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Experimental Climate Monitoring and Prediction

by: Ruchira Lokuhetti, Chalani Malge, Janan Visvanathan, Lareef Zubair and Michael Bell[1] (FECT and IRI[1])

19 September 2019

Highlights

- ***The IRI weekly rainfall forecast predicts up to 75 mm of total rainfall in Kalutara and Galle districts during 18 – 23 Sep.***
- ***Between 10 - 15 Sep: up to 140 mm of rainfalls were recorded Hambantota district on the 14th.***
- ***From 9 – 15 Sep: up to 54 km/h, westerly winds were experienced by the entire island.***
- ***0.5 ^{0}C above average sea surface temperature was observed in the seas around Sri Lanka.***

Monitoring

Rainfall

Weekly Monitoring: On September 10th, Galle and Matara districts received up to 70 mm of rainfall; Colombo, Kalutara and Ratnapura districts received up to 30 mm; and Jaffna, Kilinochchi, Polonnaruwa, Gampaha, Kegalle, Nuwara Eliya, Badulla, Monaragala and Hambantota districts. On the 11th, Kalutara, Ratnapura and Galle districts received up to 70 mm of rainfall; Kurunegala, Gampaha, Colombo and Matara districts up to 60 mm; Puttalam, Hambantota, Badulla and Monaragala districts up to 50 mm; Nuwara Eliya, Ampara, Kandy and Kegalle districts up to 30 mm; and Vavuniya, Anuradhapura, Trincomalee, Batticaloa and Matale districts up to 20 mm. On the 12th, Jaffna, Batticaloa and Ampara districts received up to 50 mm of rainfall; Kilinochchi, Mullaitivu, Badulla and Monaragala districts up to 30 mm; and Mannar, Vavuniya, Anuradhapura, Polonnaruwa, Kandy and Hambantota districts up to 20 mm. On the 13th, Badulla and Ampara districts received up to 60 mm of rainfall; Jaffna and Mullaitivu districts up to 50 mm; Kilinochchi, Mannar, Anuradhapura, Monaragala, Matale and Kandy districts up to 30 mm; and Ratnapura and Batticaloa districts up to 20 mm. On the 14th, Hambantota district received up to 140 mm of rainfall; Monaragala district up to 100 mm; Matara district up to 90 mm; Ratnapura, Badulla, Galle and Ampara districts up to 60 mm; Polonnaruwa, Batticaloa and Colombo districts up to 50 mm; Gampaha, Trincomalee and Nuwara Eliya districts up to 30 mm; and Mullaitivu, Anuradhapura, Puttalam, Kurunegala, Matale and Kandy districts up to 20 mm. On the 15th Ratnapura, Gampaha, Colombo and Kalutara districts received up to 120 mm of rainfall; Mannar, Mullaitivu, Kegalle and Galle districts up to 70 mm; Vavuniya, Puttalam, Kurunegala and Matara districts up to 60 mm; Jaffna, Kilinochchi, Kandy, Nuwara Eliya, Monaragala and Hambantota districts up to 50 mm; Trincomalee, Anuradhapura and Badulla districts up to 30 mm; and Polonnaruwa, Matale and Ampara districts up to 20 mm.

Total Rainfall for the Past Week: The RFE 2.0 tool shows total up to 200-300 mm in Colombo, Kalutara, Galle, Matara and Ratnapura districts; up to 150-200 mm Gampaha, Hambantota and Monaragala districts; and up to 100-150 mm in Jaffna, Kilinochchi, Mannar, Vavuniya, Mullaitivu, Badulla and Ampara districts. Above average rainfall up to 100-200 mm is shown for in Jaffna, Kilinochchi, Mannar, Vavuniya, Gampaha, Colombo, Kalutara, Galle, Kegalle, Ratnapura, Matra, Hambantota and Monaragala districts; and up to 50-100 mm Puttalam, Kurunegala, Anuradhapura, Trincomalee, Polonnaruwa, Batticaloa, Kandy, Nuwara Eliya, Badulla and Ampara districts.

Monthly Monitoring: During August – Above average rainfall conditions up to 360 mm were experienced by Gampaha, Colombo, Kalutara, Galle, Matara, Kegalle and Ratnapura districts; up to 240 mm in Puttalam, Kurunegala, Nuwara Eliya, Anuradhapura, Polonnaruwa, Matale, Monaragala and Hambantota; and up to 120 mm in Jaffna, Kilinochchi, Mullaitivu, Mannat, Vavuniya, Ampara and Batticaloa. Below average rainfall conditions up to 180 mm were experienced Trincomalee and most parts of Badulla district. The CPC Unified Precipitation Analysis tool shows up to 750 mm of total rainfall in Ratnapura district; up to 500 mm in Gampaha, Colombo, Kalutara, Galle, Matara, Kegalle, and Nuwara Eliya districts; up to 300 mm in Puttalam, Kurunegala and Hambantota districts; and up to 200 mm in Kandy, Badulla and Monaragala districts.

Ocean State (*Text Courtesy IRI*)

Pacific sea state: September 12, 2019

SSTs in the east-central Pacific maintained ENSO-neutral levels during August. Patterns in the key atmospheric variables are also showing ENSO-neutral conditions. Model forecasts generally favor ENSO-neutral through autumn and winter, with slightly higher chances for El Niño than La Niña. The official CPC/IRI outlook is consistent with these model forecasts.

Indian Ocean State

0.5 ^{0}C above average sea surface temperature was observed in the seas around Sri Lanka.

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Predictions

Rainfall

14-day prediction:

NOAA NCEP models:

From 18th – 24th Sep: Total rainfall up to 135 mm in Galle, Ratnapura and Matara districts; up to 115-125 mm in Hambantota district; and up to 85-95 mm in Gampaha, Kegalle, Badulla, Monaragala and Ampara districts.

From 25th Sep – 1st Oct: Total rainfall up to 105 mm in Galle, Matara and Hambantota districts; up to 85-95 mm in Gampaha, Kegalle and Ratnapura districts; and up to 65-75 mm in Kurunegala, Puttalam, Badulla and Monaragala districts.

IRI Model Forecast:

From 18th – 23rd Sep: Total rainfall up to 75 mm is expected in Kalutara and Galle districts; and up to 50 mm in most parts of the island.

MJO based OLR predictions

For the next 15 days:

MJO shall not have an impact in the rainfall of Sri Lanka in the next 5 days and shall enhance in the following 10 days.

[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.

FOUNDATION FOR ENVIRONMENT, CLIMATE AND TECHNOLOGY

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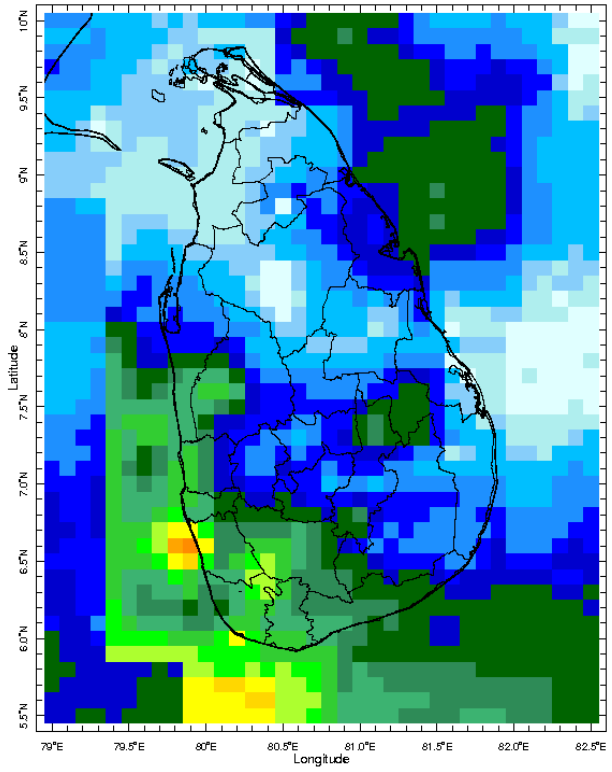
Weekly Hydro- Meteorological Report for Sri Lanka

Inside This Issue

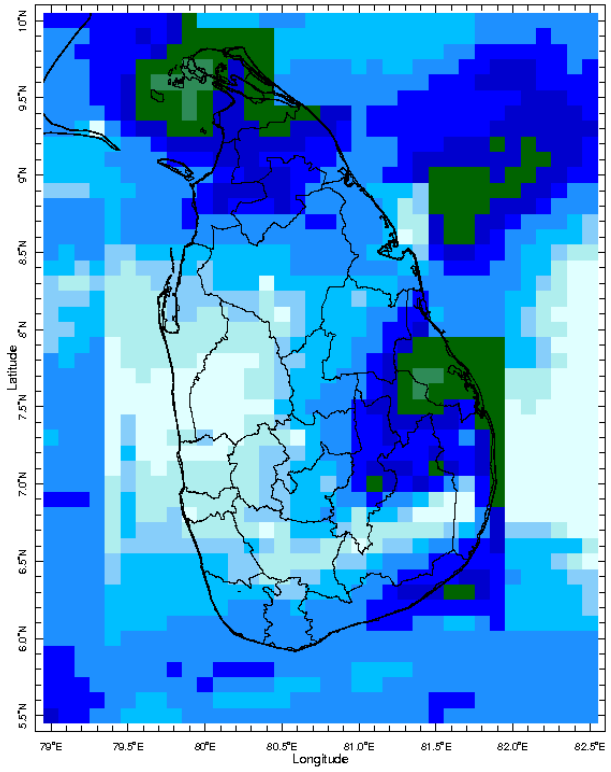
MONITORING

Daily Rainfall Monitoring

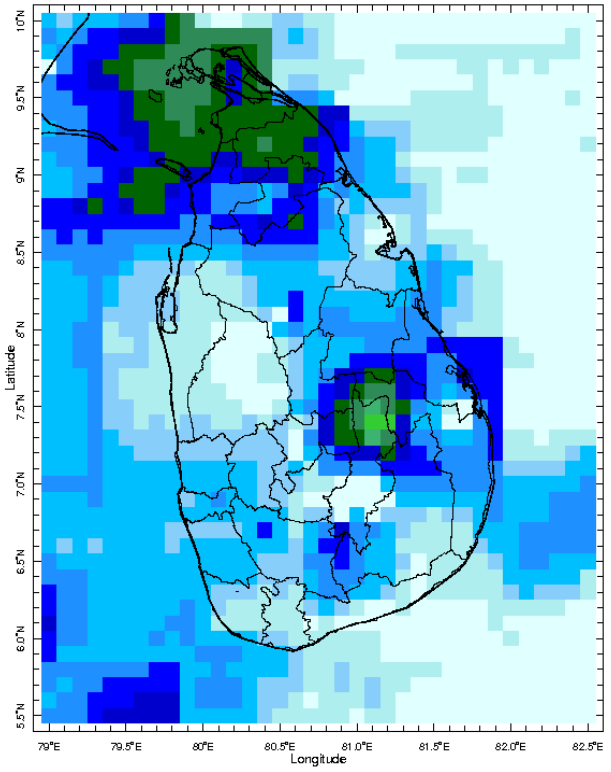
The following figures show the satellite observed rainfall in the last 7 days in Sri Lanka.



11 Sep 2019



12 Sep 2019



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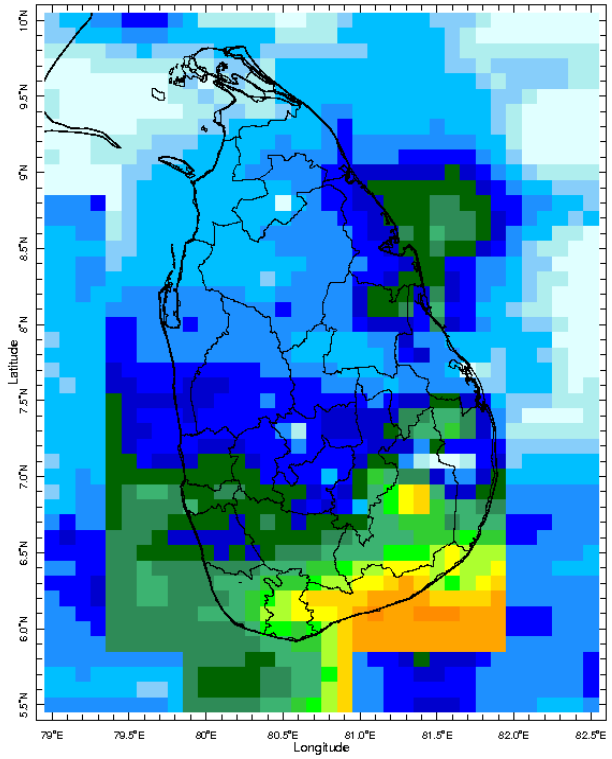
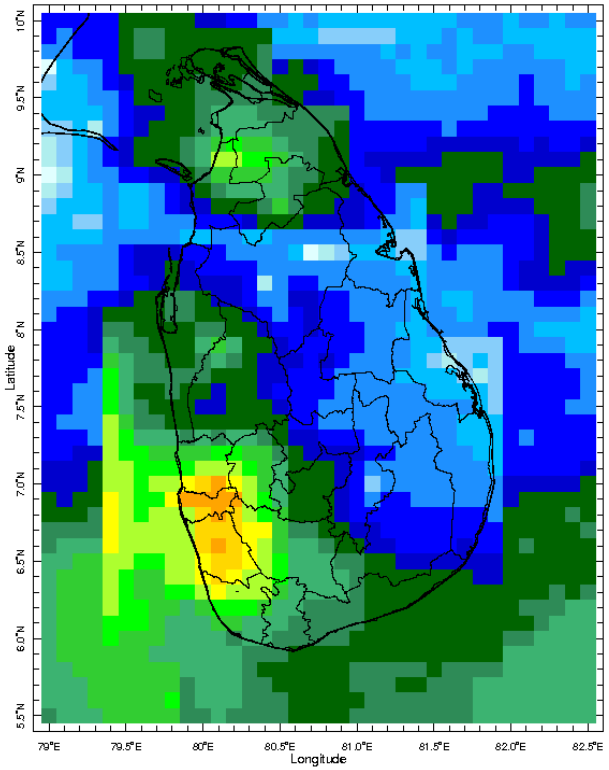
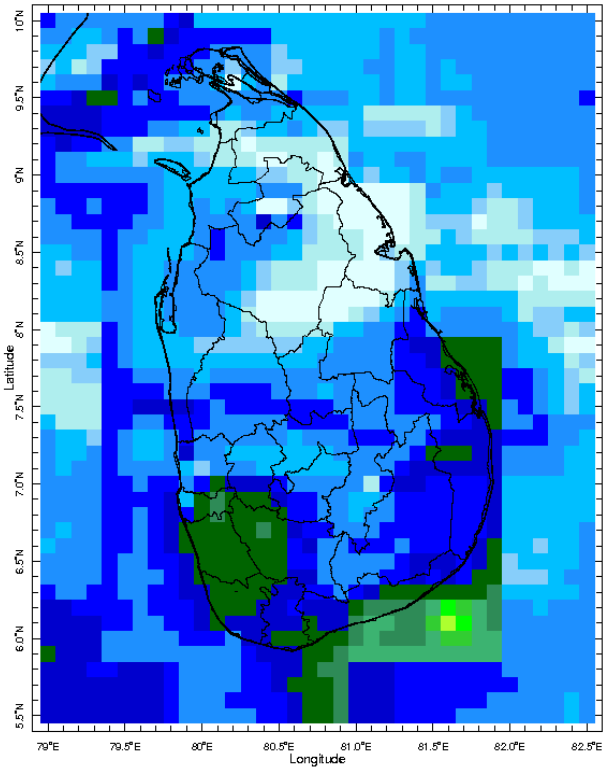


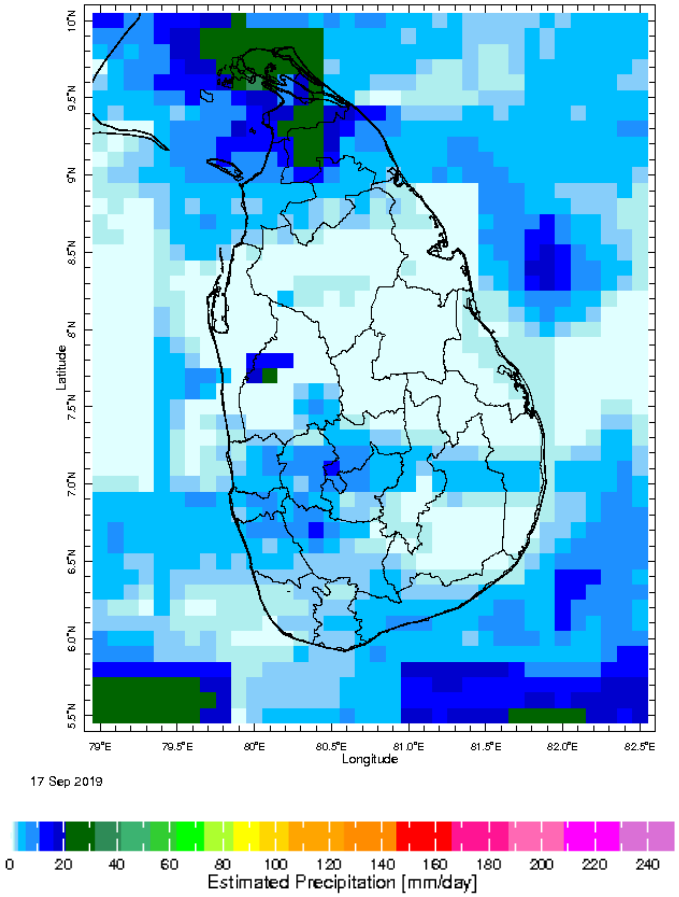
14 Sep 2019



15 Sep 2019

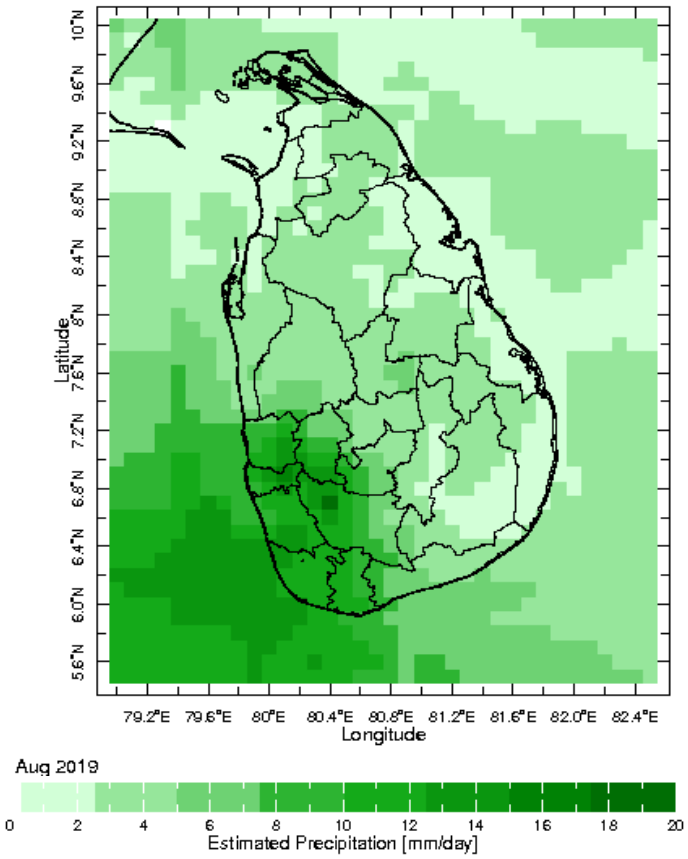


16 Sep 2019

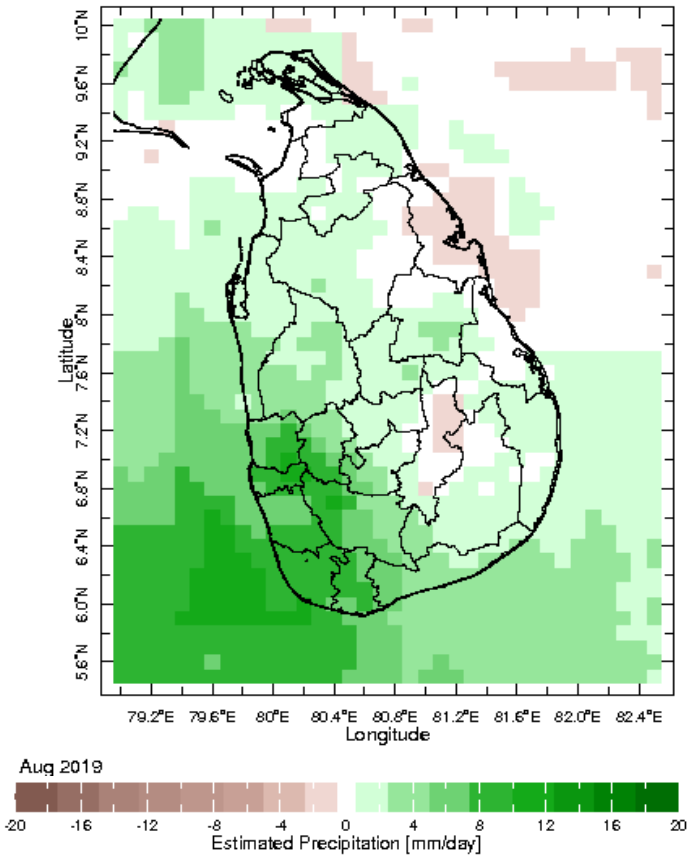


Monthly Rainfall Monitoring

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

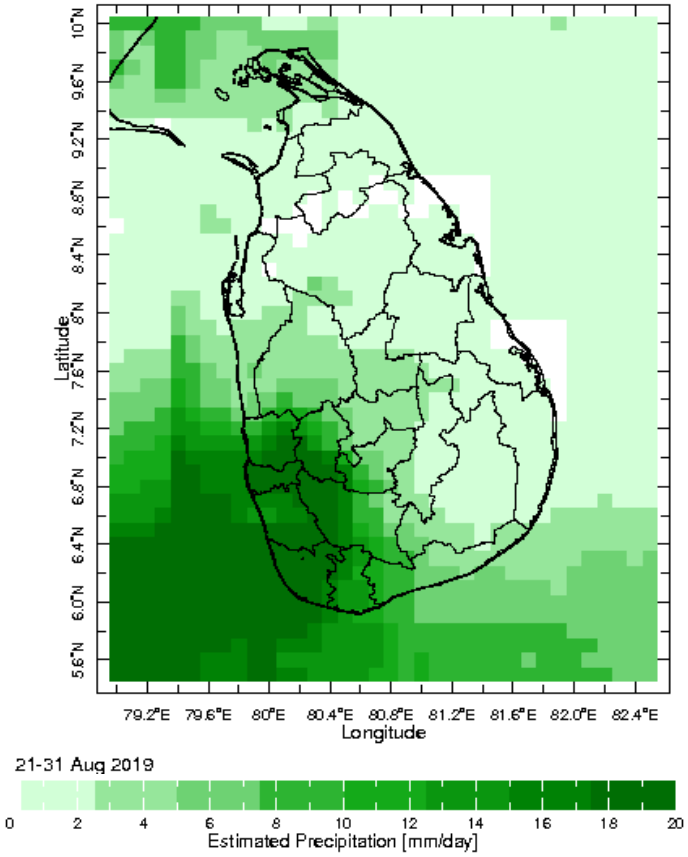


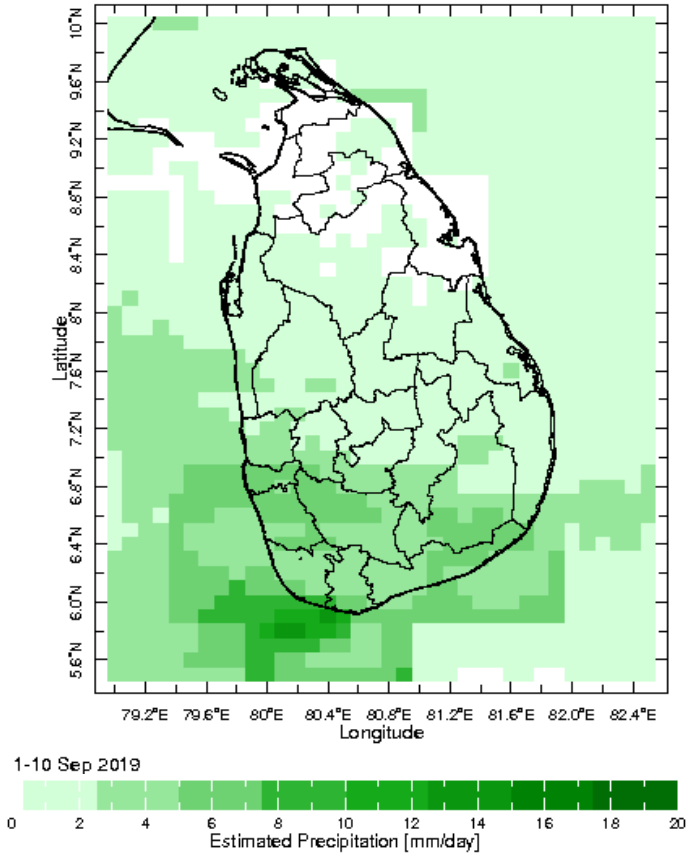
Monthly Average



Monthly Anomaly

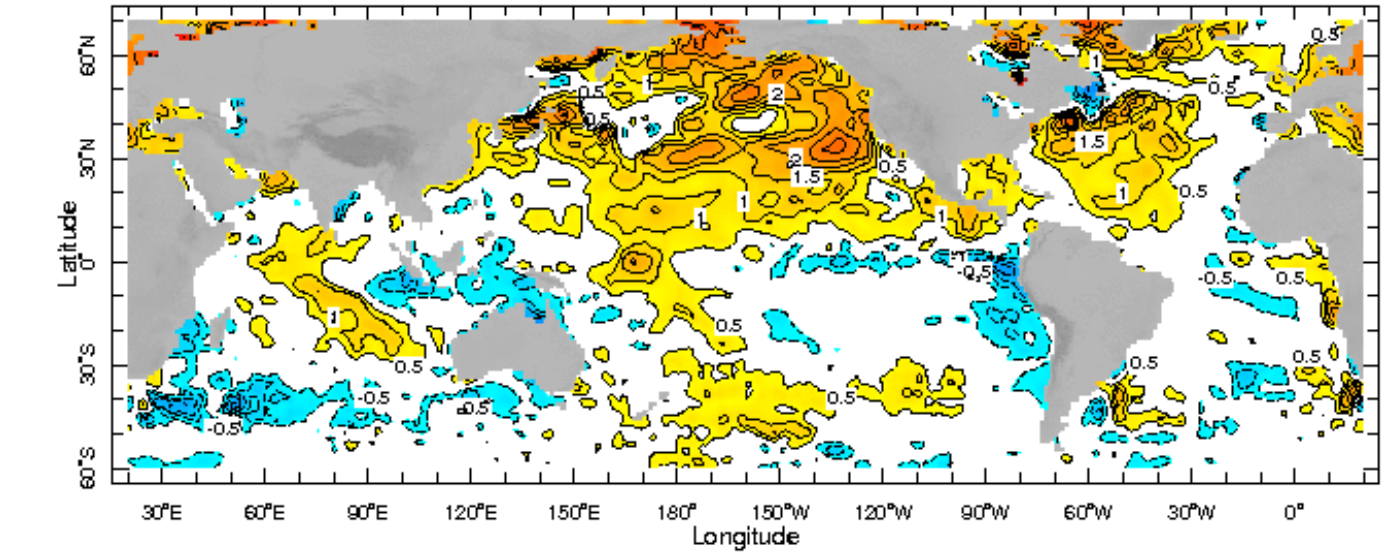
Dekadal (10 Day) Satellite Derived Rainfall Estimates





Weekly Average SST Anomalies

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

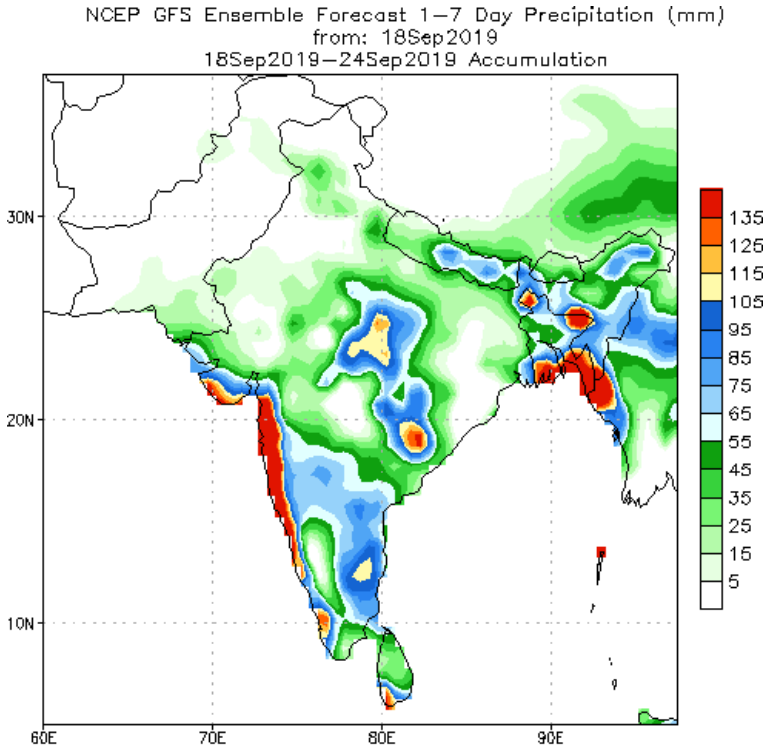


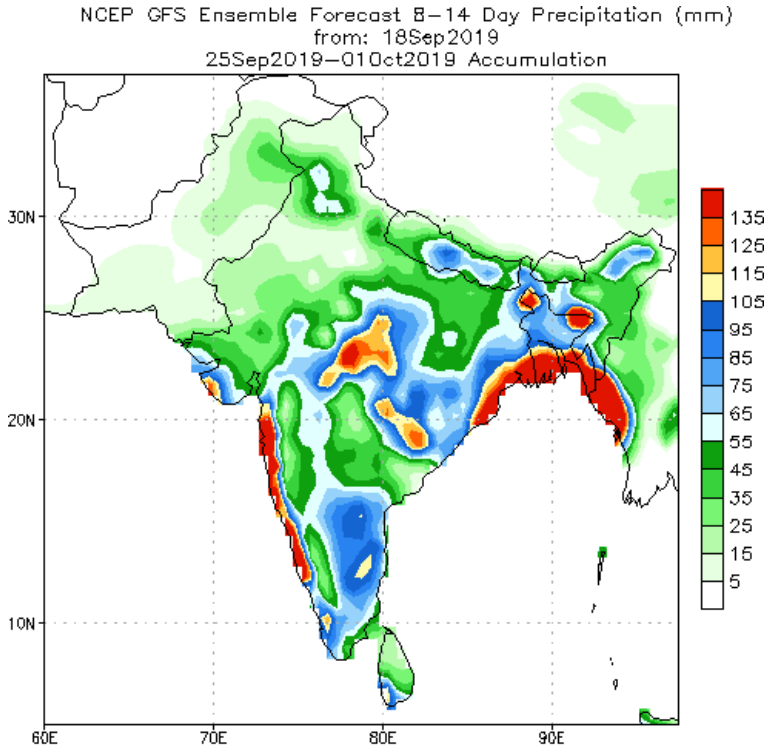
11 Sep 2019

WORLDBATH topography

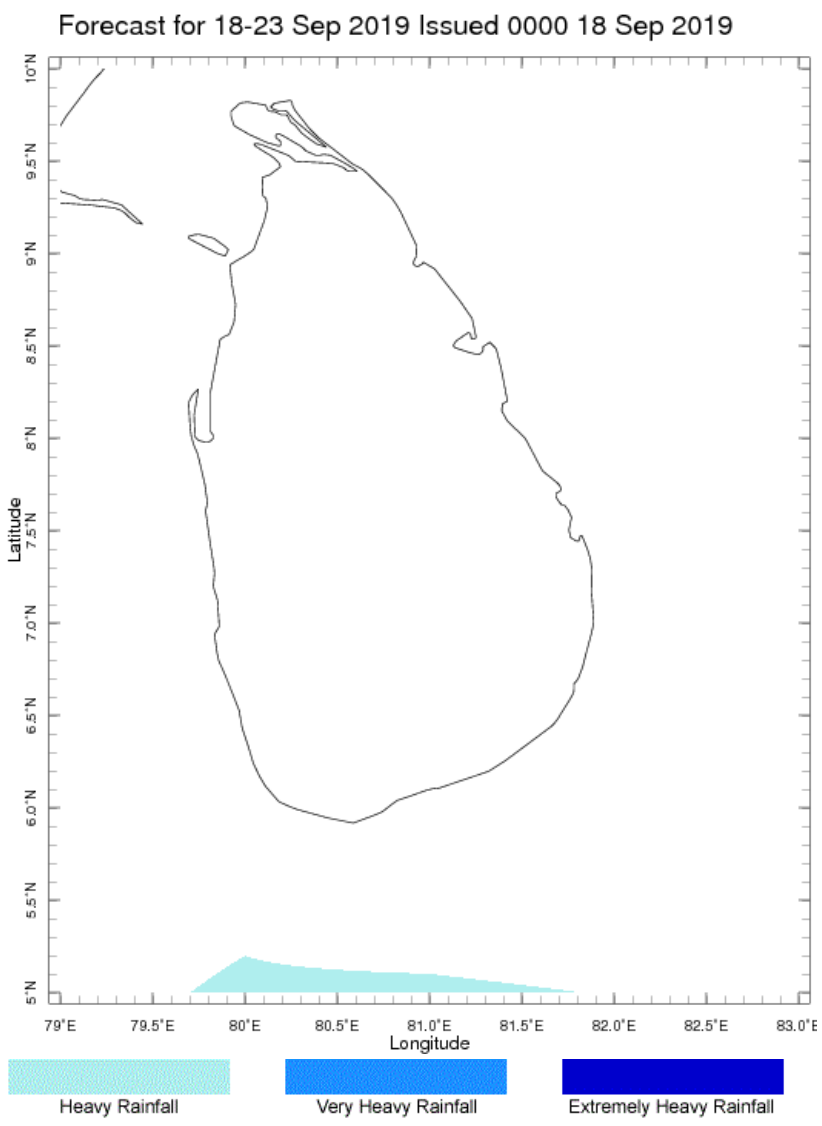
PREDICTIONS

NCEP GFS 1- 14 Day prediction

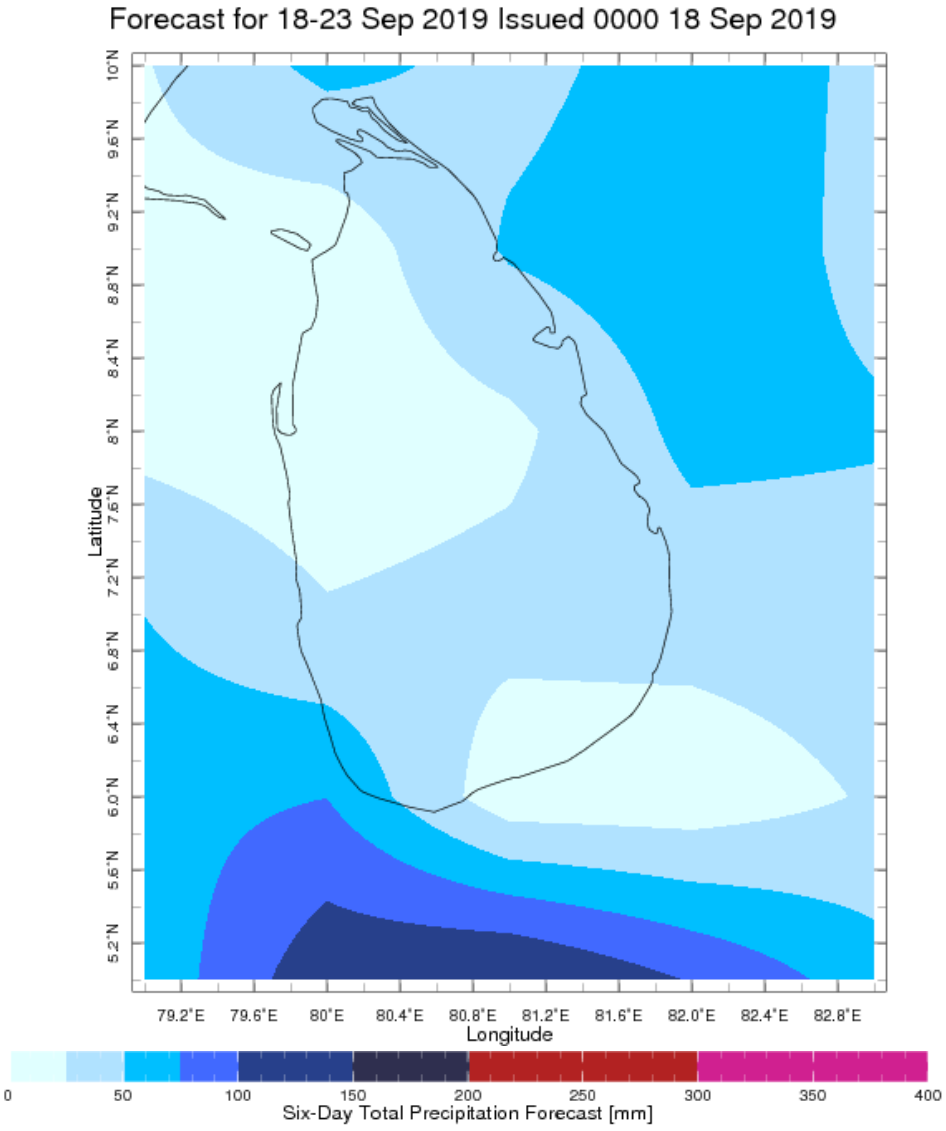

NCEP GFS Ensemble Forecast 1-7 Day Precipitation (mm)
from: 18Sep2019
18Sep2019-24Sep2019 Accumulation
30N
20N
10N
60E
70E
80E
90E
135
125
115
105
95
85
75
65
55
45
35
25
15
5
Bias correction based on last 30-day forecast error


NCEP GFS Ensemble Forecast 8-14 Day Precipitation (mm)
from: 18Sep2019
25Sep2019-01Oct2019 Accumulation
30N
20N
10N
60E
70E
80E
90E
135
125
115
105
95
85
75
65
55
45
35
25
15
5
Bias correction based on last 30-day forecast error

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