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Experimental Climate Monitoring and Prediction

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30 June 2016

Highlights

The entire country received low rainfall during the previous week except the sea adjacent to North Eastern side of the island. During the previous week maximum temperature of 35-40 ^{0}C was seen along the eastern coastal belt while the minimum temperature of 20^0 C was recorded in Nuwara Eliya. NOAA NCEP models predict up to 55mm total rainfall in the Ratnapura town in the next week while Colombo may experience up to 45mm rainfall. NOAA CPC GFS model predicts 35- 40 ^{0}C maximum temperature along the coastal region in the eastern side of the island. Wind speed is expected to remain at 15m/s throughout the country and the surrounding sea. MJO shall enhance rainfall conditions up to 5 days ahead and thereafter shall suppress.

Monitoring

Rainfall

Weekly Monitoring: No rainfall received by the island from 22nd to 25th but a considerable amount of rainfall was seen in the North Eastern Sea close to Kilinochchi and Mulativu as up to 80 mm. The intensity of the rain was seen to have reduced on the 24th and a rainfall of 20 mm was recorded in the north eastern sea in general. Only slight rains were recorded in that region on the 25th. On the 26th, no significant rainfall was seen in the entire country. Up to 20mm rainfall was recorded in Balangoda, Kahawatta and surrounding areas as well as on the central part of the Galle- Matara border on the 27th. On the 28th, up to 20 mm of rainfall was recorded in the north eastern ocean adjacent to Kilinochchi and Mulativu and slight rainfall was recorded in the Central Province and in Kegalle, Badulla and Balangoda. On the same day up to 30 mm of rainfall was recorded in the south eastern ocean as up to 30 mm. Based on the CPC Unified Precipitation Analysis, a total precipitation of up to 25 mm was recorded in the Central and Sabaragamuwa provinces as well as in Matara and Galle districts. According to the RFE 2.0 model a total precipitation of 25mm was recorded in Ratnapura and Galle districts as well as in some areas of the Central Province. The model shows 25mm below average rainfall in the Western Province and sea adjacent to Matara and the western province.

Monthly Monitoring: Entire country received more rainfall than the historical average during May 2016. The districts in western, north western and north central provinces received up to ~450 mm monthly excess rainfall than the historical average. CPC Unified Precipitation Analysis (during 20th May- 28thth June) recorded up to 500 mm total rainfall in Kalutara and Colombo Districts. The model along with the RFE 2.0 model records 150-200 mm total rainfall in the rest of the Western province, Kegalle district and major part of the Ratnapura district. A total precipitation of 75-100 mm was recorded in the Central province and the Central belt of the North western province. Within the period Kalutara, Kegalle, Ratnapura and Matara received 1.5 times more rainfall than the normal and Northern Province, Batticaloa and Moneragala received only 25% of the normal rainfall. During 1st-27th June highest precipitation was recorded on 7th and 12th and up to 70 mm below normal average precipitation was recorded in the entire country during the period.

Temperature

During the week from 19th to 25th highest maximum temperature was seen as 35-40 ^{0}C along the eastern and north eastern coastal band of the island. Nuwara Eliya region experienced lowest maximum temperature of 20-25^{0}C.The minimum temperature of 15-20 ^{0}C was recorded in Nuwara Eliya. The mean temperature during this week was 1- 3 ^{0}C above average in the southern region as well as in Jaffna and Kilinochchi.

Wind

The southern half of the country received 15-20 m/s total north westerly wind at the 850 mb level during the previous week while northern region received up to 15 m/s wind in the same direction. At the 700 mb level, Nothern province received wind speed up to 15 m/s while the rest of the country received wind speed up to 20m/s.

Ocean State

Pacific seas state: June 16, 2016

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

Indian Ocean State

Neutral sea surface temperature anomaly was observed around Sri Lanka.

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Predictions

Rainfall

14-day prediction: NOAA NCEP models predict up to 45mm total rainfall in Ratnapura and surrounding areas and up to 35mm rainfall in Colombo district during the week from 29th June to 05th July. In the same week the rest of the Sabaragamuwa province, Kurunegala and Gampaha districts may experience up to 25mm of rain. During the week from 6th-12th July, Colombo and the western side of Ratnapura will receive up to 55mm of rainfall. The adjacent areas including Gampaha and Kegalle may experience a rainfall of up to 45mm. The central province, North Western province, Ratnapura and the central region of Ratnapaura may experience rainfall of between 15-35mm.

Weekly prediction: *IMD GFS* model predicts up to 20 mm rainfall in the western region of the country on 1st July and there shall not be any rain during 2nd – 4th July in the entire country. On 5th, up to 20 mm rainfall is expected in Kalutara and Galle coastal region. On 6th the western Region of the Galle district including Galle town and the adjacent sea may receive up to 20 mm of rain. Up to 40 mm of rain is expected in the sea adjacent to Colombo and Kalutara on the 7th while up to 20 mm of rainfall is expected in rest of the Western province.

IMD WRF & IRI Model Forecast*:* According to the IMD WRF model, on 2nd July there will up to 35 mm of rainfall in the western and Sabaragamuwa provinces while there shall not be a substantial amount of rainfall in the rest of the island. Up to 35 mm of rain is expected in the same region along with the North western region on the 3rd July. No extreme rainfall is expected in the island for the period of 29th June-04th July and for the period the total expected precipitation remains at 25mm.

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

Temperature

NOAA CPC GFS model predicts 35- 40 ^{0}C maximum temperature along the coastal belt in the Eastern side of the country, the Northern Province as well as in Monaragala and Polonnaruwa Districts. The north western side of the country, Matale and Gampaha districts will experience a maximum temperature of between 30- 35 ^{0}C. Maximum temperature in the hill country and the Western province shall be between 25- 30 ^{0}C. During the same week, minimum temperature is expected around Nuwara Eliya and Badulla to be 15- 20 ^{0}C while in the northern region and Hambantota it shall be 25-30 ^{0}C. The minimum temperature in the rest of the country shall be 20-25 ^{0}C.

Wind

The wind speed shall remain at 15 m/s in the entire country as well as the surrounding sea during 22nd – 29th June in at 850 mb and 700 mb levels.

MJO based OLR predictions

MJO shall be in the Indian Ocean in the next 5 days. Thereafter the MJO shall move to the Maritime Continent. There shall be some enhancement of rainfall conditions due to the MJO in the next 5 days and the enhancement shall be less during day 6- 10 in the future. After that there shall be a slight suppression in rainfall conditions.

[1] 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.

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Weekly Hydro- Meteorological Report for Sri Lanka

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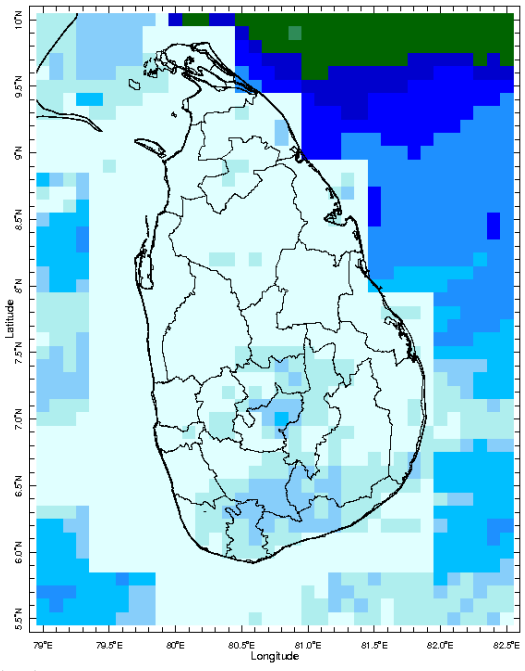
MONITORING

Daily Rainfall Monitoring

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



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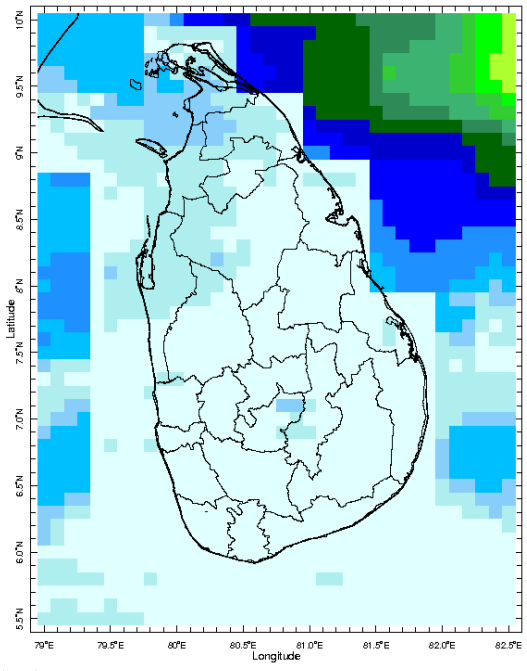

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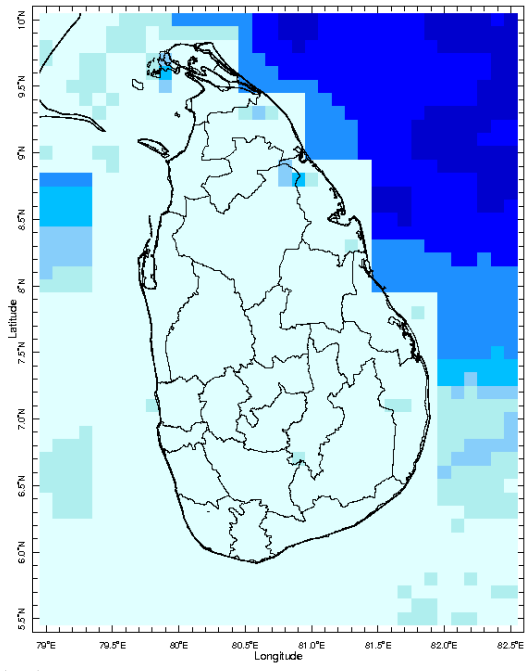

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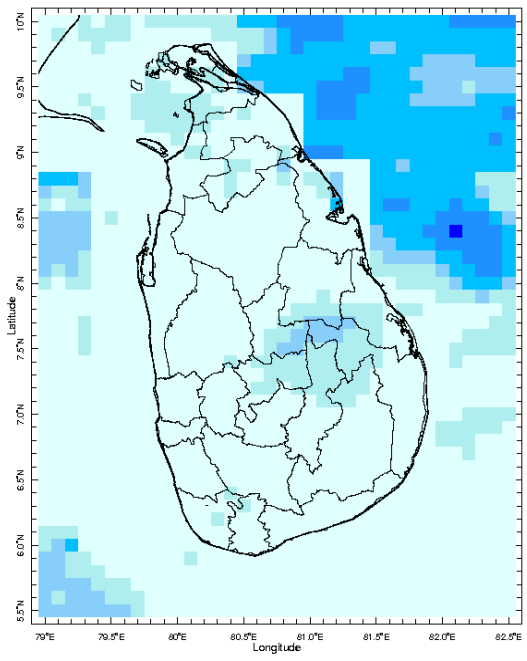

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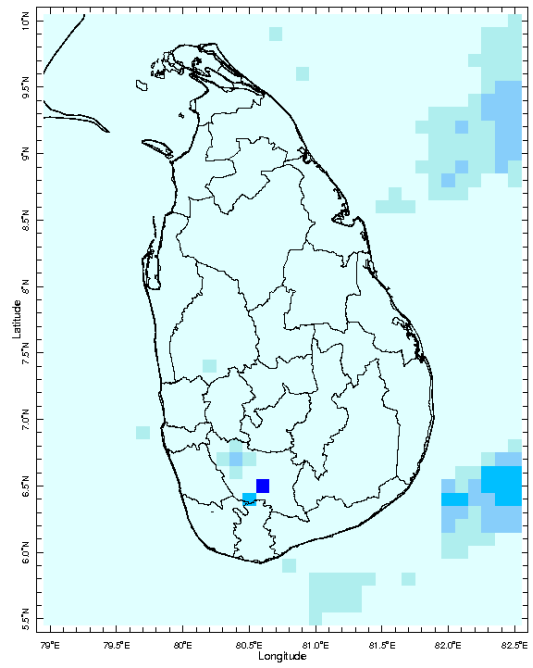

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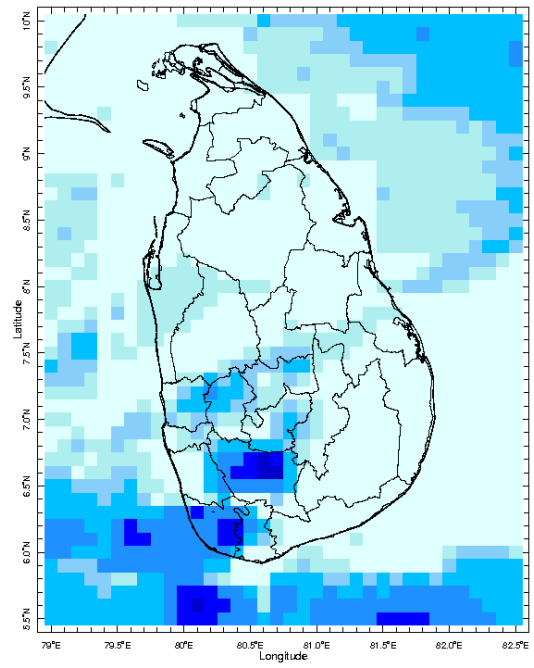

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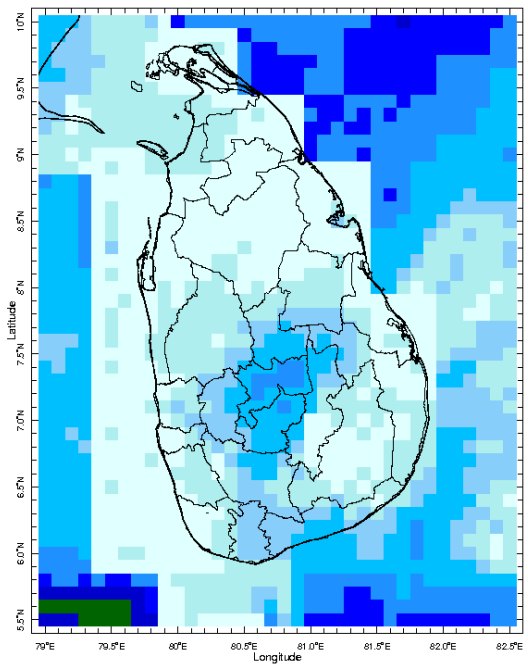
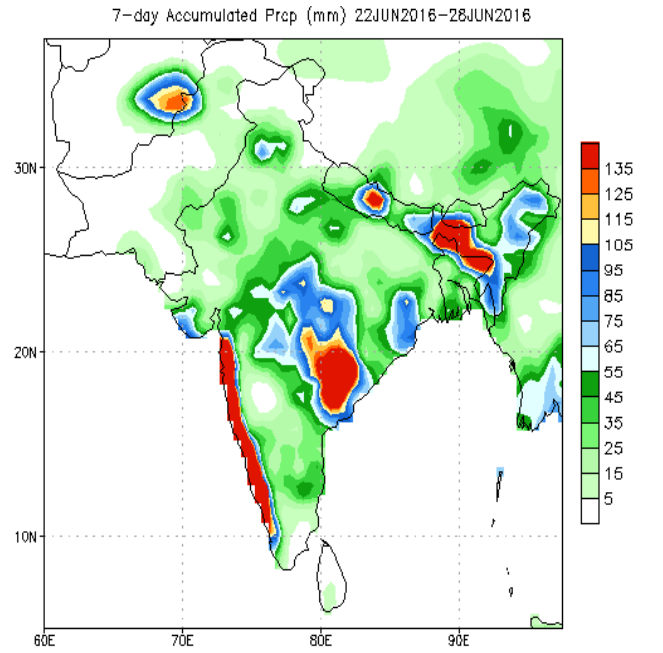


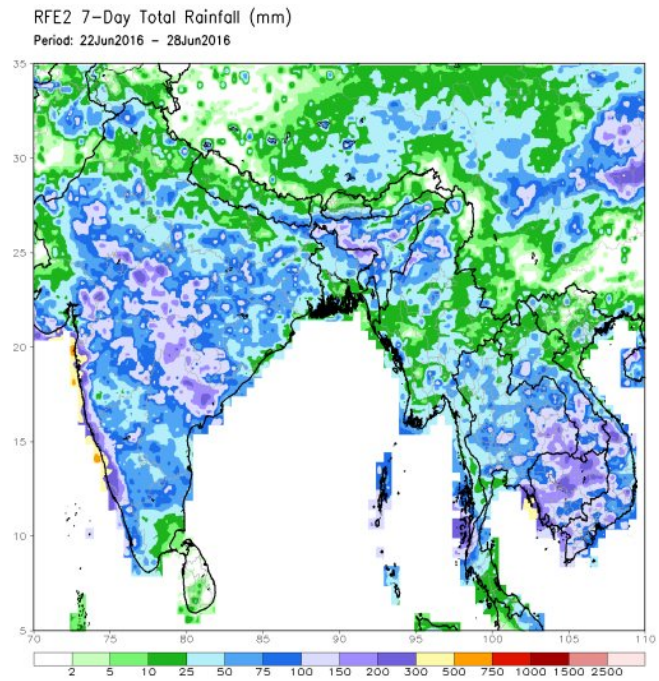
28 Jun 2016

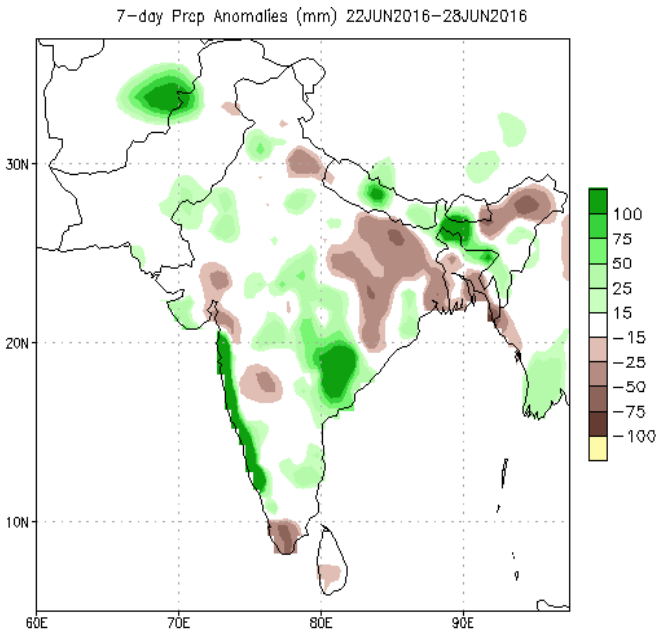
Weekly Rainfall Monitoring

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.

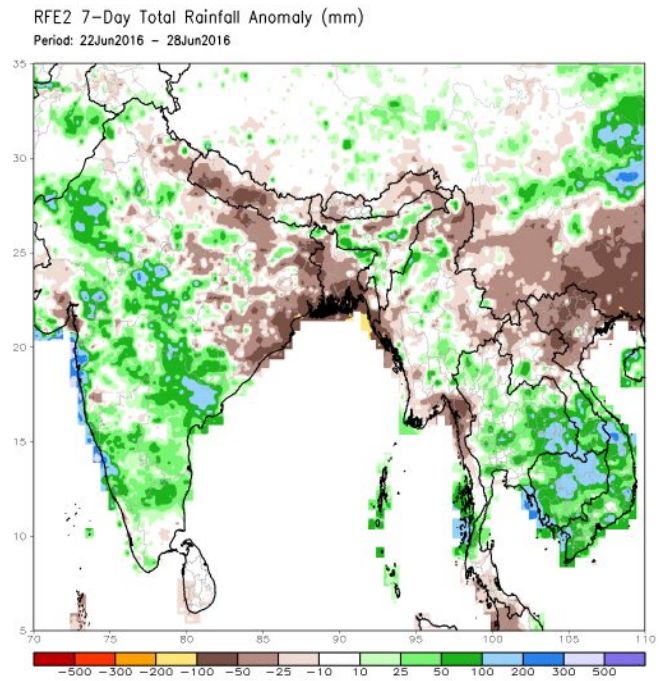


Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis



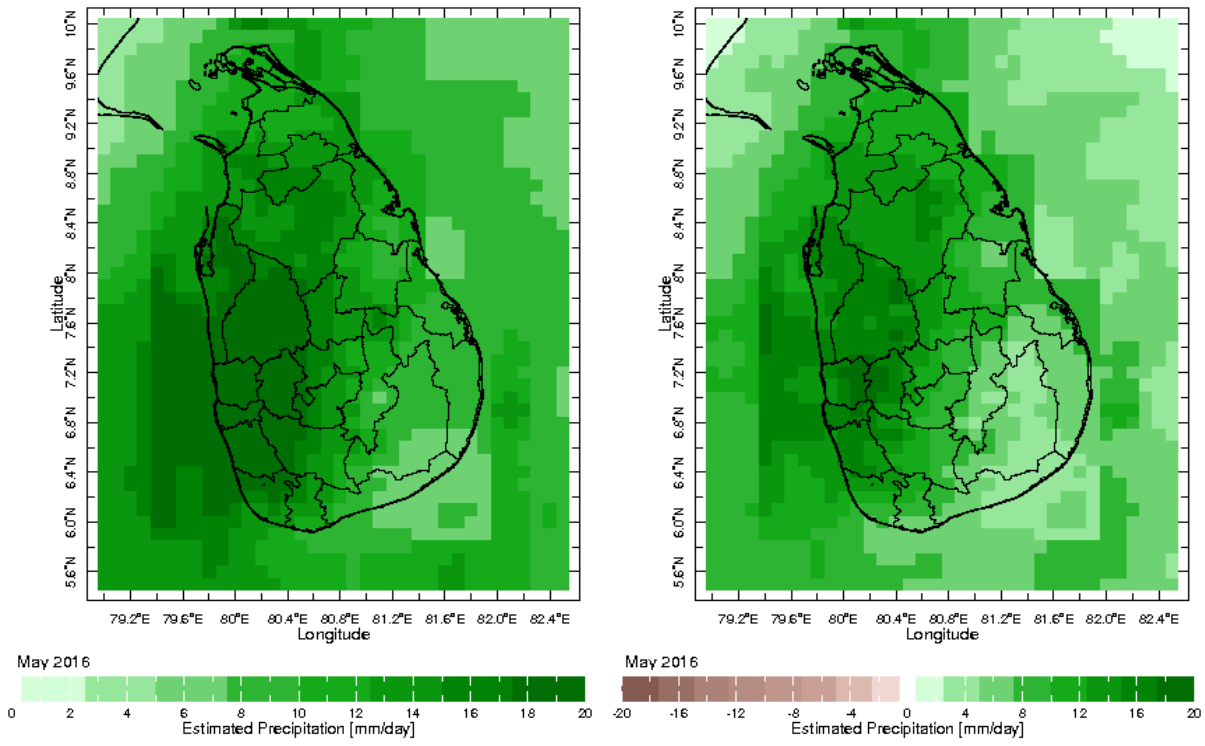


Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis
Climatology (1981-2010)



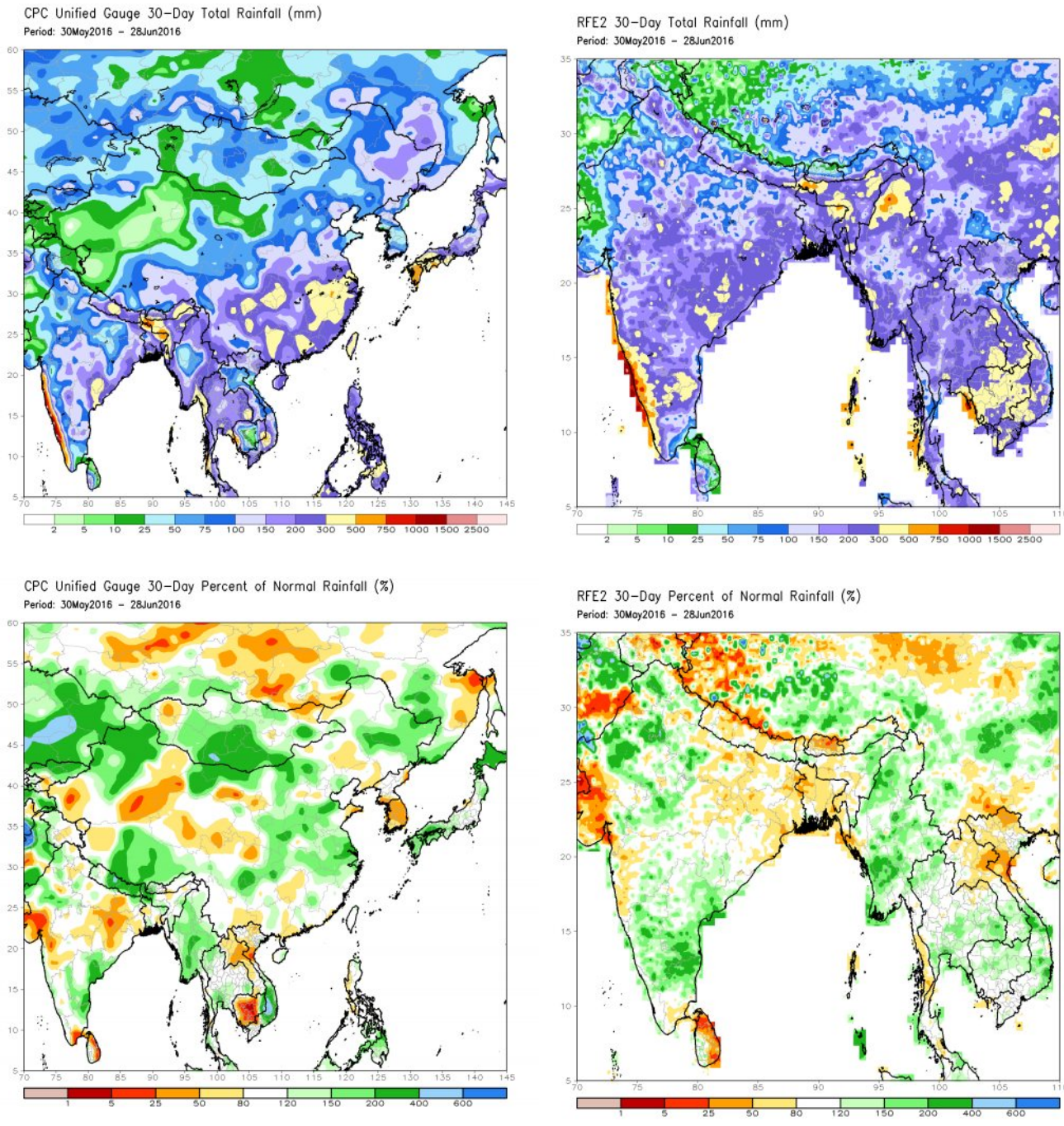
Monthly Rainfall Monitoring

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

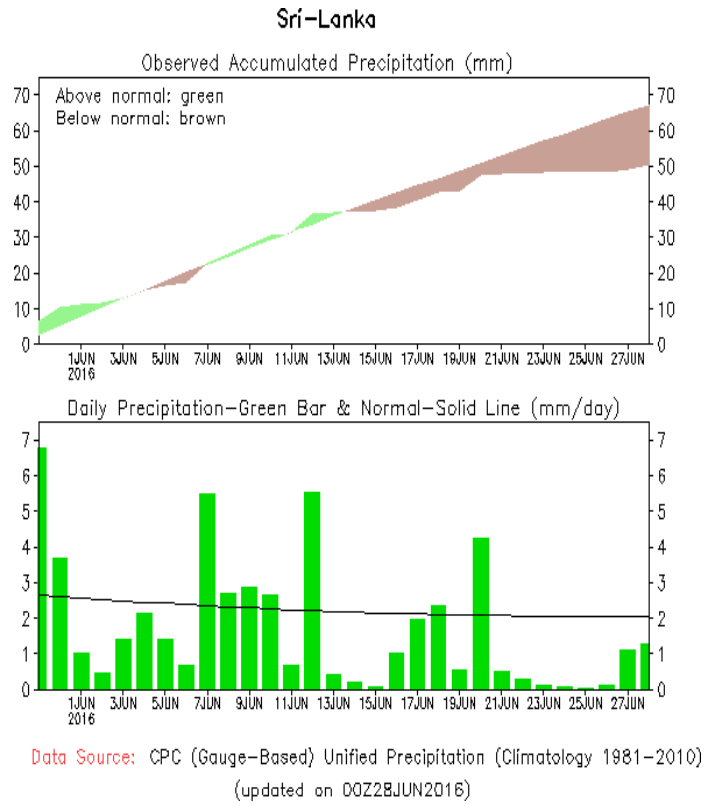


Monthly Average **Monthly Anomaly**

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.

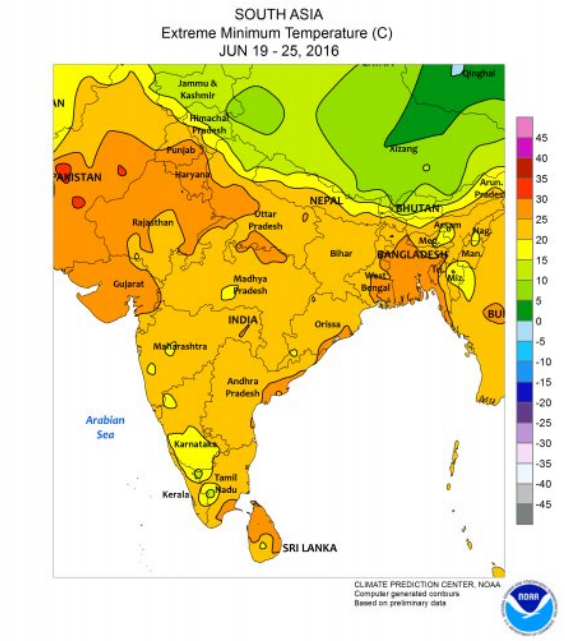


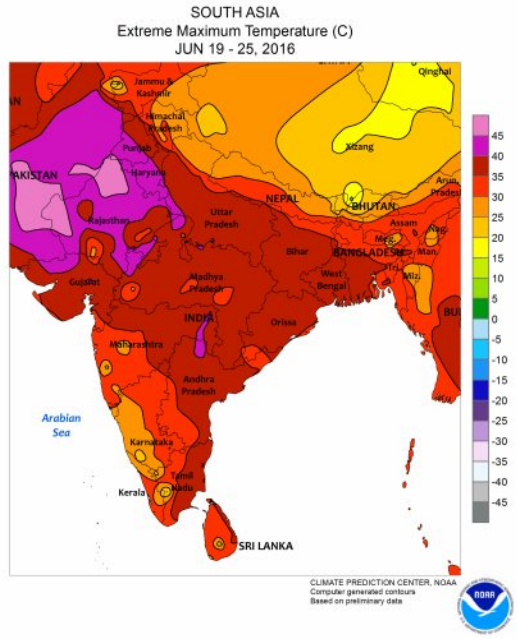
The following figure shows the observed accumulated rainfall (top) and daily observed rainfall (bottom) in Sri Lanka in the last 30 days.

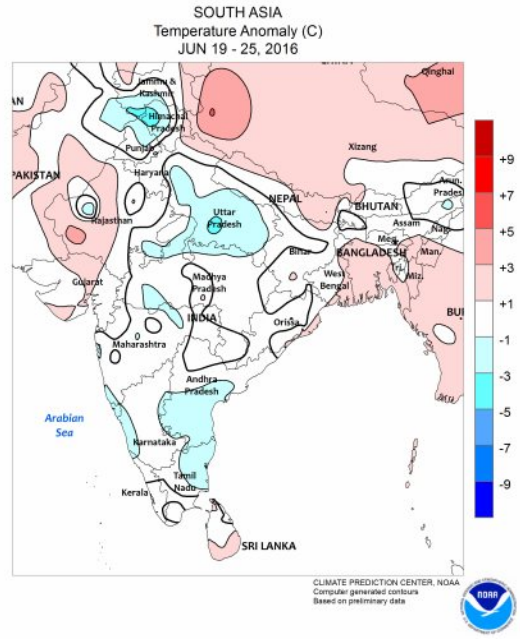


Dekadal (10 Day) Satellite Derived Rainfall Estimates

Weekly Temperature Monitoring

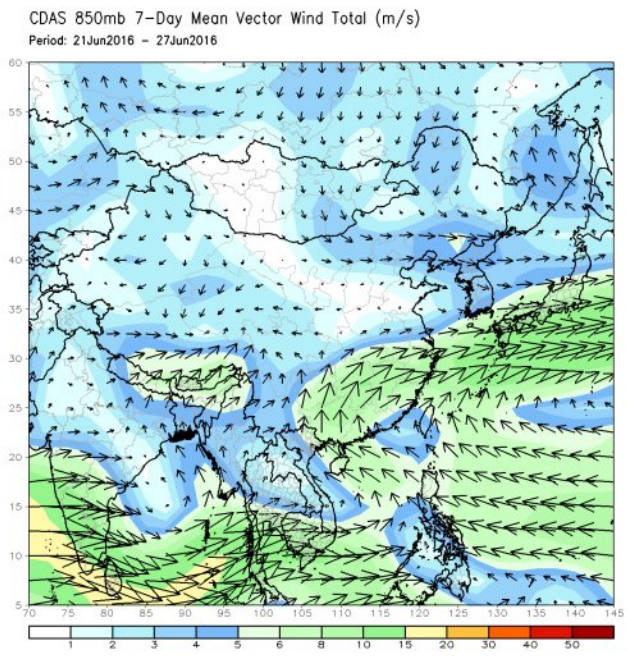


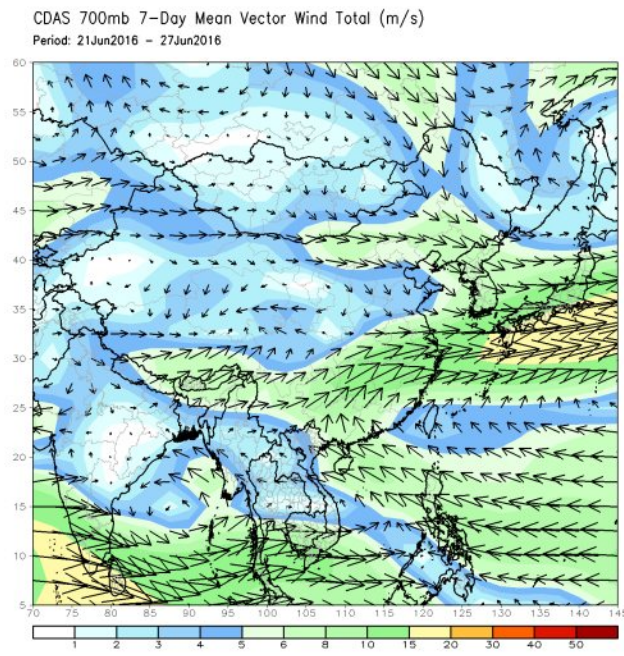




Weekly Wind Monitoring

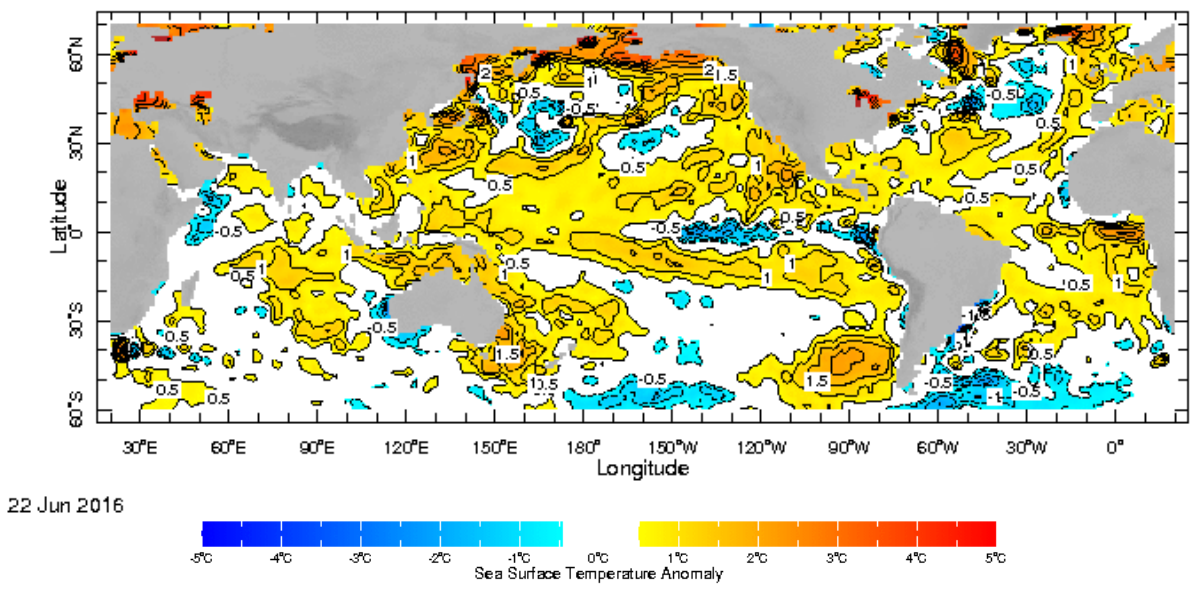
The following figures show the mean vector wind total of the past 7 days near Sri Lanka at two levels. The figure on the left shows 850 mb (~1500 m) level and the figure on the right shows 700 mb (~3000 m) level.



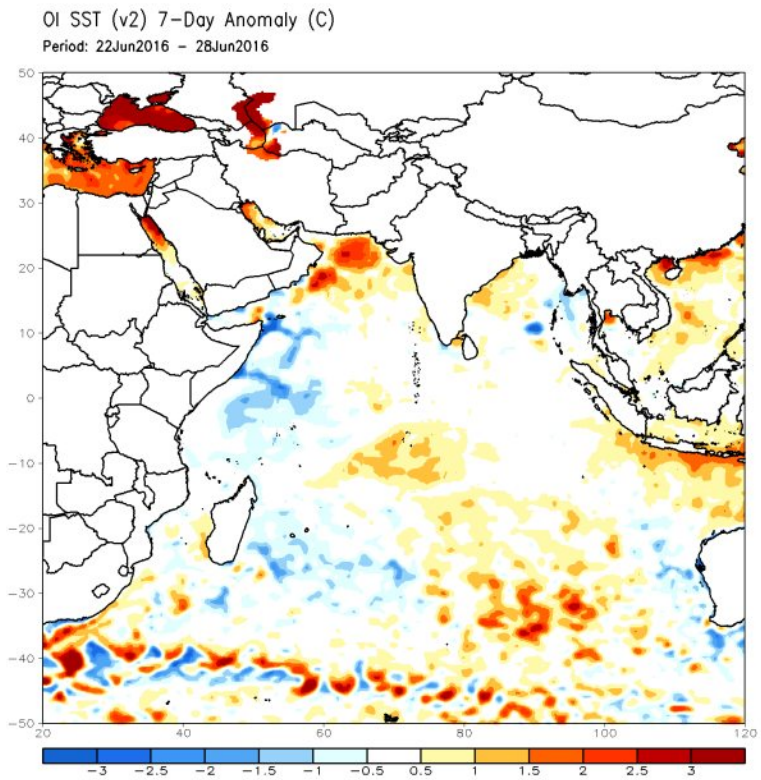


Weekly Average SST Anomalies

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

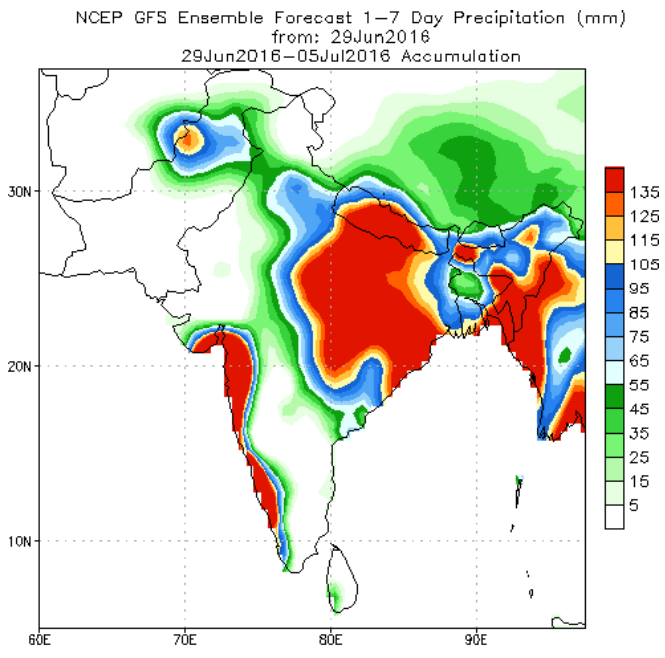


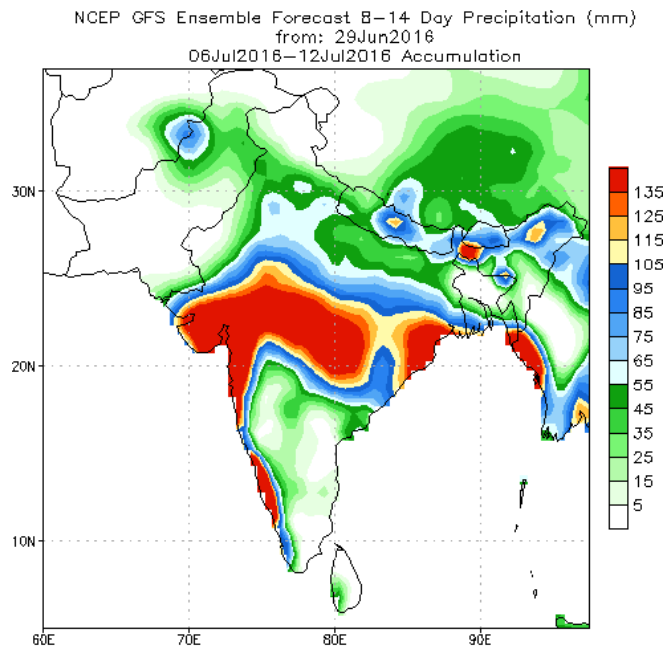
Optimum Interpolated Sea Surface Temperature Anomaly in the Indian Ocean from NOAA CPC



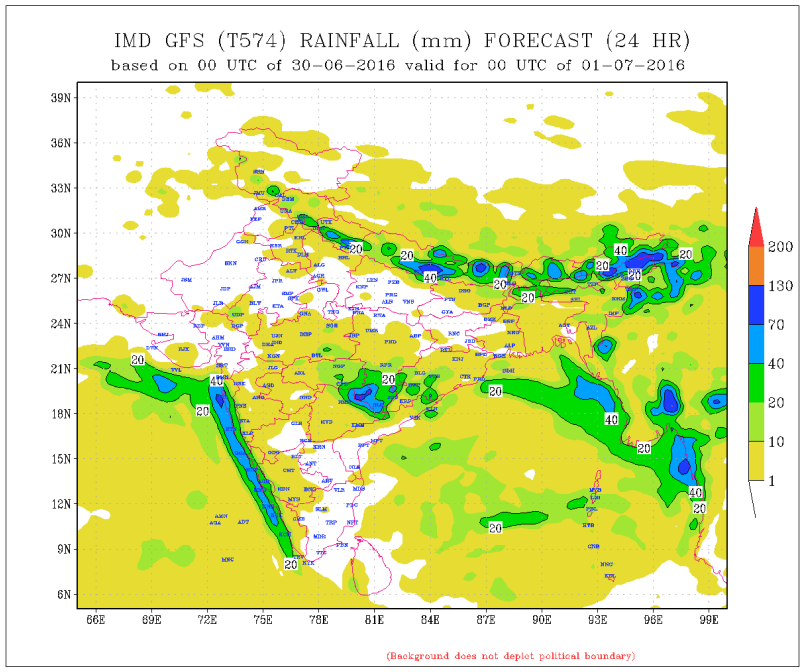
PREDICTIONS

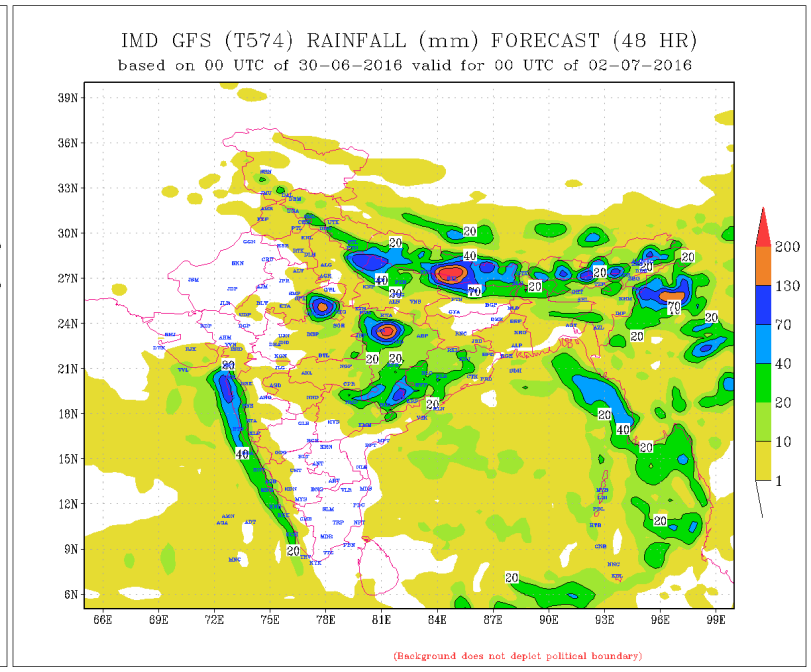
NCEP GFS 1- 14 Day prediction

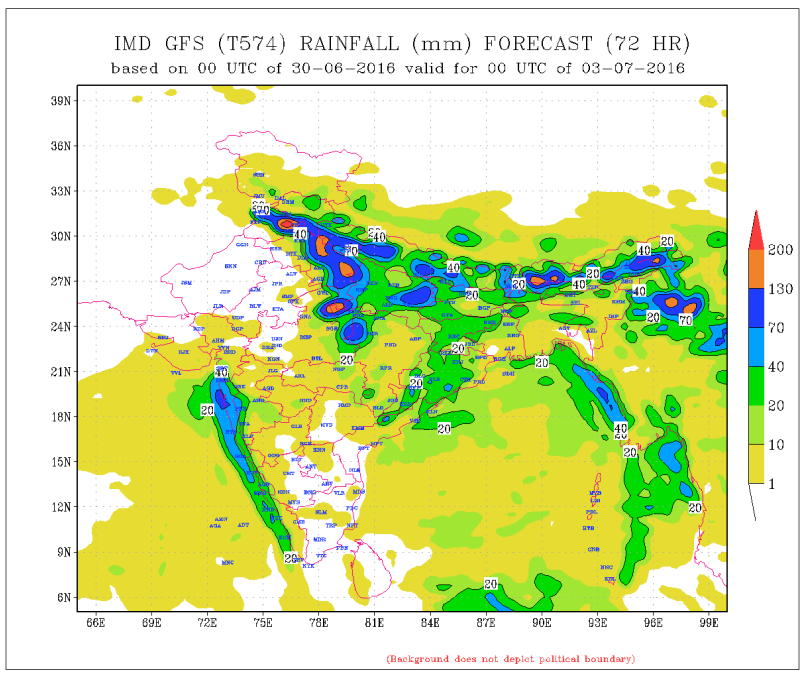


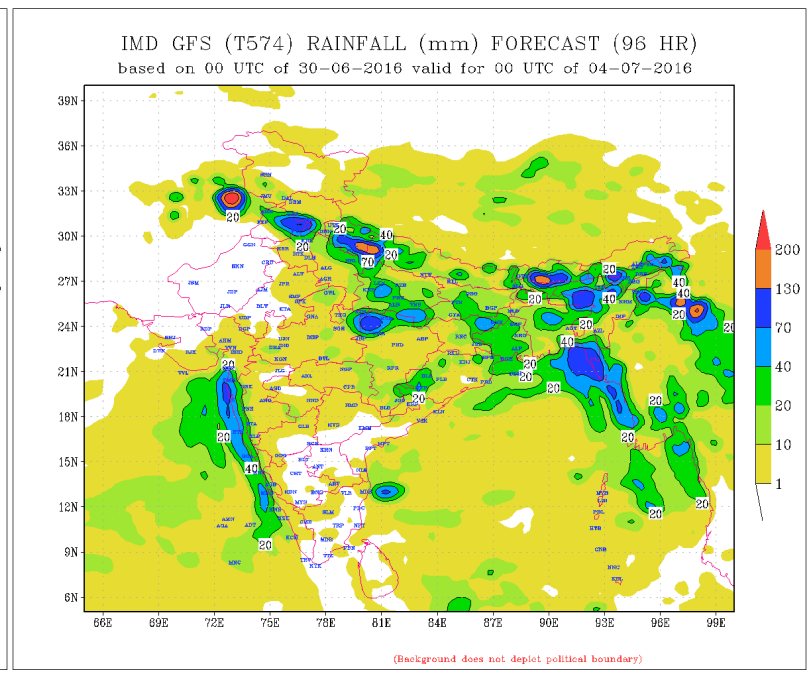


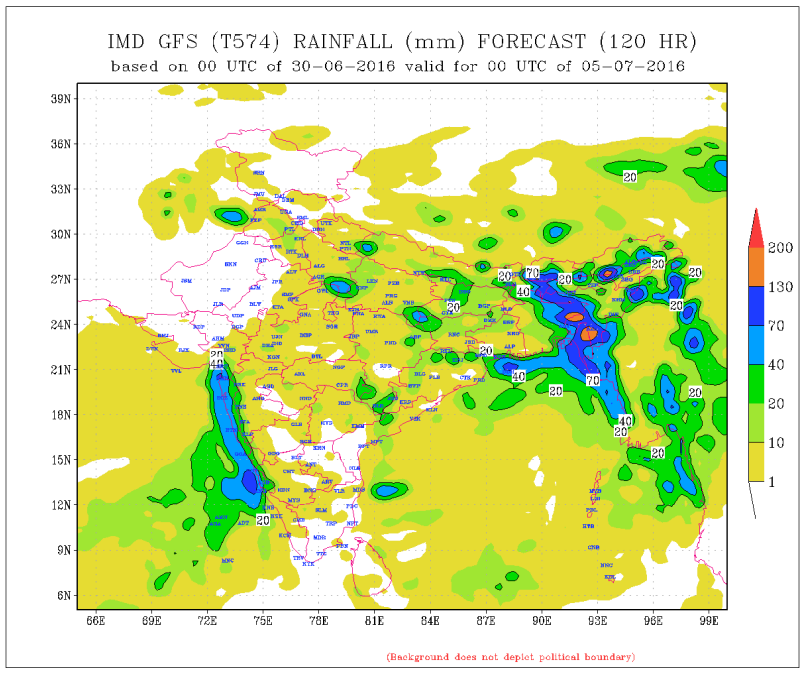
IMD GFS (T574) Model Rainfall Forecast from RMSC New Delhi, India

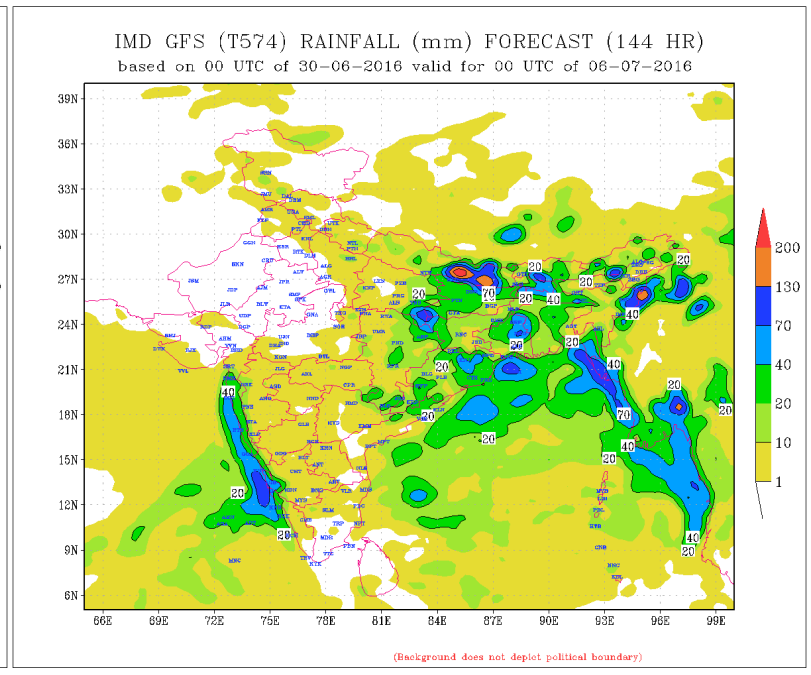


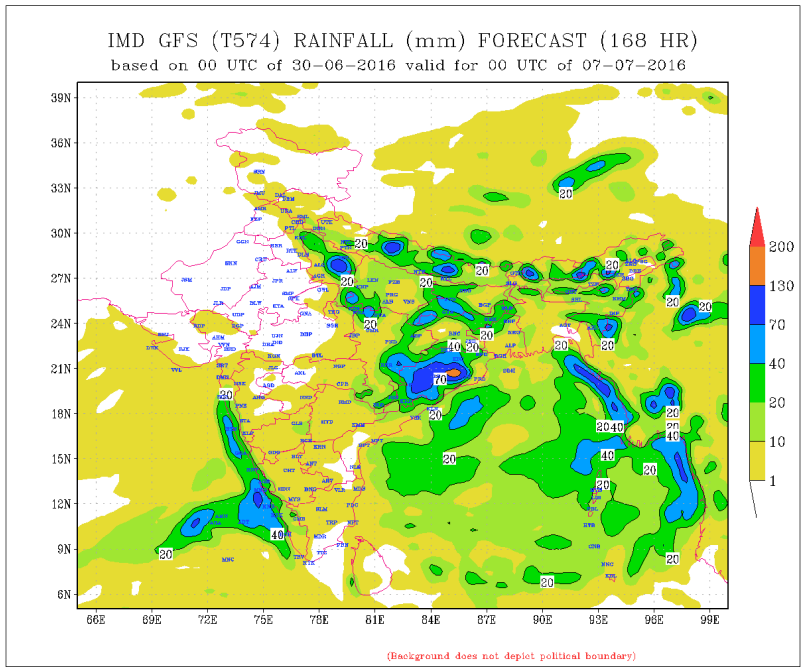




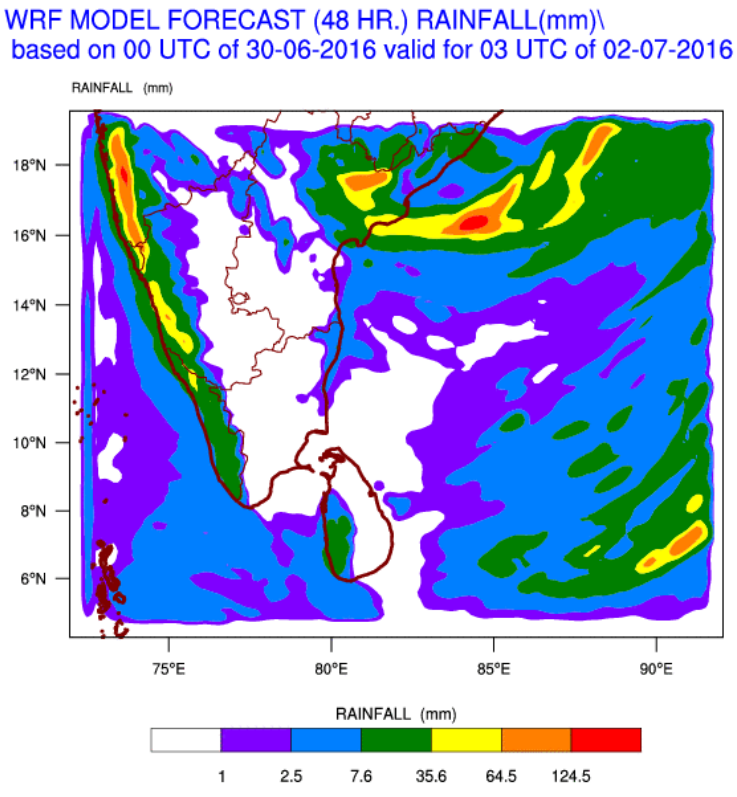


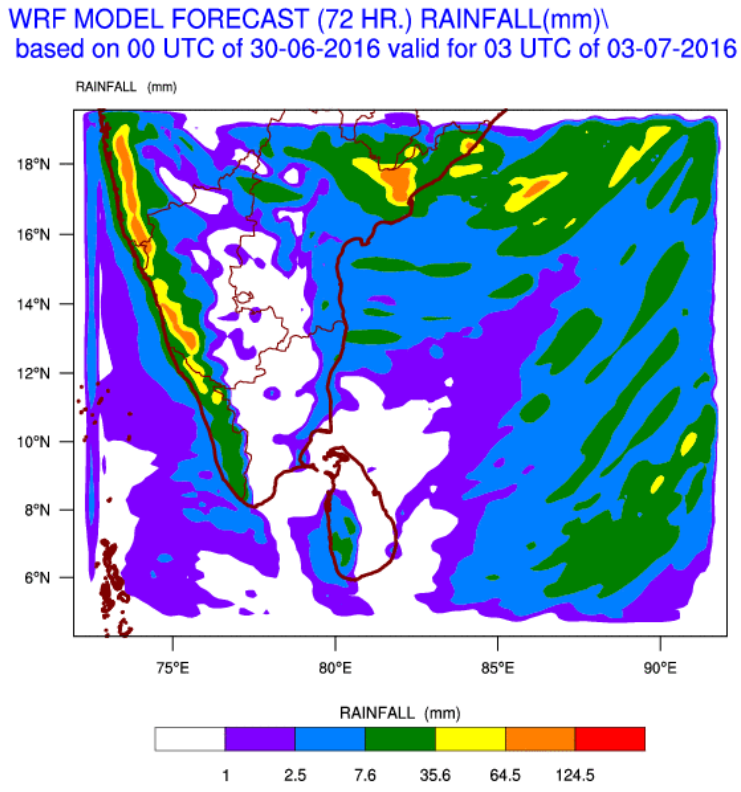






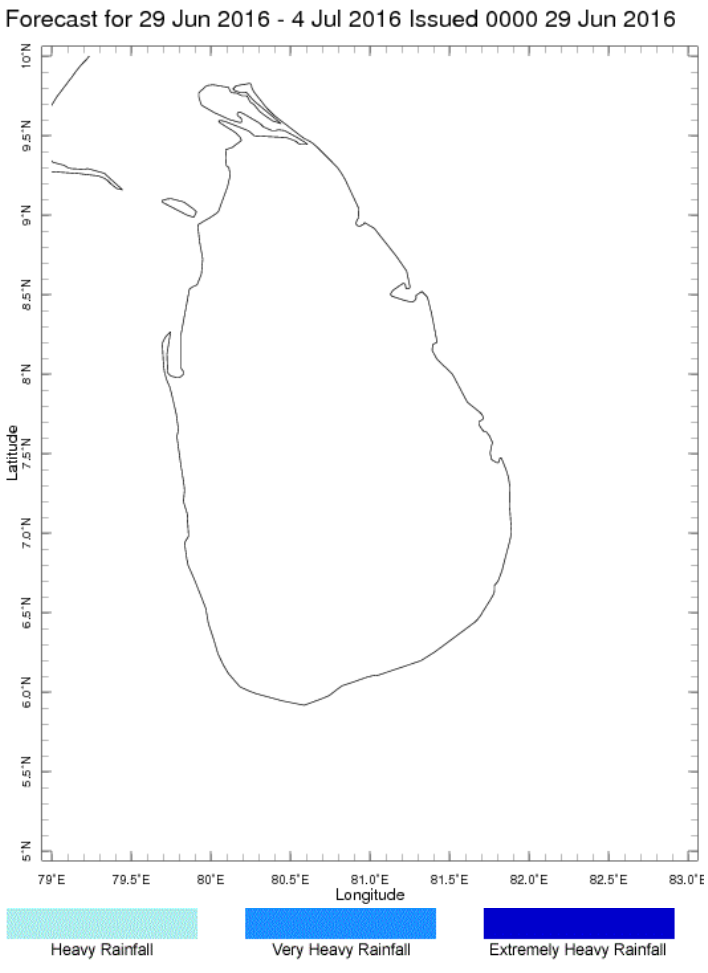
WRF Model Forecast (from IMD Chennai)



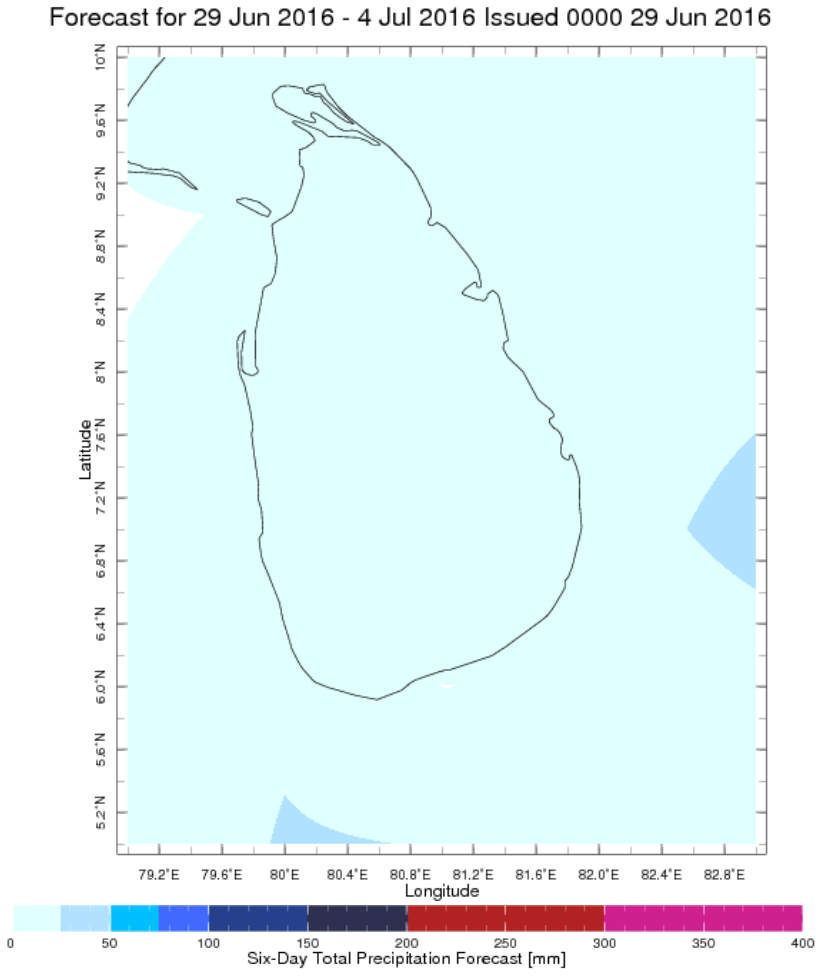


Weekly Rainfall Forecast from IRI

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.



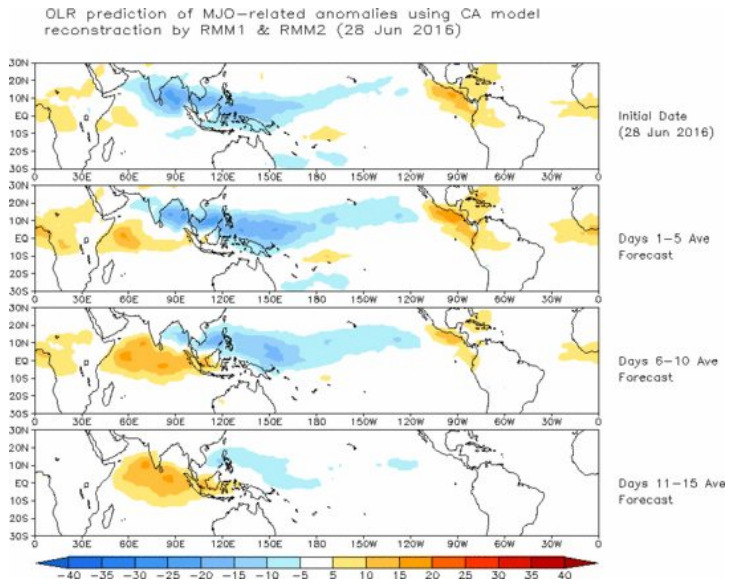
Extreme Rainfall Forecast



Total Six Day Precipitation Forecast

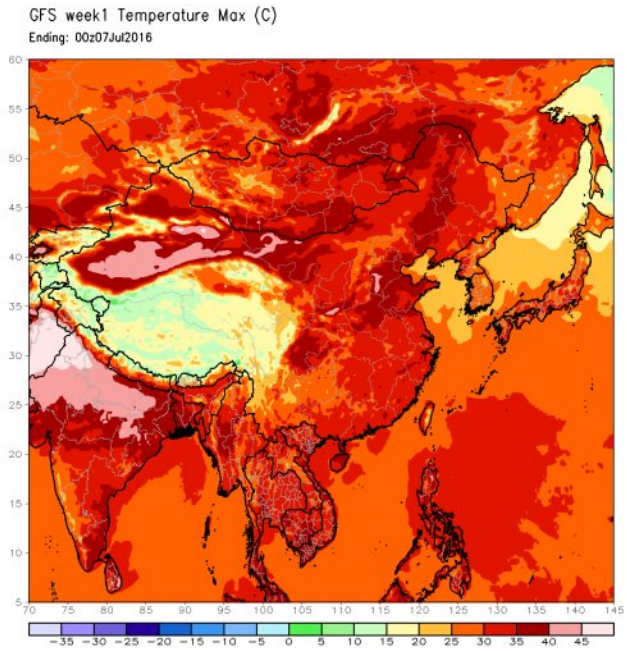
Madden Julian Oscillation (MJO) related Outgoing Longwave Radiation (OLR) Forecast

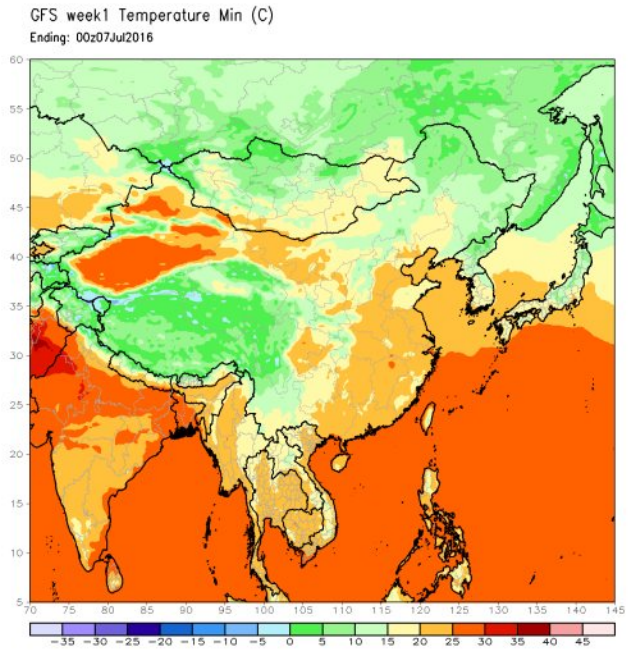
The Outgoing Longwave Radiation (OLR) is a proxy for rainfall. This can be used to identify convective rain clouds based on the MJO phase. Violet and Blue shading indicates enhanced tropical weather and Orange shading indicates suppressed conditions. The following figure shows the forecasts of MJO associated anomolous OLR for the next 15 days from the Constructed Analogue (CA) model forecasts.



Weekly Temperature Forecast

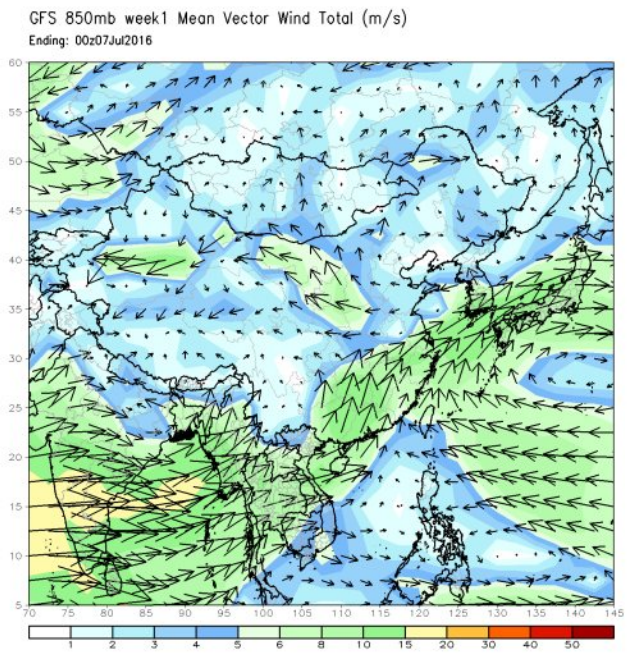
Weekly Minimum and Maximum Temperature prediction from the GFS model (from NOAA CPC)

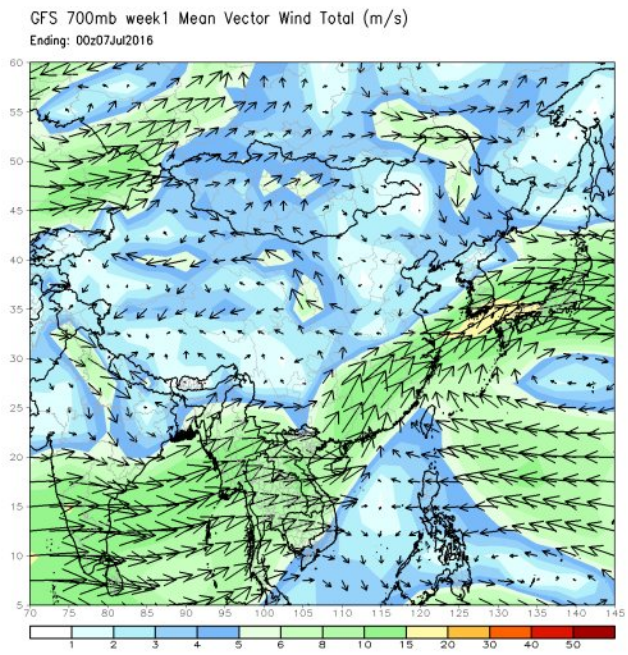




Weekly Wind Forecast

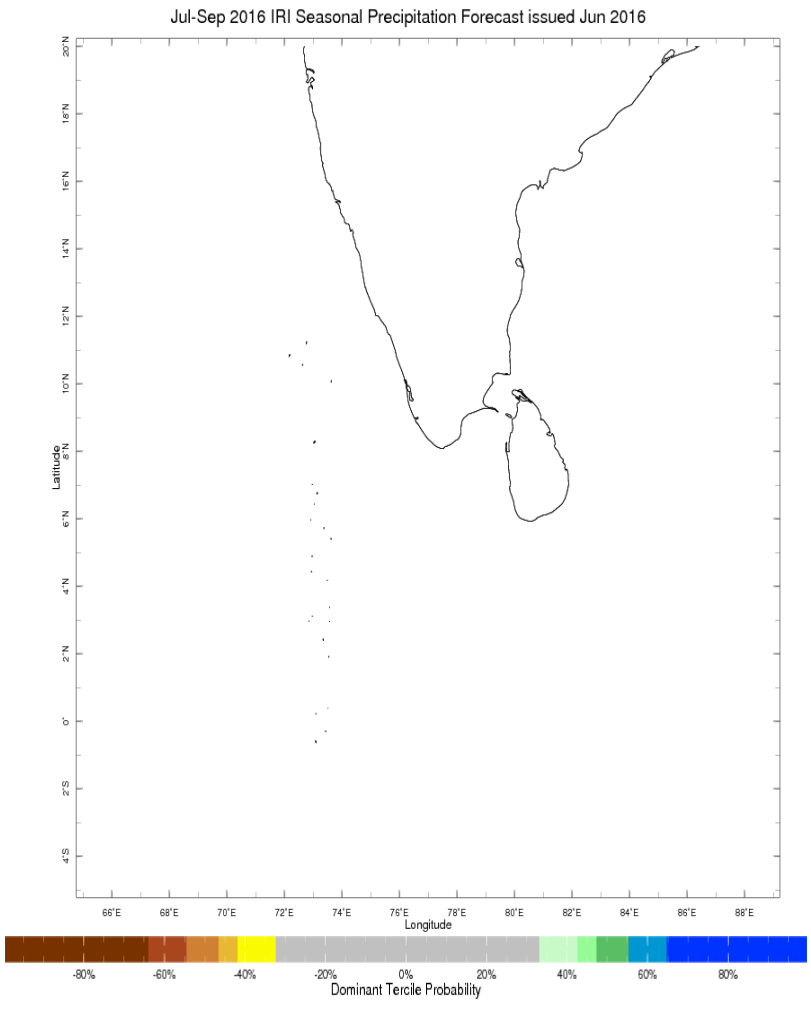
Weekly mean vector wind total prediction from the GFS model at 850 mb (left) and 700 mb (right) levels. (from NOAA CPC)



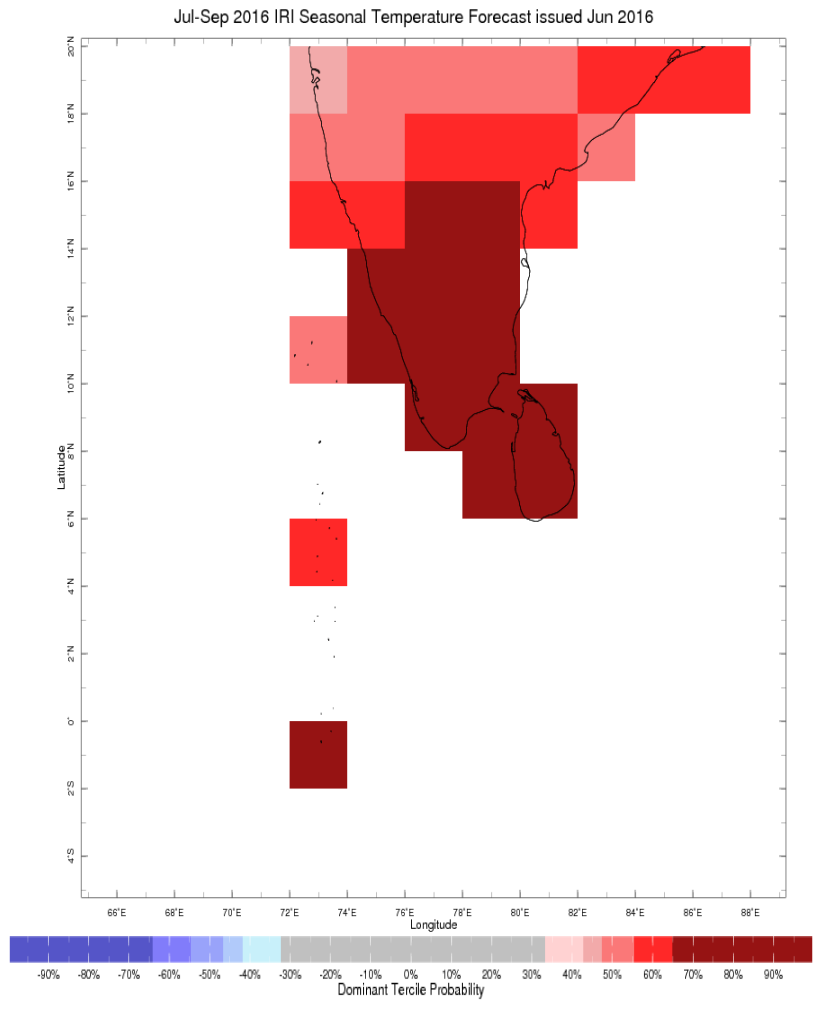


Seasonal Rainfall and Temperature Forecast

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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