

## Experimental Climate Monitoring and Prediction

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3 November 2016

### Highlights

*Heavy rainfalls were observed throughout the country during the latter part of the previous week from 26th October -1st November. The highest rainfall of 160mm for the period was recorded in Galle and Matara on 30<sup>th</sup>. Minimum temperature of 15 °C was recorded from Nuwara Eliya district while the maximum temperature between 35-40 °C was recorded from Trincomalee. Up to 20km/h north westerly winds were recorded in the Southern province. For the period from 2<sup>nd</sup>- 8<sup>th</sup> November the NOAA NCEP model predicts up to 85mm of rainfall for Colombo and adjacent sea regions. Up to 18km/h north westerly wind is expected in the whole country.*

#### Monitoring

##### Rainfall

**Weekly Monitoring:** On 26<sup>th</sup> Mannar and Kudawewa area near the district border of Kurunegala and Puttalam received up to 20 mm rainfall. No rainfall was observed in any part of the island on 27<sup>th</sup>. Up to 20 mm rainfall was recorded in Kokkilai lagoon and adjacent sea area on 28<sup>th</sup>. On 29<sup>th</sup> Galle district received up to 120 mm rainfall while Matara district received up to 90 mm rainfall. Badulla and Monaragala districts received up to 80 mm rainfall. Kandy and Batticaloa districts received up to 40 mm rainfall. Up to 30 mm rainfall was observed in Hambantota, Nuwara Eliya and Ratnapura districts. Heavy rainfalls were observed in several parts of the island during 30<sup>th</sup> and 31<sup>st</sup>. On 30<sup>th</sup> Galle and Matara districts received up to 160 mm rainfall with adjacent southern sea receiving the same amount of rainfall. Mullaitivu, Vavuniya, Mannar, Kegalla and Ratnapura districts received up to 40 mm rainfall while Gampaha, Colombo, Monaragala, Kilinochchi and Anuradhapura districts received up to 30 mm rainfall. Up to 20 mm rainfall was observed in Jaffna, Kalutara, Nuwara Eliya, Kurunegala and Puttalam districts. On 31<sup>st</sup> Puttalam district received up to 120 mm rainfall while Kurunegala and Anuradhapura districts received up to 90 mm rainfall. Up to 60 mm rainfall was observed in Vavuniya district. Up to 40 mm rainfall was observed in Ampara district and north western sea adjacent to the island. Mannar, Vavuniya, Kegalla, Ratnapura, Monaragala and Batticaloa districts received up to 30 mm rainfall. Up to 20 mm rainfall was observed in Kilinochchi, Matale, Kandy and Hambantota districts. For the past week, the RFE 2.0 tool shows rainfall up to 100mm in Mannar, Anuradhapura, Kurunegala, Puttalam, Gampaha, Galle, Badulla, Monaragala, Kandy and Matale districts. Up to 75mm of rainfall is shown for most of the country. Up to 25 mm rainfall is shown for Hambantota district. It also shows an above average rainfall of 100-200 mm in the Galle and Matara districts; and 50-100 mm in Vavuniya, Anuradhapura, Puttalam and Kurunegala districts. Below average rainfall of 50-100mm is shown for Jaffna, Trincomalee, Polonnaruwa, Colombo regions, and 25-50 mm for most parts of the island.

**Monthly Monitoring:** Below average rainfall conditions were experienced in the entire island in the month of October except for coastal regions of Galle district, where monthly average rainfall amount to 450mm/month. Rainfall did not exceed 210mm/month for the rest of the island. The CPC Unified Precipitation Analysis tool shows ~100mm of total rainfall in Gampaha, Colombo, Ratnapura, Galle, Matara, Anuradhapura, Mannar, Vavuniya,, Matale, Kandy and Nuwara Eliya districts ; and ~25 mm of total rainfall in Ampara, Badulla, Monaragala, Kegalla and Jaffna districts.

##### Temperature

From 23<sup>rd</sup>-29<sup>th</sup> October the lowest temperature of 10-15°C was recorded in Nuwara Eliya. The maximum temperature recorded was between 35-40°C in Trincomalee region. The maximum temperature range in rest of the country was 20-25°C. The maximum temperature in the rest of the country was between 30-35 °C. During this period an above average temperature of 0-3°C was observed by the southern and northern regions of the country including Colombo region. Central region experienced an above average temperature of 0-1 °C.

##### Wind

At 850 mb level up to 20 km/h north westerly wind was experienced by the Southern province. The rest of the country experienced wind in the same direction with speed less than 18 km/h. At 700 mb level southern half of the island including Ampara district experienced north westerly winds with a speed of up to 20 km/h while rest of the country experienced winds with a speed less than 18km/h in the same direction.

##### Ocean State

##### **Pacific sea state: October 20, 2016**

During mid-October 2016 the tropical Pacific SST anomaly was slightly cooler than -0.5C, the threshold for weak La Niña. However, not all of the atmospheric variables have been supporting weak La Niña conditions for a sufficient duration to constitute good ocean-atmospheric coupling. Although the upper level winds suggest weak La Niña, the lower level trade winds only became stronger than average in mid-September. The Southern Oscillation index and the pattern of cloudiness and rainfall do indicate weak La Niña

conditions. The lack of enhanced trade winds until recently makes us hesitate to say La Niña has really begun, so our diagnosis remains ENSO-neutral. The collection of ENSO prediction models indicates SSTs near or slightly cooler than the threshold of La Niña during fall, then weakening to cool-neutral during winter. (Text Courtesy IRI)

#### Indian Ocean State

0.5 °C above average sea surface temperature was observed in the western sea of Sri Lanka.

#### Predictions

##### Rainfall

**14-day prediction:** From 2<sup>nd</sup>-8<sup>th</sup> November, the NOAA NCEP models predicts total rainfall, between 75-85mm in Colombo and adjacent area; 65-75mm in Galle, Matara and Ratnapura regions; 45-55 mm in Jaffna, Ampara, Gampaha and Kegalla regions; and total rainfall between 25-35 mm is expected in most parts of the country. For the period 9<sup>th</sup>-16<sup>th</sup> November total rainfall between 75-85 mm is expected in Colombo. Gampaha, Kegalla, Ratnapura, Puttalam, Kurunegala and Galle regions are expected to receive total rainfall between 45-55 mm. Total rainfall between 35-45 mm is expected in Central and North Central provinces.

**Weekly prediction:** IMD GFS model predicts rainfall between 70-130 mm in Nuwara Eliya and 40-70 mm rainfall in Kandy, Badulla and Ratnapura areas for the 3<sup>rd</sup> of November. Rainfall between 20-40 mm is expected for rest of the central regions of the country including Hambantota. Rest of the island is expected to receive 10-20 mm rainfall. On 4<sup>th</sup> rainfall between 40-70 mm is expected for Nuwara Eliya and Badulla regions and rainfall between 20-40 mm in Kandy, Kegalla, Ratnapura and Monaragala regions. Rest of the island is expected to receive 10-20 mm rainfall. On 5<sup>th</sup> entire island is expected to receive rainfall between 10-20 mm except for Anuradhapura, Vavuniya and Kilinochchi. Rainfall between 40-70 mm is expected in western and south western sea regions adjacent to the island. On 6<sup>th</sup> the whole island is expected to receive rainfall between 10-20mm except for Kurunegala and Matale regions. On 7<sup>th</sup> rainfall between 10-20mm is expected in most parts of the country. On 8<sup>th</sup> surrounding areas of Hambantota, Trincomalee and Vavuniya are expected to receive rainfall between 10-20mm. No rainfall is expected in any part of the country on 8<sup>th</sup>.

**IMD WRF & IRI Model Forecast:** According to the IMD WRF model up to 125 mm of rainfall is expected in Ratnapura region on the 4<sup>th</sup>. Colombo, Kalutara, Galle, Kegalla, Yala and Puttalam regions are expected to receive up to 65 mm rainfall with Ampara, Monaragala, Badulla, Matara, Gampaha and Kurunegala regions expected to receive 35 mm rainfall. On 5<sup>th</sup> surrounding areas of Ratnapura shall receive rainfall up to 64mm, and western region of the country shall experience rainfall up to 35 mm.

**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 35-40°C maximum temperature in Monaragala and Ampara districts. The maximum temperature for the rest of the island will range between 30-35°C. For the same period minimum temperature is expected in Nuwara Eliya to be between 15-20°C.

##### Wind

The 850 mb level predicts up to 18 km/h north westerly wind for the entire country. The 700 mb level predicts up to 20km/h north westerly wind in the Southern province. The rest of the country experienced wind in the same direction with speed less than 18 km/h.

##### MJO based OLR predictions

MJO shall not have a significant impact on the 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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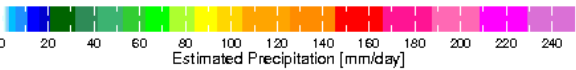
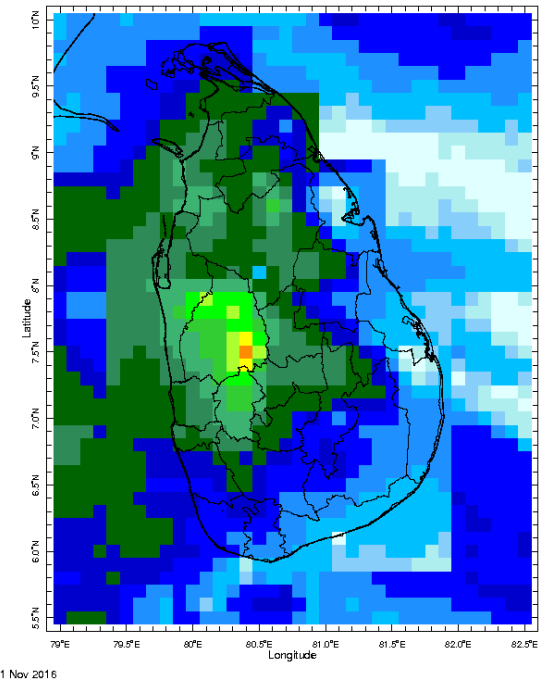
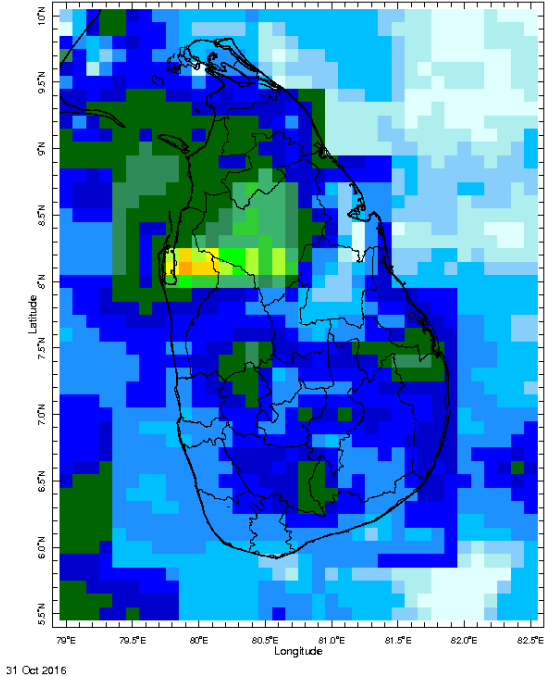
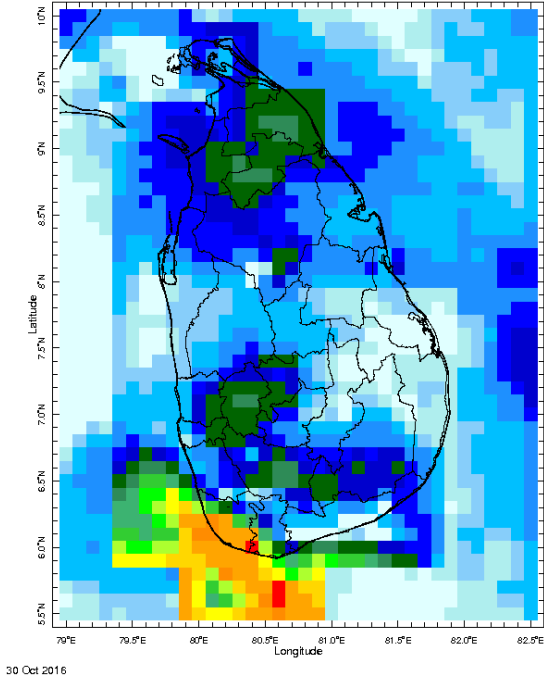
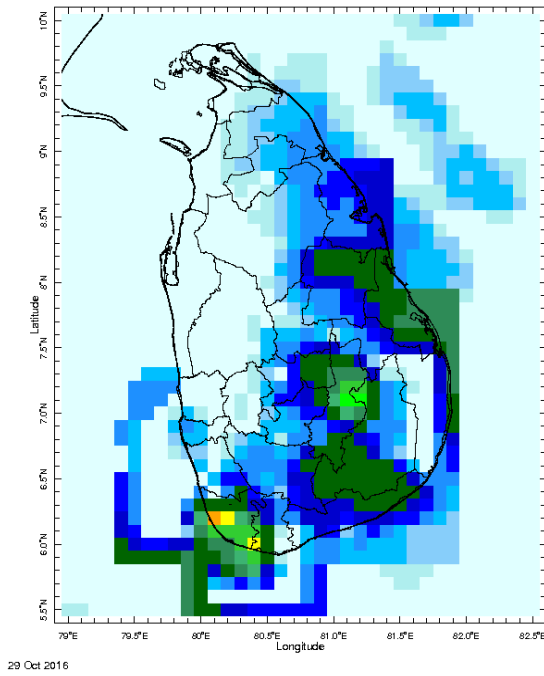
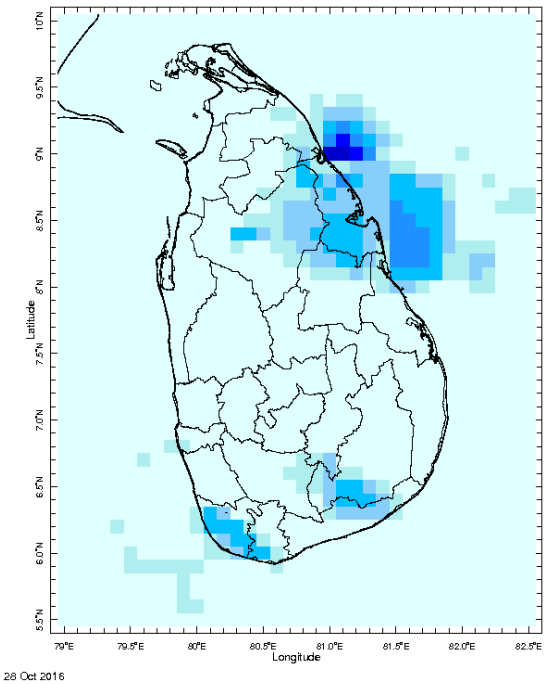
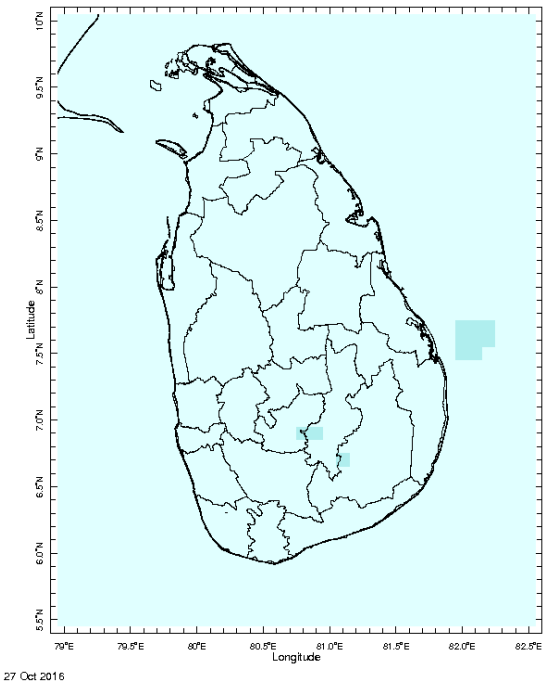
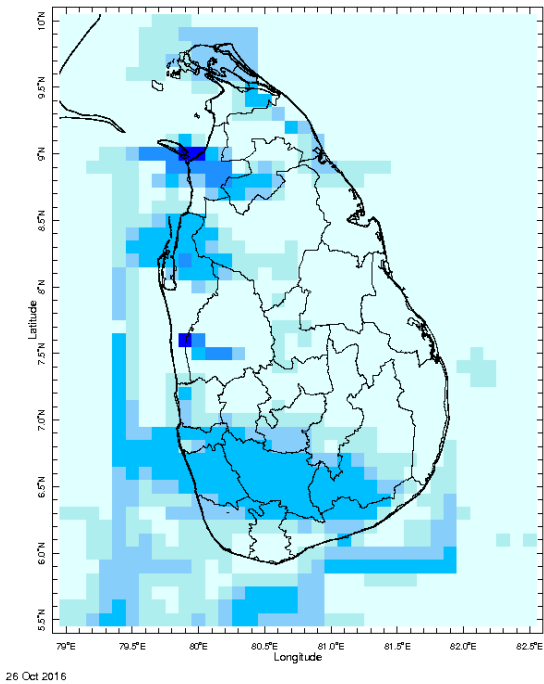
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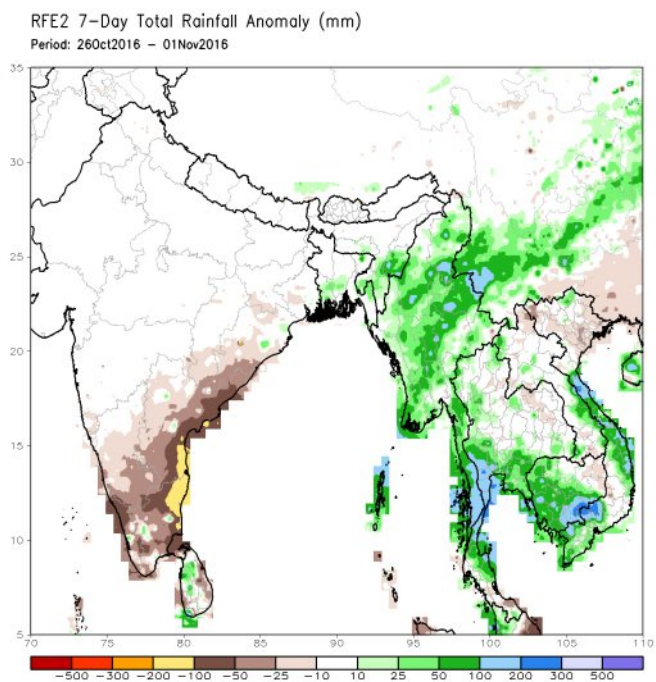
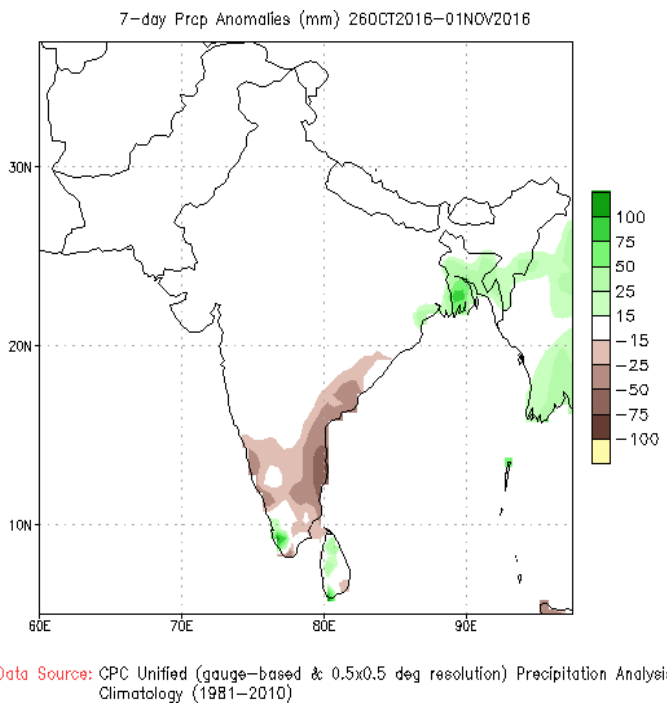
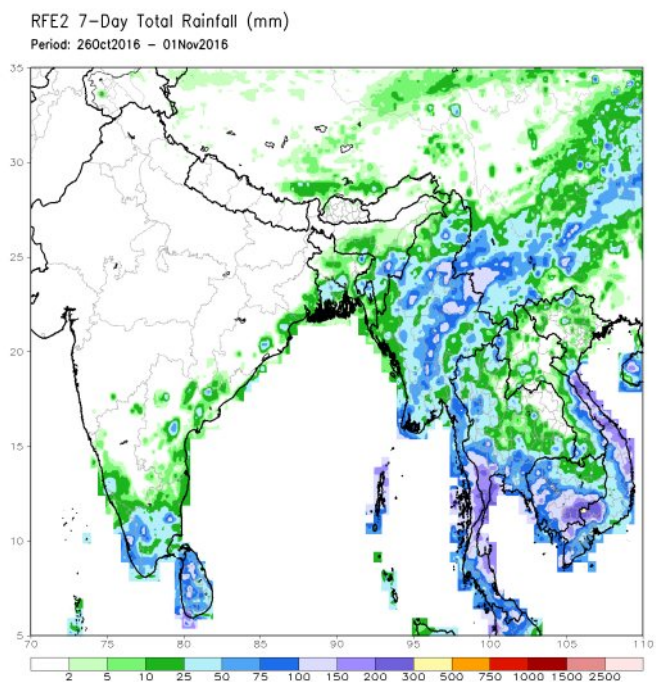
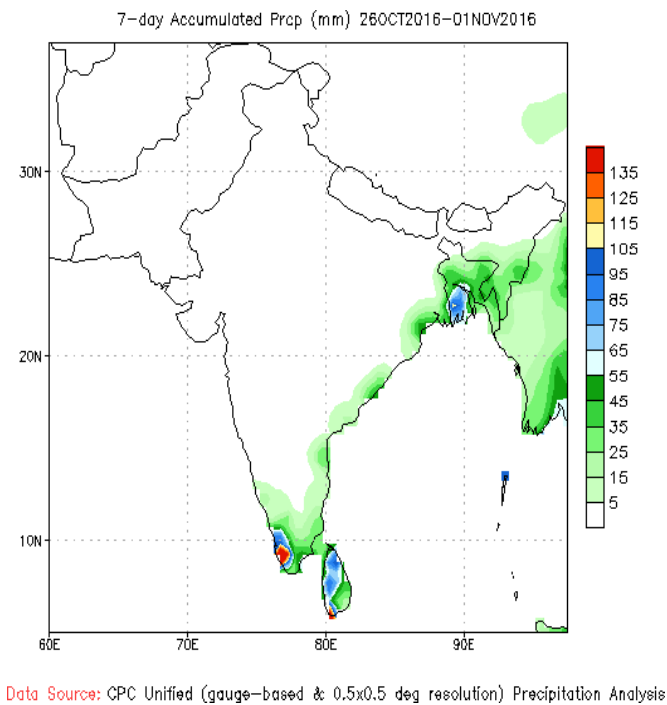
Daily Rainfall Monitoring

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



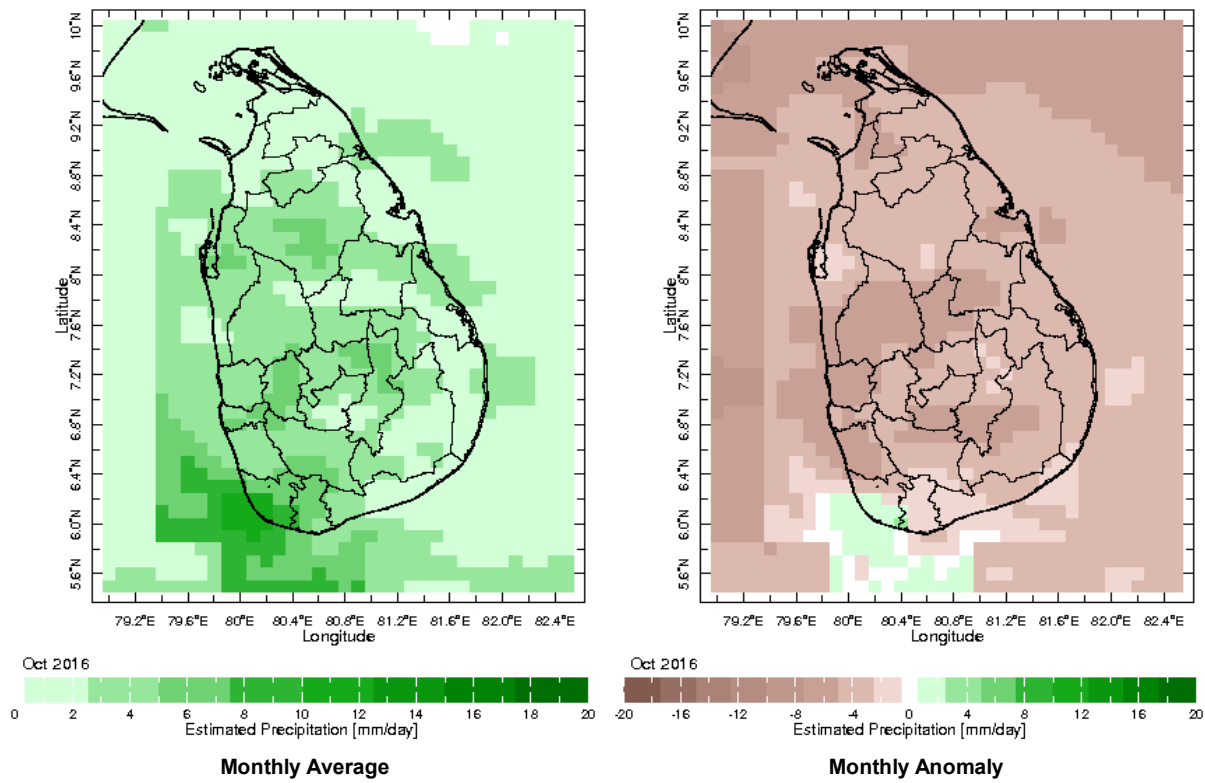
Weekly Rainfall Monitoring

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.



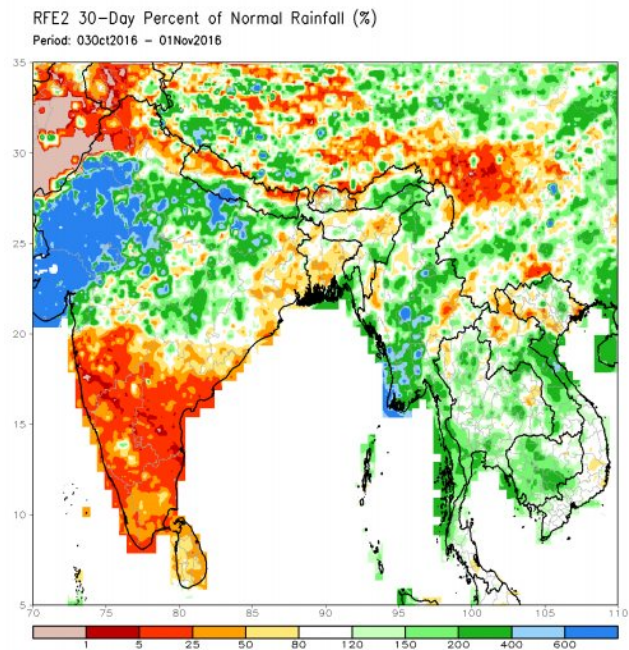
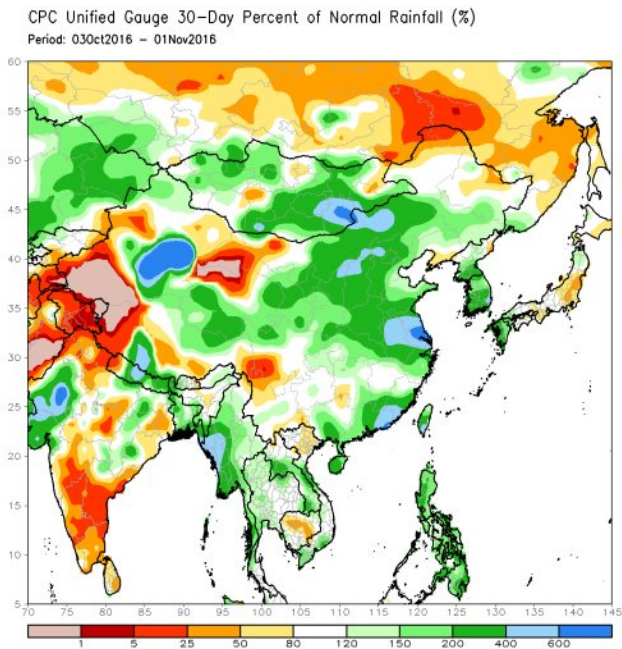
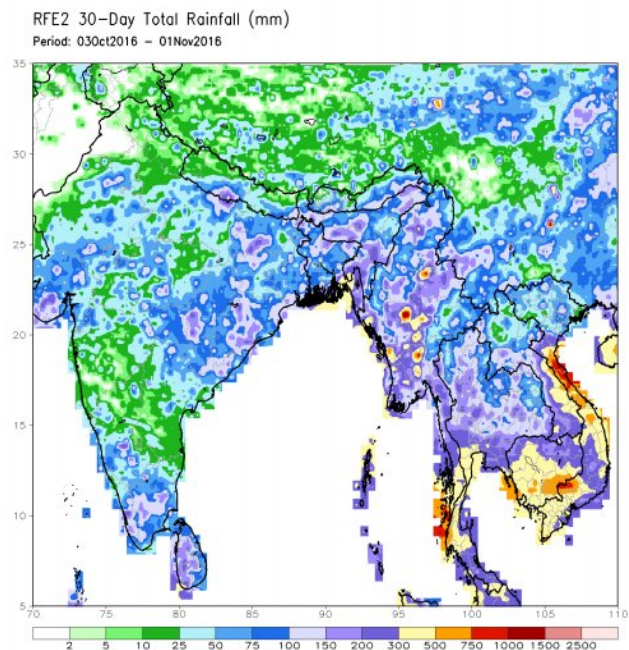
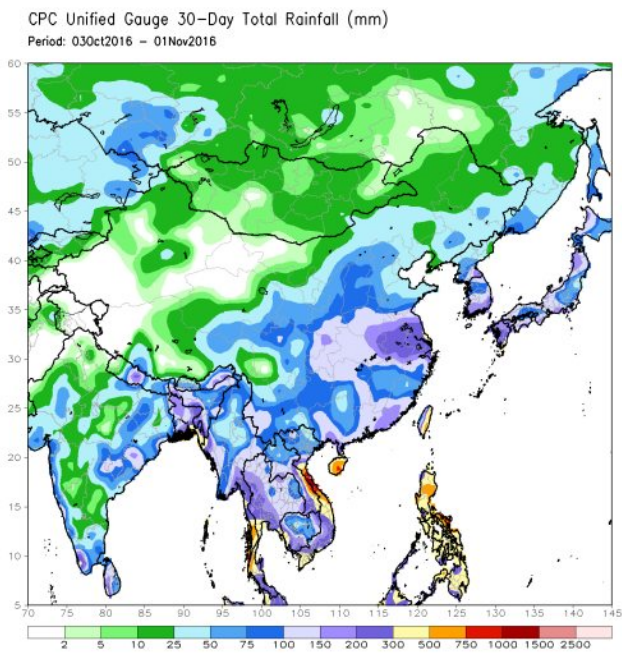
Monthly Rainfall Monitoring

The figure in the left shows the averageobserved 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 receivedless rainfall than the historical average while the green color shows places with above average rainfall. Darker shades show higher magnitudes in rainfall

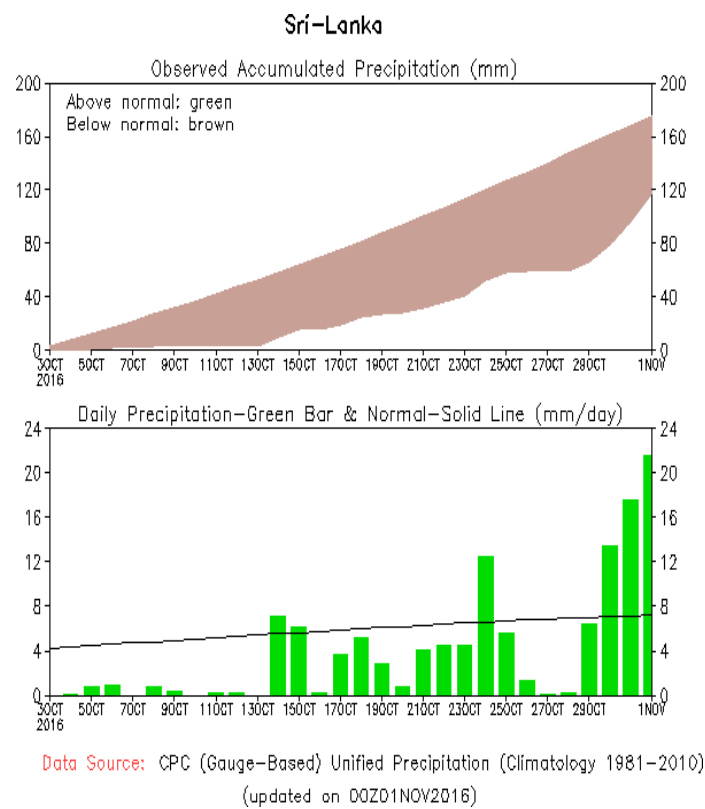




The figure in the top-left shows the total rainfall in the past 30 days from CPC Unified Precipitation Analysis while the figure in the top-right shows the total rainfall for the same period from RFE 2.0 Satellite Rainfall Estimates. The bottom two figures show the percentage of rainfall received in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

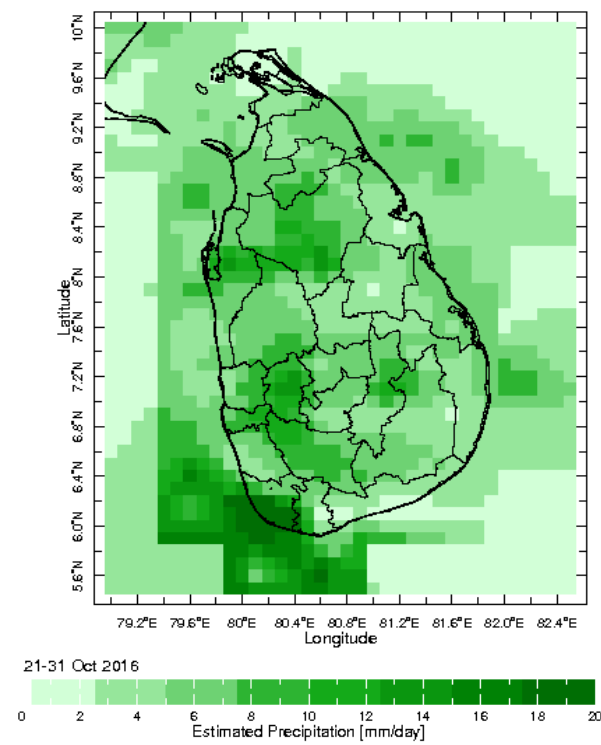
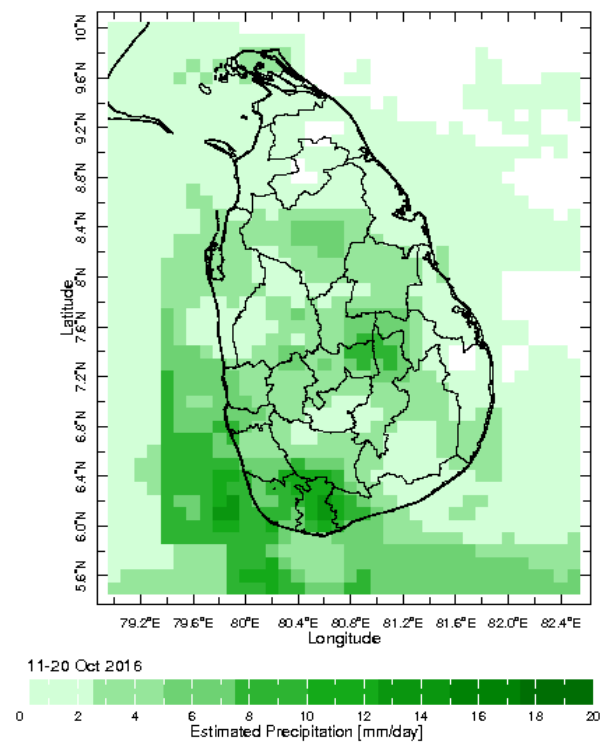


The following figure shows the observed accumulated rainfall (top) and daily observed rainfall (bottom) in Sri Lanka in the last 30 days.

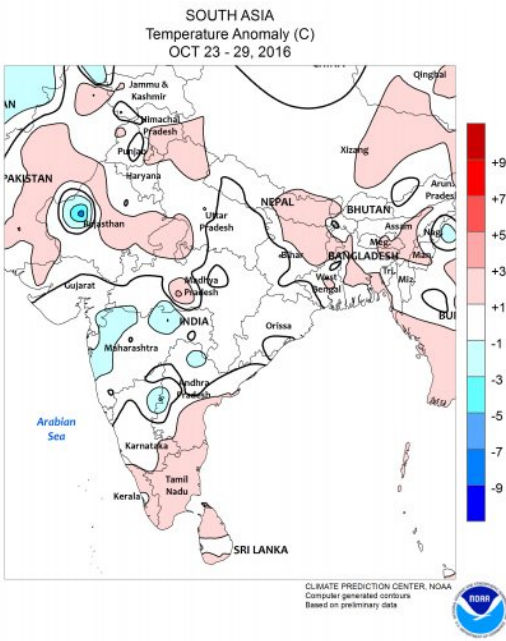
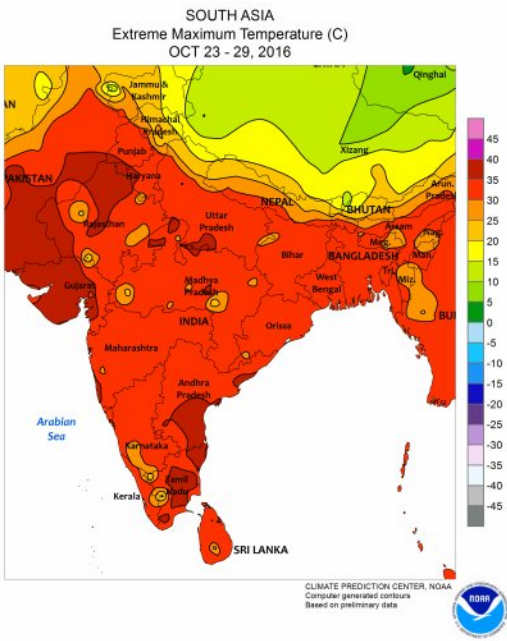
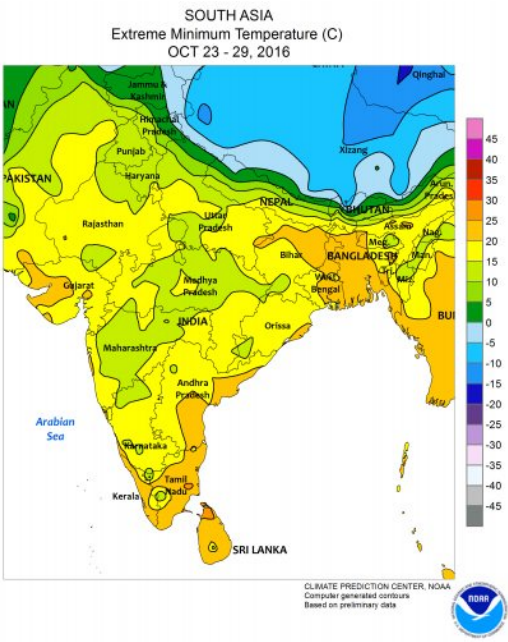




Dekadal (10 Day) Satellite Derived Rainfall Estimates

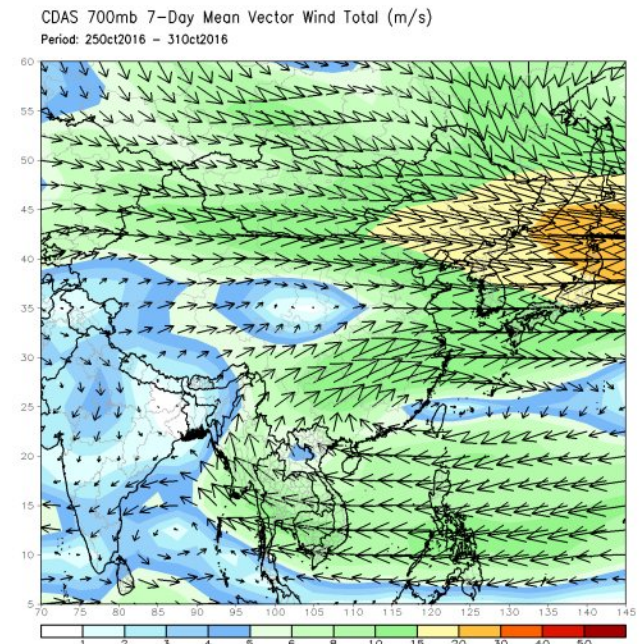
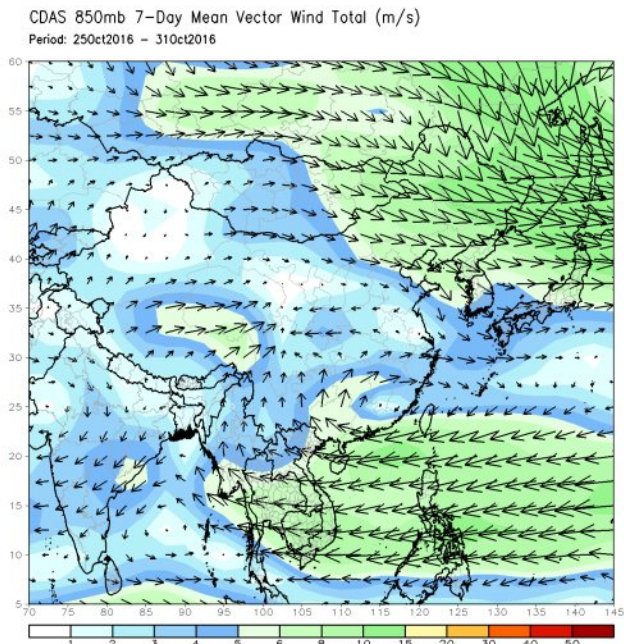


Weekly Temperature Monitoring



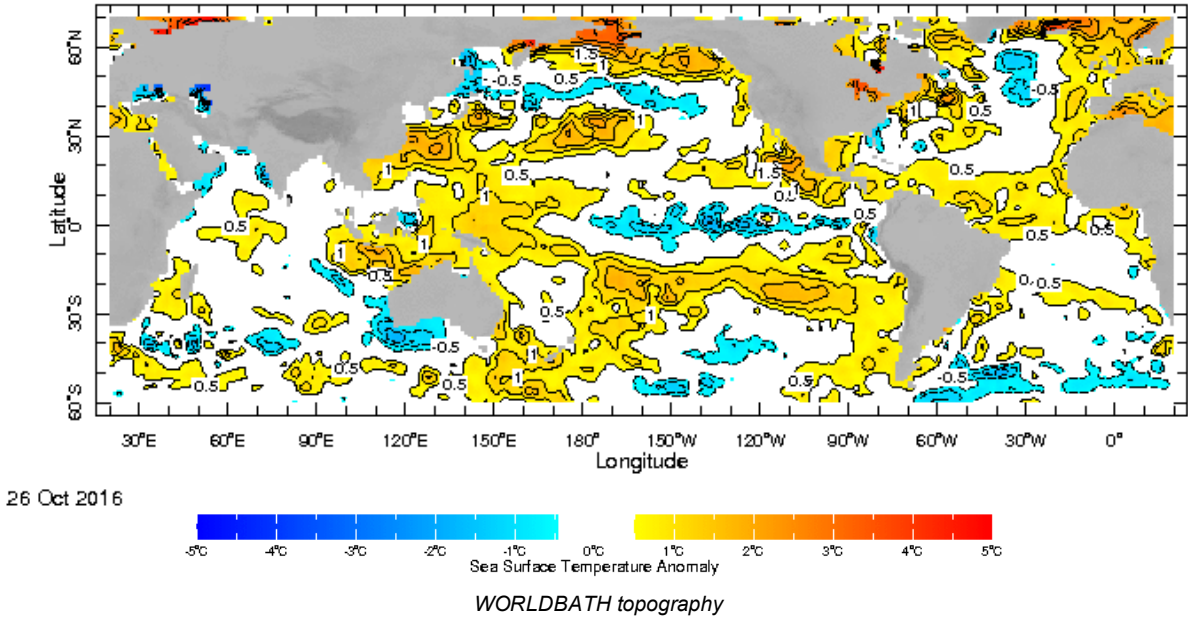
## Weekly Wind Monitoring

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.

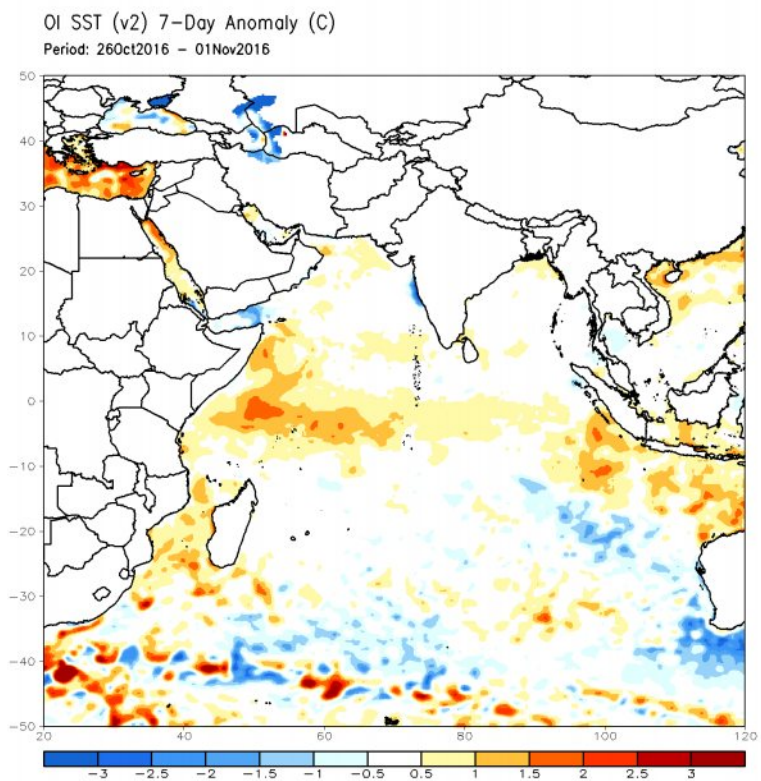


Weekly Average SST Anomalies

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



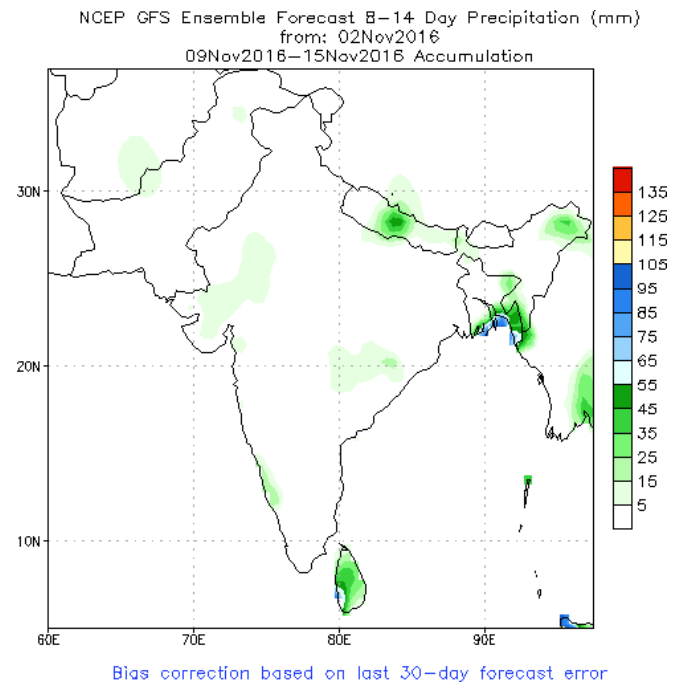
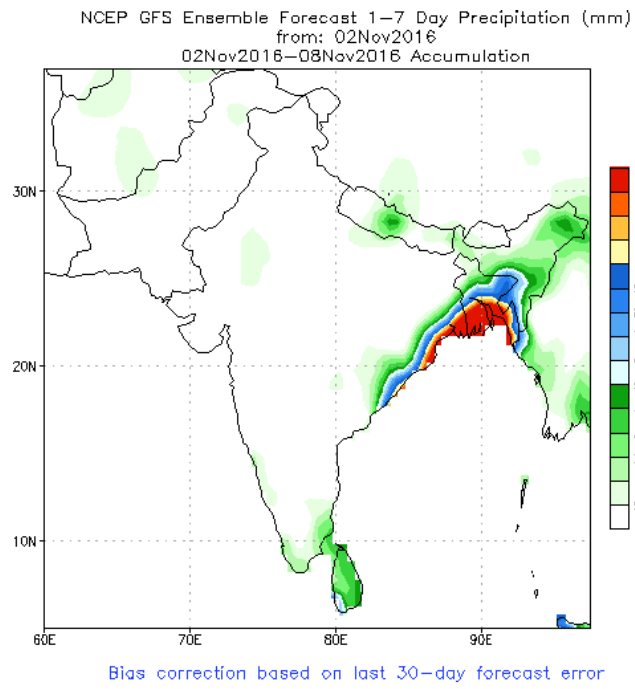
Optimum Interpolated Sea Surface Temperature Anomaly in the Indian Ocean from NOAA CPC

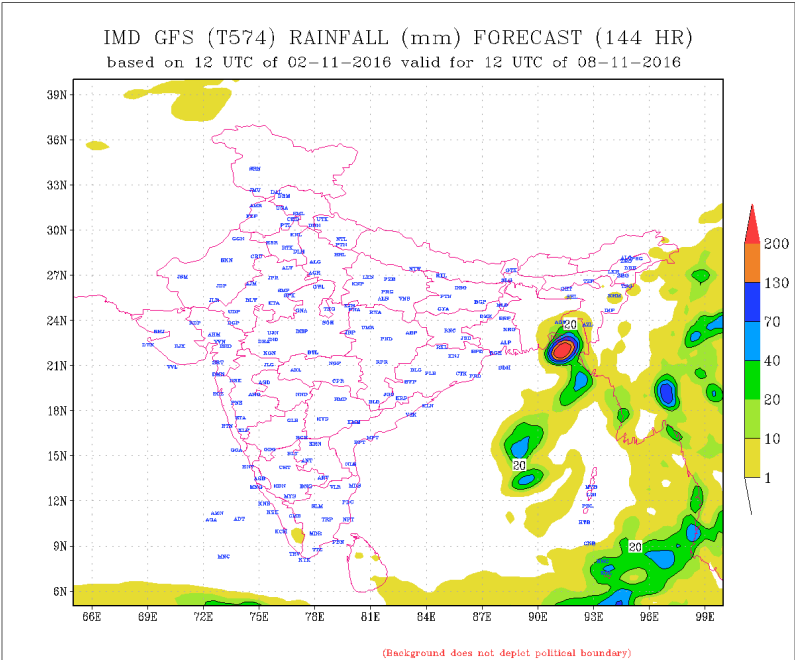
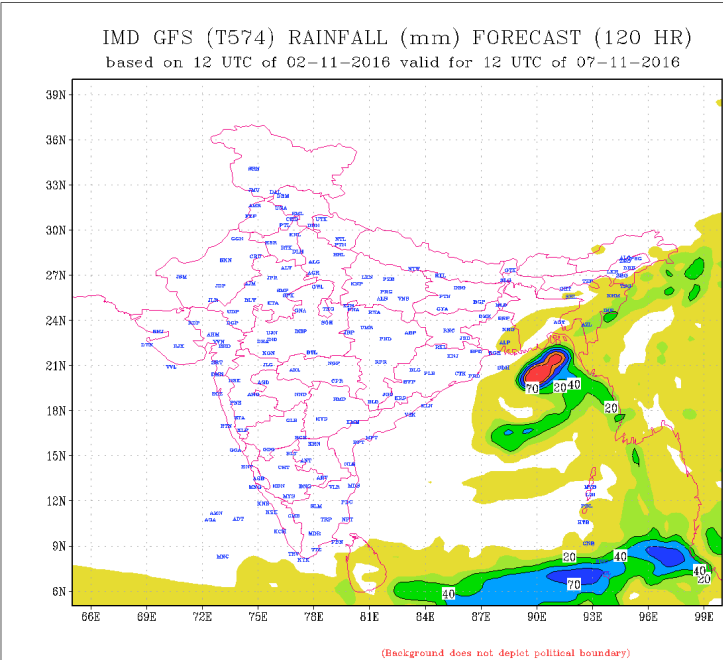
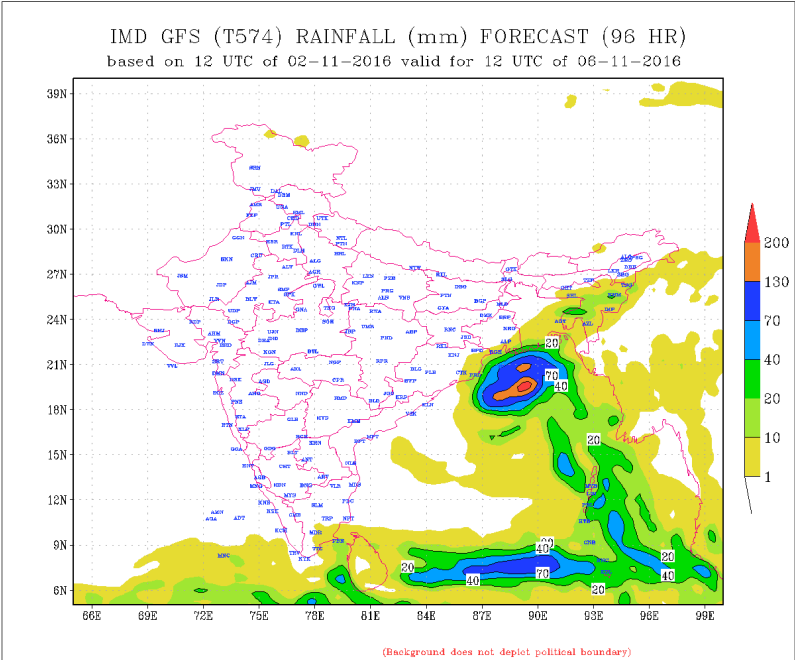
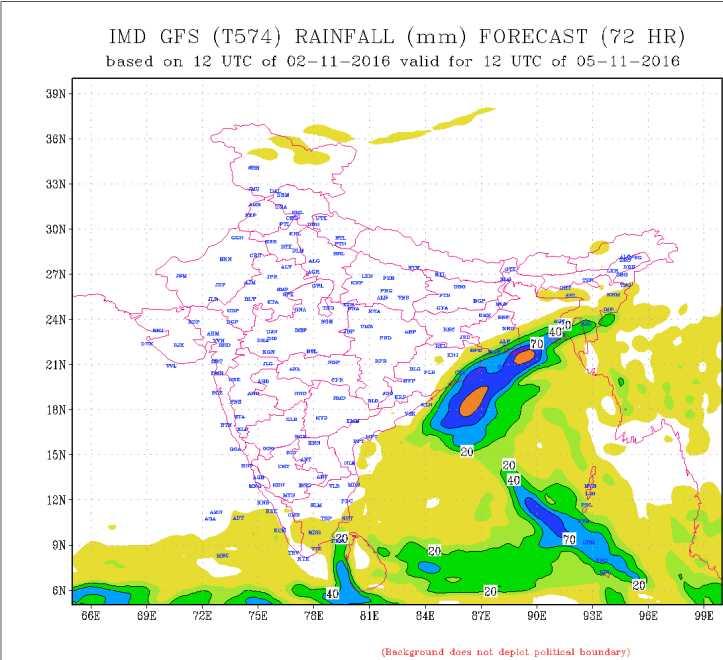
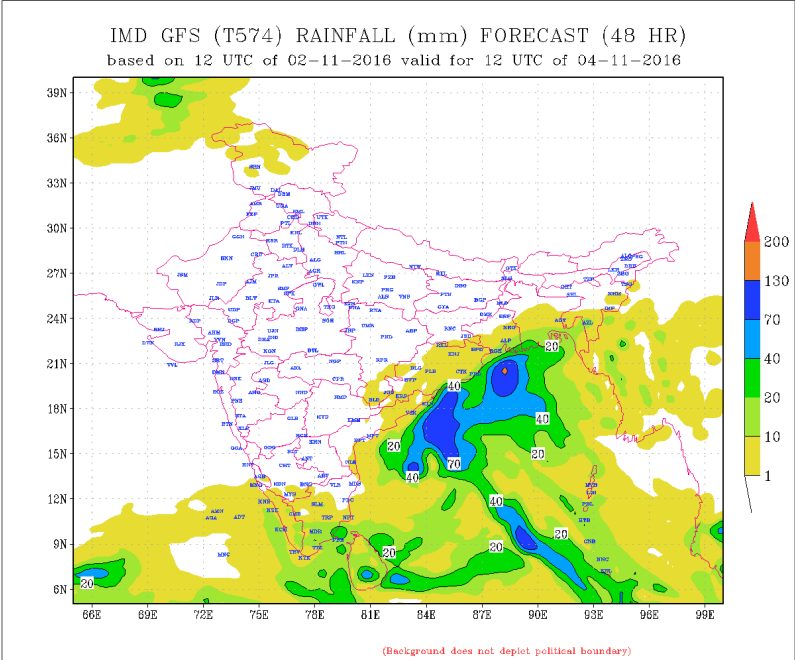
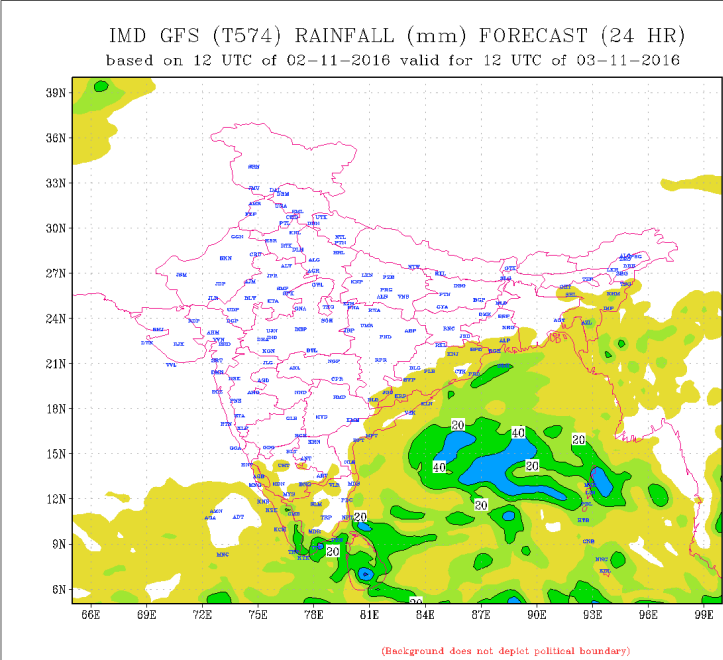




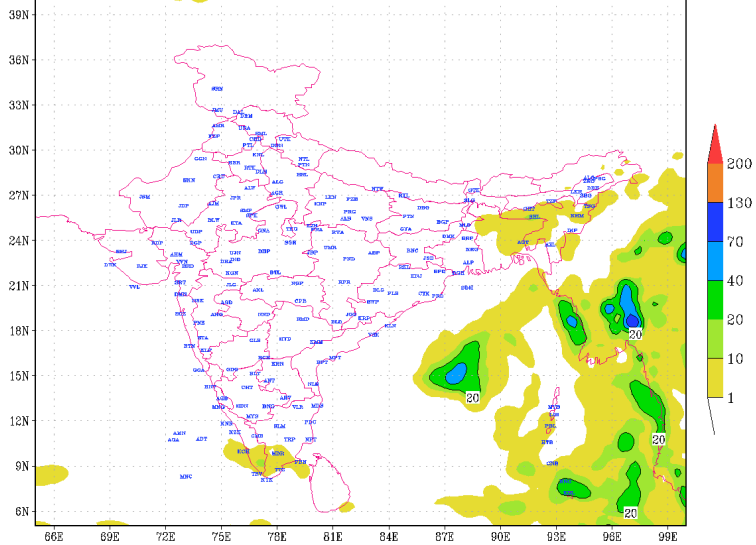
## PREDICTIONS

### NCEP GFS 1- 14 Day prediction

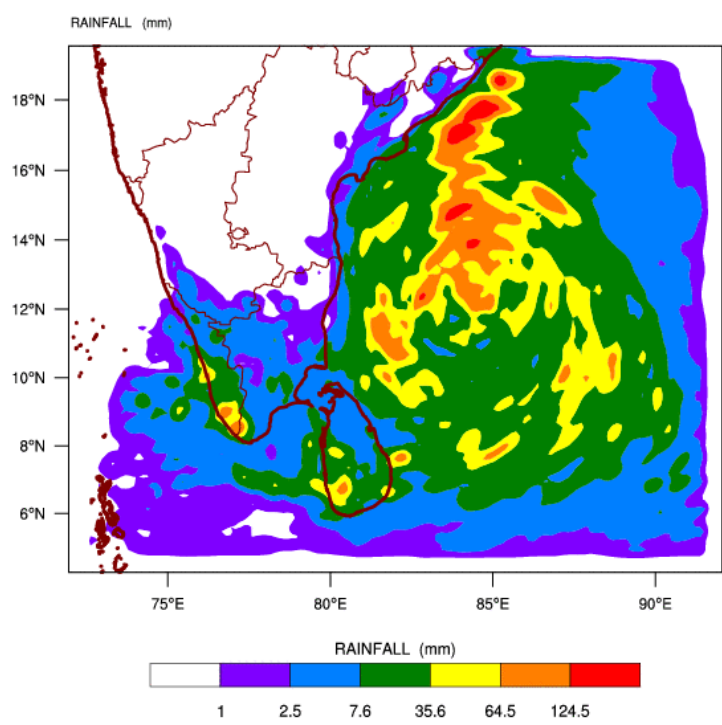




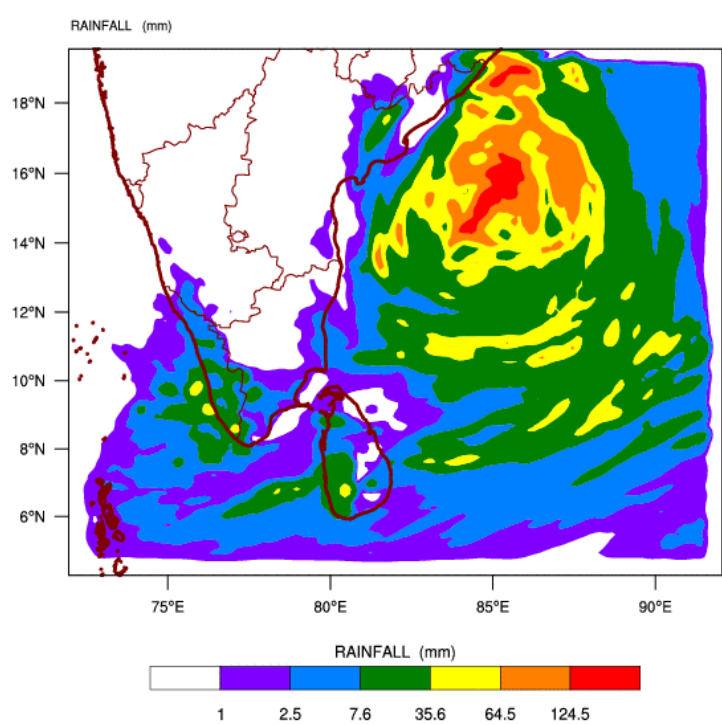
IMD GFS (T574) RAINFALL (mm) FORECAST (168 HR)  
based on 12 UTC of 02-11-2016 valid for 12 UTC of 09-11-2016



WRF MODEL FORECAST (48 HR.) RAINFALL(mm)\  
based on 00 UTC of 02-11-2016 valid for 03 UTC of 04-11-2016

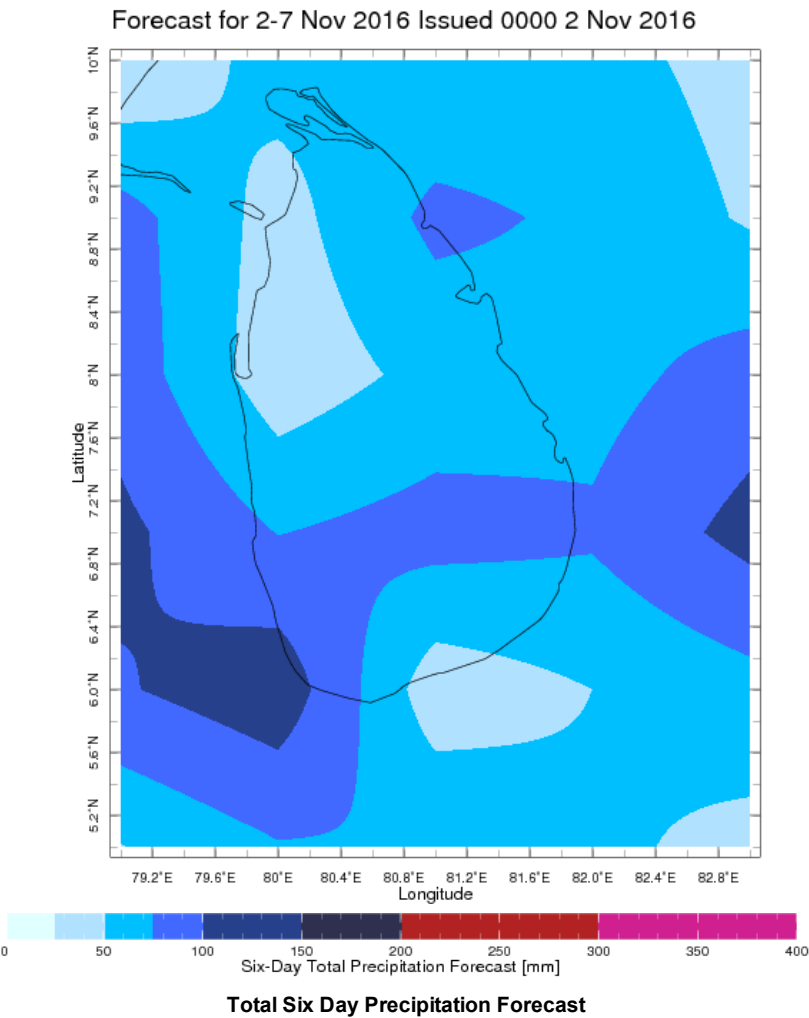
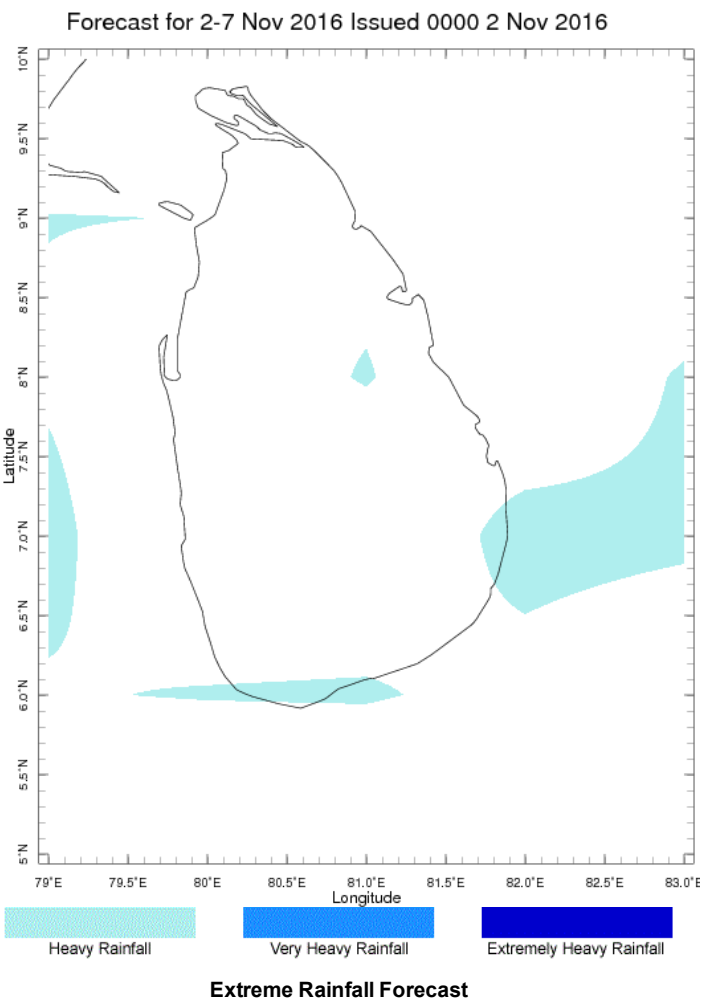


WRF MODEL FORECAST (72 HR.) RAINFALL(mm)\  
based on 00 UTC of 02-11-2016 valid for 03 UTC of 05-11-2016



Weekly Rainfall Forecast from IRI

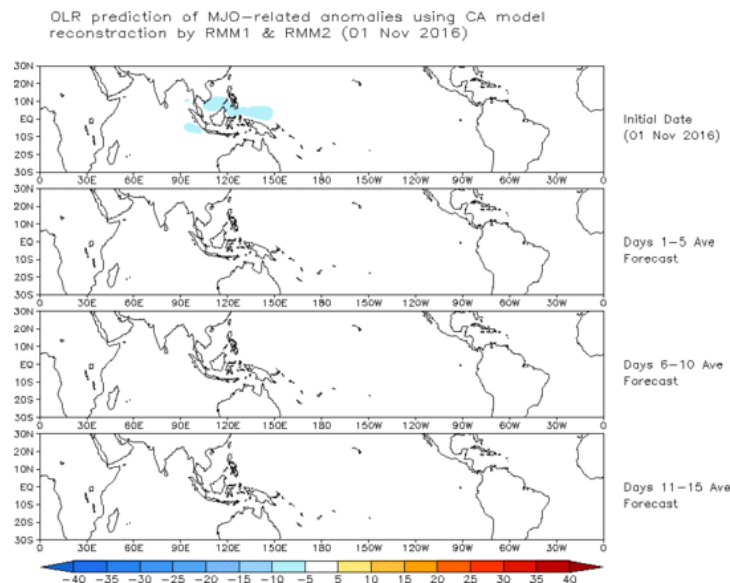
Total rainfall forecast from the IRI for next six days is provided in figures below. The figure to the left shows the expectancy of heavy rainfall events during these six days while the figure to the right is the prediction of total rainfall amount during this period.





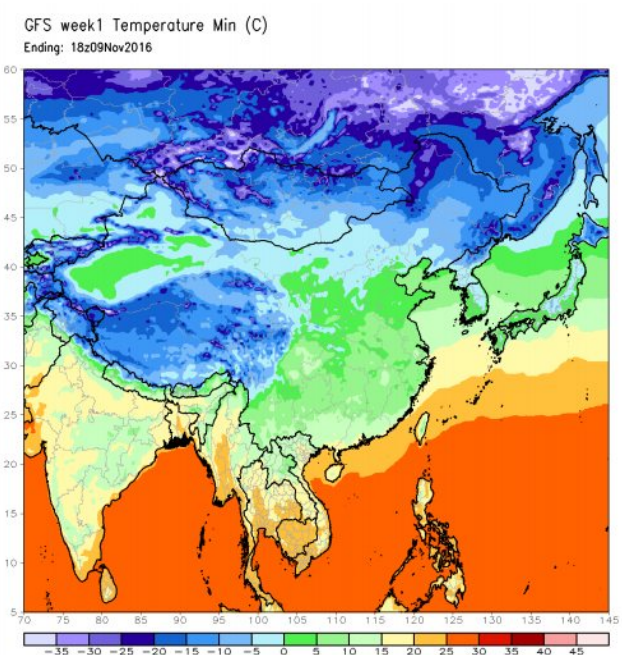
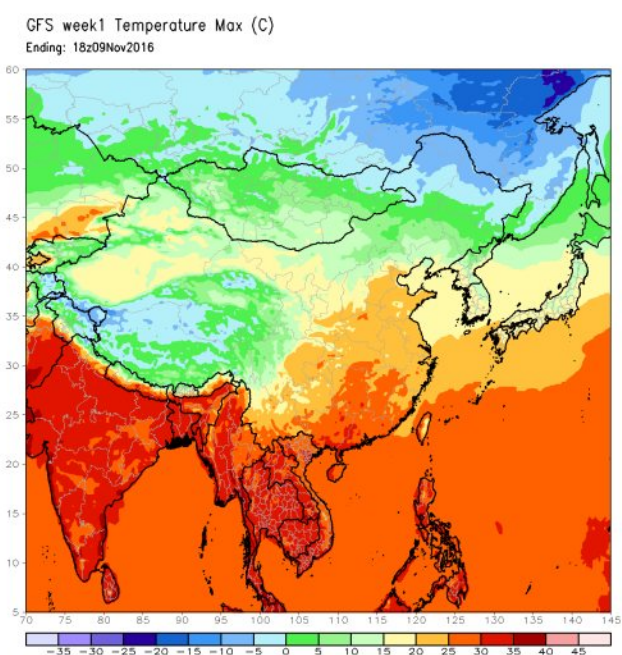
Madden Julian Oscillation (MJO) related Outgoing Longwave Radiation (OLR) Forecast

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.



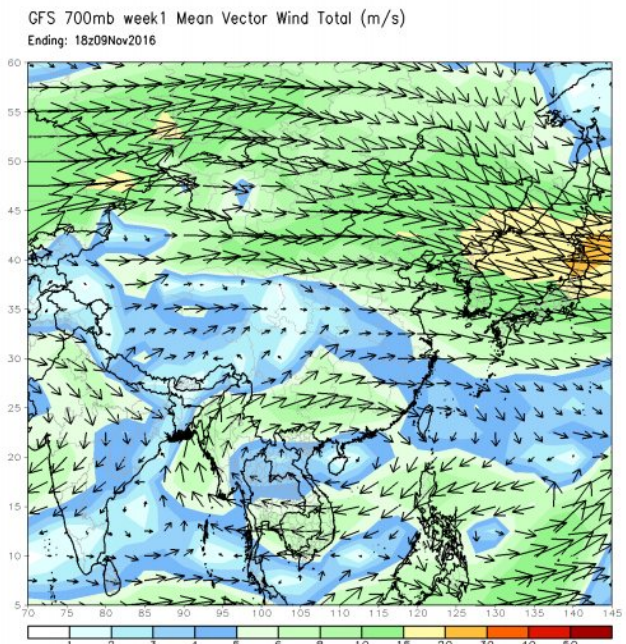
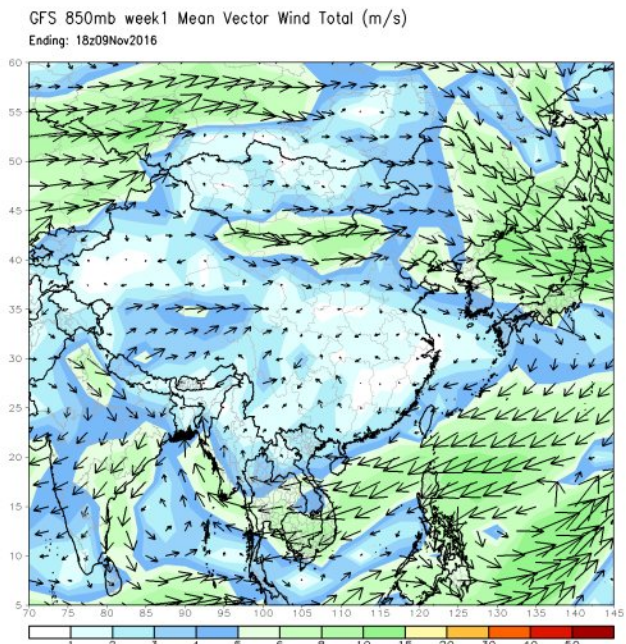
**Weekly Temperature Forecast**

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



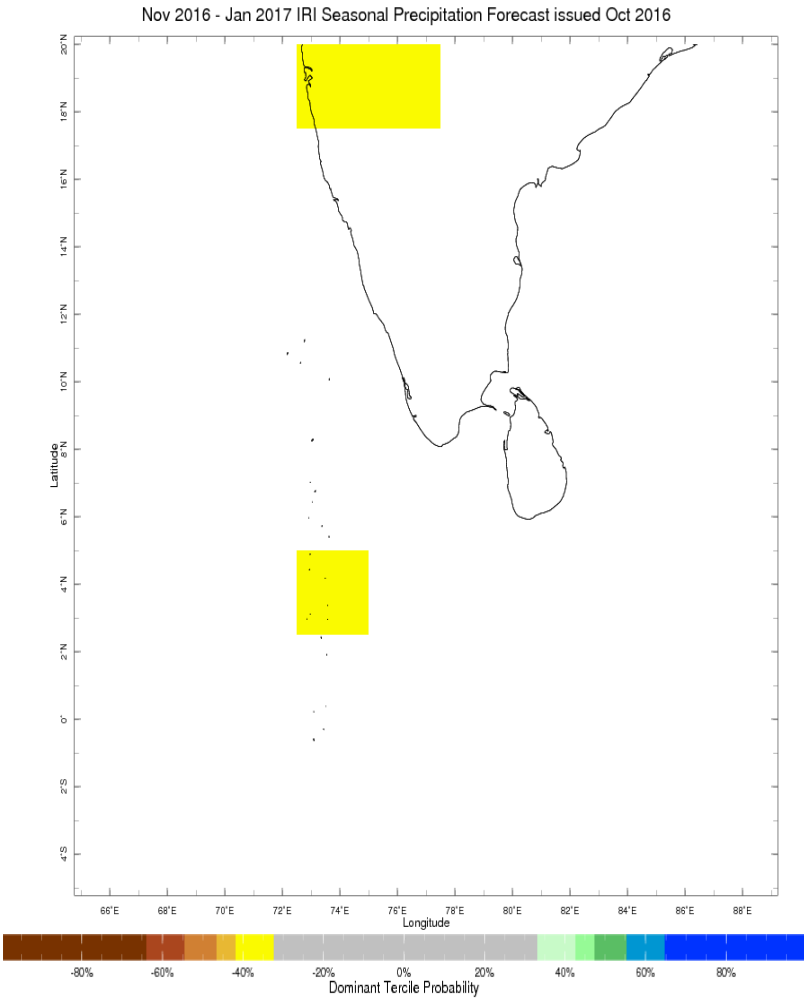
Weekly Wind Forecast

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

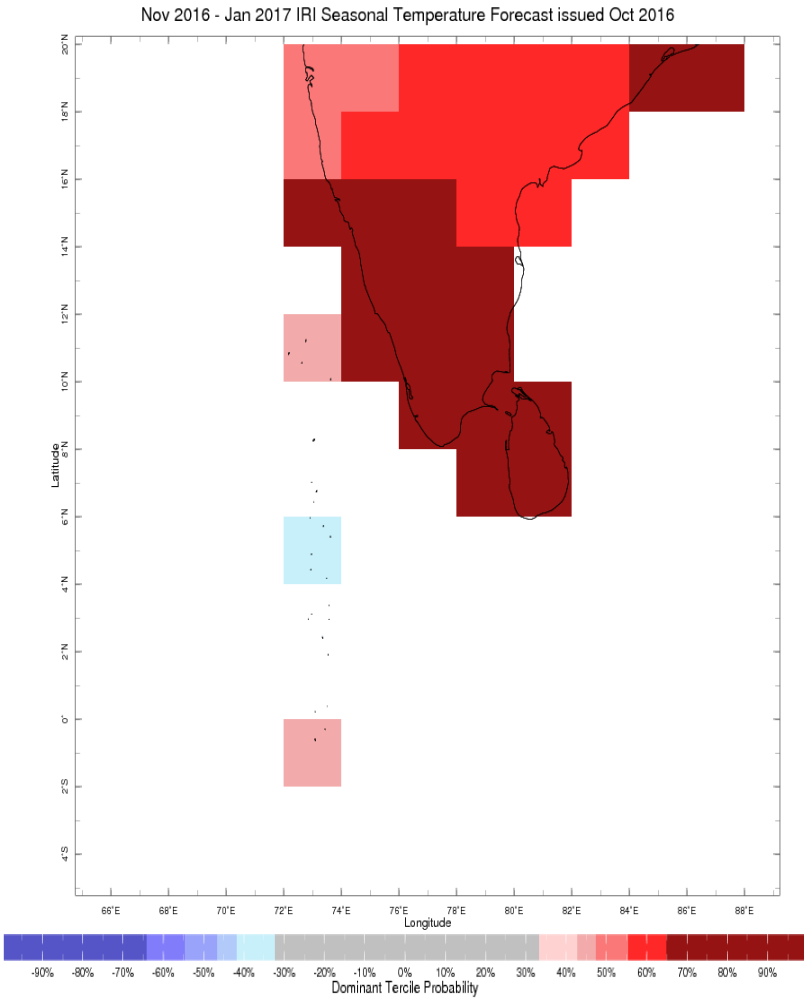


Seasonal Rainfall and Temperature Forecast

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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