

## Experimental Climate Monitoring and Prediction

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### Highlights

*A significant increase in the rainfall events was observed during the previous week from 13<sup>th</sup> - 18<sup>th</sup> October compared to the previous week. The highest rainfall of 140 mm for the period was recorded in Kirinda area on 17<sup>th</sup>. The minimum temperature of 20 °C was recorded from Nuwara Eliya district while the maximum temperature was recorded from the northern eastern and south eastern coastal areas to be between 35-40 °C. Up to 30 km/h north westerly winds were recorded in the southern regions of the country. For the period from 19<sup>th</sup> - 25<sup>th</sup> October the NOAA NCEP model predicts up to 45 mm rainfall for Galle and Matara districts. Up to 30 km/h north westerly wind is expected in the southern half of the country.*

#### Monitoring

##### Rainfall

**Weekly Monitoring:** On 13<sup>th</sup> October Hasalaka and Madugoda areas of Kandy district received up to 20 mm rainfall. On 14<sup>th</sup> up to 90 mm rainfall was observed in Beligalla region of Badulla district while surrounding areas of Mahiyangana, Horabora Wewa and Alutketiyawa received up to 50 mm rainfall. Haputale and the rest of the northern half of Badulla district including Rangala, Hasalaka and Madugoda of Kandy district, Rambewa and Kahatagasdigiliya of Anuradhapura district received up to 40 mm rainfall. Up to 30 mm rainfall was observed in neighboring regions of Galagedara, Mawatagama, Kegalla, Mawanella, Gampola, Akurana, Kandy, Kundasale, Padiyathalawa, Maha Oya, Dehiattakandiya, Matale, Hettipola, Kalpitiya, Illavakulam, Anuradhapura, Kala Oya and Tirappane. Up to 20 mm rainfall was observed in most of the central regions of the island including several areas of North Central and North Western provinces. On 15<sup>th</sup> up to 50 mm rainfall was observed in Rambukkana area and in the western sea region adjacent to the island. Up to 30 mm rainfall was observed in surrounding areas of Udappuwa, Pallama Puttalam district, Giriulla, Polgahawela, Narammala of Kurunegala district, Ranwala, Mawanella of Kegalla district, Murutalawa, Katugastota of Kandy district and coastal area of Negombo region. Up to 20 mm was observed in several areas of Puttalam, Kurunegala, Anuradhapura, Kurunegala, Gampaha, Kegalla, Kandy, Nuwara Eliya, Colombo, Kalutara and Galle districts. On 16<sup>th</sup> south eastern sea near the island received up to 20 mm rainfall. On 17<sup>th</sup> up to 140 mm rainfall was observed in Kirinda area of Matara district and in south western sea near the island. Deniyaya and Hakmana regions received up to 120 mm rainfall while rest of the Matara district received up to 90 mm rainfall including Neluwa, Embilipitiya, Middeniya areas. Up to 60 mm rainfall was observed in Rakwana of Kegalla district. Up to 50 mm rainfall was observed in Galle town, Hiniduma, Udugama areas of Galle district, Peliyagoda of Colombo district and Wiraketiya and Nonagama areas of Hambantota district. Rest of the Galle district received up to 40 mm rainfall except for Pitigala area where up to 30 mm rainfall was observed. Similar amount of rainfall was observed in Dehiwala, Aluthgama, Migahathenna, Kalawana, Madampe and Hambegamuwa. Up to 20 mm rainfall was observed in several areas of Colombo, Kalutara, Kegalla, Ratnapura, Monaragala and Hambantota districts. For the past week, the RFE 2.0 tool shows rainfall up to 100 mm for the surrounding areas of Haslaka and Mahiyangana areas along the district border of Galle and Matara. Up to 75 mm rainfall is shown for Galle district including the coastal areas of Western province, southern region of Ratnapura district and western region of Hambantota district. Rainfall between 10-25 mm is shown in several areas of Nuwara Eliya, Monaragala, Ampara, Polonnaruwa, Anuradhapura, Kurunegala and Puttalam. It also shows an above average rainfall of 25-50 mm in Matara district. A below average rainfall of 50-100 mm is shown for Mannar, Vavuniya, Anuradhapura, Battcaloa, Polonnaruwa, Madampe and Nuwara Eliya regions. A below average rainfall of 25-50 mm for the most of the island.

**Monthly Monitoring:** Below average rainfall conditions were experienced in the entire island in the month of September. Monthly average amount to 120 mm/month in Ahungalla and Ratnapura town while everywhere else the rainfall did not exceed 60 mm/month. The CPC Unified Precipitation Analysis tool shows ~75 mm of total rainfall in Ratnapura, ~25 mm of rainfall in Colombo, Kegalla, Nuwara Eliya, Bandarawela and Matara areas.

##### Temperature

During the period from October 9<sup>th</sup>-15<sup>th</sup> the lowest temperature of 15-20 °C was recorded in Nuwara Eliya. The maximum temperature to be recorded was between 35-40 °C in the north eastern and south eastern coastal belt. The maximum temperature of Kandy, Kegalla, 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 by the entire country except for the north eastern coastal belt where an above average temperature of 3-5 °C was observed.

## Wind

At 850 mb level up to 30 km/h north westerly wind was experienced by the southern region of the island. The rest of the country experienced wind in the same direction with speed less than 18 km/h. At 700 mb level southern regions of the island including Ampara district experienced north westerly winds with speed up to 20 km/h while rest of the country experienced wind with speed less than 18 km/h in the same direction.

## Ocean State

### **Pacific sea state: October 13, 2016**

During early October 2016 the tropical Pacific SST anomaly was slightly cooler than -0.5C, the weak La Niña threshold. However, not all of the atmospheric variables have consistently been supporting weak La Niña conditions. Although the upper level winds in the tropical Pacific suggest weak La Niña, the lower level trade winds only became stronger than average in late September. The Southern Oscillation index and the pattern of cloudiness and rainfall across the equatorial Pacific do indicate weak La Niña conditions, but the lack of enhanced trade winds until recently makes us uncertain that La Niña is really here. Therefore, our current 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.

### **Indian Ocean State**

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

## Predictions

### Rainfall

**14-day prediction:** NOAA NCEP models predicts total rainfall between 35-45 mm is expected in Galle and Matara districts with adjacent sea expected to receive 45-55 mm total rainfall during 19<sup>th</sup>-25<sup>th</sup> October. For the same period Kalutara, Ratnapura, Hambegamuwa and Yala areas are expected to receive total rainfall between 25-35 mm while Colombo, Avissawella, Nuwara Eliya, Bandarawela and Monaragala areas expected to receive total rainfall between 15-25 mm. A total rainfall between 25-35 mm is expected for Gampaha, Kegalla, Kandy, Badulla and Ampara regions. For the period 26<sup>th</sup> October–1<sup>st</sup> November total rainfall between 45-55 mm is expected in Colombo, Gampaha, Kegalla, Ratnapura and Galle regions. Puttalam, Kurunegala, Kandy, Nuwara Eliya and Matara regions are expected to receive total rainfall between 35-45 mm. Total rainfall between 25-35 mm is expected for Mannar, Anuradhapura, Polonnaruwa, and Badulla regions.

**Weekly prediction:** IMD GFS model predicts rainfall between 10-20 mm for the whole island on 20<sup>th</sup> of October. On 21<sup>st</sup> Rainfall between 20-40 mm is expected for Mullaitivu and adjacent sea area including wester sea near the island. The rest of the island is expected to receive between 10-20 mm rainfall except for Anuradhapura and Hambantota regions. On 22<sup>nd</sup> the coastal regions of the island except for southern coast are expected to receive between 10-20 rainfall with north eastern sea receiving 40-70 mm rainfall. On 23<sup>rd</sup> northern, western and center regions are expected receive rainfall between 10-20 mm. On 24<sup>th</sup> south western coastal region is expected to receive rainfall between 20-40 mm with adjacent sea receiving rainfall between 40-70 mm rainfall. The rest of the country except for Matale, Kurunegala, Anuradhapura and Mannar is expected to receive rainfall between 10-20 mm. On 25<sup>th</sup> north western, center and south eastern regions of the country are expected to receive rainfall between 10-20 mm.

**IMD WRF & IRI Model Forecast:** According to the IMD WRF model up to 64 mm of rainfall is expected in Chilaw and Puttalam regions on 21<sup>st</sup>. Several other north eastern and western coastal and regions of the country are expected to receive up to 35 mm rainfall. On 22<sup>nd</sup> the rainfall is expected to be increased with Kuchchaveli and the adjacent sea receiving rainfall up to 124 mm. Mullaitivu, Kilinochchi and Anuradhapura areas are expected to receive rainfall up to 65 mm. Up to 35 mm rainfall is expected in several other northern and western regions of the island.

**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 eastern coastal belt including Monaragala and Polonnaruwa. The maximum temperature of Ratnapura area will be between 25-30°C while in Kandy, Matale, Puttalam, Galle and Matara districts the maximum temperature will be 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 30 km/h north westerly wind in the southern half of the island including North Western province. Up to 18 km/h south westerly wind is expected for the northern half of the country. The 700 mb level predicts up to 36 km/h north westerly wind for the southern and central regions of the country while rest of the island is expected to receive wind with speed less than 20 km/h in the same direction.

## MJO based OLR predictions

MJO shall not have a significant impact on the rainfall in Sri Lanka.

### 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/>



[www.fb.com/fectsl](http://www.fb.com/fectsl)



[@fectlk](https://twitter.com/fectlk)

## Weekly Hydro- Meteorological Report for Sri Lanka

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#### 1. Monitoring

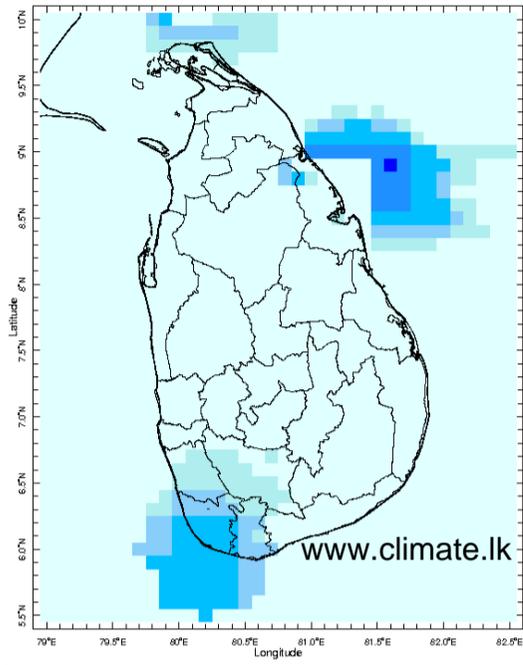
- a. Daily Rainfall Monitoring
- b. Weekly Rainfall Monitoring
- c. Monthly Rainfall Monitoring
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- e. Weekly Temperature Monitoring
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#### 2. Predictions

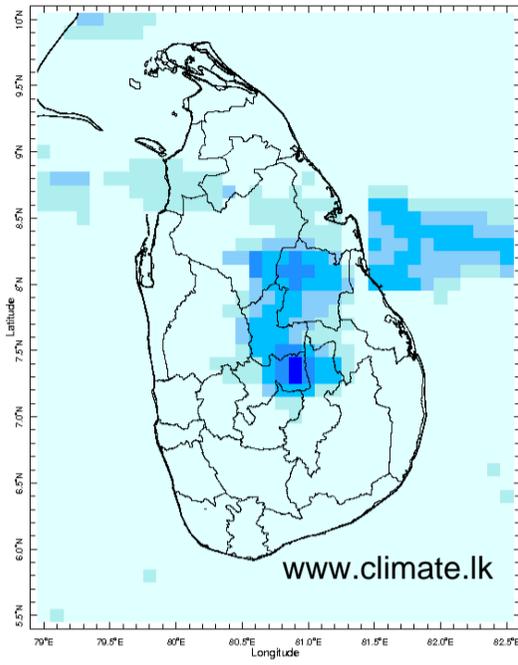
- a. NCEP GFS Ensemble 1-14 day Rainfall Predictions
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Daily Rainfall Monitoring

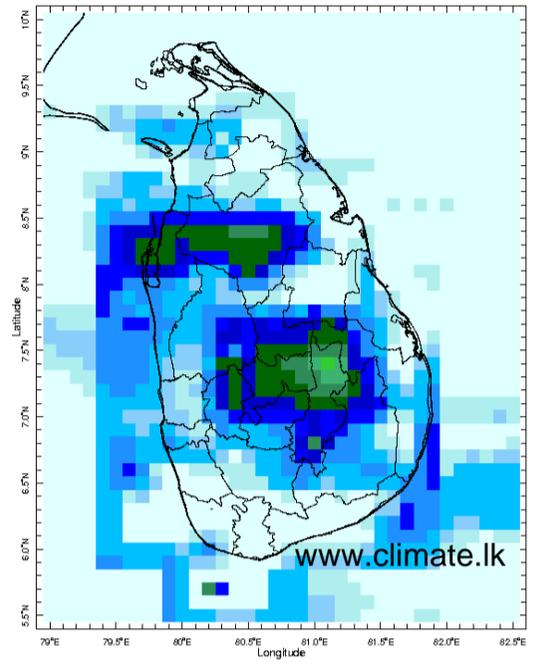
The following figures show the satellite observed rainfall in the last 7 days in Sri Lanka.



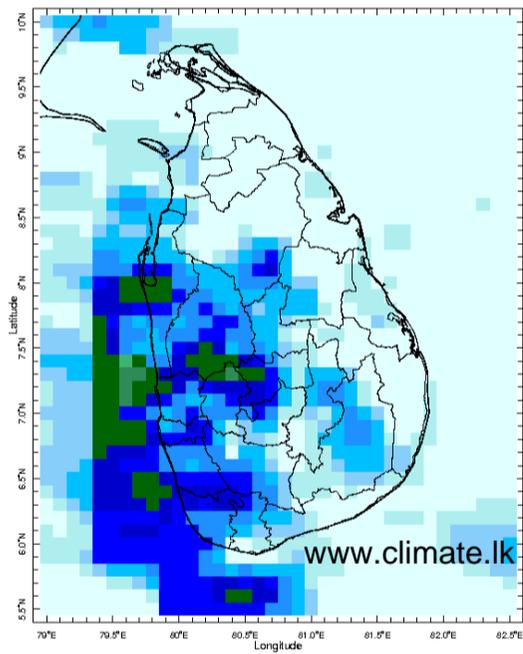
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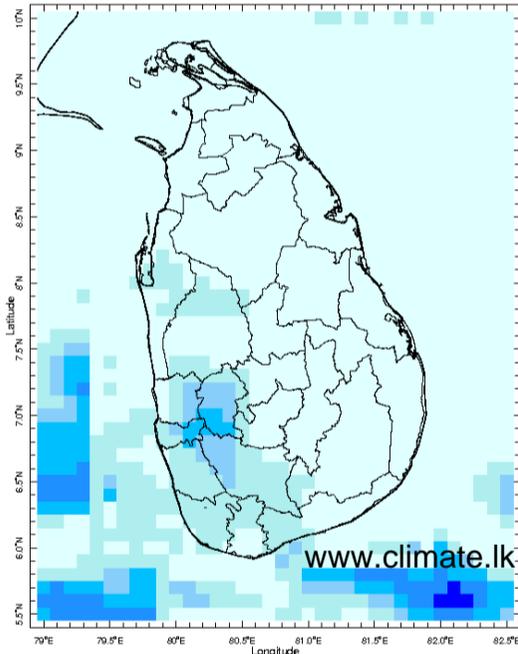
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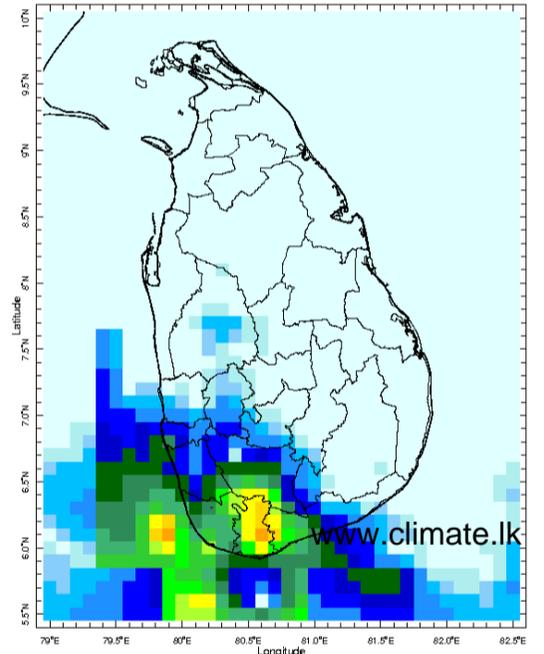
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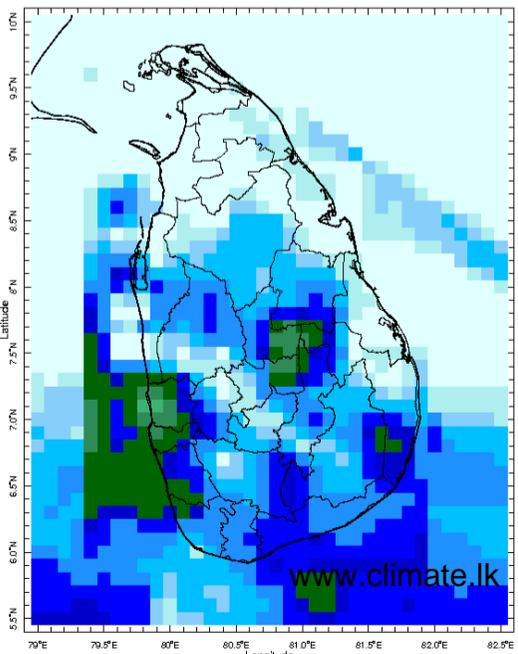
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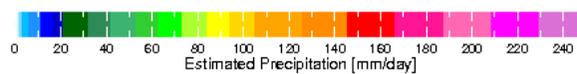
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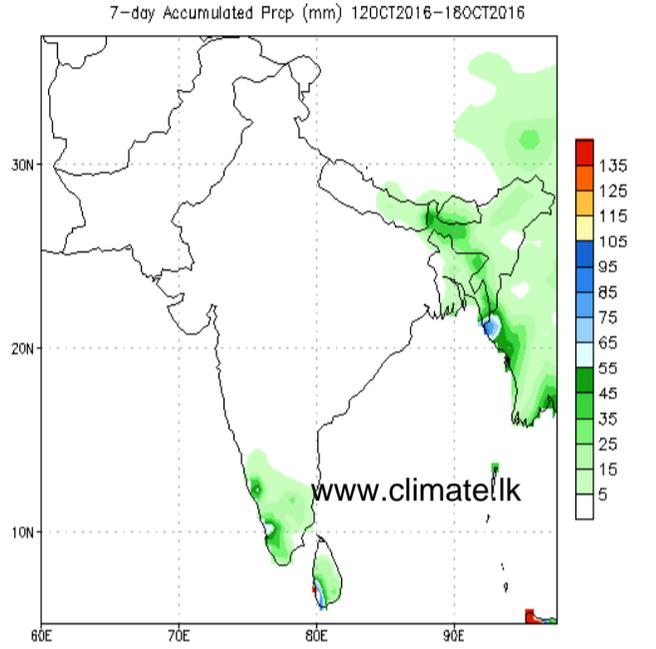


18 Oct 2016

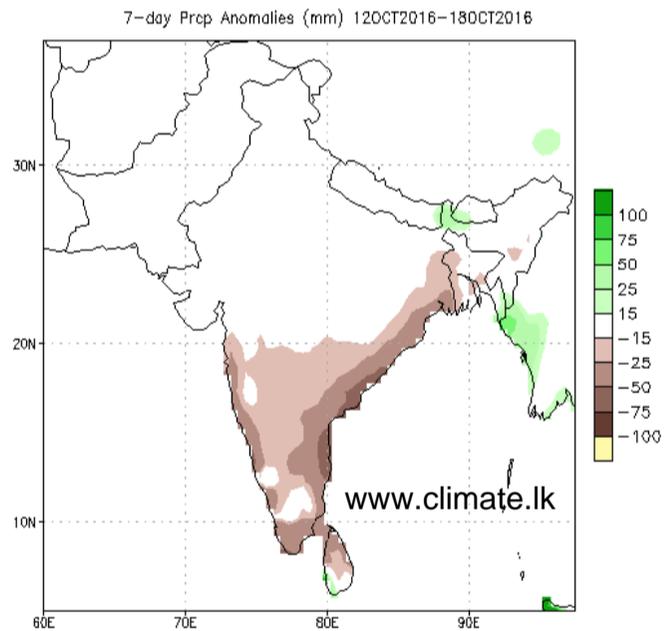
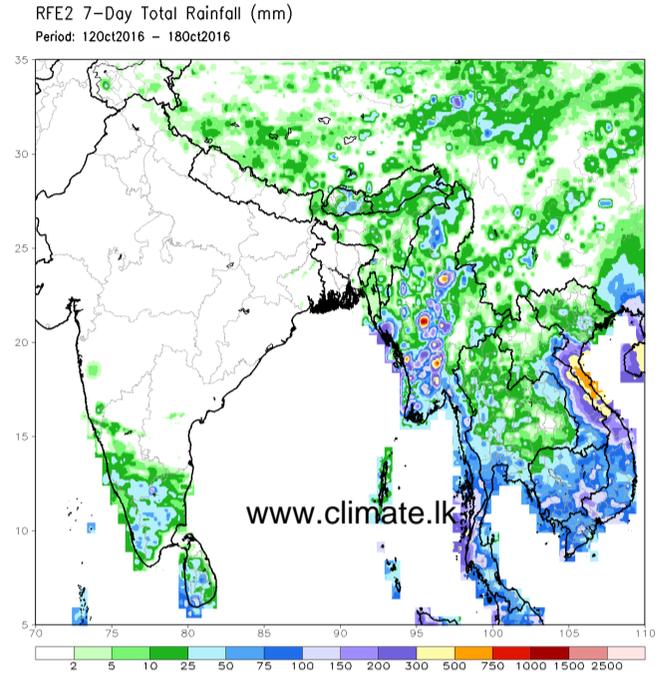


## Weekly Rainfall Monitoring

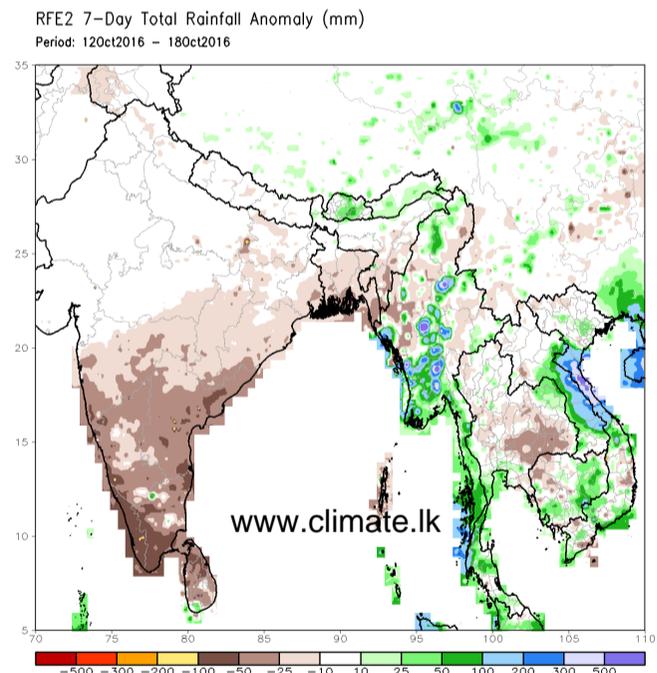
The following figures show the total satellite observed rainfall in the last week in Sri Lanka. The figure in the left is the total 7-day rainfall from NOAA Climate Prediction Center (CPC) Unified Precipitation Analysis and the figure in the right is the total 7-day rainfall from CPC RFE 2.0 Satellite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



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

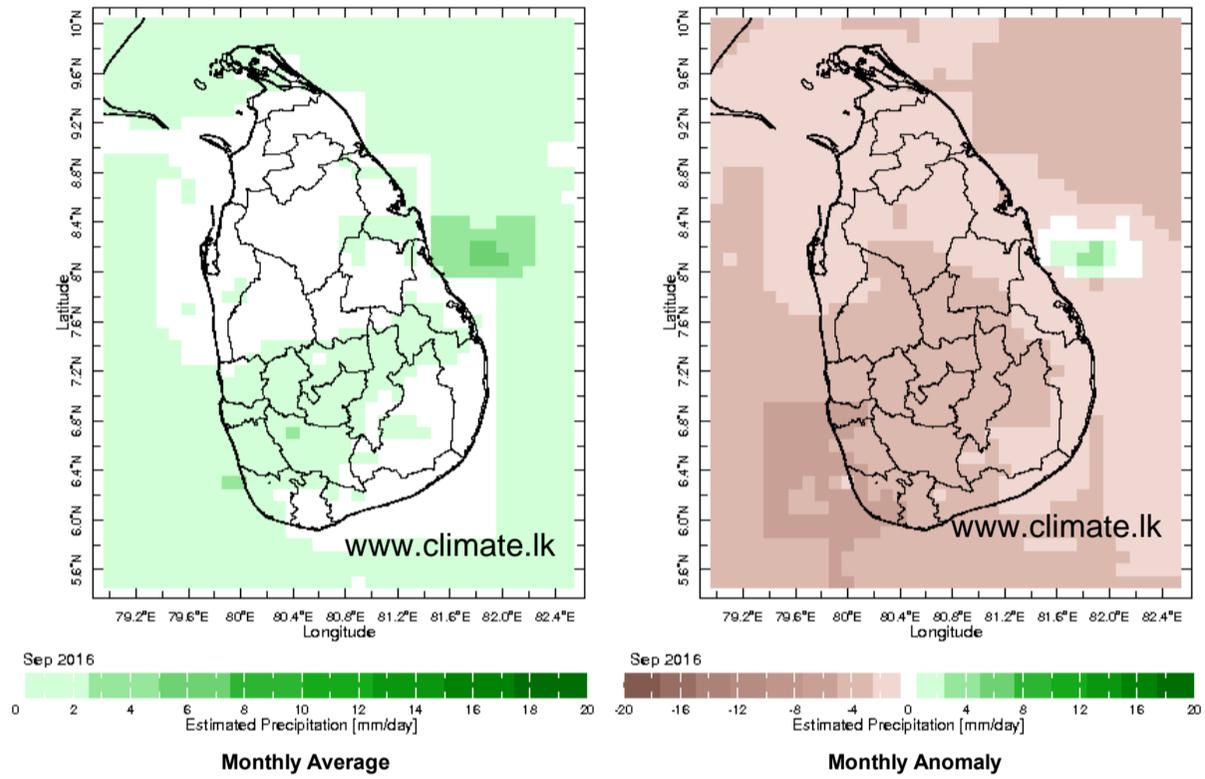


Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis  
Climatology (1981-2010)

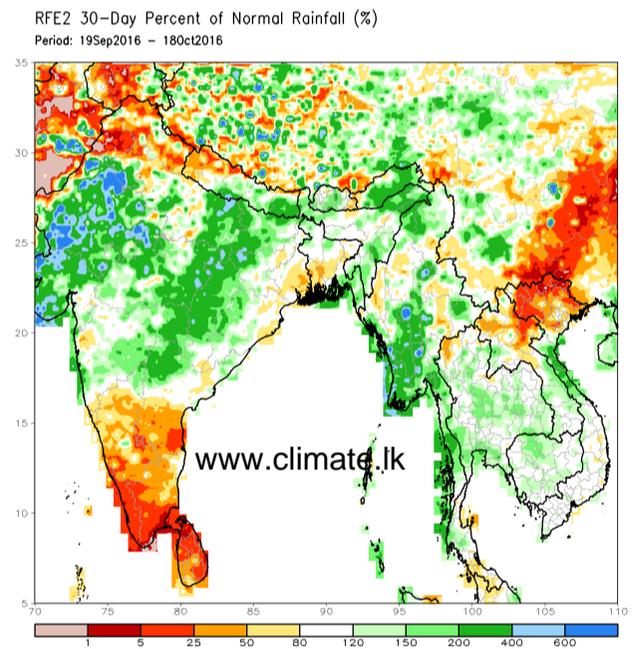
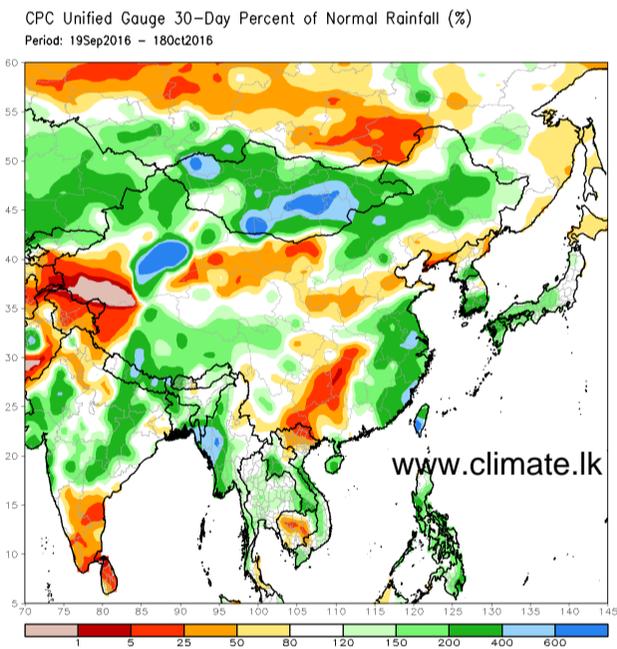
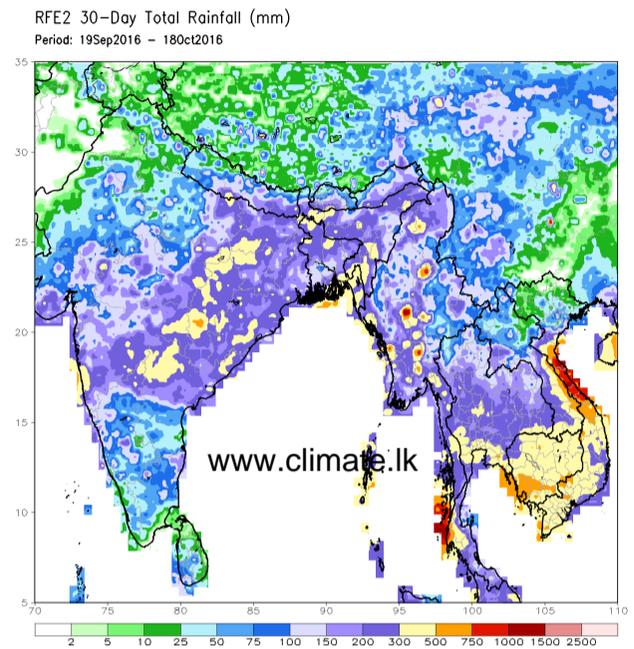
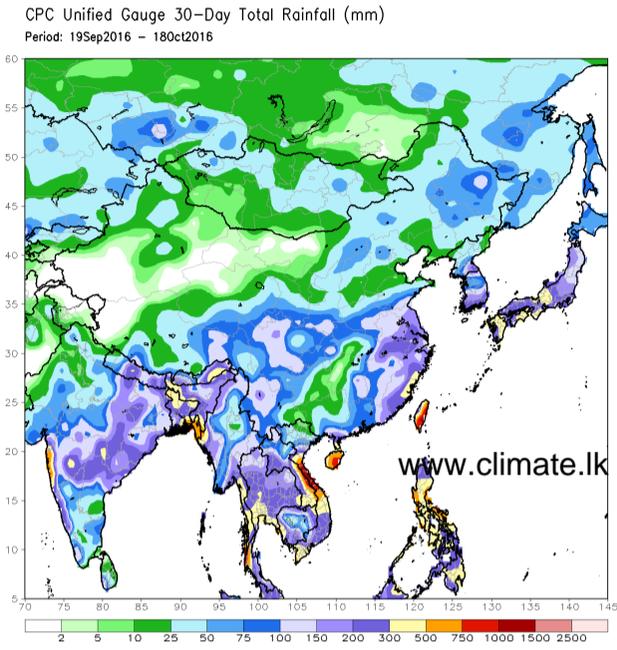


## Monthly Rainfall Monitoring

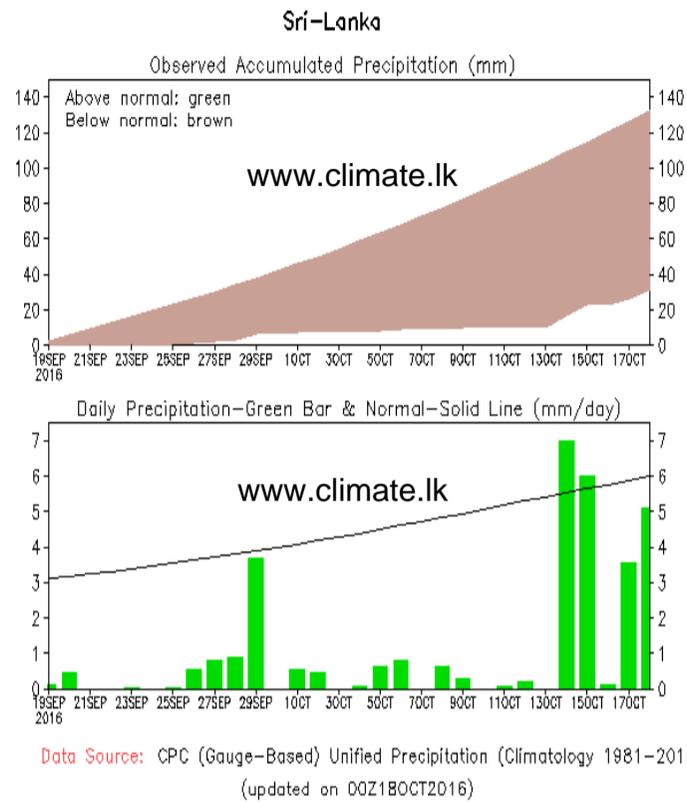
The figure in the left shows the average observed rainfall in the previous month. The rainfall anomaly in the previous month is shown in the figure to the right. The brown color in the anomaly figure shows places which received less rainfall than the historical average while the green color shows places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



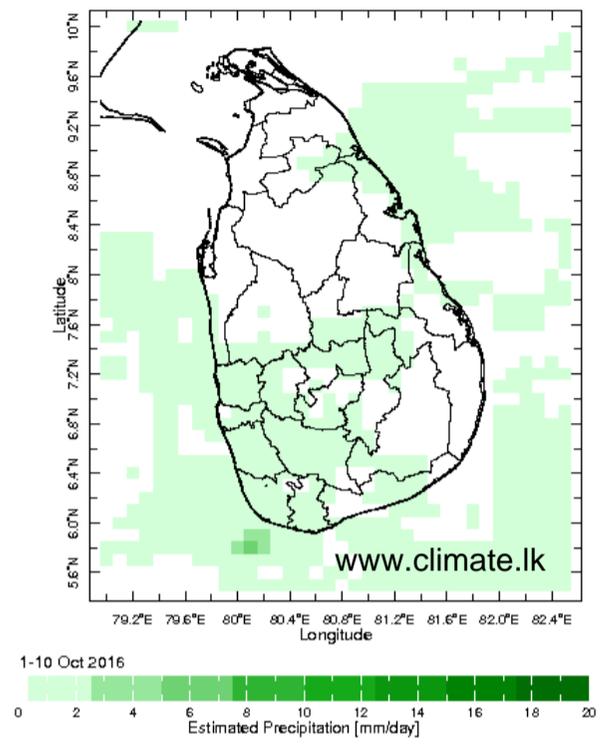
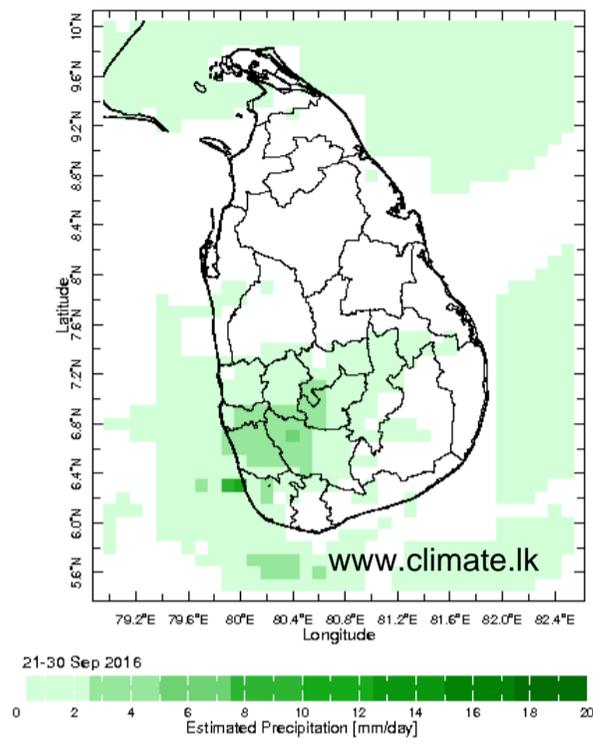
The figure in the top-left shows the total rainfall in the past 30 days from CPC Unified Precipitation Analysis while the figure in the top-right shows the total rainfall for the same period from RFE 2.0 Satellite Rainfall Estimates. The bottom two figures show the percentage of rainfall received in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

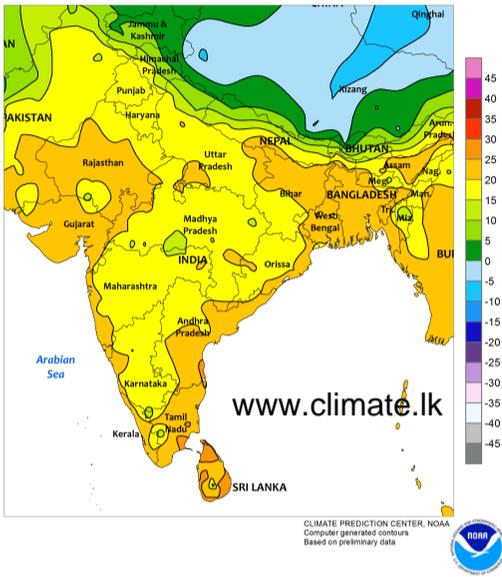


## Dekadal (10 Day) Satellite Derived Rainfall Estimates

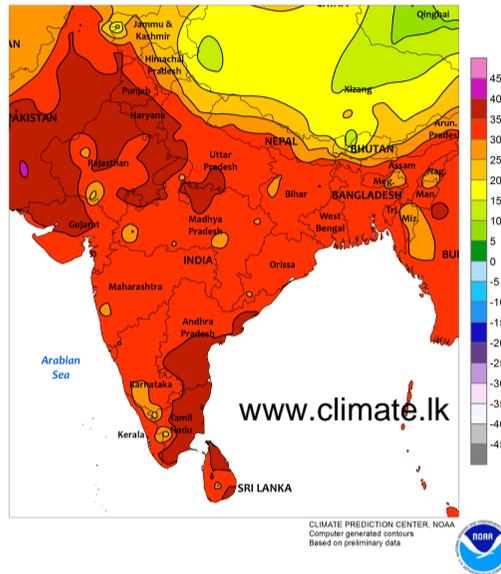


## Weekly Temperature Monitoring

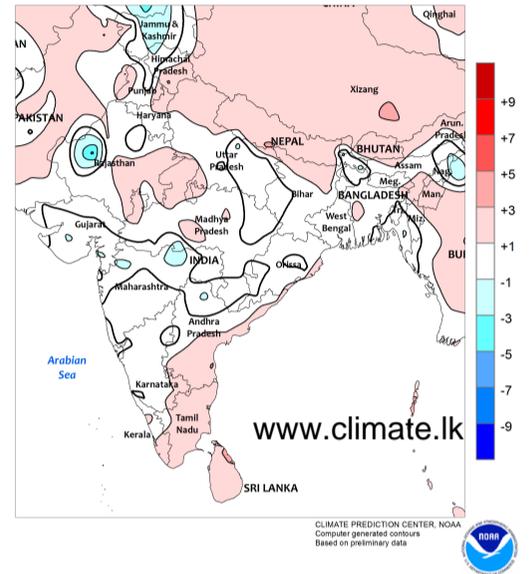
SOUTH ASIA  
Extreme Minimum Temperature (C)  
OCT 9 - 15, 2016



SOUTH ASIA  
Extreme Maximum Temperature (C)  
OCT 9 - 15, 2016



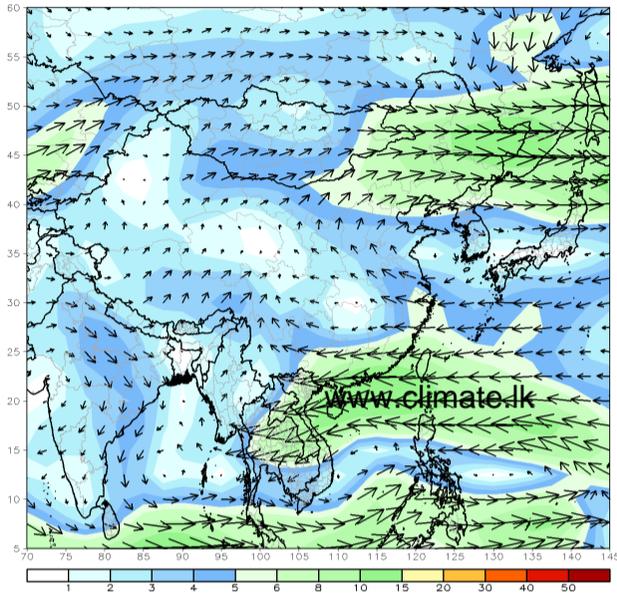
SOUTH ASIA  
Temperature Anomaly (C)  
OCT 9 - 15, 2016



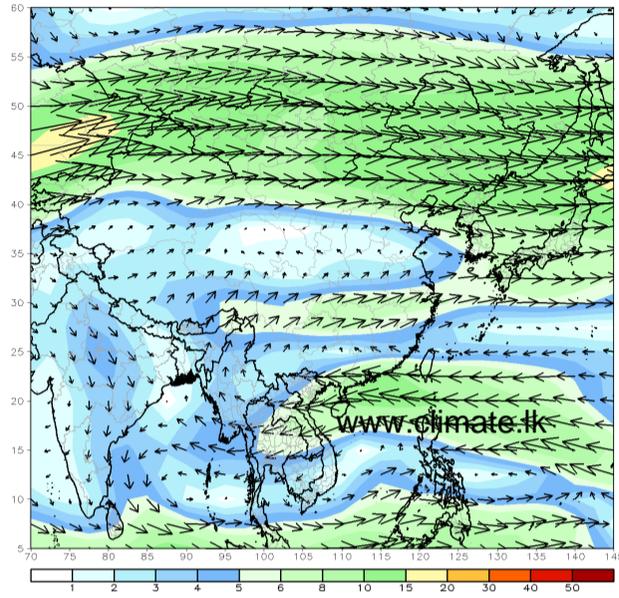
## Weekly Wind Monitoring

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.

CDAS 850mb 7-Day Mean Vector Wind Total (m/s)  
Period: 11Oct2016 - 17Oct2016

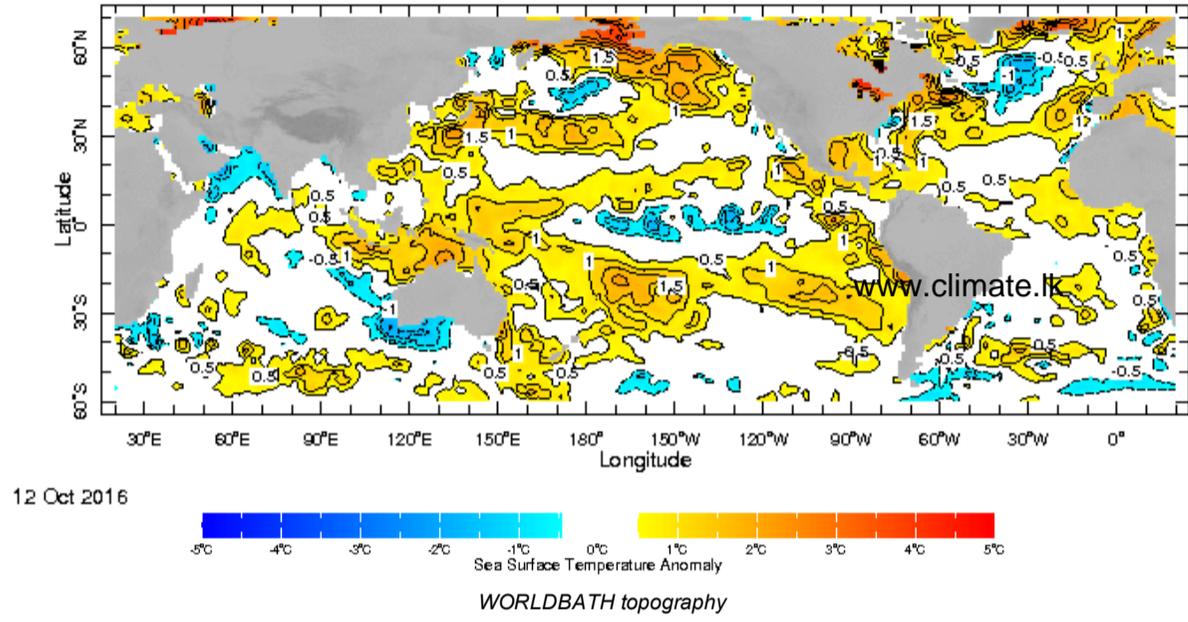


CDAS 700mb 7-Day Mean Vector Wind Total (m/s)  
Period: 11Oct2016 - 17Oct2016



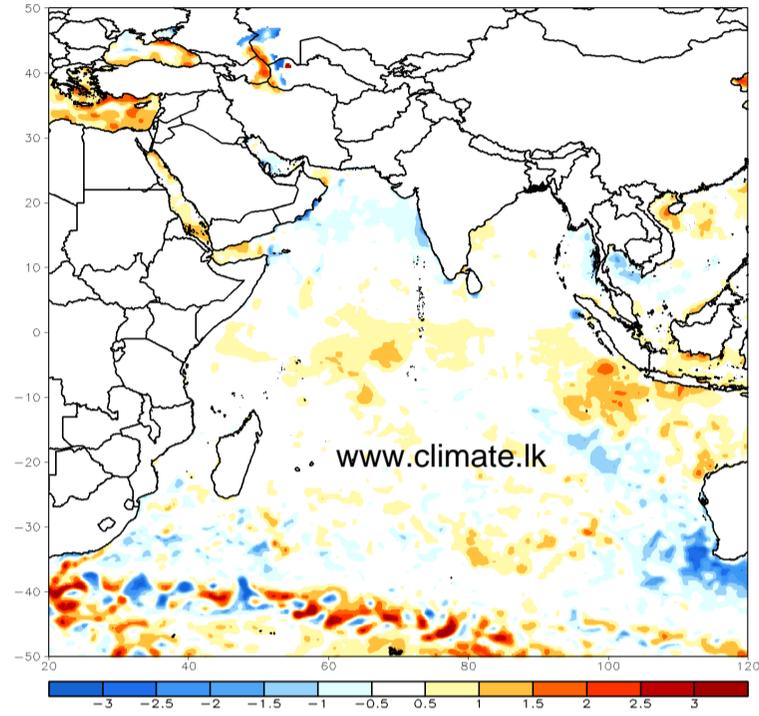
## Weekly Average SST Anomalies

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



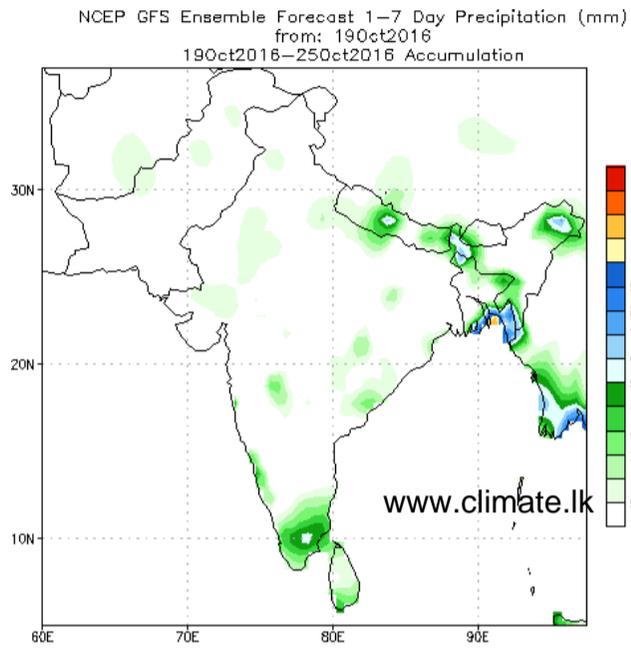
Optimum Interpolated Sea Surface Temperature Anomaly in the Indian Ocean from NOAA CPC

OI SST (v2) 7-Day Anomaly (C)  
Period: 12Oct2016 - 18Oct2016

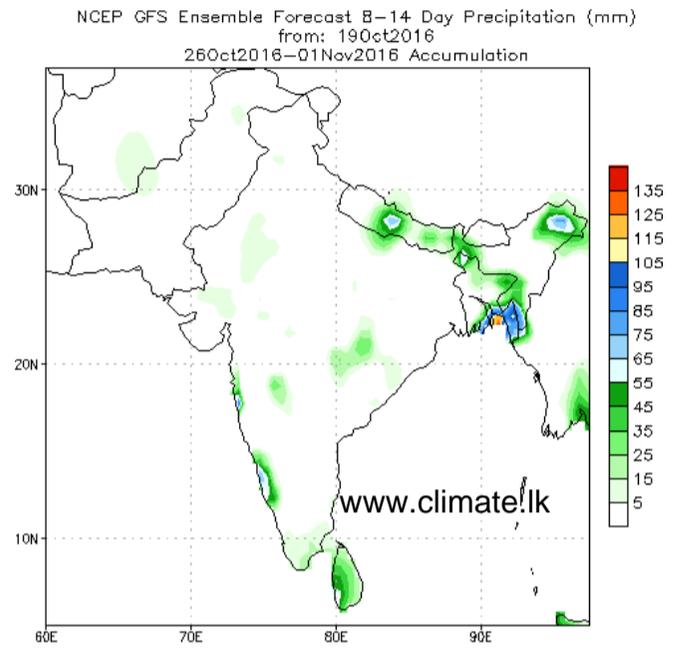


# PREDICTIONS

## NCEP GFS 1- 14 Day prediction

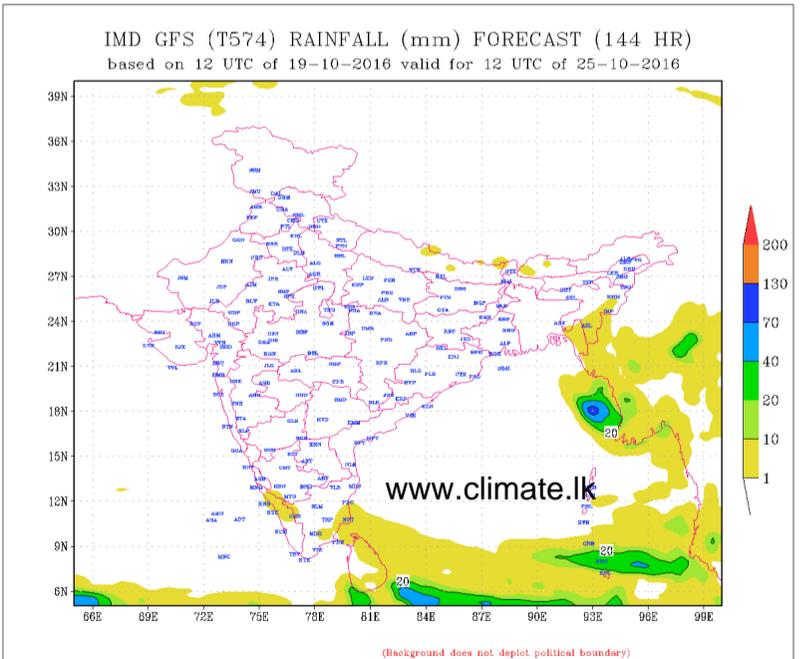
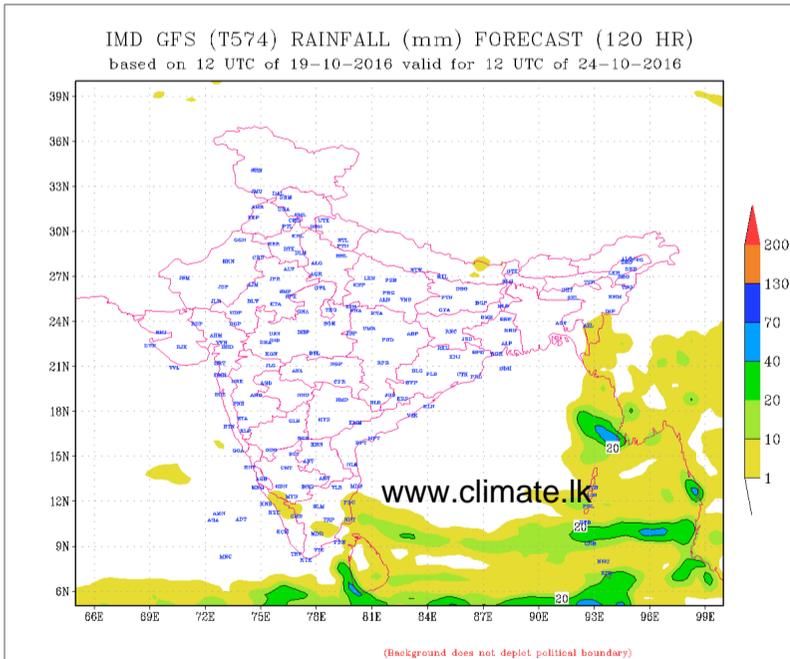
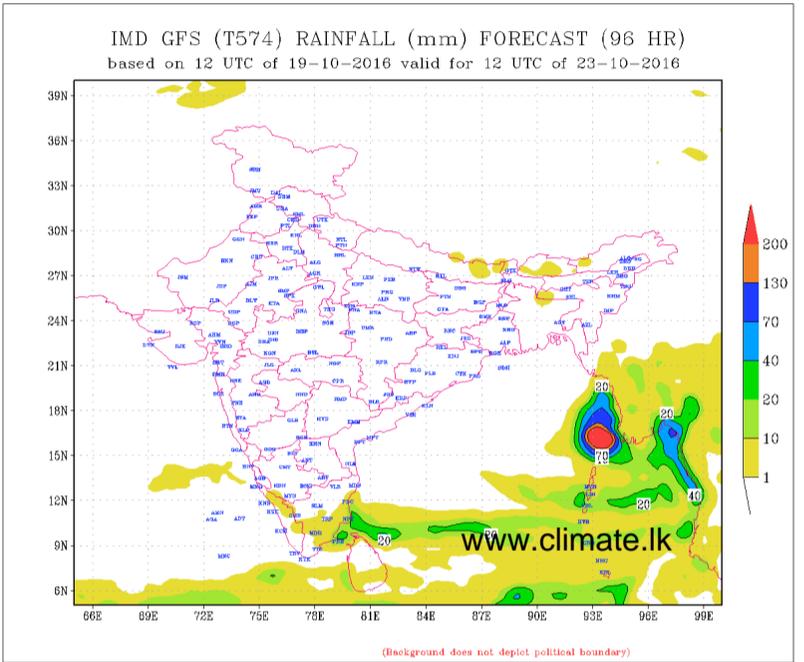
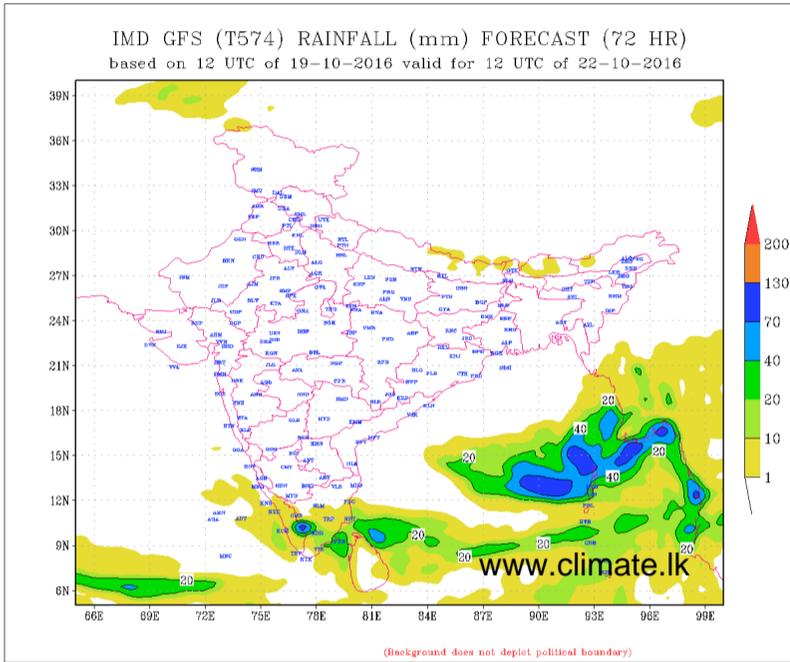
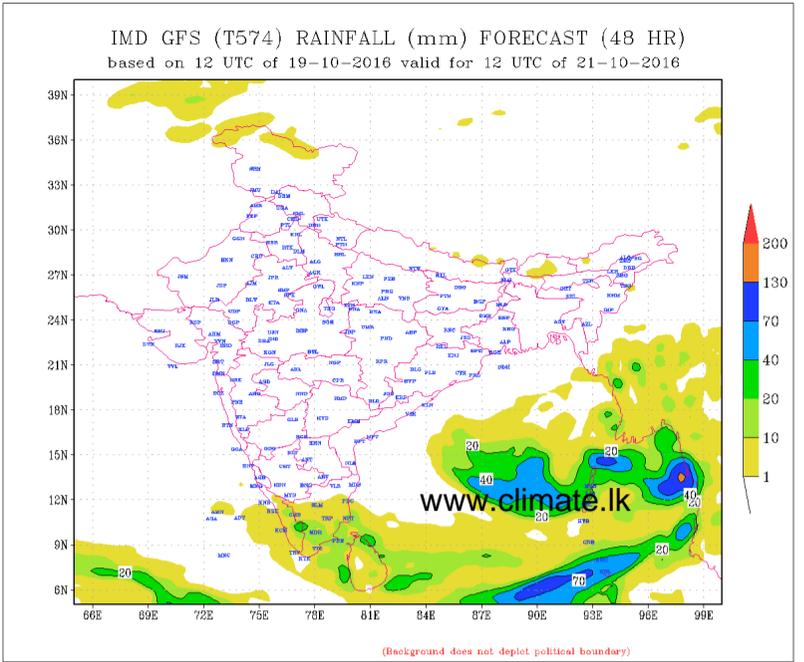
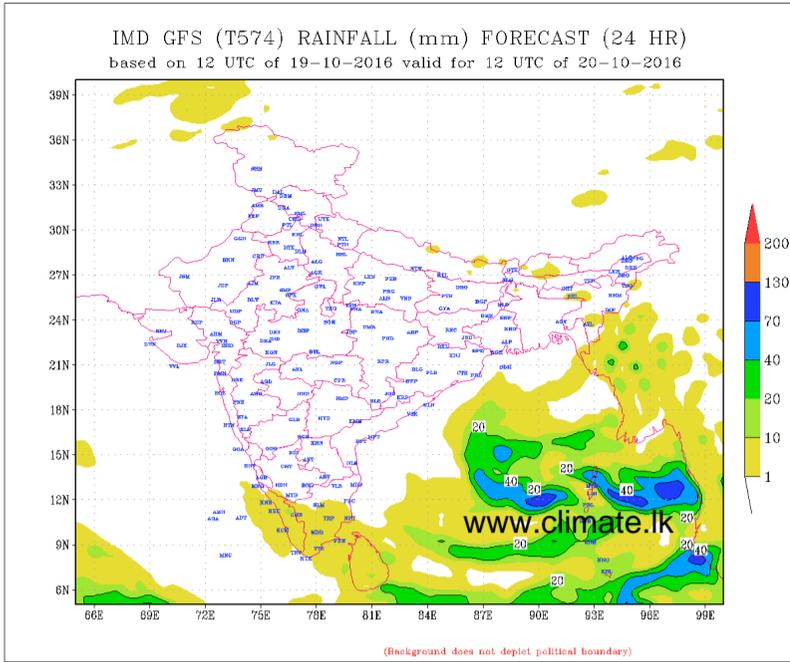


Bias correction based on last 30-day forecast error

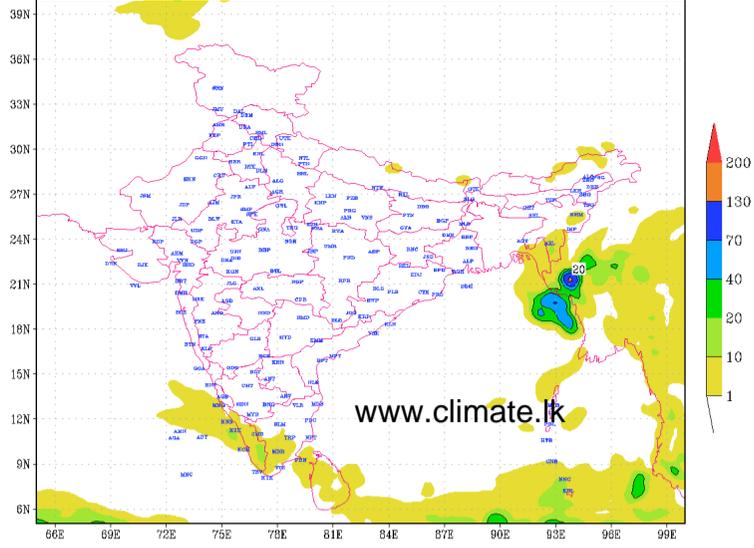


Bias correction based on last 30-day forecast error

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



IMD GFS (T574) RAINFALL (mm) FORECAST (168 HR)  
based on 12 UTC of 19-10-2016 valid for 12 UTC of 26-10-2016

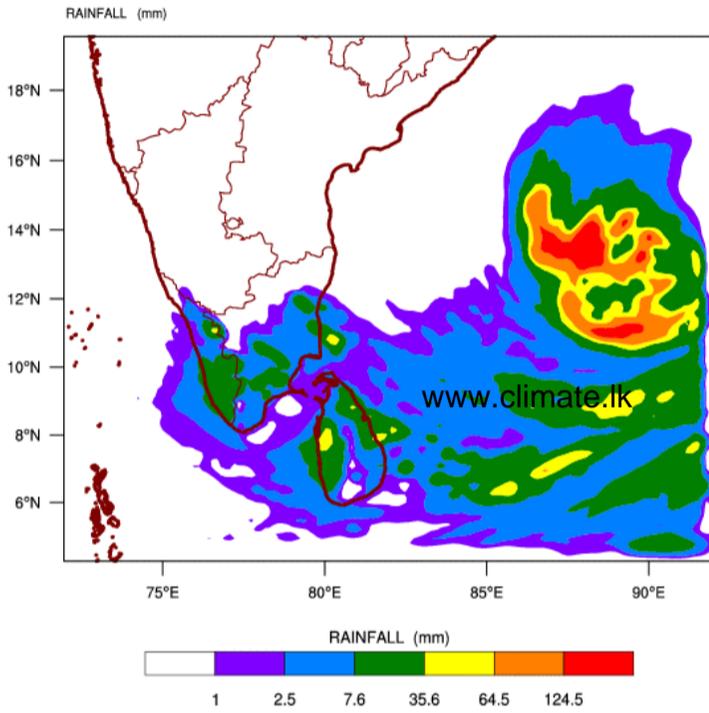


(Background does not depict political boundary)

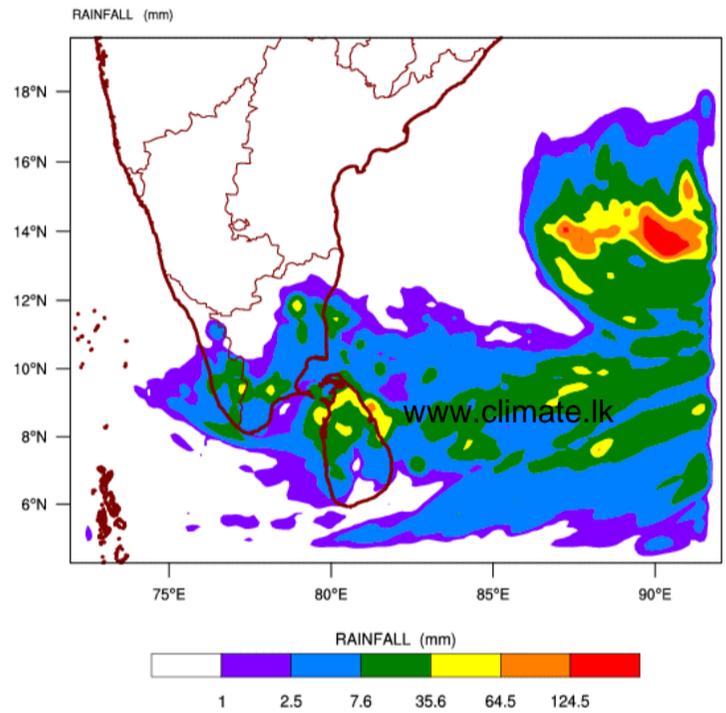
**WRF Model Forecast (from IMD Chennai)**

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WRF MODEL FORECAST (48 HR.) RAINFALL(mm)\  
based on 00 UTC of 19-10-2016 valid for 03 UTC of 21-10-2016

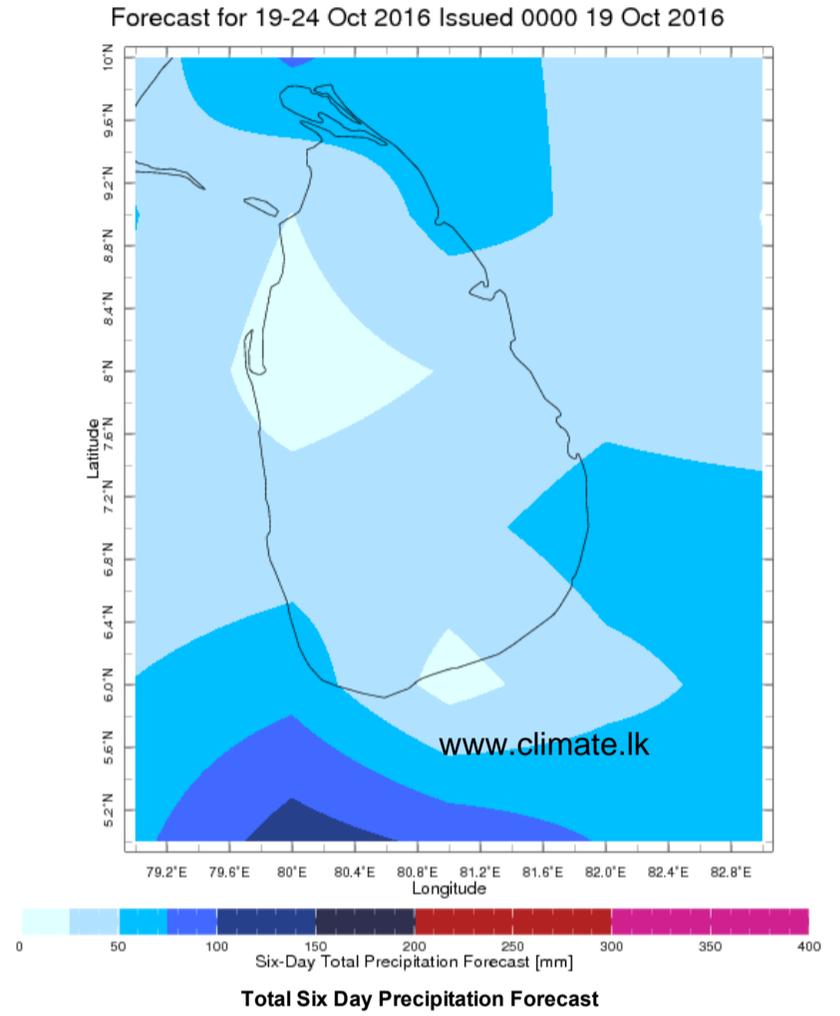
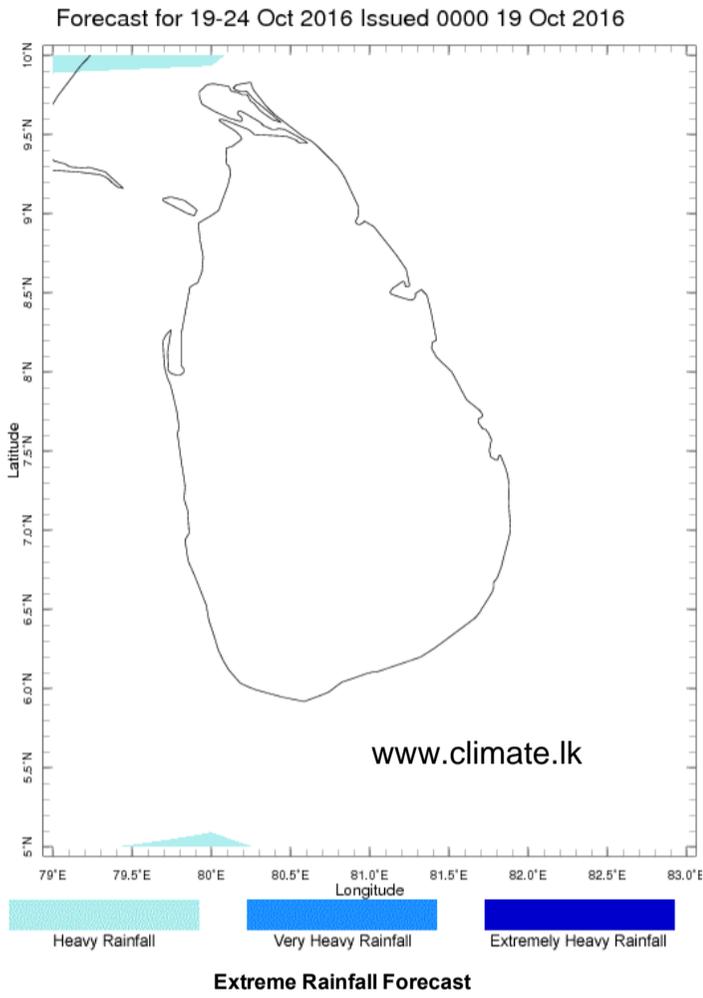


WRF MODEL FORECAST (72 HR.) RAINFALL(mm)\  
based on 00 UTC of 19-10-2016 valid for 03 UTC of 22-10-2016



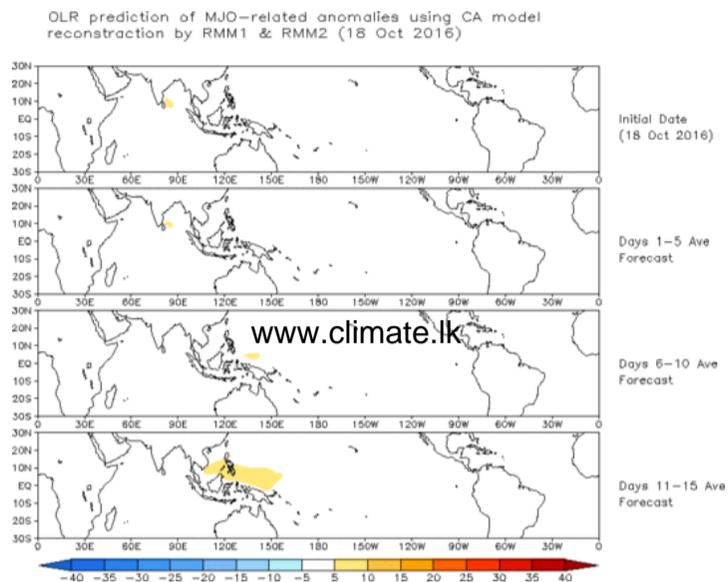
## Weekly Rainfall Forecast from IRI

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.



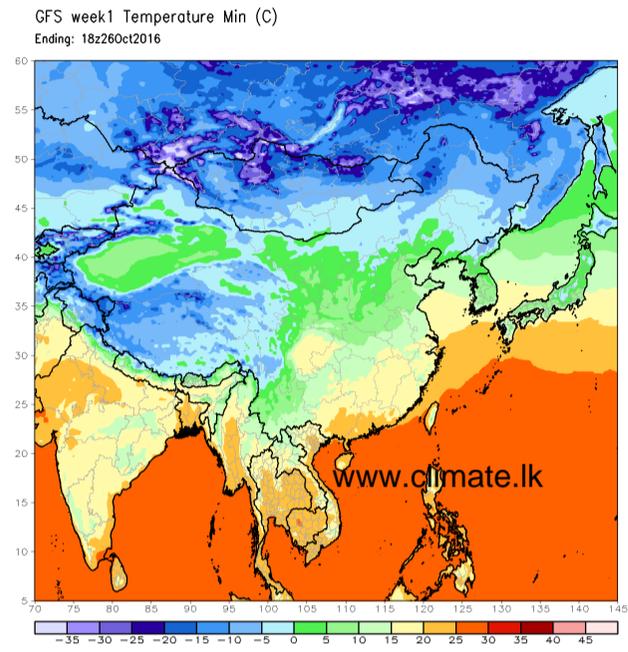
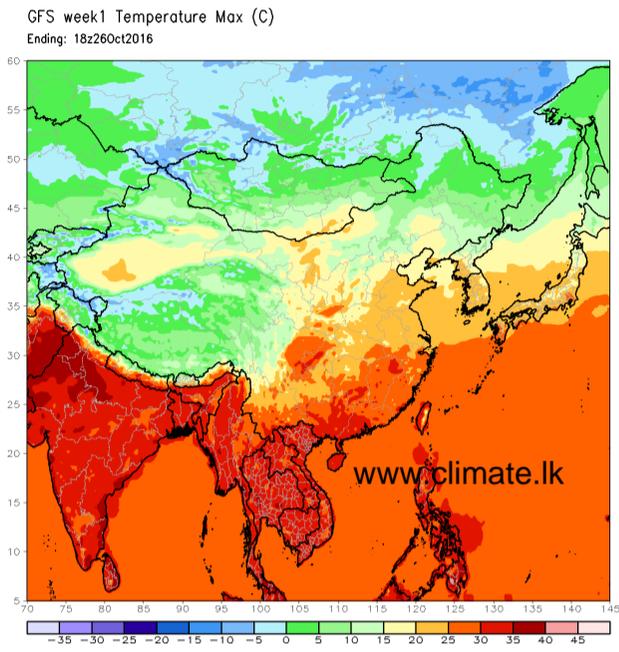
## Madden Julian Oscillation (MJO) related Outgoing Longwave Radiation (OLR) Forecast

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

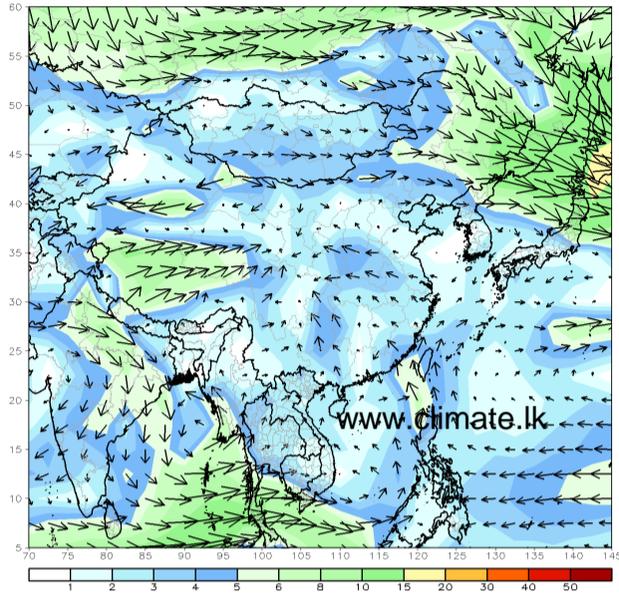
Weekly Minimum and Maximum Temperature prediction from the GFS model (from NOAA CPC)



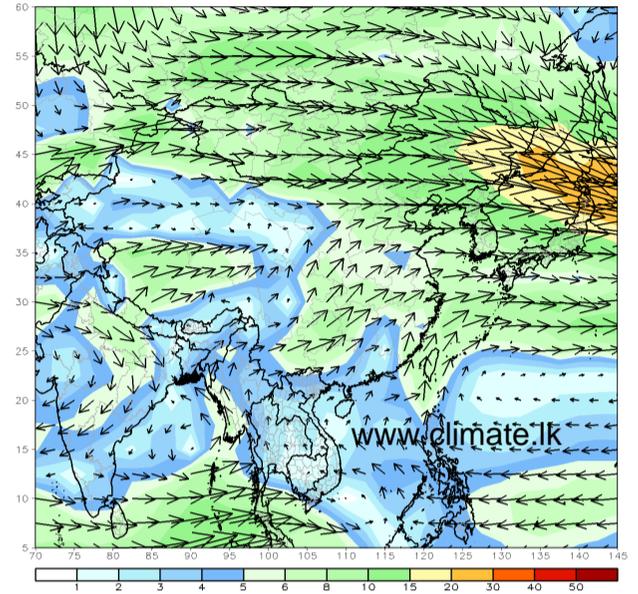
## Weekly Wind Forecast

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

GFS 850mb week1 Mean Vector Wind Total (m/s)  
Ending: 18z26Oct2016

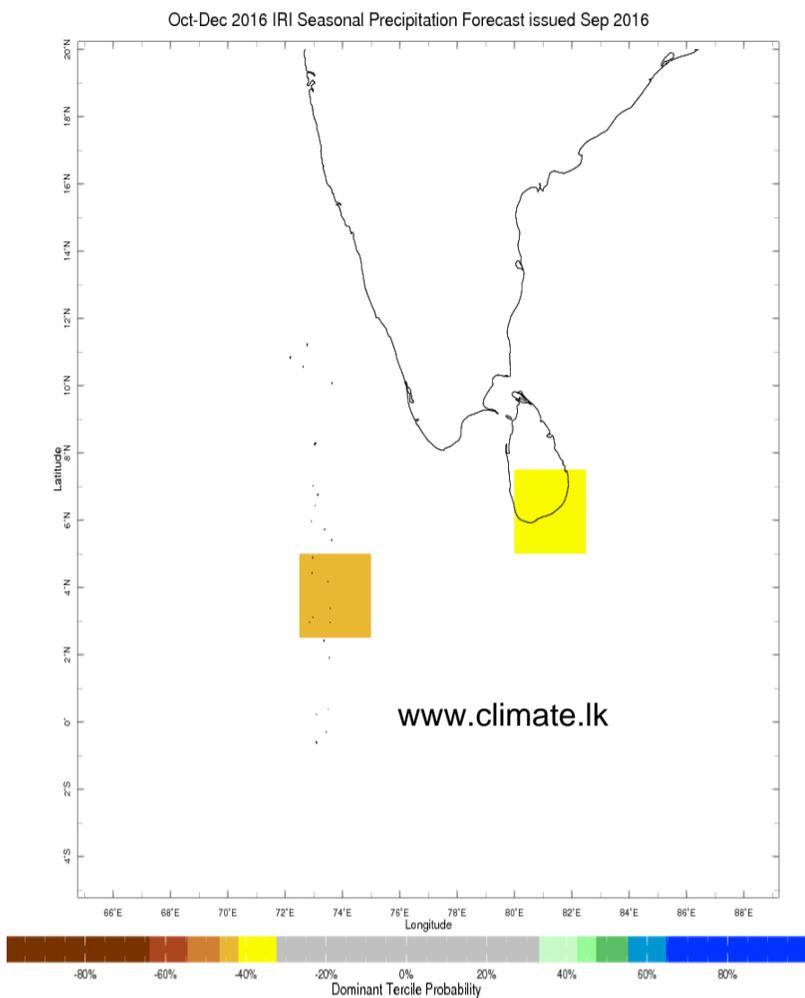


GFS 700mb week1 Mean Vector Wind Total (m/s)  
Ending: 18z26Oct2016

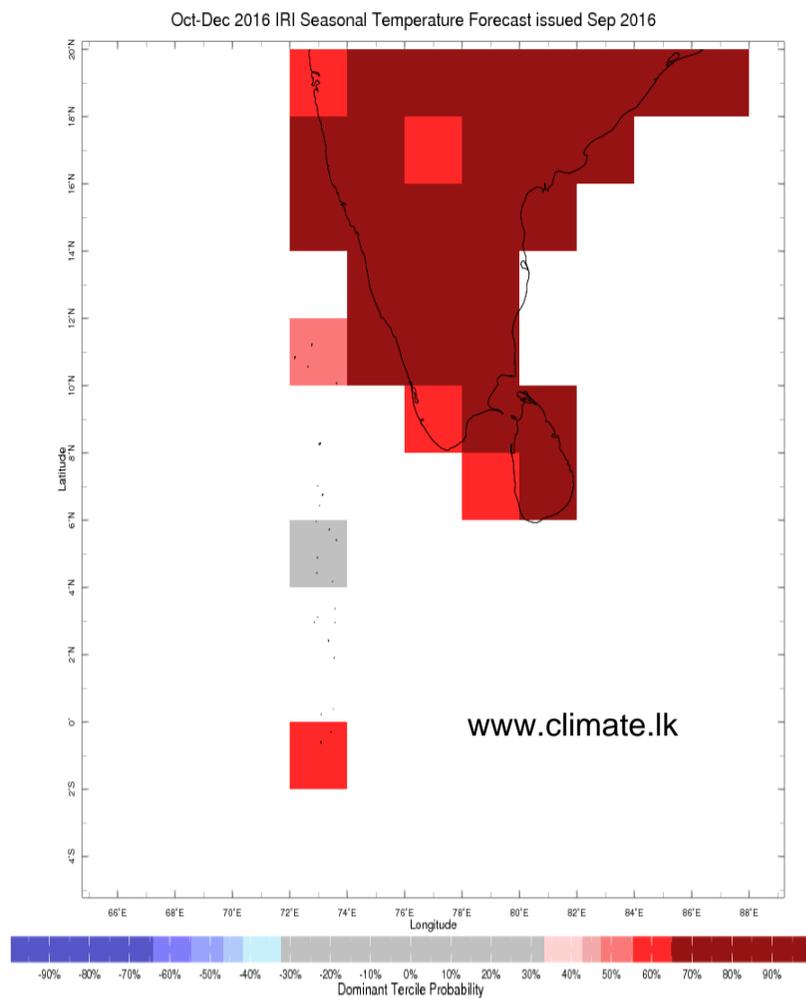


# Seasonal Rainfall and Temperature Forecast

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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