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Experimental Climate Monitoring and Prediction

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14 July 2016

Highlights

Mostly less than 10 mm rainfall was seen in the country in the period from 6th-8th. However, on the 9th, 70 mm of rainfall was recorded in Puttalam and considerable rainfall was seen in Alawwa, Nttambuwa and adjoining areas. Within the week from 6th-11th, highest temperature of 35-40 ^{0}C was recorded in the Eastern part of the country while the minimum temperature was recorded in Nuwara Eliya. High wind speed of 15-20 m/s was recorded in the central region of the island. Heavy rainfall is expected in the sea close to Kalutara in the coming week from 14th-20th. Up to 70mm of rainfall is expected in Beruwala and Kalutara areas. The rest of the western province as a whole will experience up to 40mm of rainfall. Ratnapura and Gampaha districts too shall experience rainfall in the coming week. The wind speed will remain at 10-15 m/s. MJO shall be in the Indian Ocean and therefore it shall enhance rainfall condition in Sri Lanka.

Monitoring

Rainfall

***Weekly Monitoring*:** No rainfall was received by the entire island on the 6th. Slight rainfall was received by the central belt of the country including Kurunegala, Matale and Kandy on the 7th. On that same day 30 mm of rainfall was recorded in the North Western Sea. On 8th, 20 mm of rainfall was received by the Kurunegala, Katugastota and Matale areas. The rainfall condition on the 9th was of contrast to the previous few days of the week and heavy rainfall was seen in some areas. 70 mm of rainfall was recorded in Puttalam area while 40 mm of rainfall was recorded in Nochchiyagama and Pasyala. 30 mm of rainfall was received by Hatton, Alawwa Nittambuwa and surrounding areas and slight rainfall was received by the western and south western sea on the same day. The intensity of rain was seen to have reduced on the 10th and less than 20 mm of rainfall was received by the central region of the country as well as Ratnapura and Moneragala districts. On 11th and 12th the rainfall pattern was seen to have shifted towards the south western side of the island and 20 mm of rainfall was recorded in Moratuwa and Panadura on 11th. Less than 15 mm of rainfall was recorded in other parts of the western province and western sea on the 11th and 12th. The CPC Unified Precipitation Analysis reports 35 mm of rainfall Gampaha and Central region of the country and less than 25 mm of rainfall in the surrounding areas for the period from 6th- 12th. For that same period, the RFE2 model reports 75 mm of rainfall close to Kurunegala and Matale areas and 50mm of precipitation in the adjoining areas of Kegalle, Alawwa, Nittambuwa, Matale and Nuwaraeliya. The RFE2 model reports that the rainfall for those areas is 25-50 mm above average.

***Monthly Monitoring*:** Rainfall for the month of June was very low compared to the excessive rainfall in the previous month. The monthly average does not exceed 8mm in the entire island. Rainfall was mostly in the south western region of the country which totaled up to 75- 100 mm in the entire month. This amounts to only 50-80% of the usual rainfall for the month of June. Remaining part of the country received only 25-50% of the normal rainfall. With this, the average rainfall deficit in the entire country which was at 25 mm by 25th June had increased to 50 mm by 8th June.

Temperature

During the week from 3rd to 9th July, the highest temperature of 35-40 ^{0}C was recorded in the eastern side of the island. The lowest temperature of 15-20 ^{0}C was recorded in Nuwara Eliya. For the period, the temperature was 1-3 ^{0}C above average in the whole country.

Wind

The wind remained westerly at 10-15 m/s both at 850mb level and 700mb level same as the previous week. However, at 850mb level, 15-20 m/s wind was recorded in upper central region of the island including Puttalam, Kurunegala, Anuradhapura, Batticaloa and the adjoining sea.

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 SST anomaly was observed around Sri Lanka except in the southern sea, where 0.5^{0}C positive anomaly was observed.

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Predictions

Rainfall

14-day prediction: NOAA NCEP models predict up to 55 mm total rainfall during 13th- 19th July 2016 in Matara district and adjoining areas including Tangalla. The central and southern regions of the country may experience up to 35-40 mm total rainfall and Jaffna region may experience less than 15 mm rainfall during this period. In the week from 20th-26th the northern part of the island may experience some rainfall. Up to 35-45 mm total rainfall is expected in Jaffna and Kilinochchi areas. The Central and Sabaragamuwa provinces too shall experience some rainfall.

Weekly prediction: *IMD GFS* model predicts 70 mm of rainfall in Beruwala, Balapitiya areas and the adjoining western sea on the 14th. On the same day up to 40 mm of rainfall is expected in the western province, Galle, Gampaha and the adjoining sea. The rain is seen to be shifting southwards across the coastal belt of the island on the 15th. Rainfall of between 70-130 mm is expected in the ocean close to Kalutara, a few kilometers away from the island on that day. Up to 70 mm of rainfall is expected in coastal areas including Kalutara, Bentota, Beruwala, Ambalangoda and the adjoining sea. The rest of the western province and Galle district may experience 20-40 mm of rainfall on the same day. Heavy rainfall of 40-70 mm is expected in the western and south western sea as well as the coastal area from Katunayake to Galle on the 16th. On the same day rest of the western province, Galle and Gampaha districts and adjoining sea may experience between 20-40 mm of rain. Similar rainfall condition is expected on the 17th. Apart from that Ratnapura district and adjoining areas too shall experience 20-40 mm of rainfall. Less rainfall is expected in the western region on 18th and less than 20 mm rain is expected. This pattern continues on 19th as well and on 20th no rainfall is expected in the entire island.

IMD WRF & IRI Model Forecast*:* According to the IMD WRF model, up to 124 mm of rainfall is expected in Ratnapura and Batticaloa areas and up to 65 mm of rainfall is expected in the surrounding areas 14th July. From 14-16th, up to 65 mm of rainfall is expected in Colombo, Negombo and Kegalle areas. IRI model predicts heavy rainfall in the sea close to Kalutara.

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. Maximum temperature in Kurunegala, Kandy, Colombo and Matara areas will be 30-35 ^{0}C. For the same week maximum temperature of Kalutara, Galle and Ratnapura areas will be 25-30 ^{0}C. During the same week, minimum temperature is expected around Nuwara Eliya to be 15- 20 ^{0}C. The minimum temperature of Jaffna will be 25-30 ^{0}C and that of rest of the country will be20-25 ^{0}C.

Wind

At 850 mb level, 10-15 m/s westerly and north westerly wind is expected in lower half of the country while 8-10 m/s westerly wind is expected in northern half of the country. At 700 mb level 6-8 m/s westerly wind is expected throughout the country.

MJO based OLR predictions

MJO shall be in the Indian Ocean region in the next 15 days and therefore it shall enhance rainfall in Sri Lanka.

[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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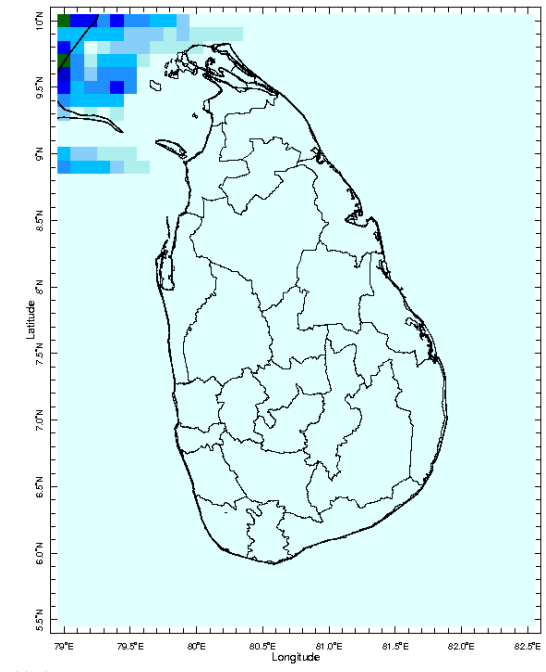
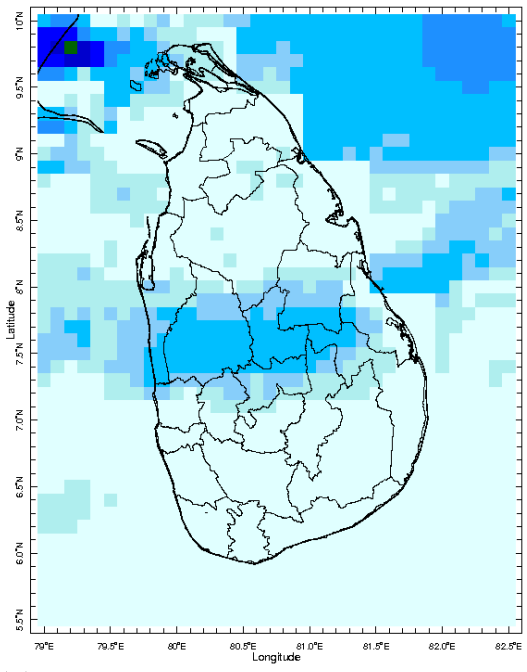
MONITORING

Daily Rainfall Monitoring

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



6 Jul 2016



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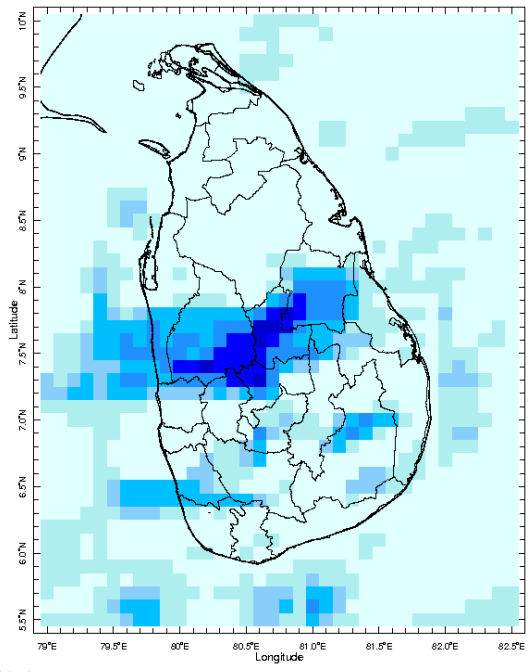

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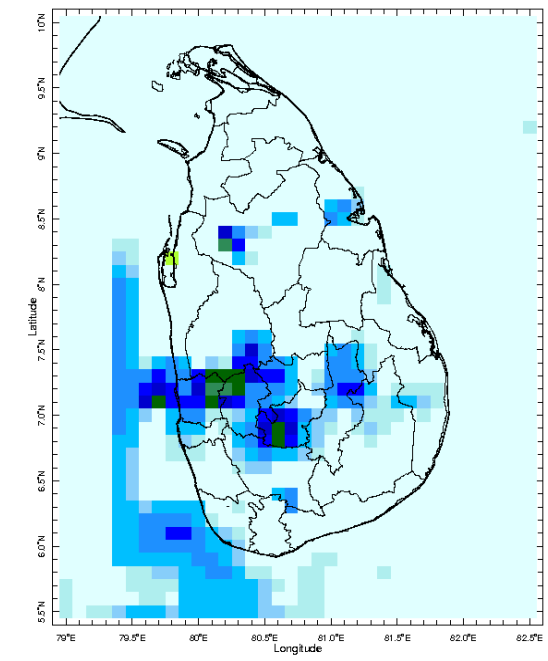

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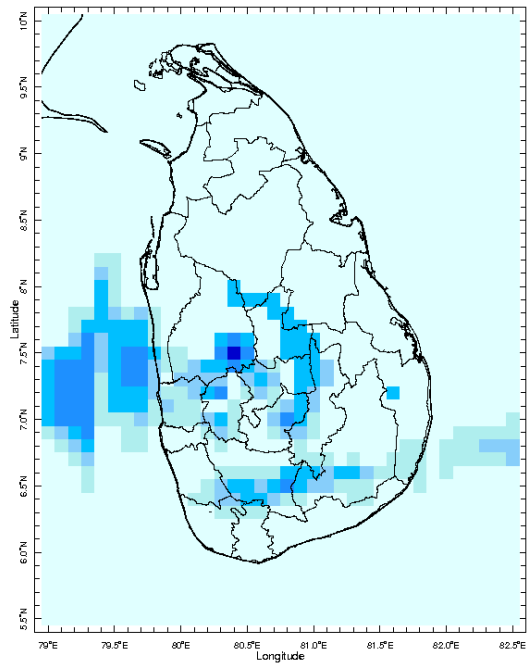

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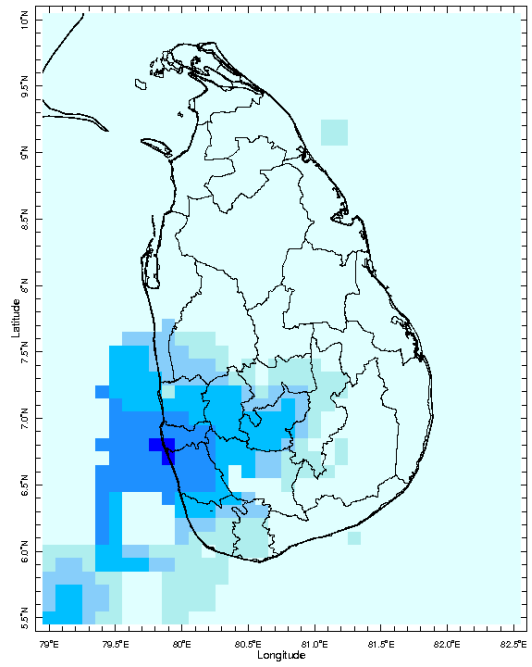

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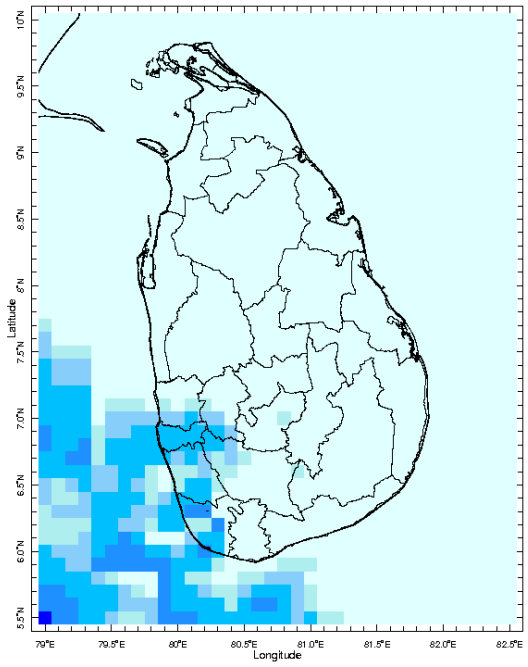

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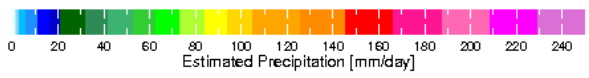
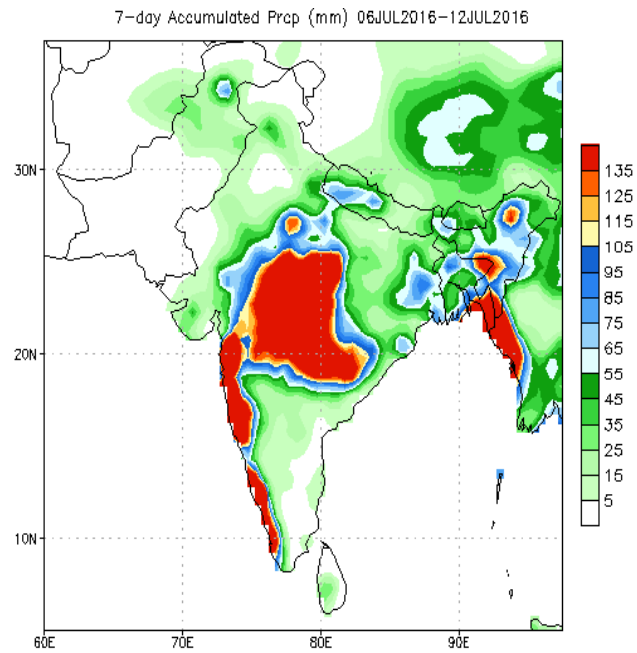
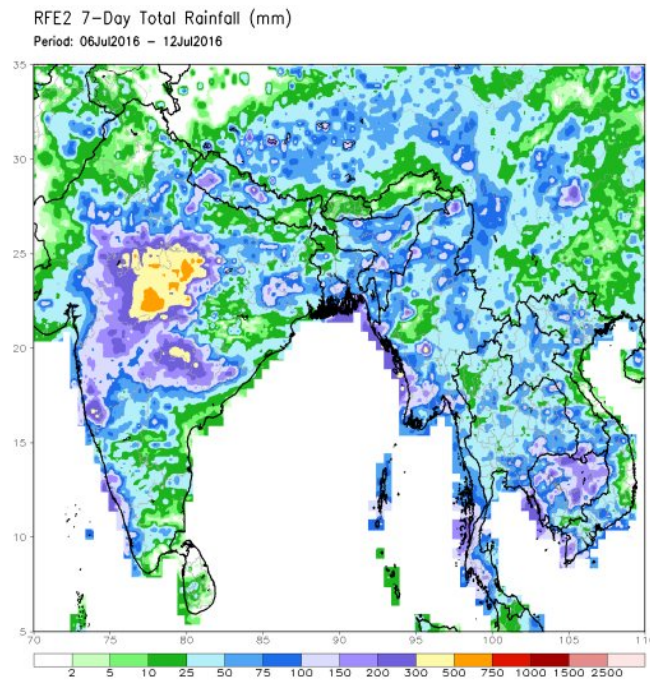


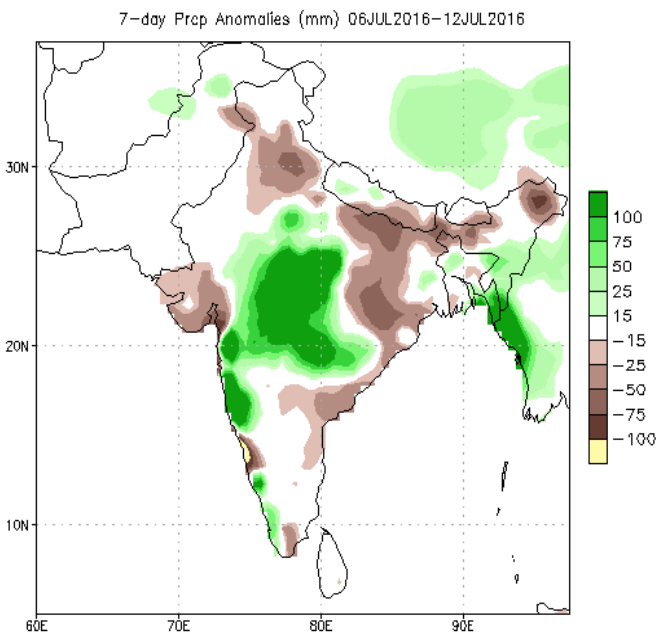
Weekly Rainfall Monitoring

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.

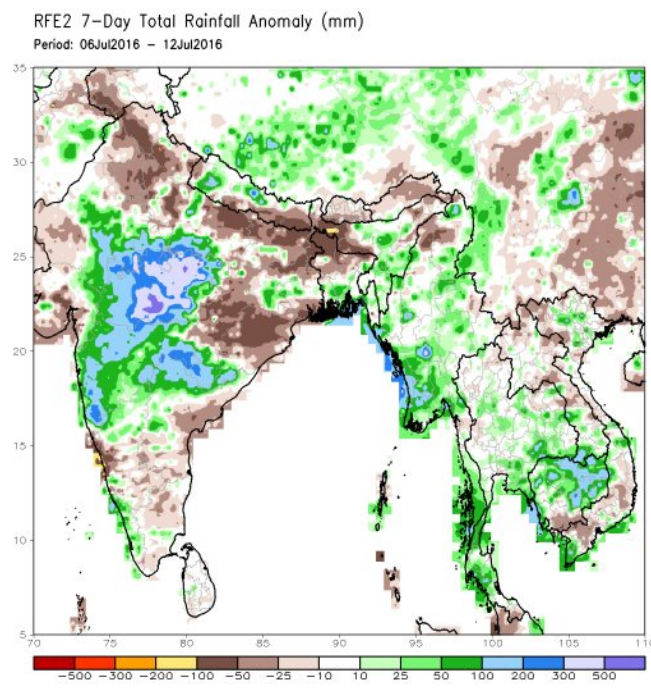


Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis



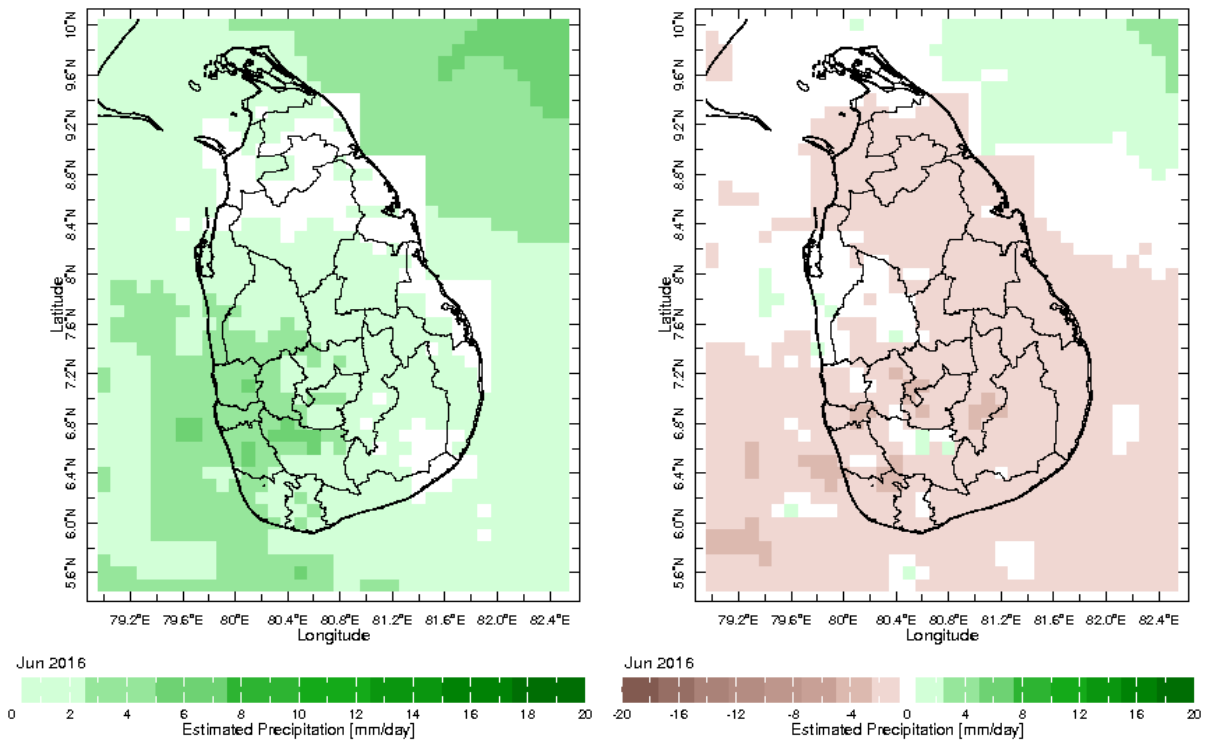


Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis Climatology (1981-2010)



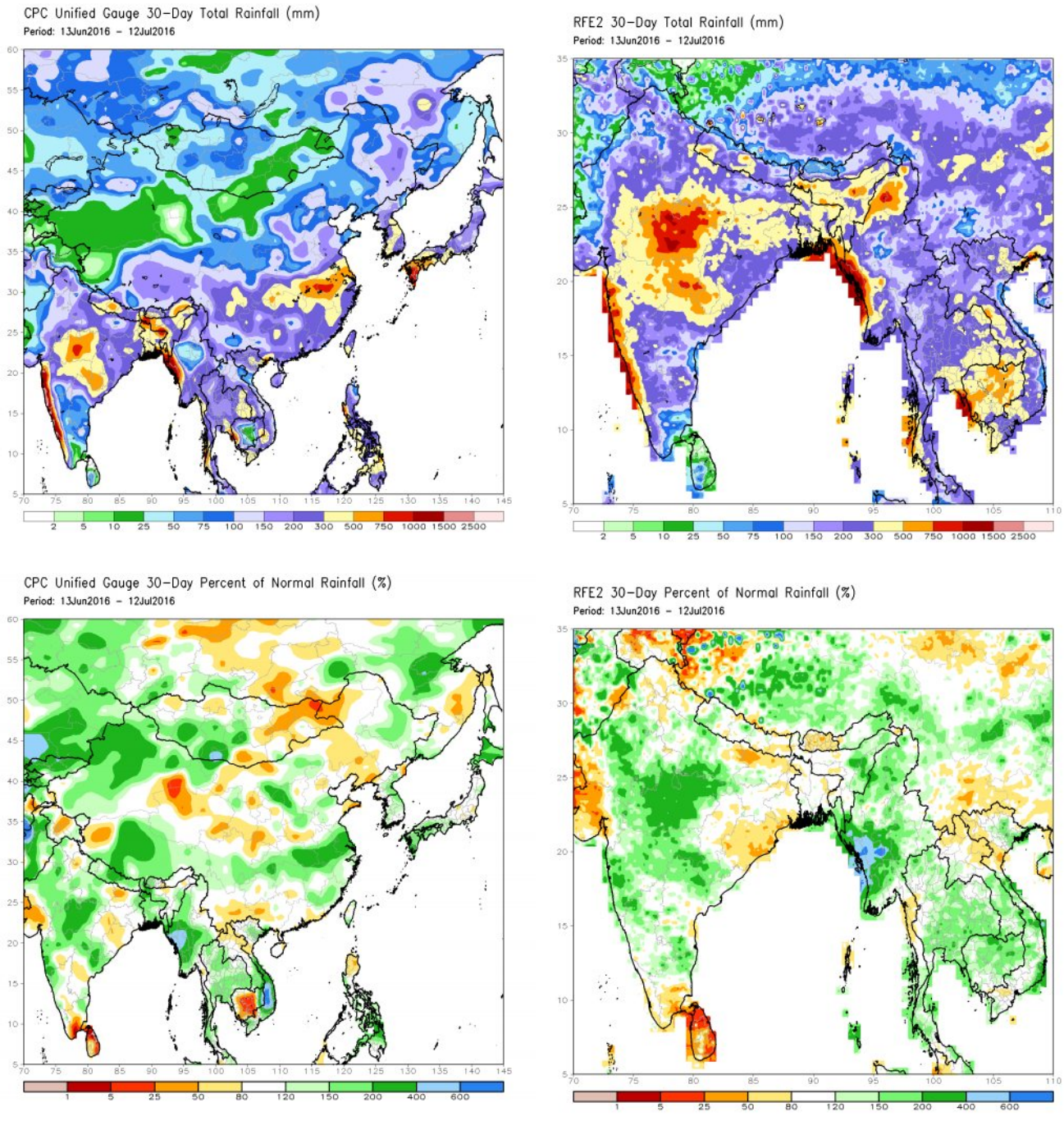
Monthly Rainfall Monitoring

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

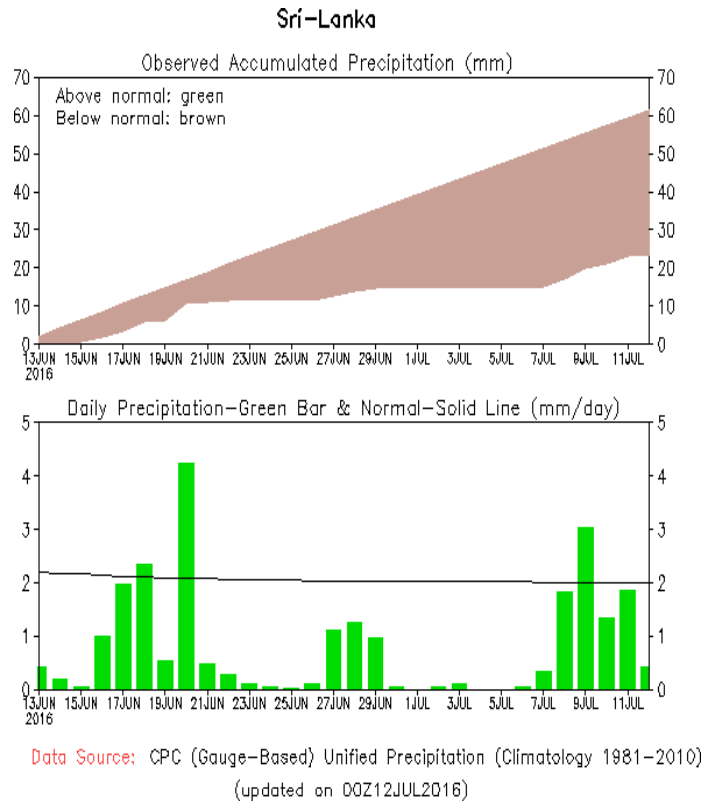


Monthly Average **Monthly Anomaly**

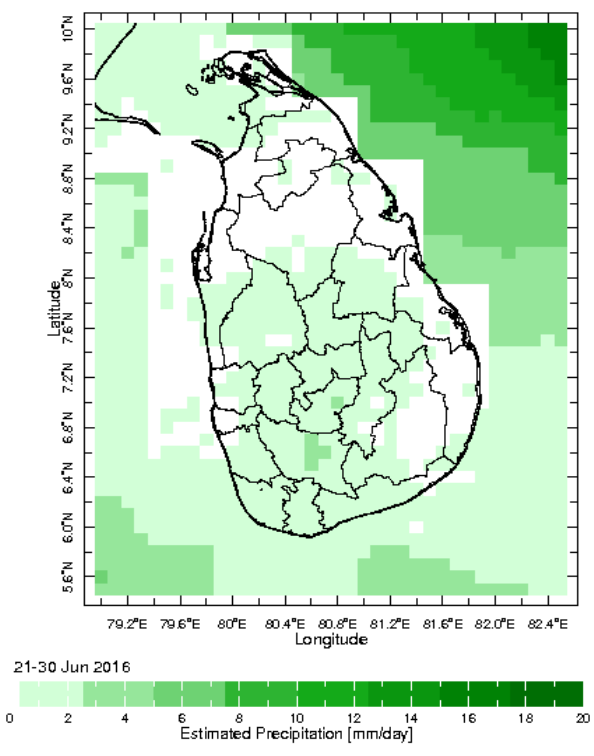
The figure in the top-left shows the total rainfall in the past 30 days from CPC Unified Precipitation Analysis while the figure in the top-right shows the total rainfall for the same period from RFE 2.0 Satellite Rainfall Estimates. The bottom two figures show the percentage of rainfall received in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

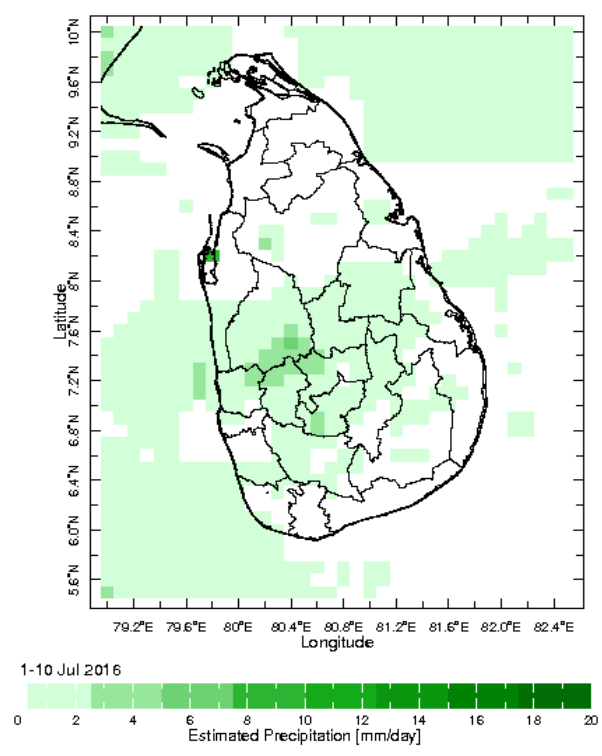


The following figure shows the observed accumulated rainfall (top) and daily observed rainfall (bottom) in Sri Lanka in the last 30 days.

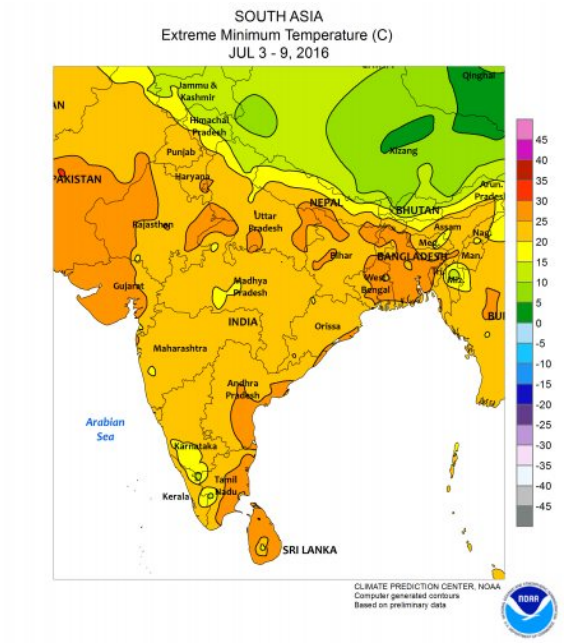


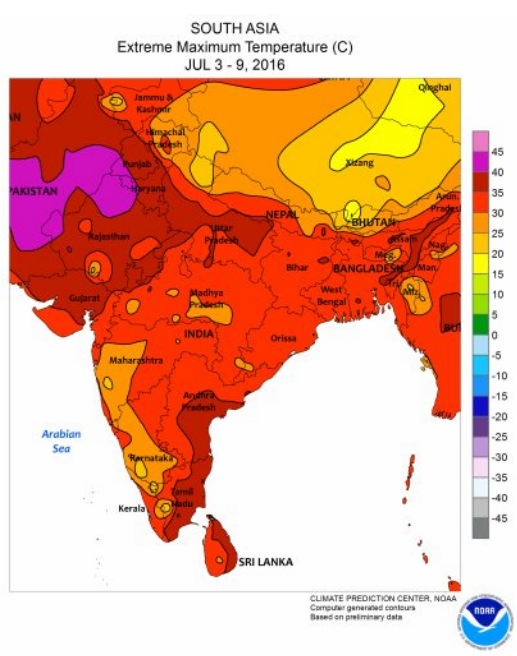
Dekadal (10 Day) Satellite Derived Rainfall Estimates

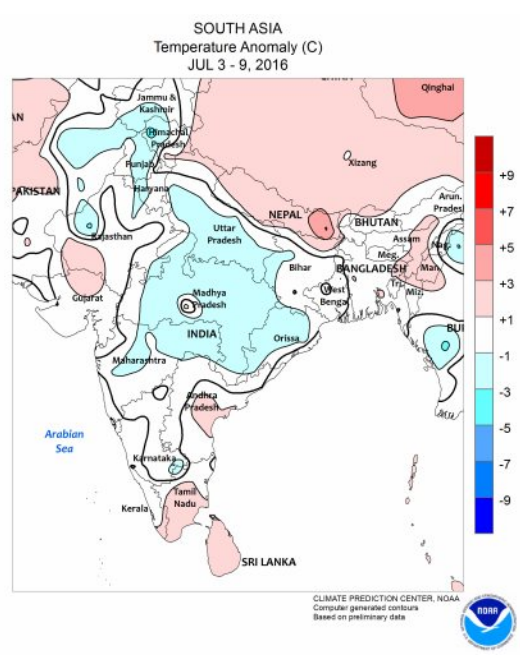




Weekly Temperature Monitoring

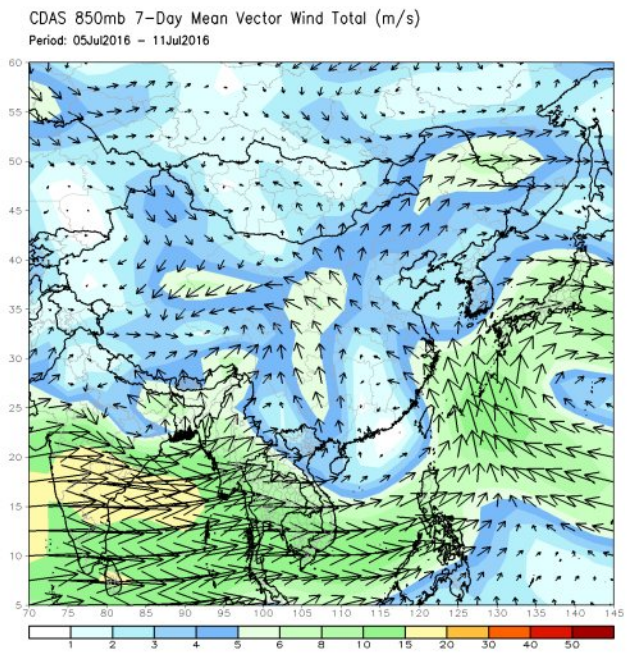


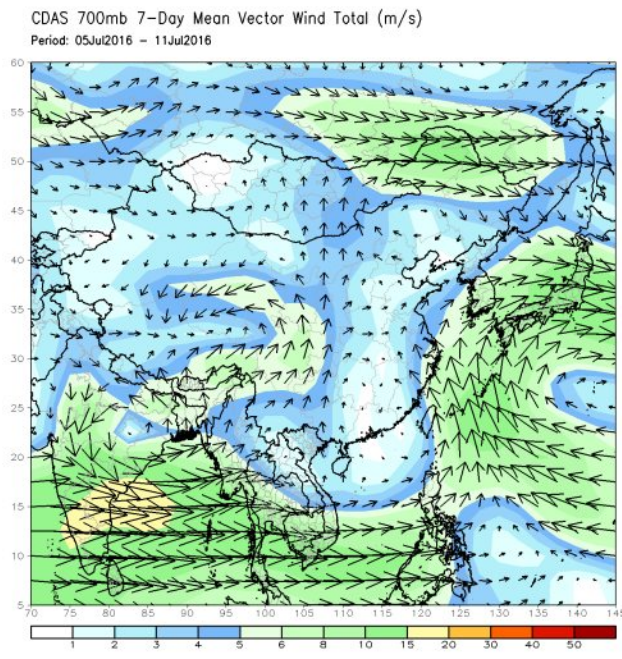




Weekly Wind Monitoring

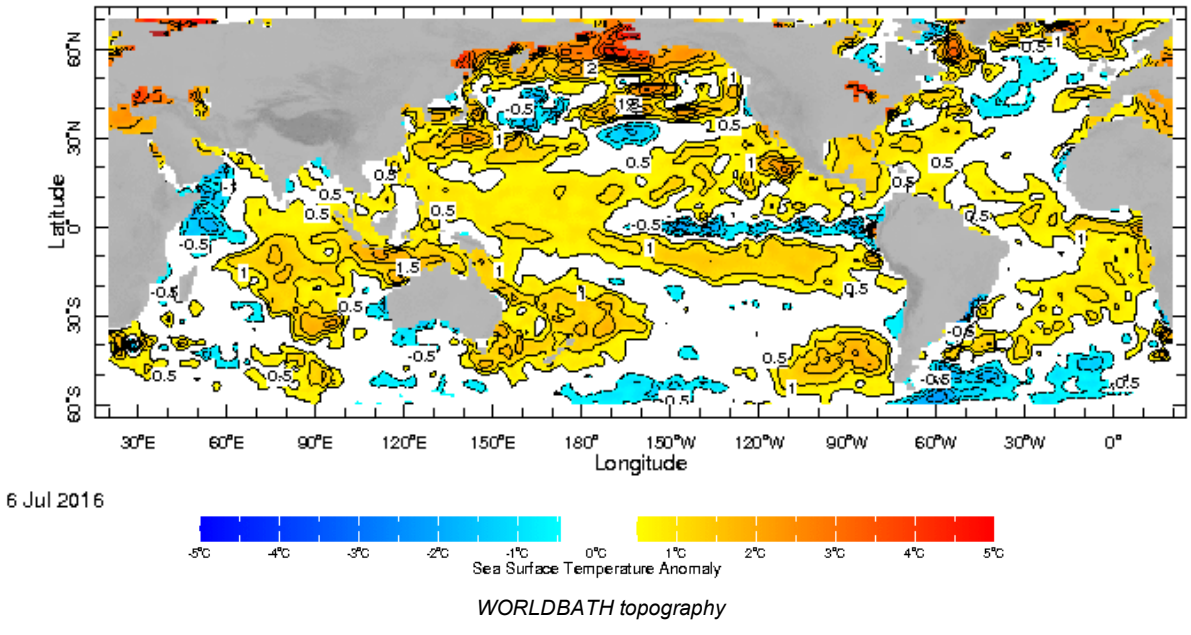
The following figures show the mean vector wind total of the past 7 days near Sri Lanka at two levels. The figure on the left shows 850 mb (~1500 m) level and the figure on the right shows 700 mb (~3000 m) level.



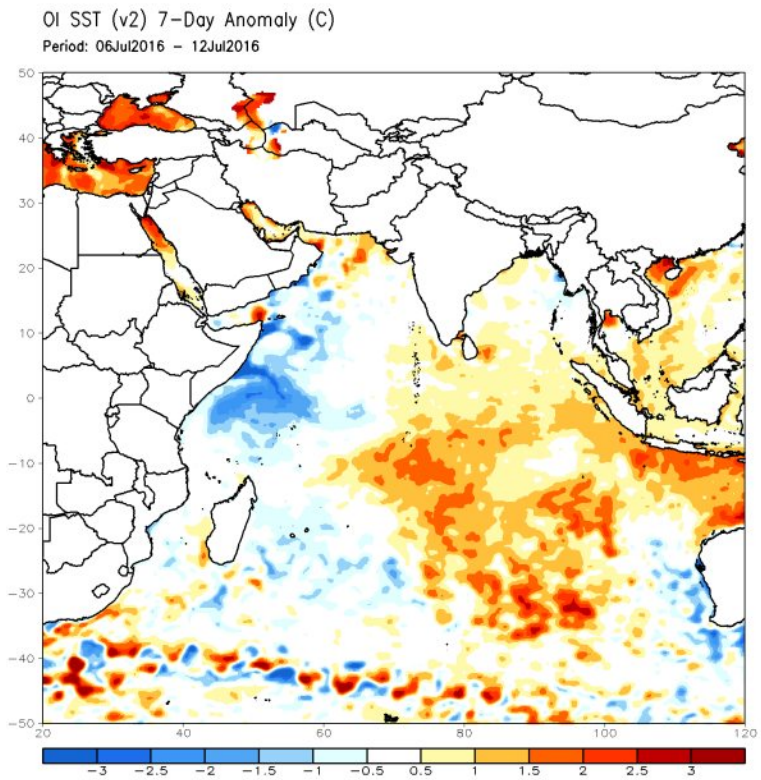


Weekly Average SST Anomalies

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

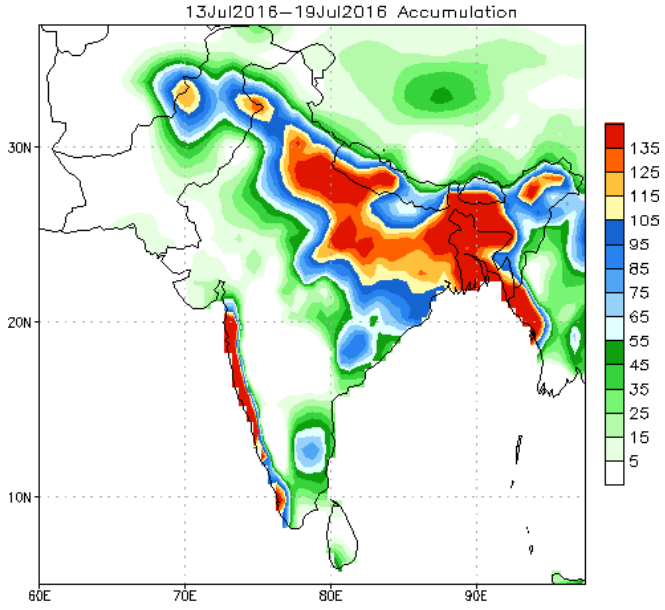


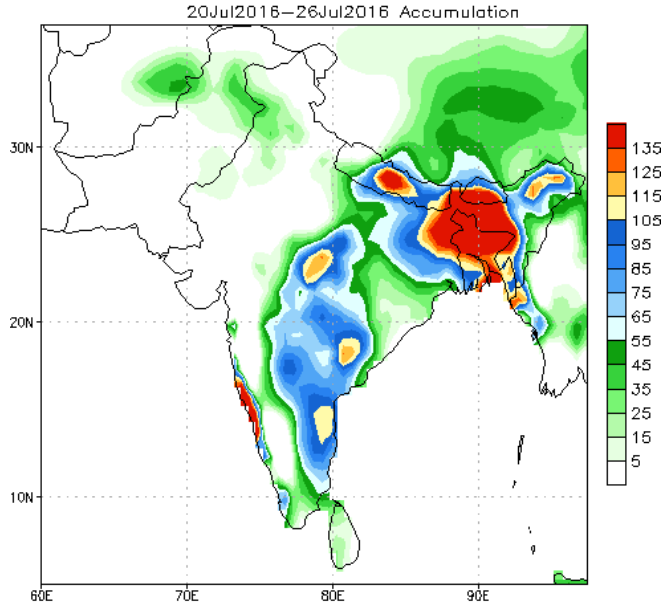
Optimum Interpolated Sea Surface Temperature Anomaly in the Indian Ocean from NOAA CPC



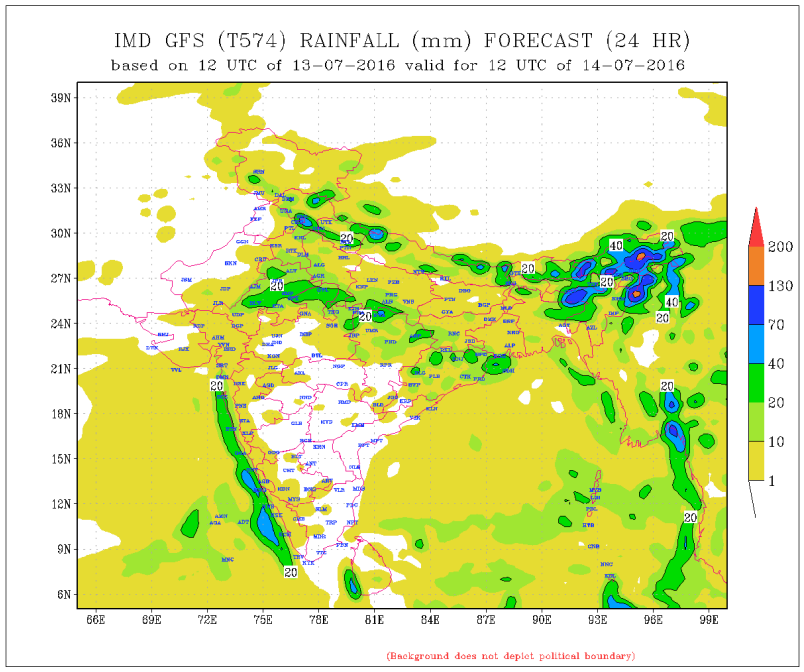
PREDICTIONS

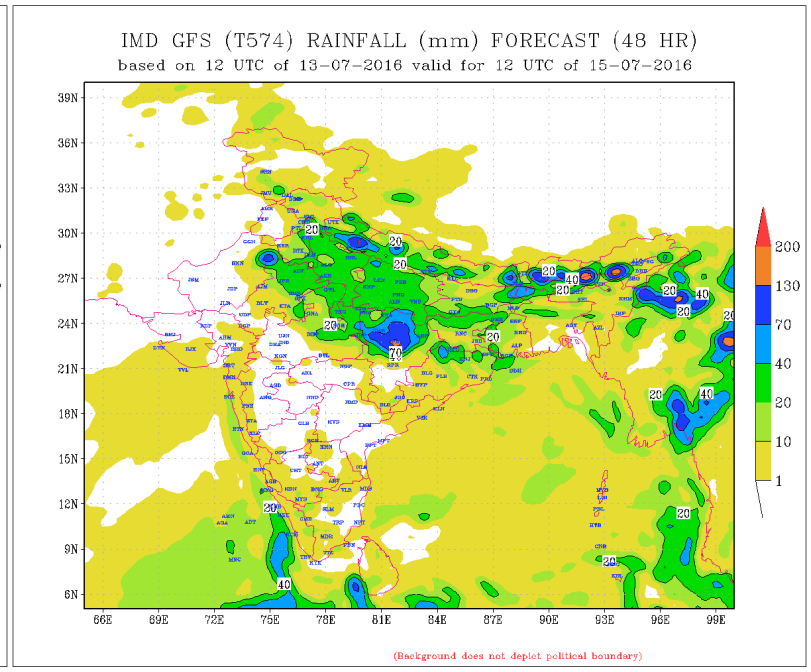
NCEP GFS 1- 14 Day prediction

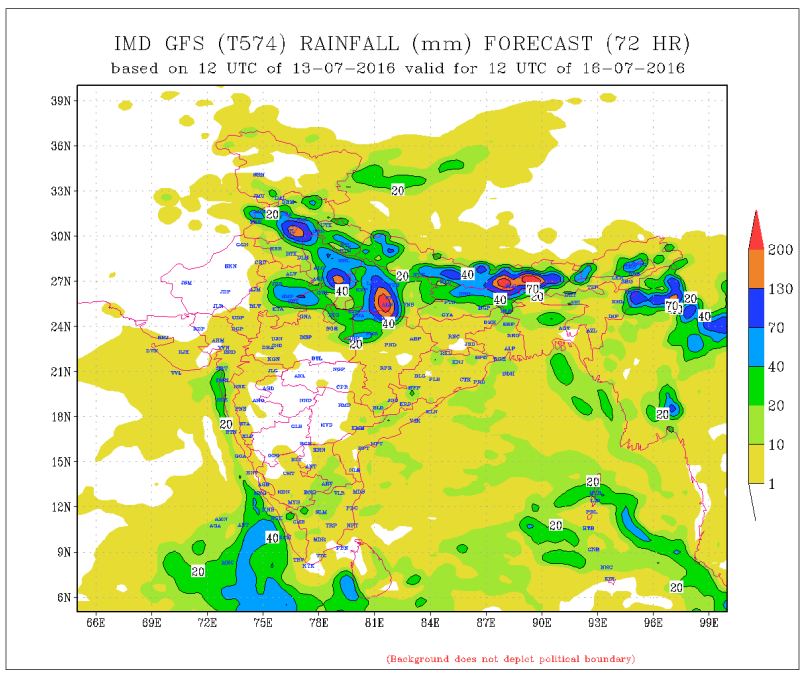


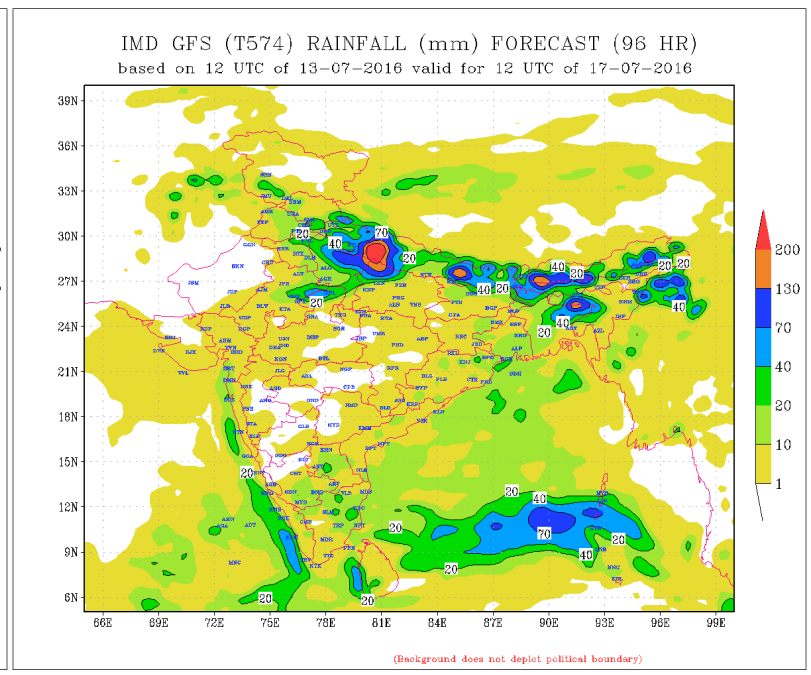


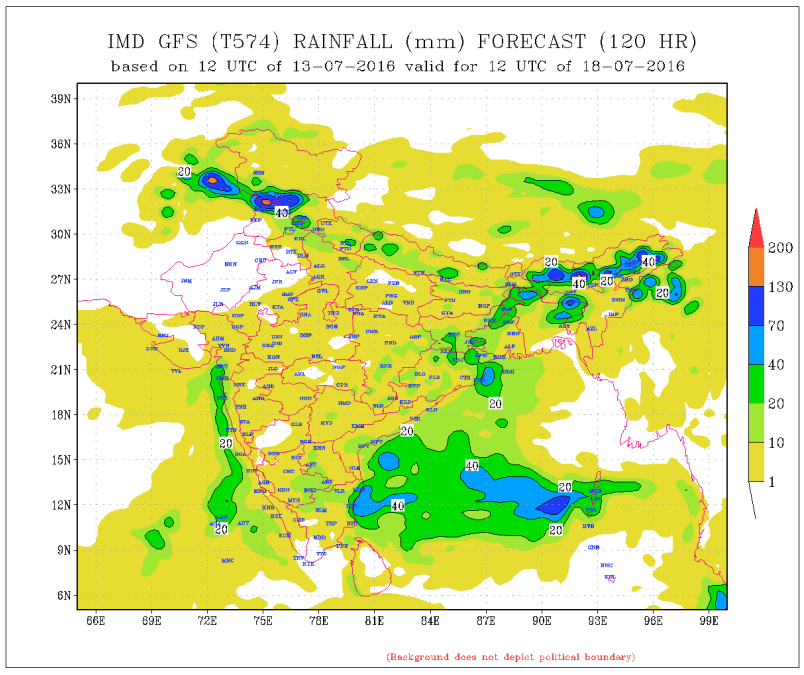
IMD GFS (T574) Model Rainfall Forecast from RMSC New Delhi, India

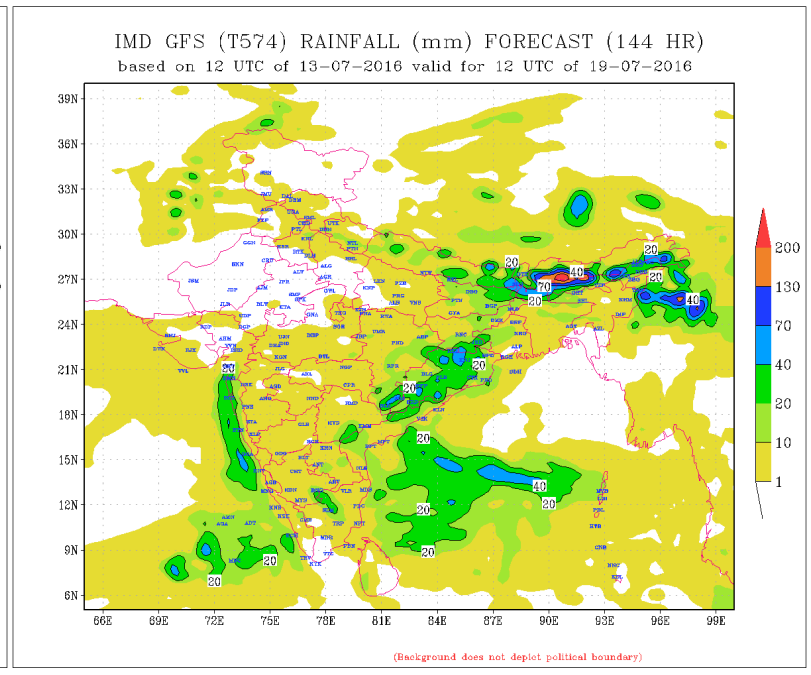


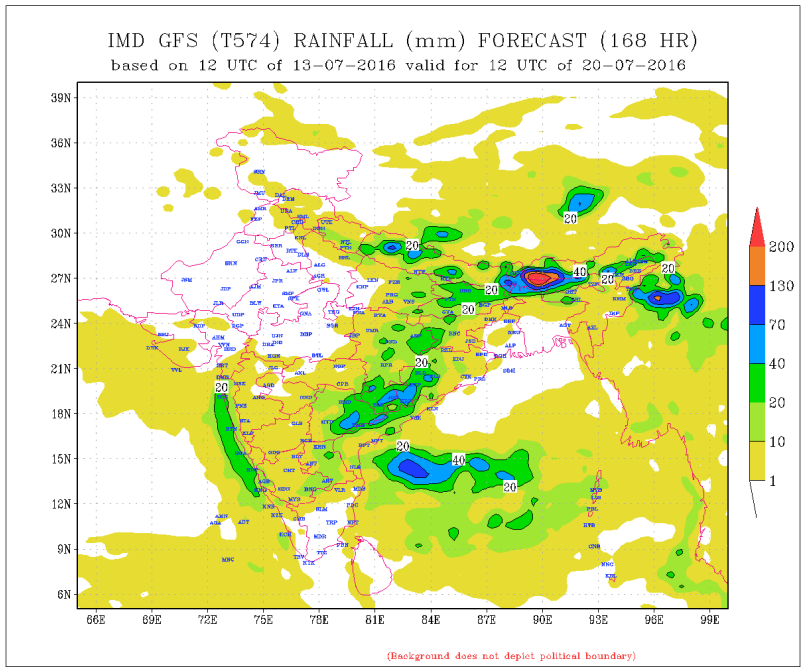




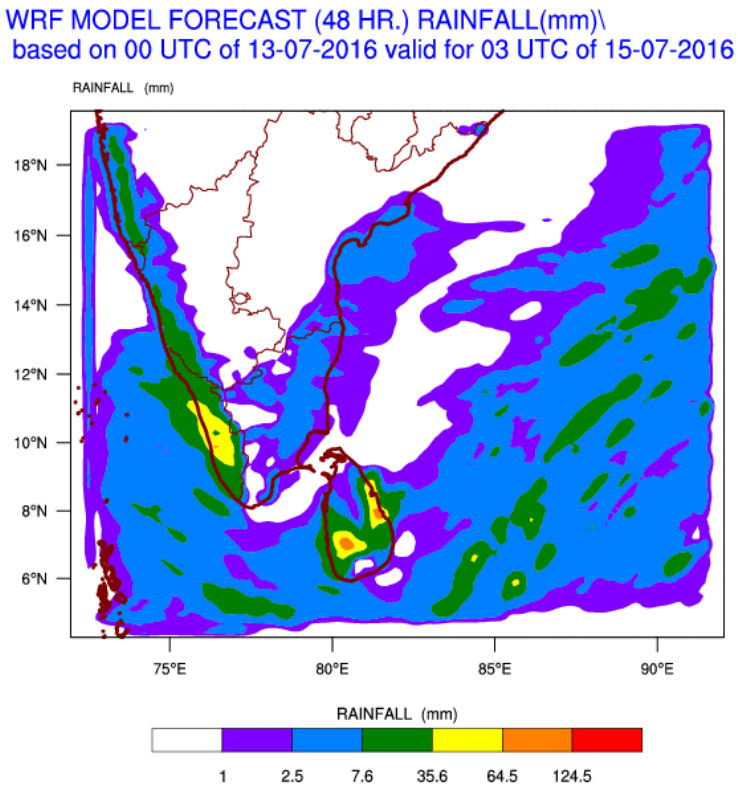


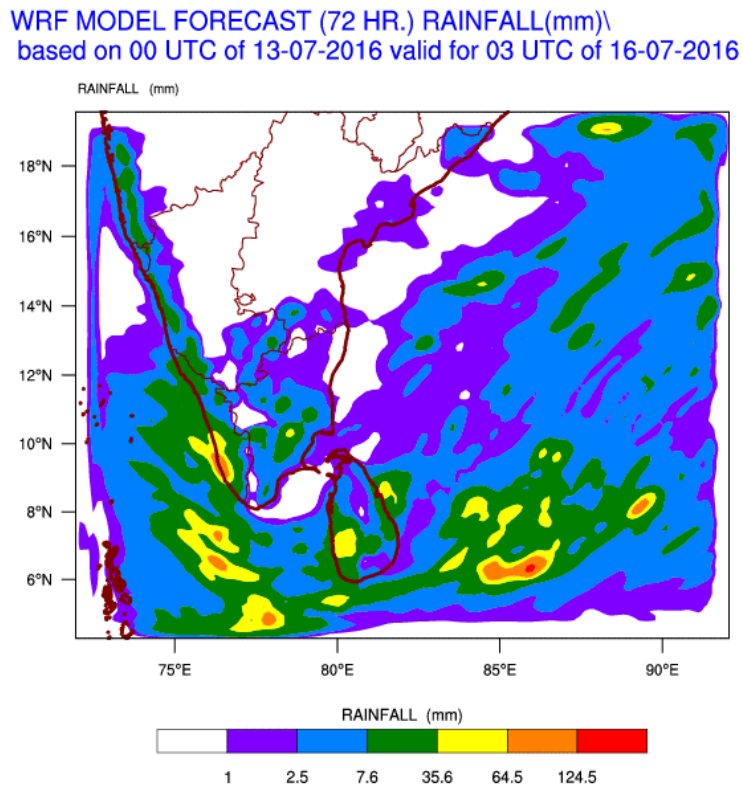






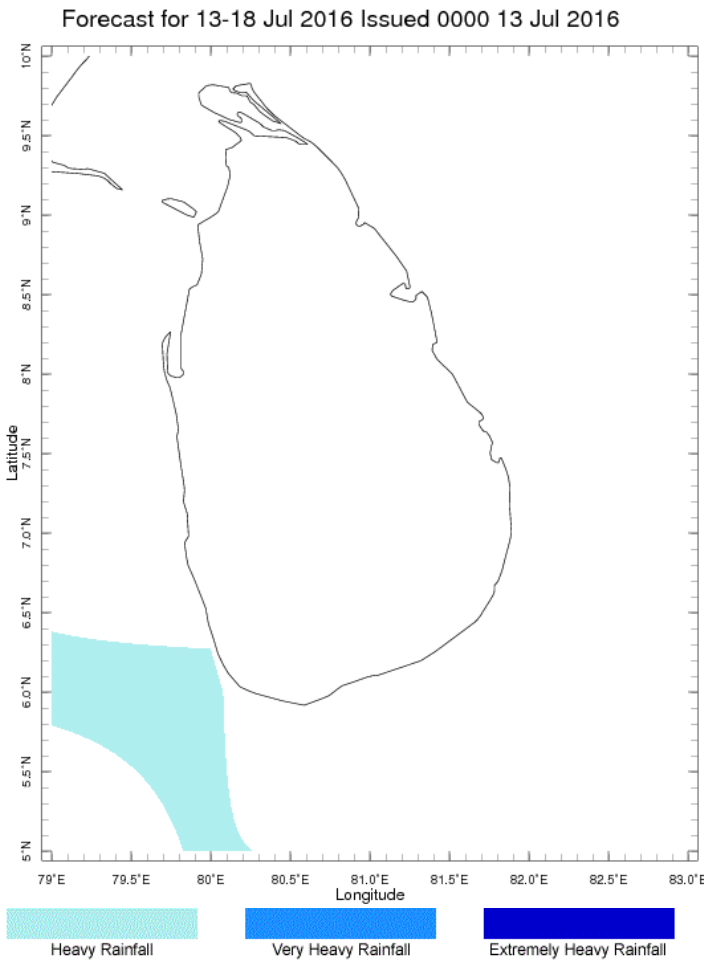
WRF Model Forecast (from IMD Chennai)



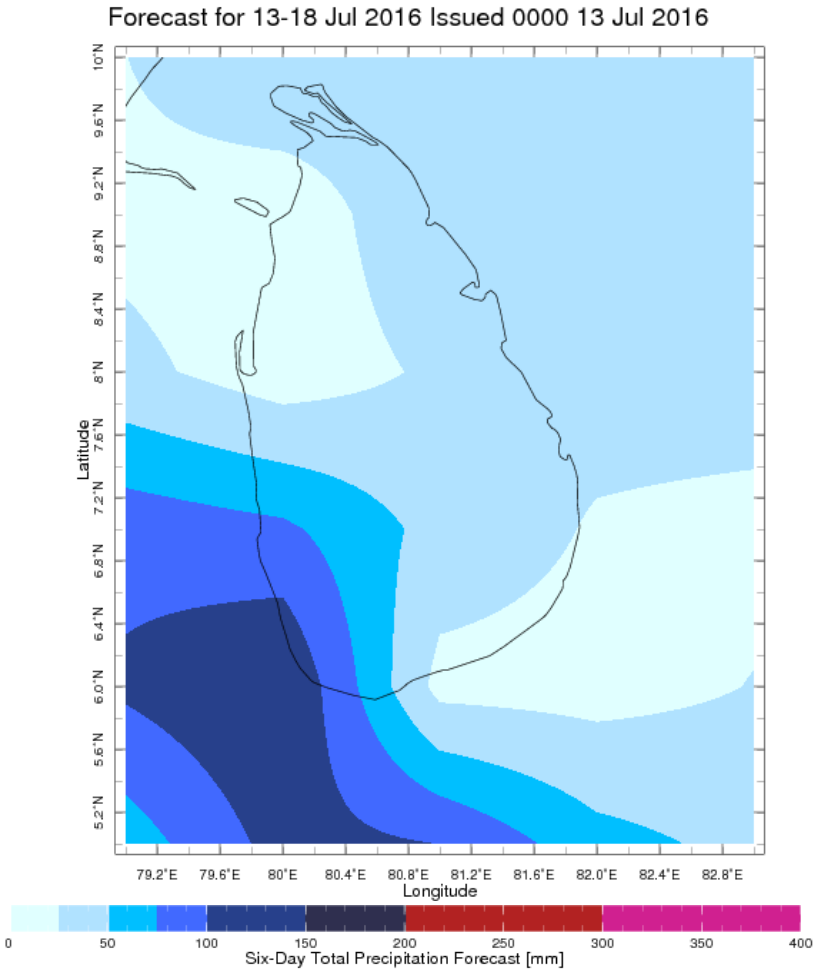


Weekly Rainfall Forecast from IRI

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.



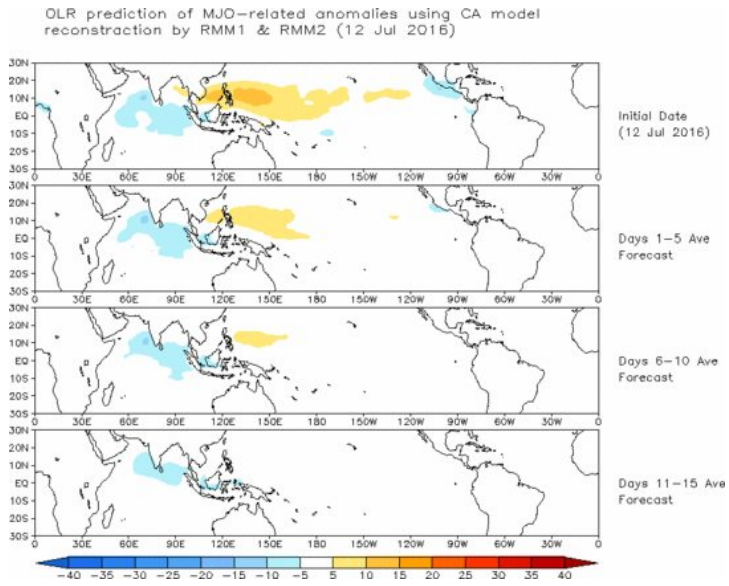
Extreme Rainfall Forecast



Total Six Day Precipitation Forecast

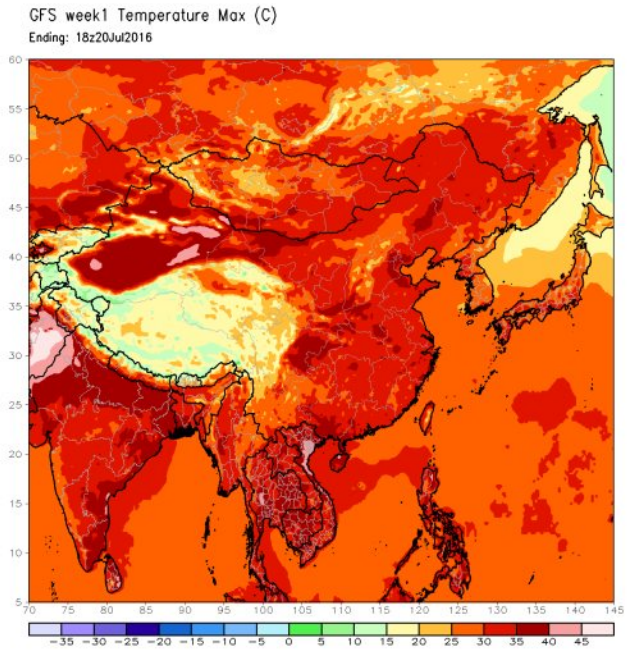
Madden Julian Oscillation (MJO) related Outgoing Longwave Radiation (OLR) Forecast

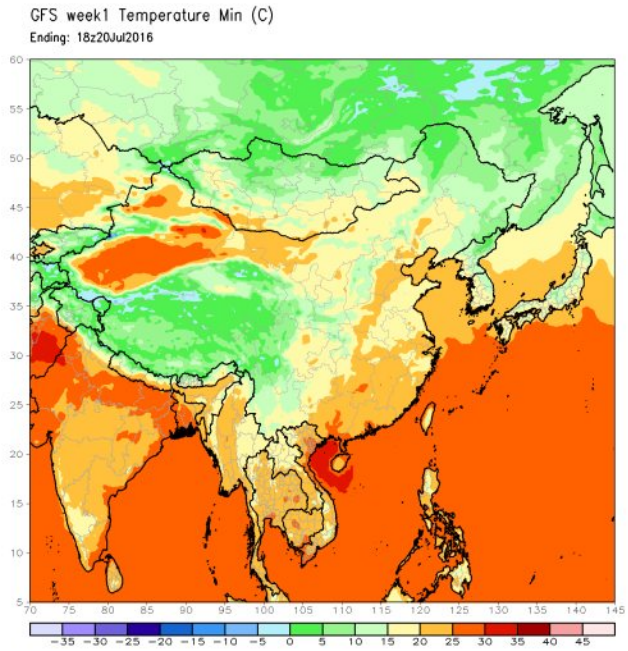
The Outgoing Longwave Radiation (OLR) is a proxy for rainfall. This can be used to identify convective rain clouds based on the MJO phase. Violet and Blue shading indicates enhanced tropical weather and Orange shading indicates suppressed conditions. The following figure shows the forecasts of MJO associated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



Weekly Temperature Forecast

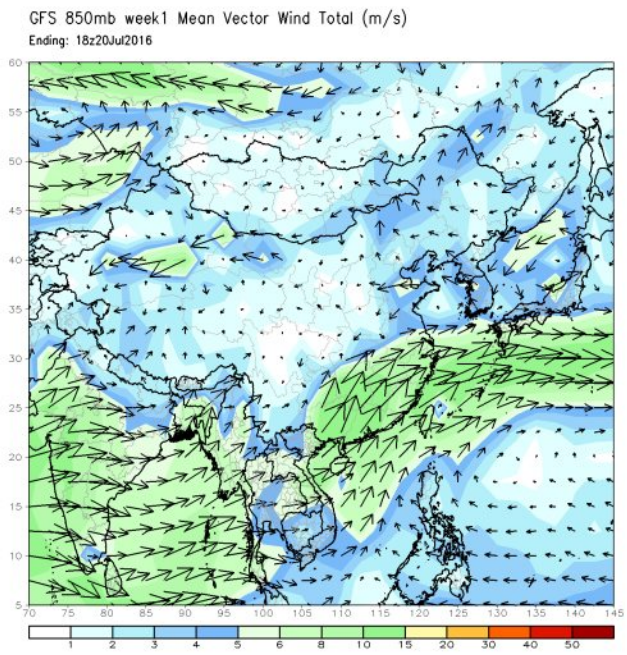
Weekly Minimum and Maximum Temperature prediction from the GFS model (from NOAA CPC)

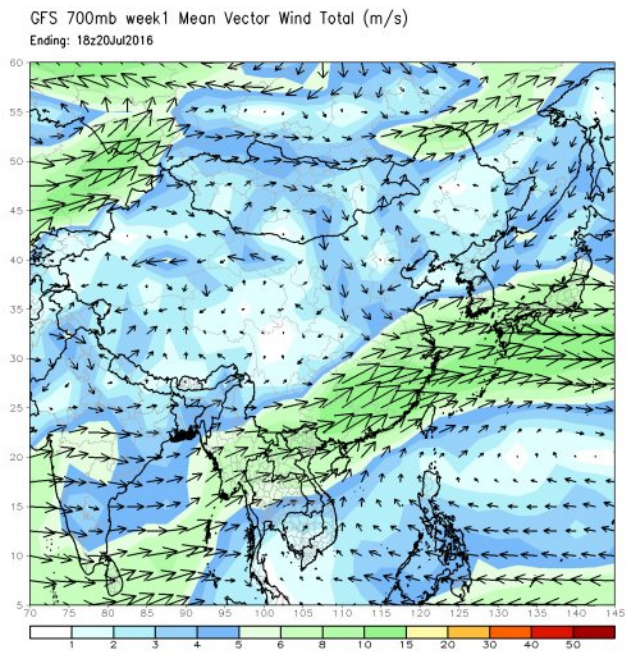




Weekly Wind Forecast

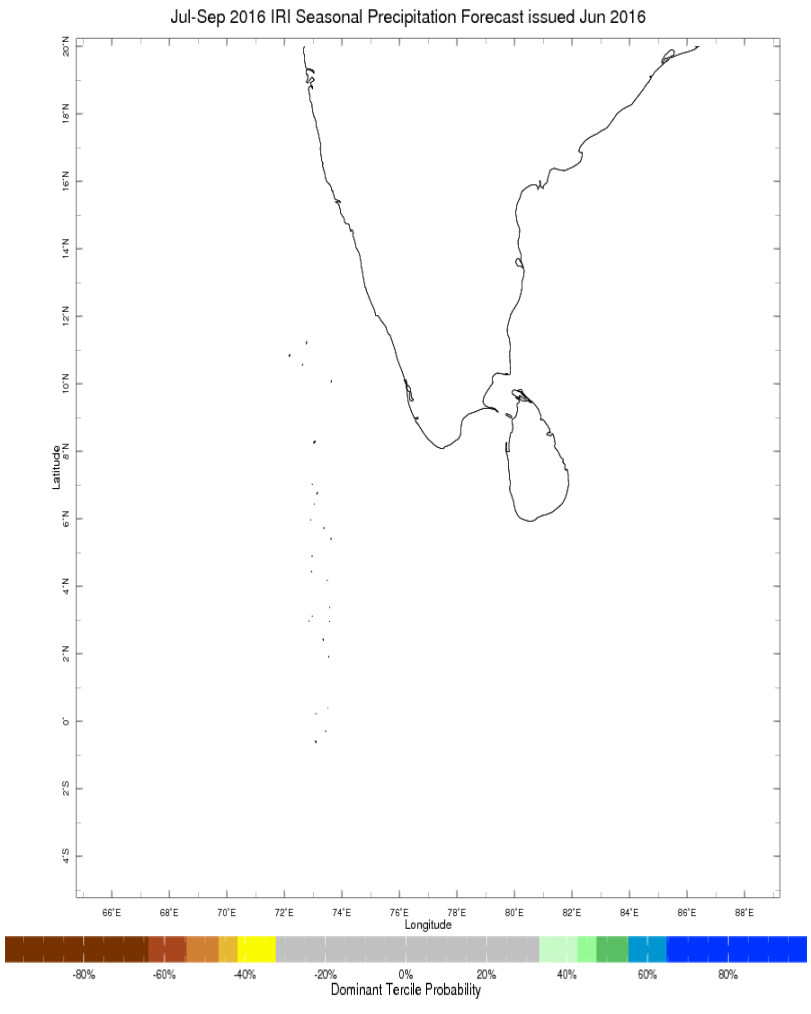
Weekly mean vector wind total prediction from the GFS model at 850 mb (left) and 700 mb (right) levels. (from NOAA CPC)



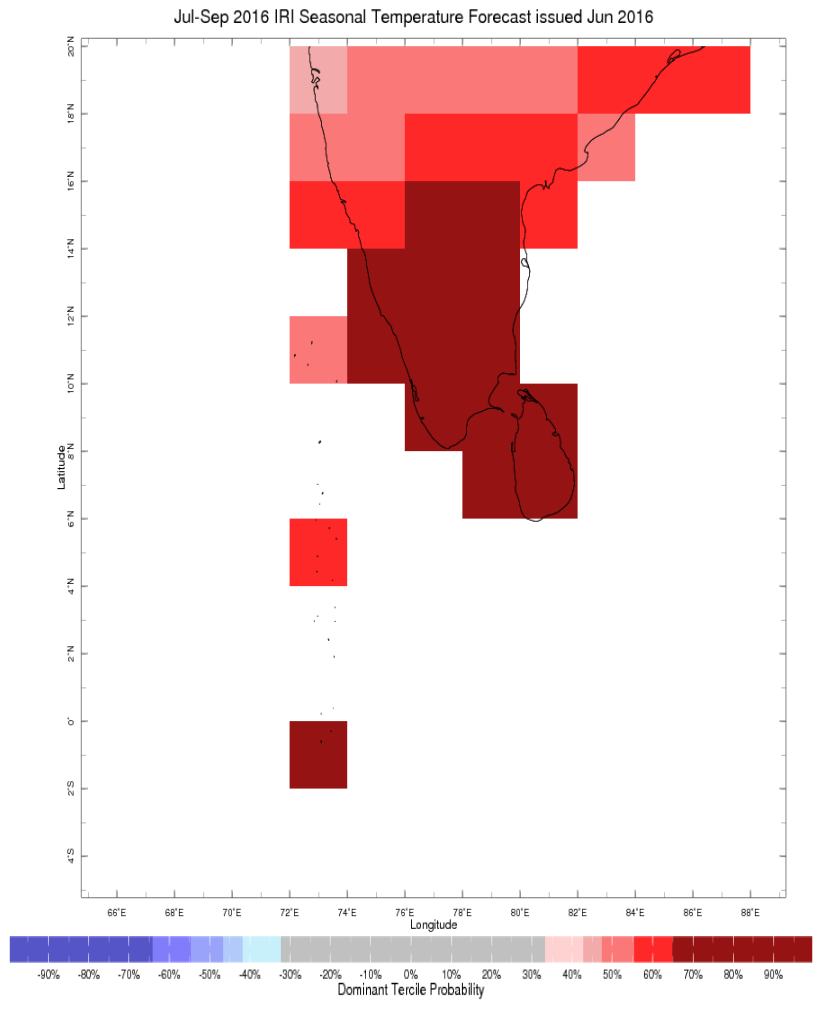


Seasonal Rainfall and Temperature Forecast

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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