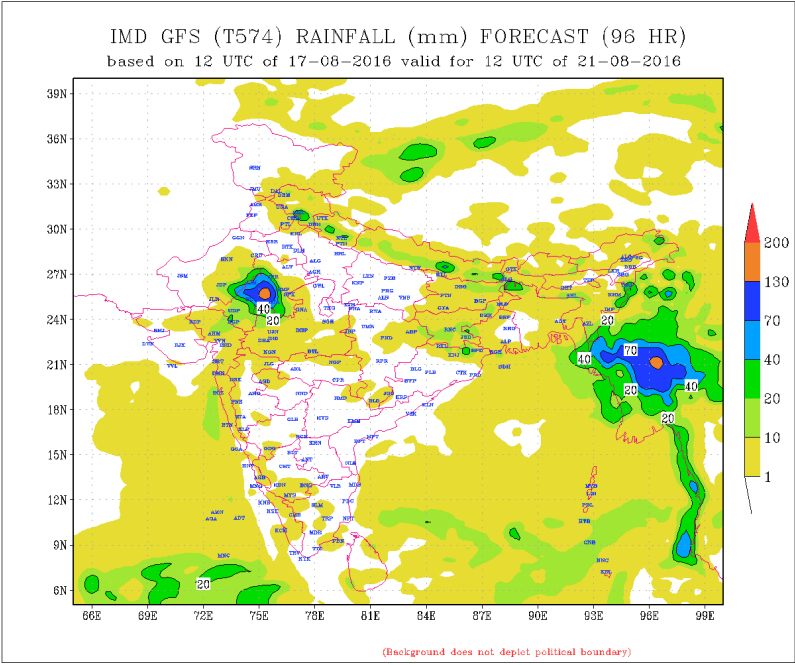
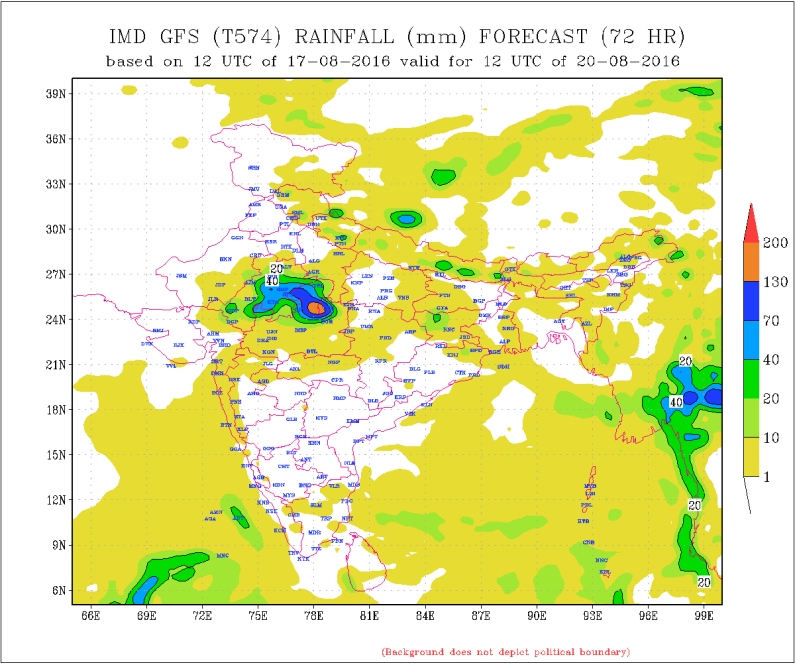
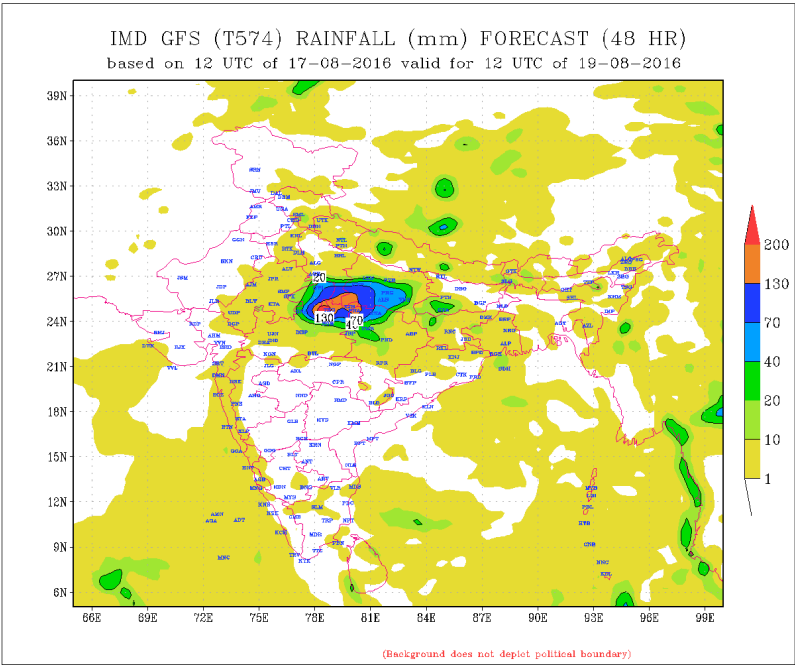
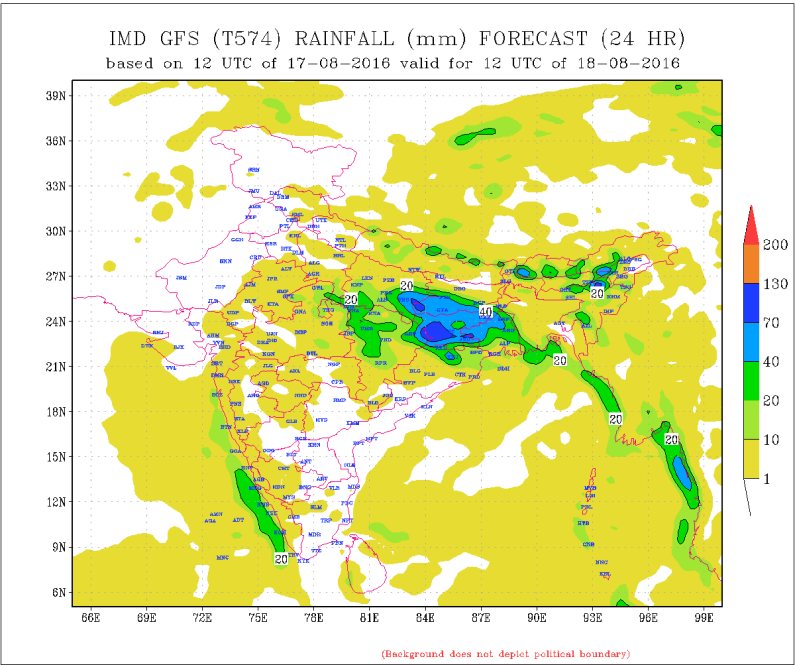


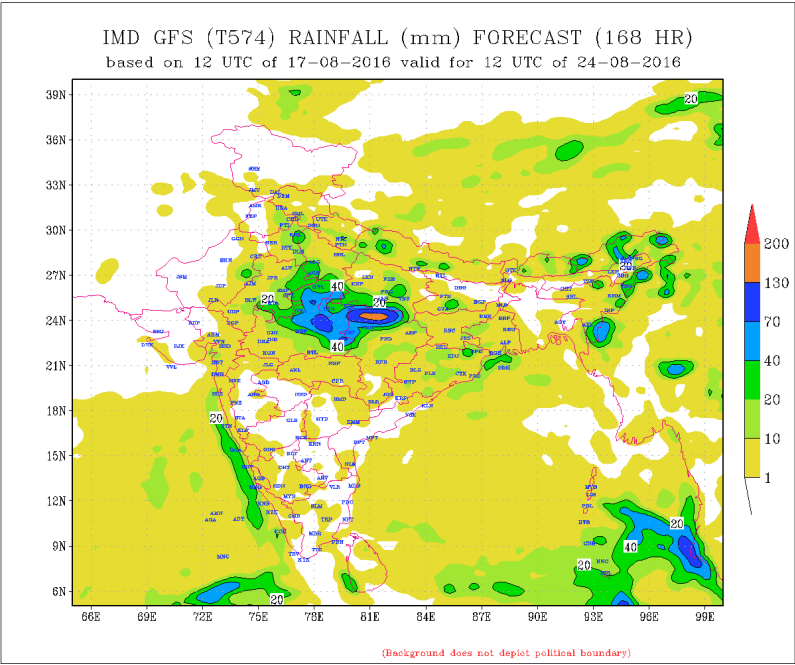


PREDICTIONS

NCEP GFS 1- 14 Day prediction

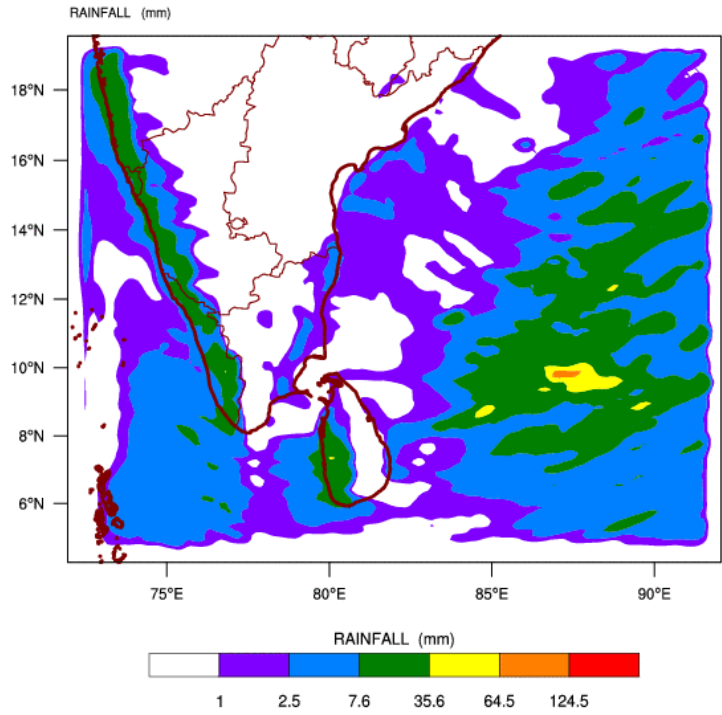




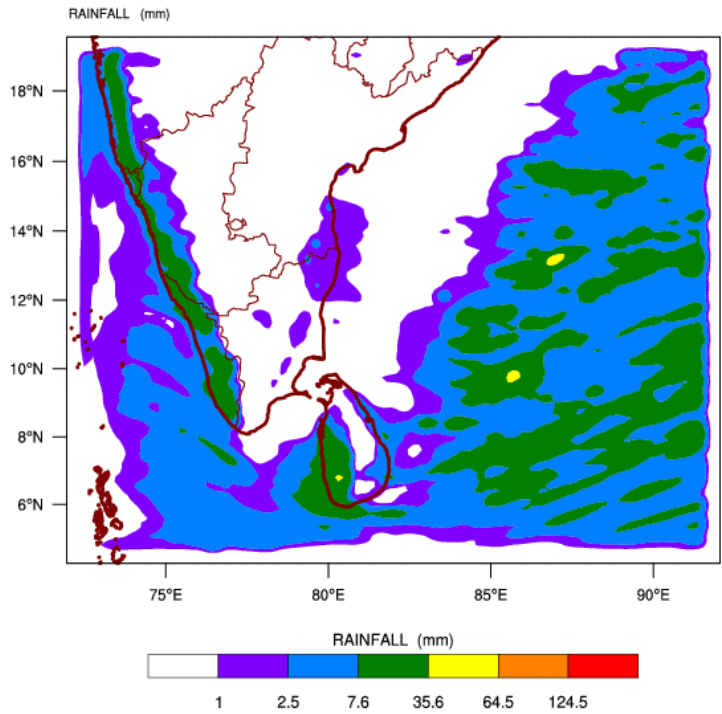


WRF Model Forecast (from IMD Chennai)

WRF MODEL FORECAST (48 HR.) RAINFALL(mm)\  
based on 00 UTC of 17-08-2016 valid for 03 UTC of 19-08-2016



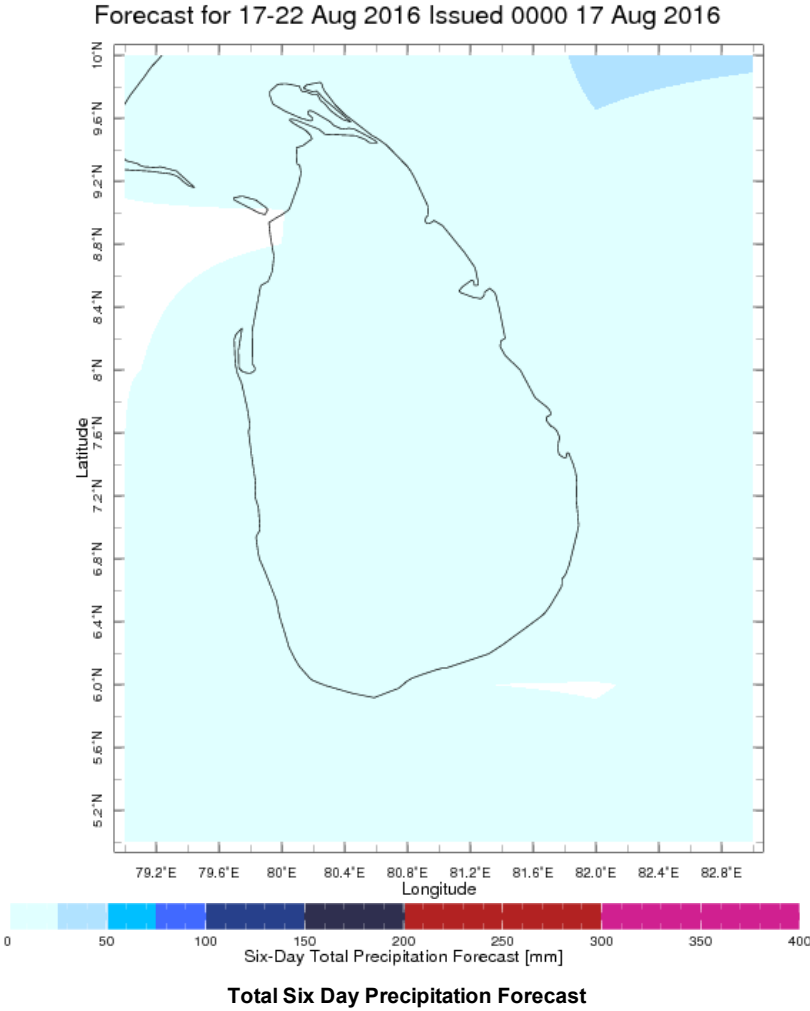
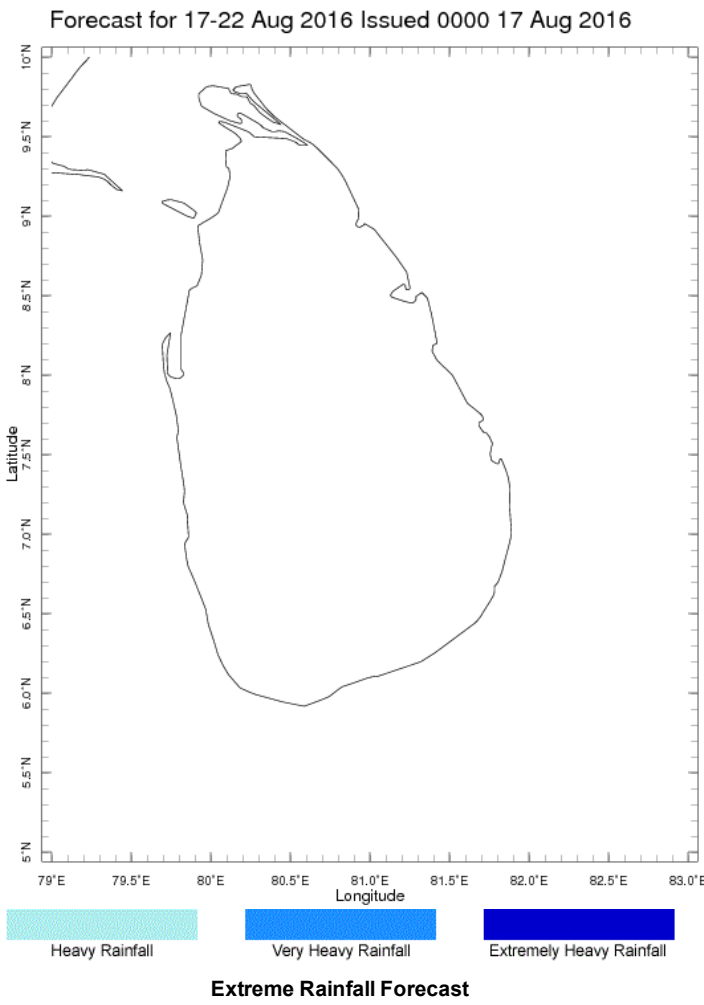
WRF MODEL FORECAST (72 HR.) RAINFALL(mm)\  
based on 00 UTC of 17-08-2016 valid for 03 UTC of 20-08-2016





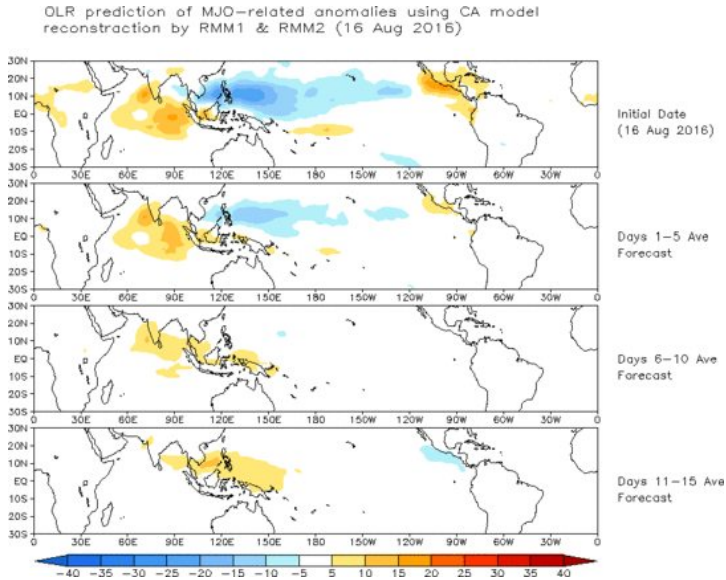
Weekly Rainfall Forecast from IRI

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.



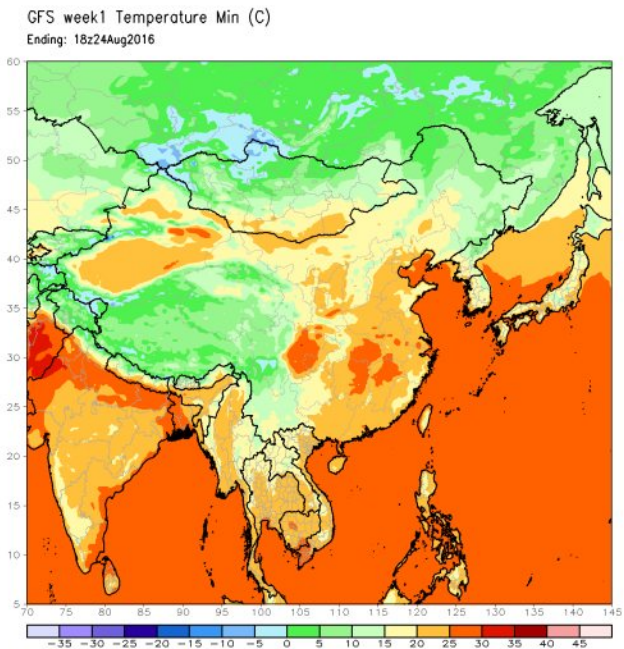
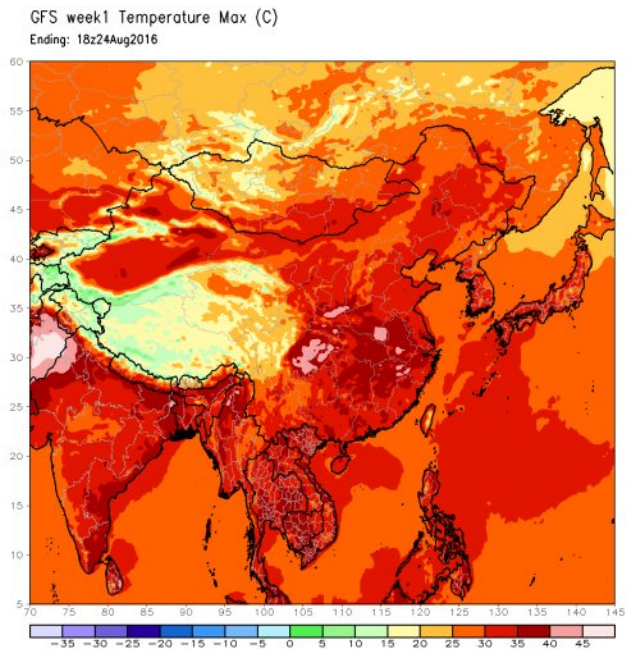
Madden Julian Oscillation (MJO) related Outgoing Longwave Radiation (OLR) Forecast

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



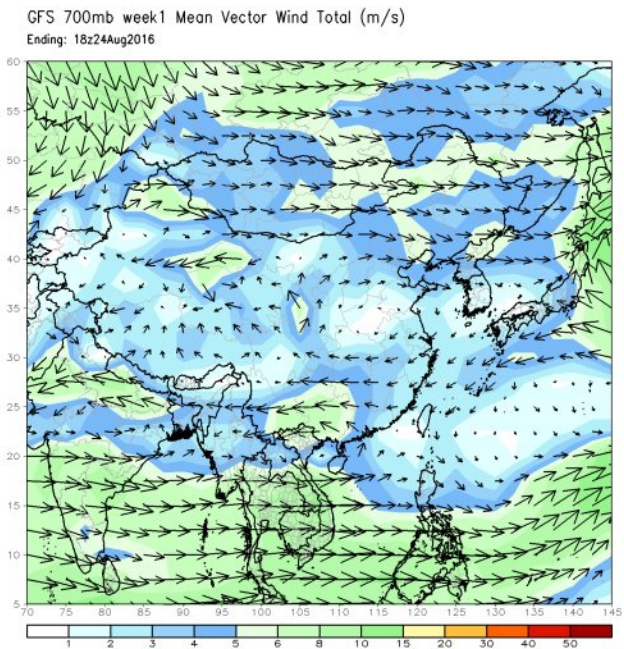
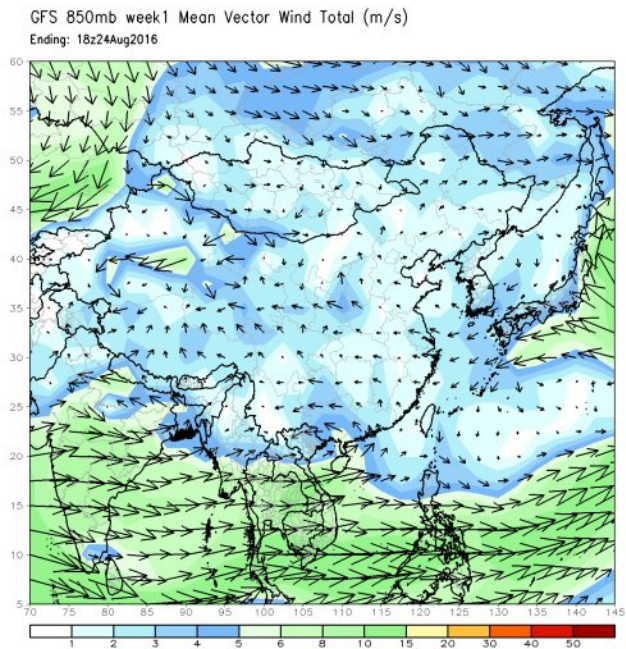
## Weekly Temperature Forecast

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



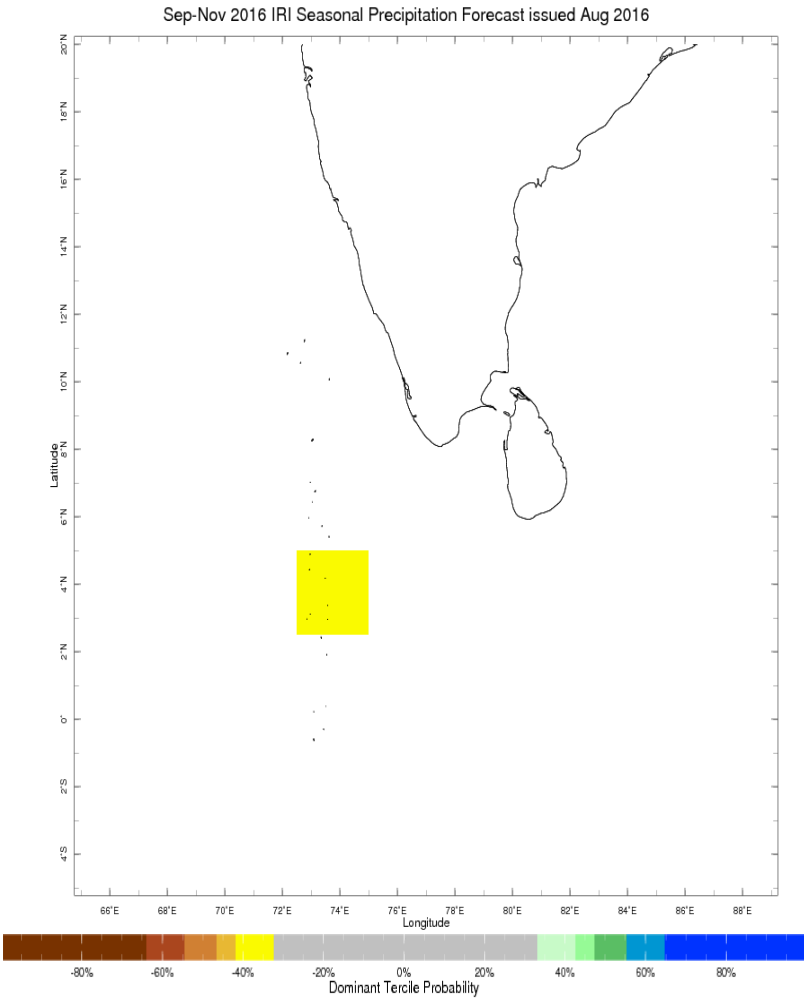
## Weekly Wind Forecast

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

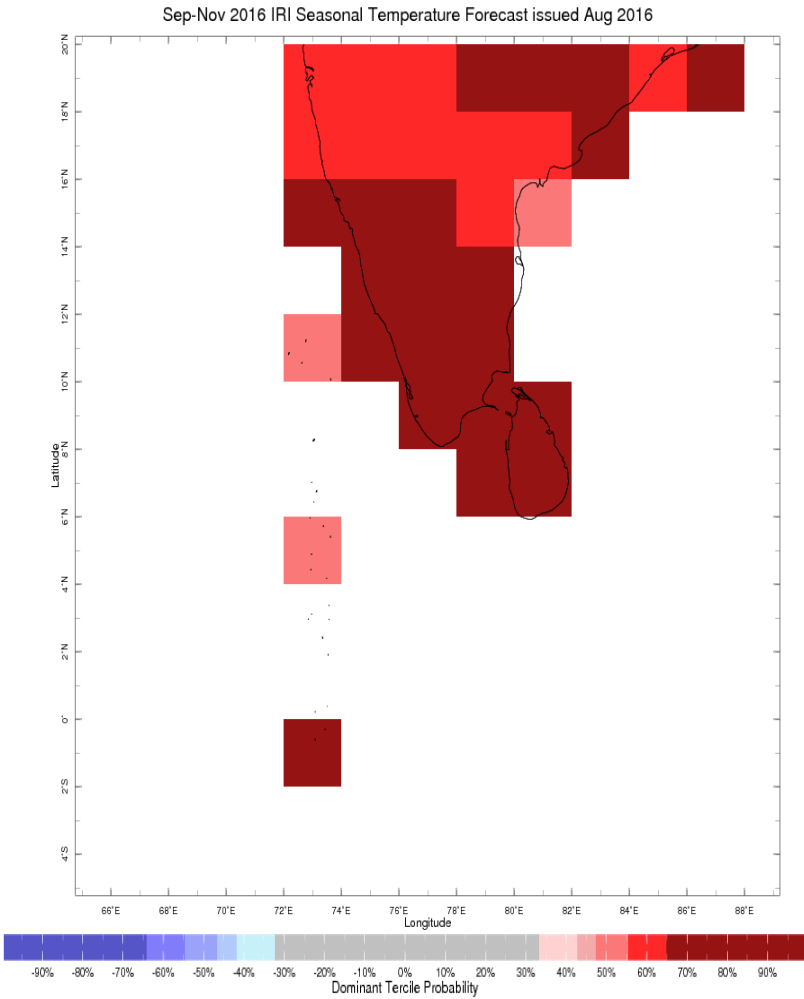


Seasonal Rainfall and Temperature Forecast

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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