Federation for Environment, Climate and Technology

c/o, Maintenance Office, Mahaweli Authority, Digana Village, Rajawella, Sri Lanka.
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Week of 27 Nov - 4 Dec 2020

CLIMATE MONITORING AND PREDICTION FOR SRI LANKA

By: Nipuni Alahakoon, Ushan Adithya, Azra Munas, Tuan Hadgie, Lareef Zubair and Michael Bell[1] (FECT and IRI[1])

HIGHLIGHTS

Rainfall Prediction

•*Between 26th Nov - 2nd Dec: high rainfall over the Eastern Province the drop in rainfall over the rest of the country.*

Monitored Rainfalls

•*Between 19th - 25th Nov: up to 90 mm in Jaffna, Mullaitivu and Vavuniya districts on 24th Nov.*

Monitored Wind

•*From 18th - 24th Nov:up to 8 km/h Northeasterly winds were experienced by the nothern of the island.*

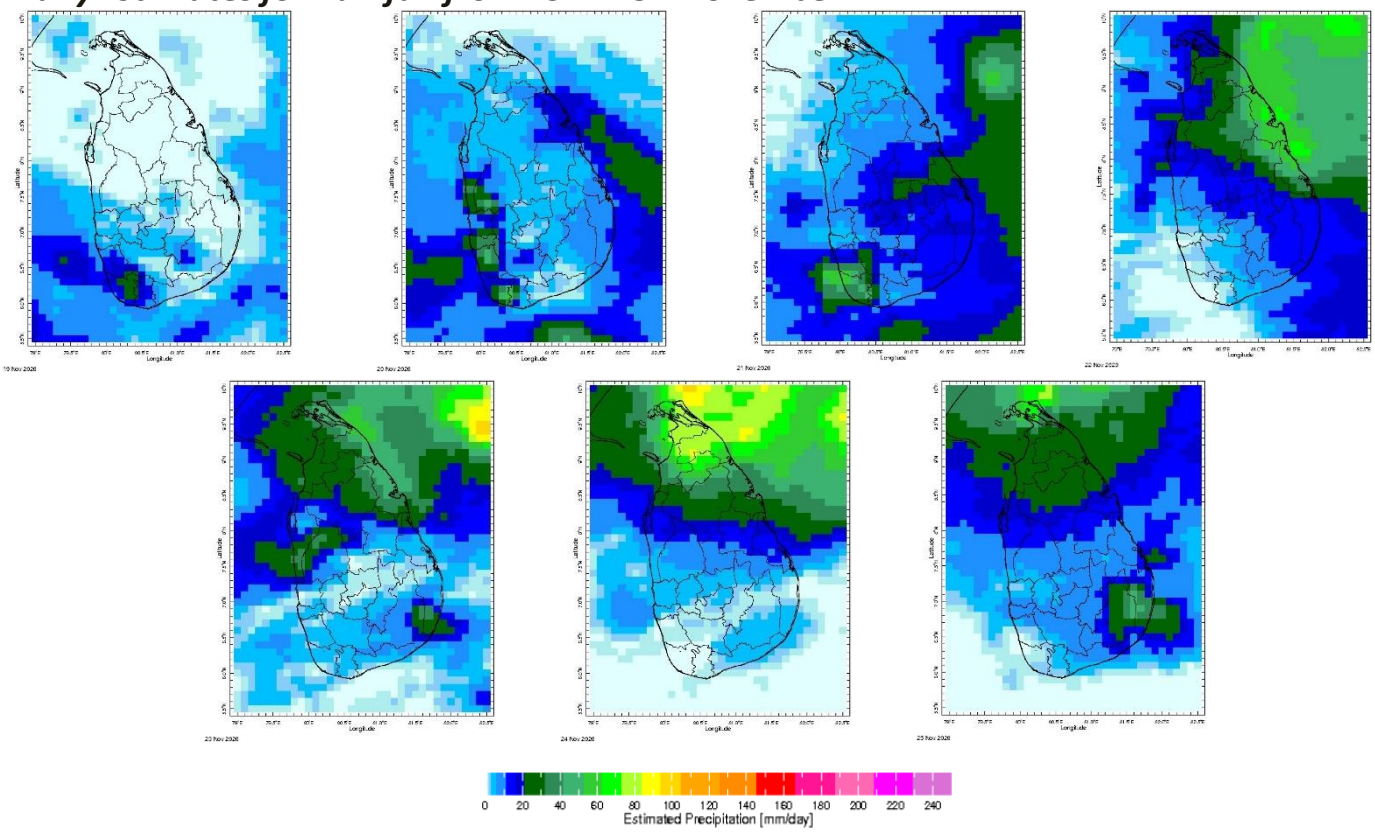
Monitored Sea Surface

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

Monitoring

Rainfall

Daily Estimates for Rainfall from 19th– 25th November



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Total Rainfall for the Past Week

The RFE 2.0 tool shows total up to 200 – 300 mm in Jaffna and Mullaitivu districts; up to 150 – 200 mm in Kilinochchi, Mannar, Vavuniya, Anuradhapura, Trincomalee, Polonnaruwa and Batticaloa districts; up to 100 – 150 mm up to in Puttalam district; up to 75 – 100 mm in Kurunegala, Ampara, Moneragala, Matara, Galle, Matale and Kalutara districts; up to 50 -75 mm in Colombo, Gampaha, Hambantota, Ratnapura, Kegalle, Kandy and Badulla districts; up to 25 – 50 mm in Nuwara Eliya district.

Above rainfall average up to 100 – 200 mm in Jaffna, Mullaitivu and Trincomalee districts; up to 50 – 100 mm in Kilinochchi, Mannar, Vavuniya, Anuradhapura, Polonnaruwa, Batticaloa and Galle districts; up to 25 – 50 mm in Puttalam, Ampara, Moneragala and Matara districts;up to 10 – 25 mm Kurunegala, Hambantota and Kalutara districts; Below rainfall average up to 50 – 100 mm in Gampaha, Kegalle and Nuwara Eliya districts; up to 25 – 50 mm in Colombo, Ratnapura, Badulla, Kandy and Matale districts.

Monthly Monitoring

Overall, October had been drier than normal. However, as November is the wettest month in Sri Lanka, the rainfall was high. During October; Above average rainfall conditions up to 4 mm in Vavuniya, Anuradhapura, Badulla, Ampara and Moneragala districts; up to 2 mm in Mannar, Batticaloa, Ratnapura and Hambantota districts; Below average rainfall up to 8 mm in Galle, Kalutara and Colombo district; up to 6 mm in Matara, Gampaha, Kegalle, Nuwara Eliya, Kandy, Kurunegala, Puttalam, Jaffna districts; up to 4 mm in Kilinochchi, Mullaitivu, Polonnaruwa, Matale and Trincomalee districts.

Ocean State *(Text Courtesy IRI)*

Pacific sea state: November 18, 2020

Equatorial Eastern Pacific SST reached La Niña threshold in mid-November, and the atmospheric variables were either ENSO-neutral or indicative of weak La Niña conditions.

Indian Ocean State

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

Predictions

Rainfall

14-day prediction: NOAA NCEP models

From 26th November – 2nd December: Total rainfall up to 135 mm in Eastern province; up to 125 mm in Northern and North central provinces; up to 95 mm in North western province: up to 85 mm in Central, and Uva provinces; 75 mm in Western and Sabaragamuwa provinces and 55 mm in Southern province.

From 3rd – 9th December: Total rainfall up to 95 mm in Eastern province; up to 75 mm in Northern and North central provinces; up to 65 mm in Central, North western, Western, Sabaragamuwa and Uva provinces and up to 55 mm in Southern province.

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NOAA Model Forecast:

From 24th – 29th September: Total rainfall up to 75 mm in Badulla district; up to 50 mm in Ampara, Moneragala, Ratnapura, Nuwara Eliya, Kandy, Matale, Polonnaruwa, Anuradhapura, Batticaloa, Trincomalee, Vavuniya, Mullaitivu, Kilinochchi and Jaffna districts; and up to 25 mm in Mannar, Puttalam, Kurunegala, Kegalle, Gampaha, Colombo, Kalutara, Galle, Matara and Hambantota districts.

MJO based OLR predictions

For the next 15 days:

MJO shall slightly enhance the rainfall during 25th – 29th Nov and Significantly suppress during 30th Nov - 9th Dec over Sri Lanka.

Interpretation

Monitoring

Rainfall: During the last two weeks, here had been high rainfall over the Jaffna and Mullaitivu districts. Northern Province with significant rainfall over the North central and Eastern Provinces. November is a month which typically has the highest rainfall in Sri Lanka. Rainfall deficiency in October was ompensated on the western coast during the last fortnight.
Wind: As was typical for mid-to late November the wind direction had reversed from the previous South-West to coming from North and East. The cyclonic circulation pattern in the southern Bay of Bengal influenced the North-Easterly coast of Sri Lanka to the end of last week.
Temperatures: were cooling from the highs in the previous month as was seasonable – still the temperature anomalies were above normal for the Southern half the last – driven by the warm SST's.

Predictions

Cyclonic Circulation: Cyclonic circulation reported last week has intensified to a named cyclone Nivar which made landfall just North of Chennai, India the end of last week. Its remnants shall weaken as it going inland into Tamil Nadu in the next days. The impacts on Sri Lanka were heavy rainfall and high wind in the Mullaitivu and Jaffna districts and the surrounding seas.
Rainfall: During the next two weeks, heavy rainfall predicted on the Eastern coast in Sri Lanka.
Temperatures: During 18th Nov –3th Dec, the temperature remains high especially the Western, Eastern and Southern coast.
Teleconnections: MJO- is in phases that significantly suppress from 30th Nov -9th Dec.

La Nina-has set in as assessed by IRI on October 20. The SST in the Indian Ocean is reacting slowly and is still warmer by 0.5 degree than is seasonable. Usually with La Nina, the rainfall from October to December is suppressed but this is not getting picked up in enough models because the rest of the SST is not typical for the La Nina.

[1] International Research Institute for Climate and Society, Columbia University Water Center, Earth Institute at Columbia University, New York.

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Weekly Climate Bulletin for Sri Lanka

Inside This Issue

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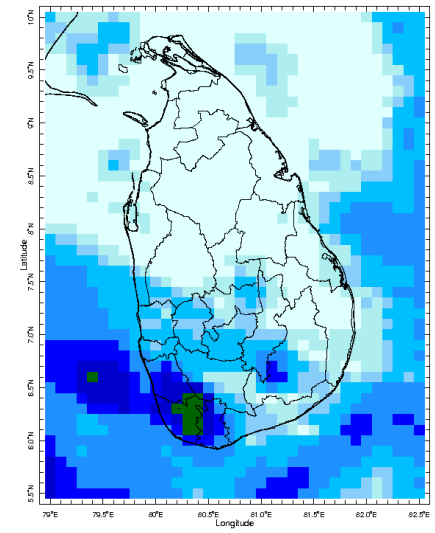
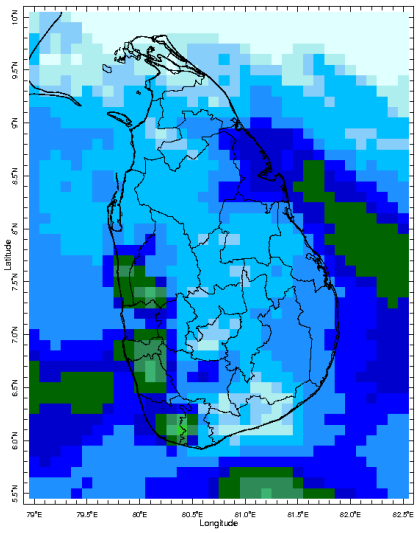
MONITORING

Daily Rainfall Monitoring

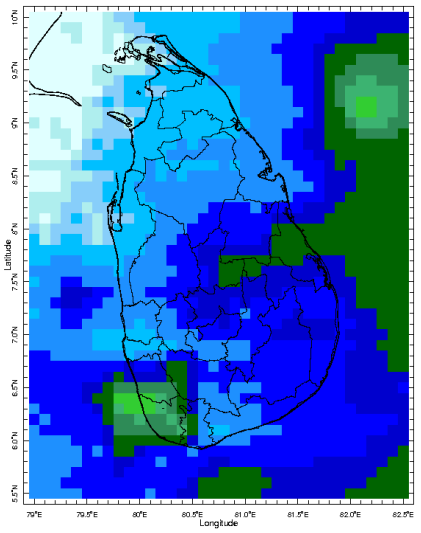
The following figures show the satellite observed rainfall in the last 7 days in Sri Lanka.



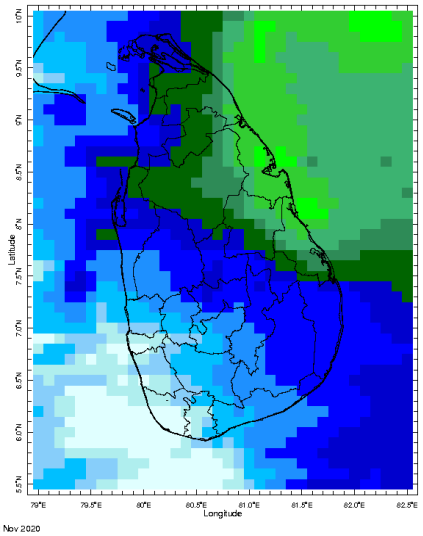
19 Nov 2020



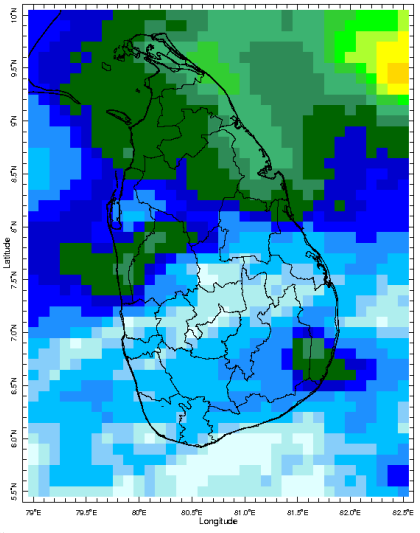
20 Nov 2020



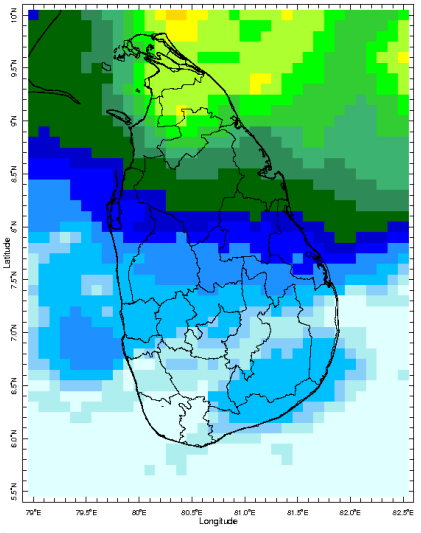
21 Nov 2020



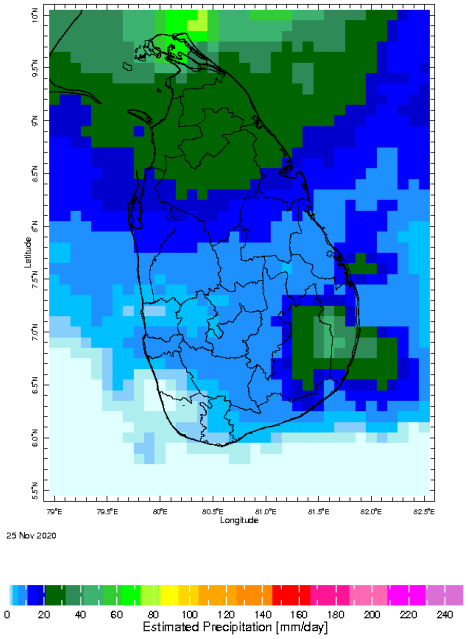
22 Nov 2020



23 Nov 2020

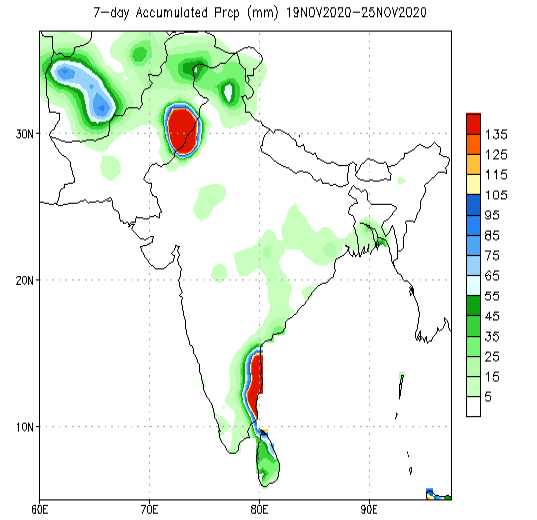


24 Nov 2020

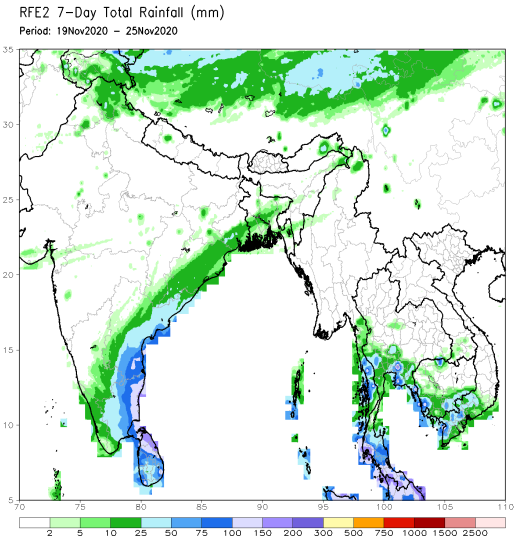


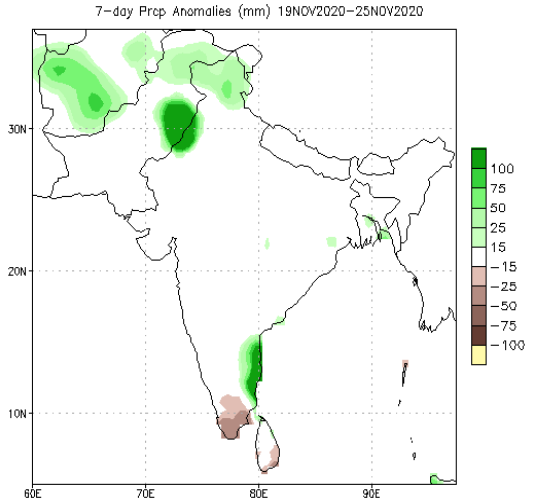
Weekly Rainfall Monitoring

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.

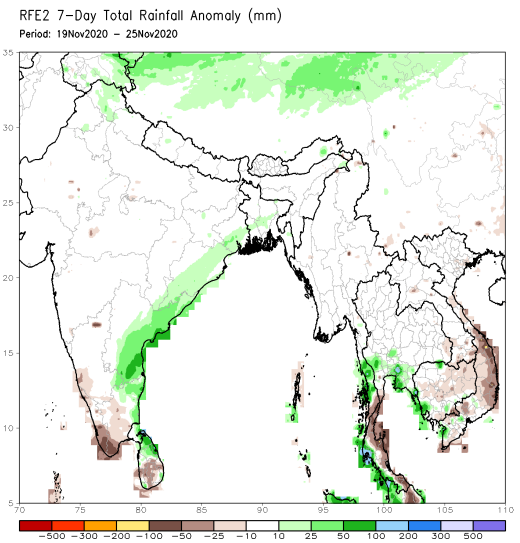


Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis



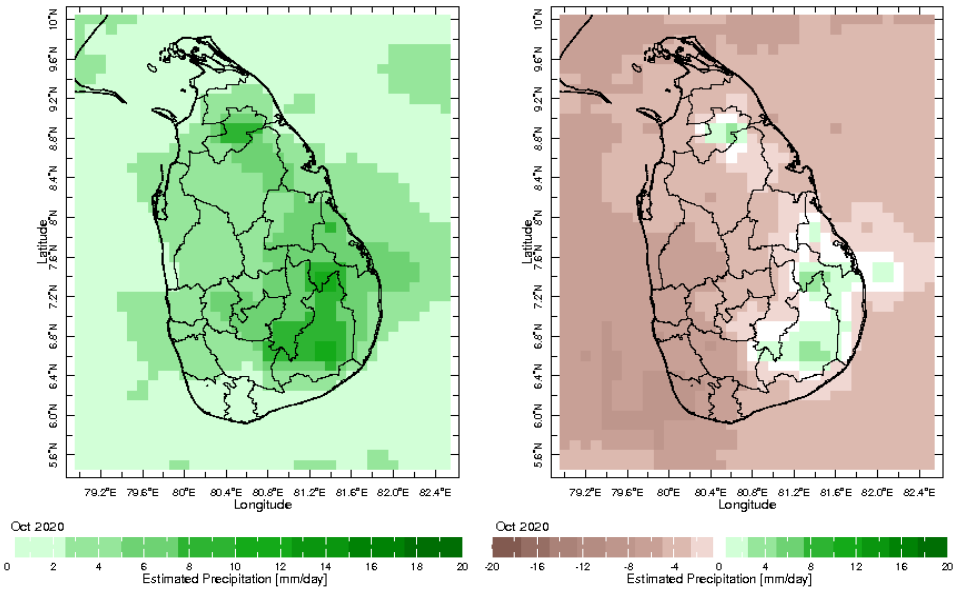


Data Source: CPC Unified (gauge-based & 0.5x0.5 deg resolution) Precipitation Analysis Climatology (1981-2010)



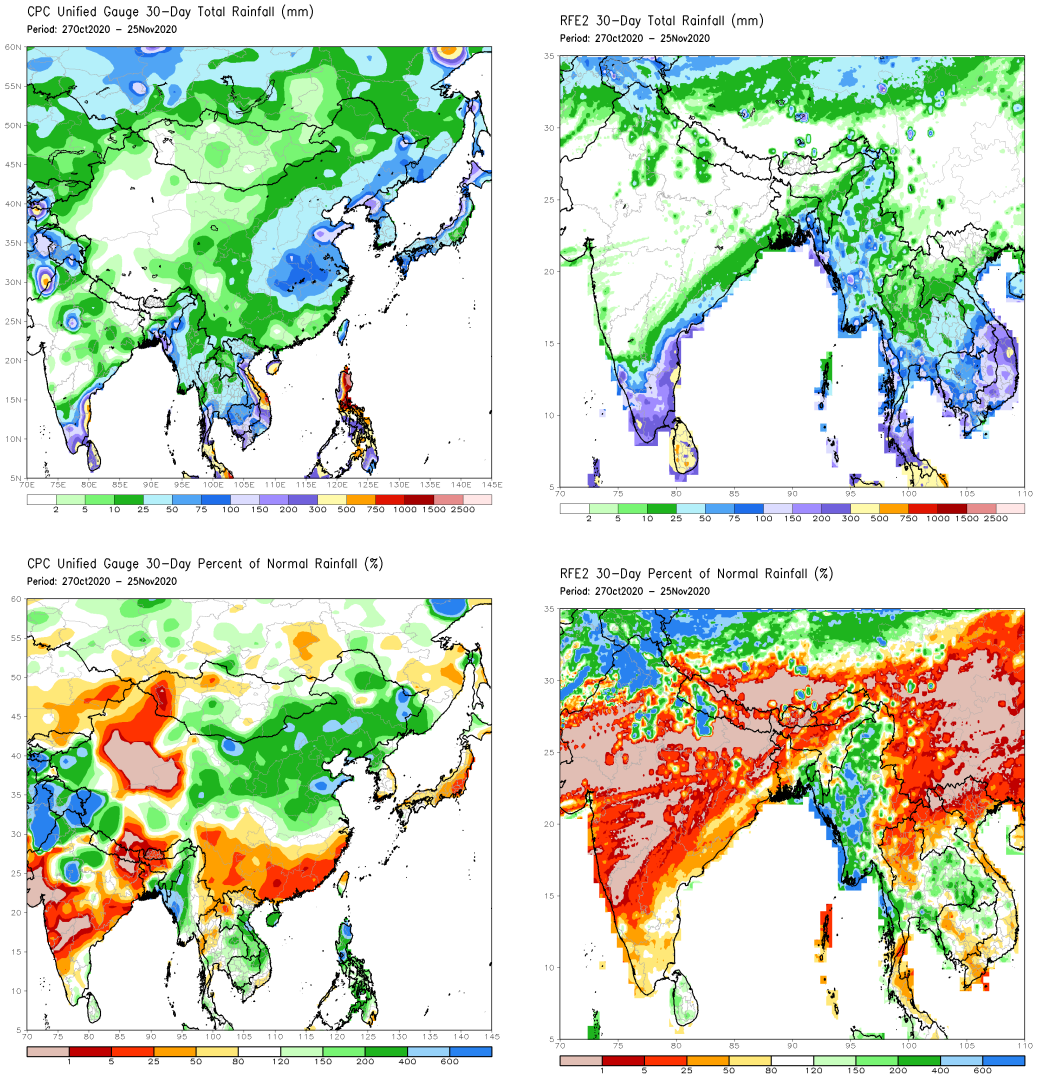
Monthly Rainfall Monitoring

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

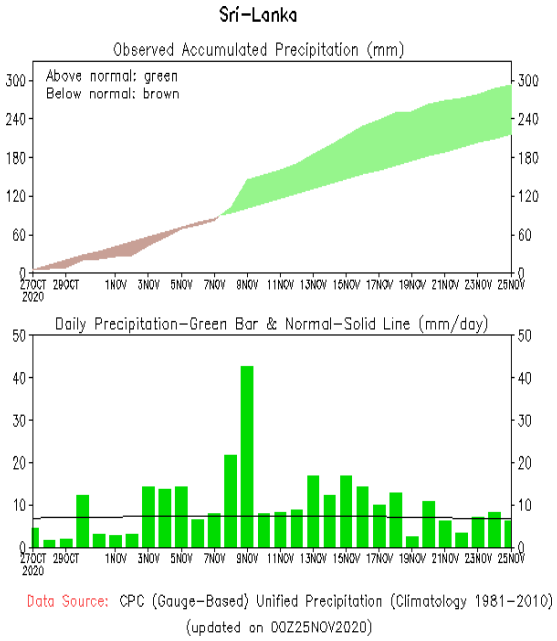


Monthly Average **Monthly Anomaly**

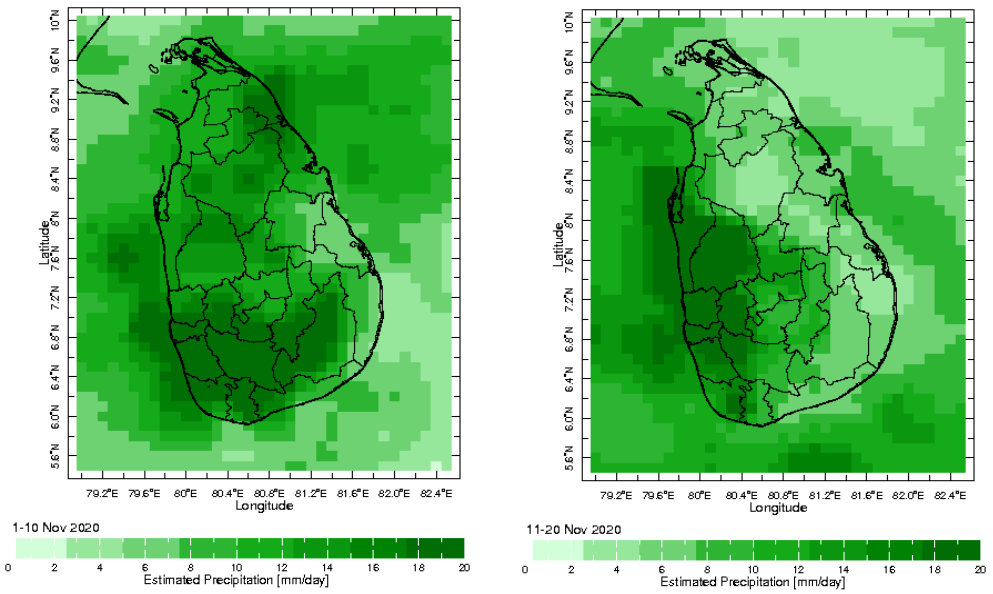
The figure in the top-left shows the total rainfall in the past 30 days from CPC Unified Precipitation Analysis while the figure in the top-right shows the total rainfall for the same period from RFE 2.0 Satellite Rainfall Estimates. The bottom two figures show the percentage of rainfall received in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



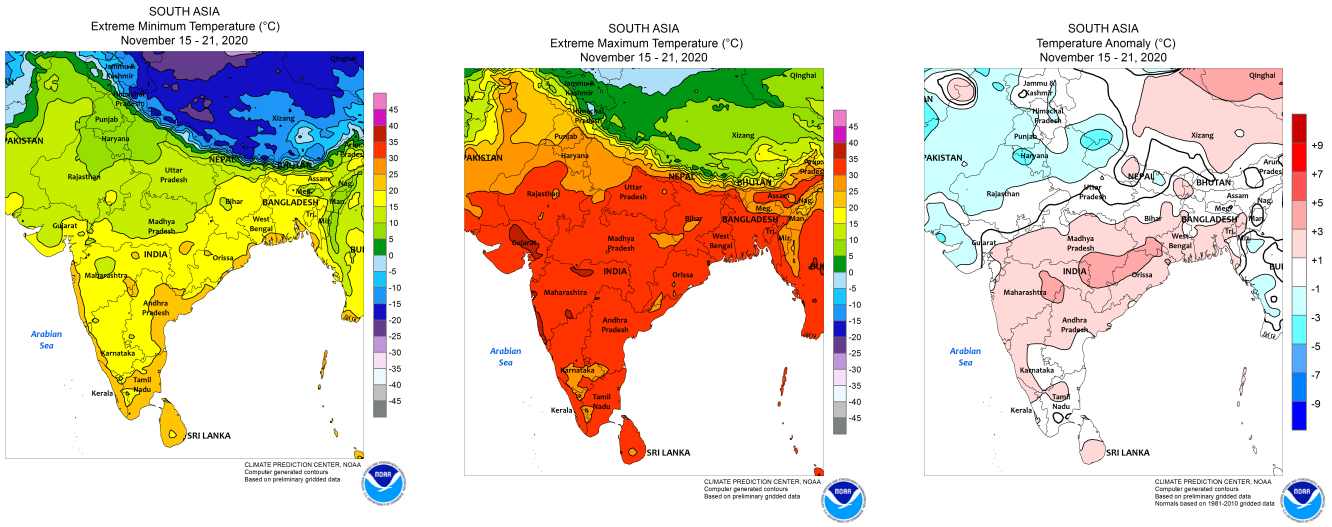
The following figure shows the observed accumulated rainfall (top) and daily observed rainfall (bottom) in Sri Lanka in the last 30 days.



Dekadal (10 Day) Satellite Derived Rainfall Estimates

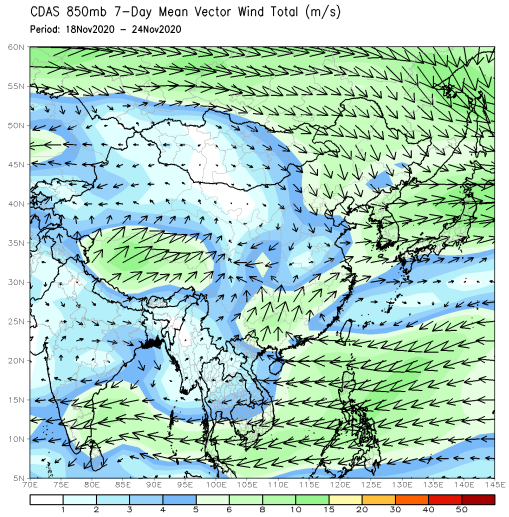


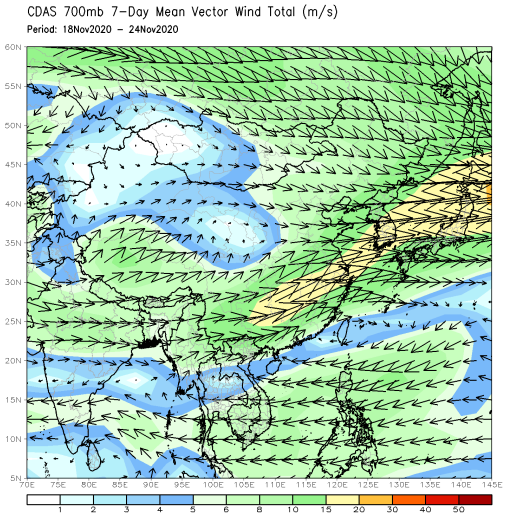
Weekly Temperature Monitoring



Weekly Wind Monitoring

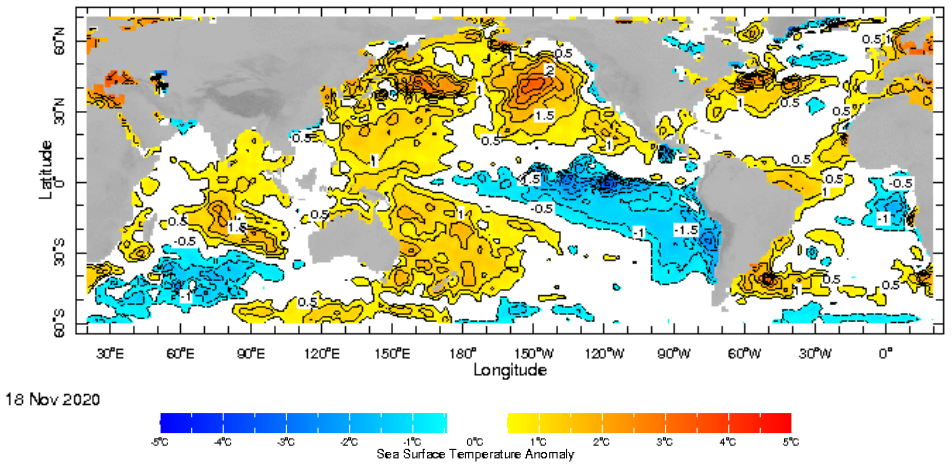
The following figures show the mean vector wind total of the past 7 days near Sri Lanka at two levels. The figure on the left shows 850 mb (~1500 m) level and the figure on the right shows 700 mb (~3000 m) level.





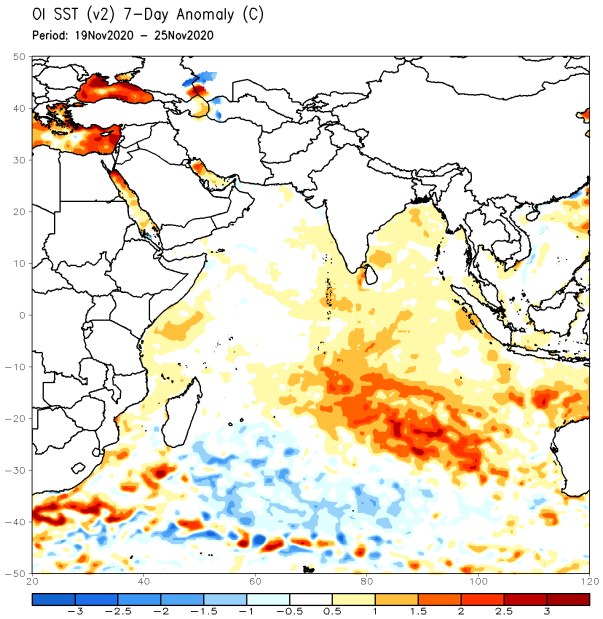
Weekly Average SST Anomalies

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



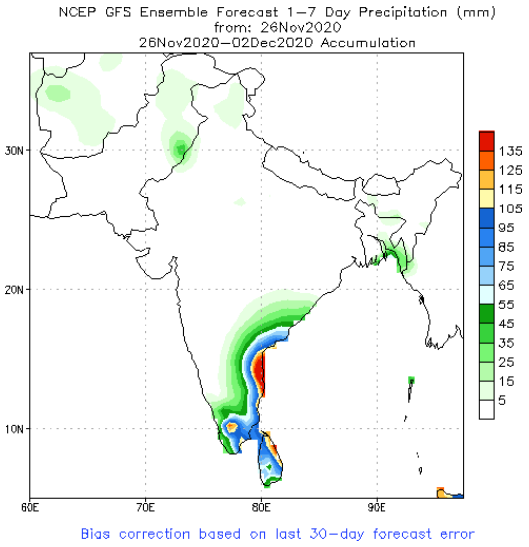
WORLDBATH topography

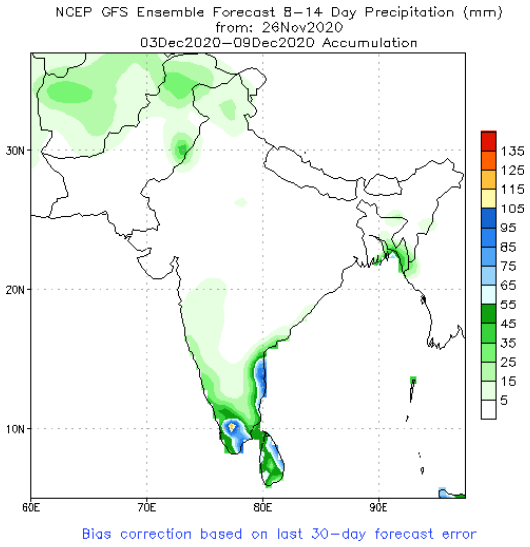
Optimum Interpolated Sea Surface Temperature Anomaly in the Indian Ocean from NOAA CPC



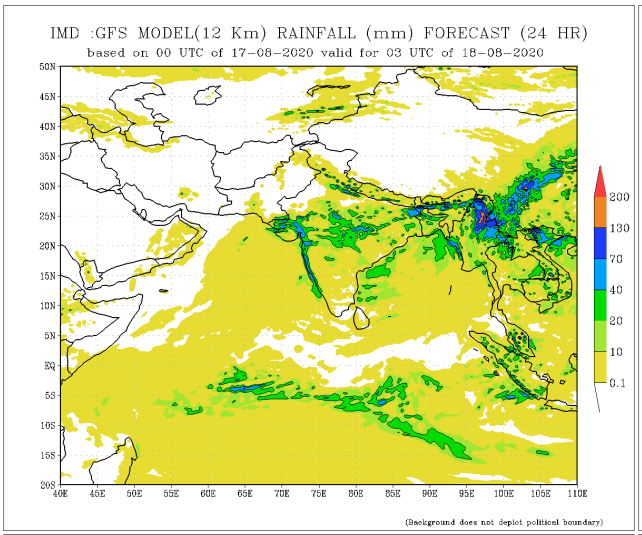
PREDICTIONS

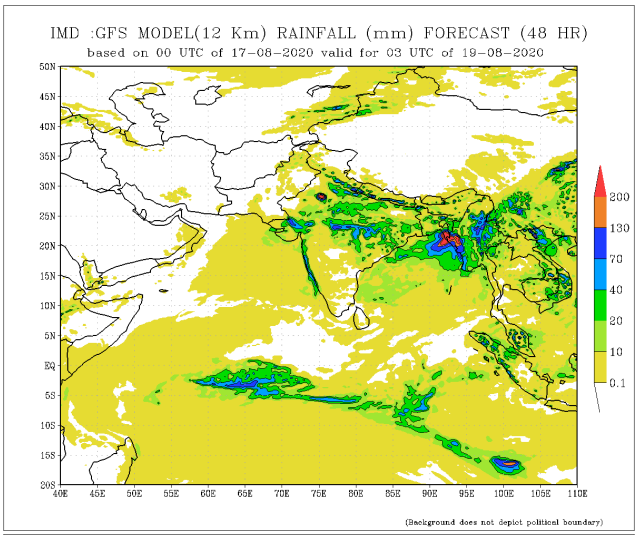
NCEP GFS 1- 14 Day prediction

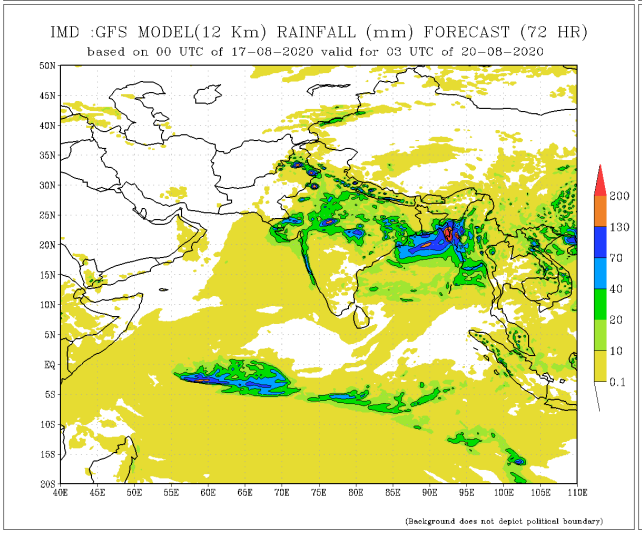


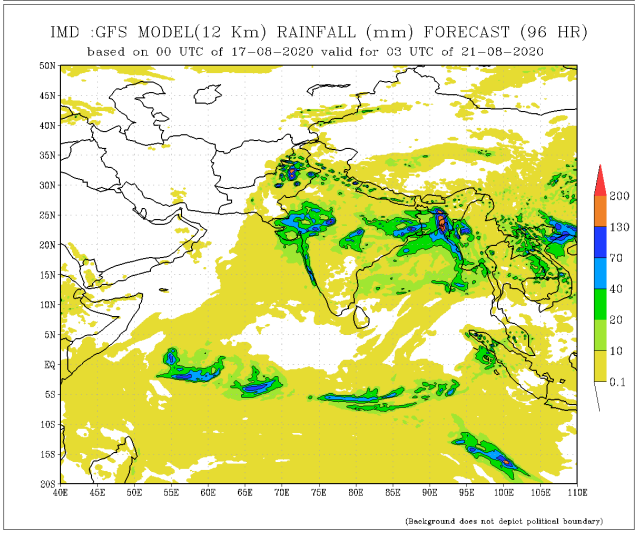


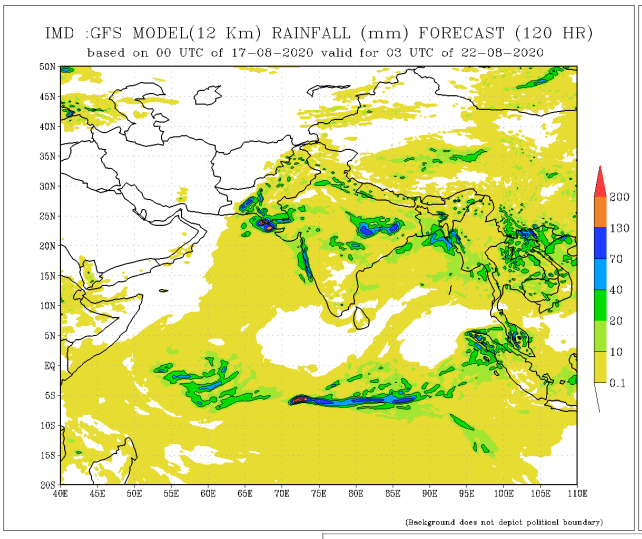
IMD GFS (T574) Model Rainfall Forecast from RMSC New Delhi, India

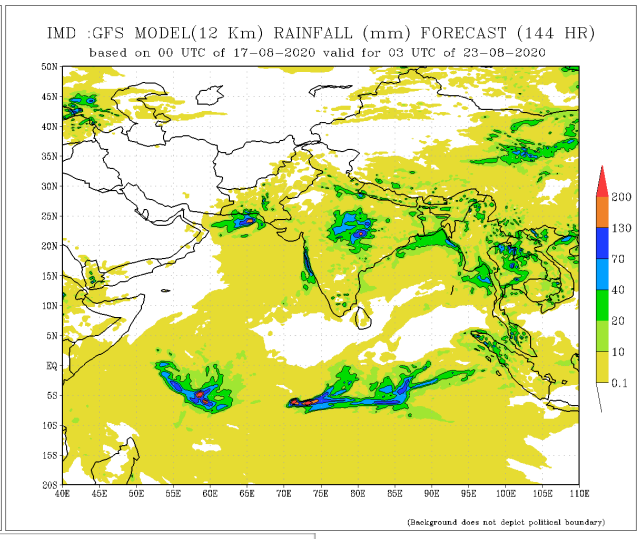


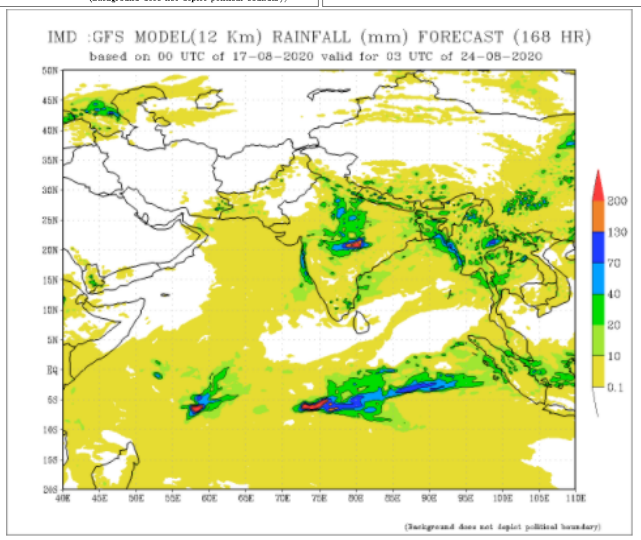






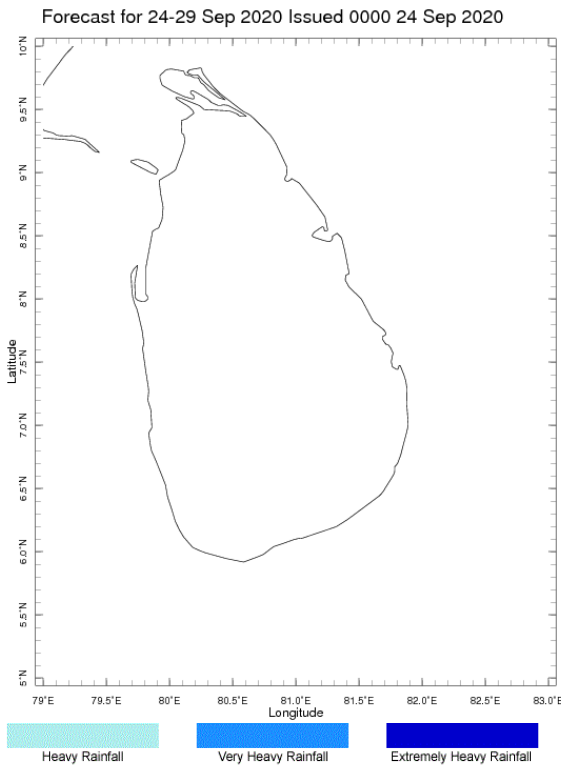




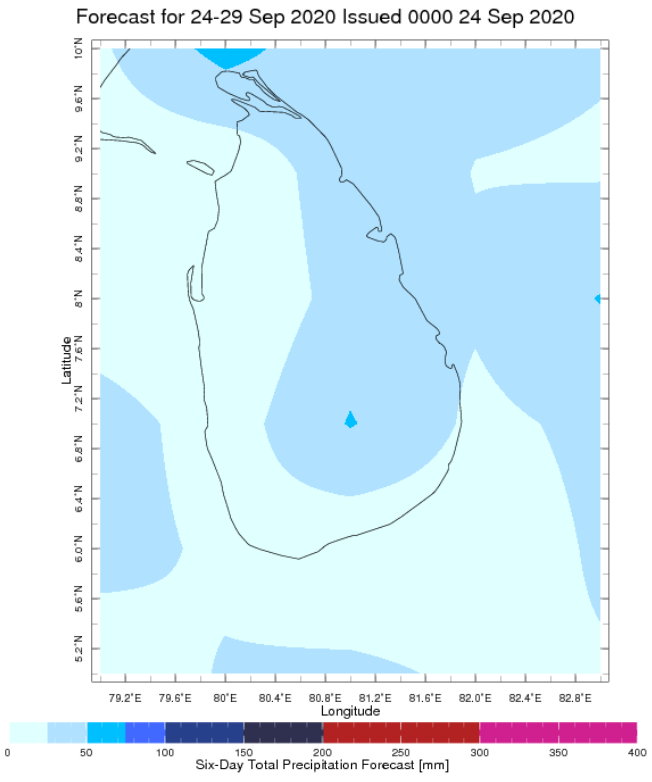


Weekly Rainfall Forecast from IRI

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.



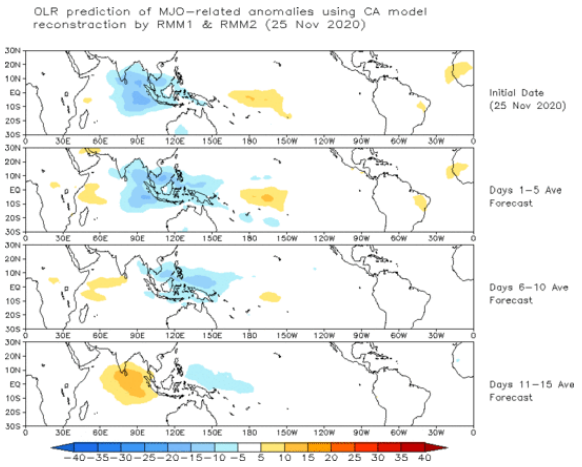
Extreme Rainfall Forecast



Total Six Day Precipitation Forecast

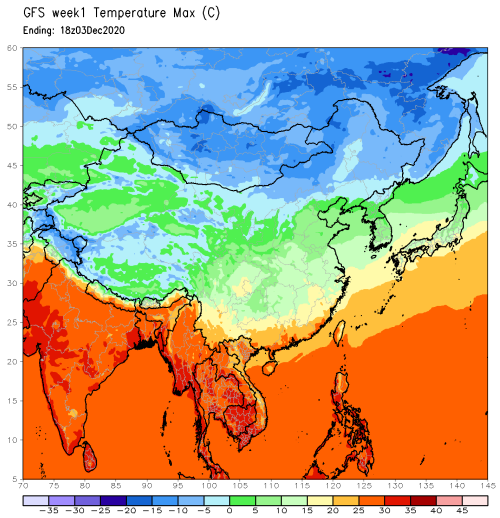
Madden Julian Oscillation (MJO) related Outgoing Longwave Radiation (OLR) Forecast

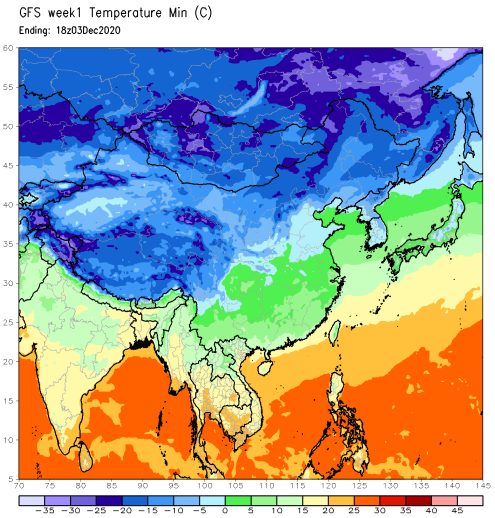
The Outgoing Longwave Radiation (OLR) is a proxy for rainfall. This can be used to identify convective rain clouds based on the MJO phase. Violet and Blue shading indicates enhanced tropical weather and Orange shading indicates suppressed conditions. The following figure shows the forecasts of MJO associated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



Weekly Temperature Forecast

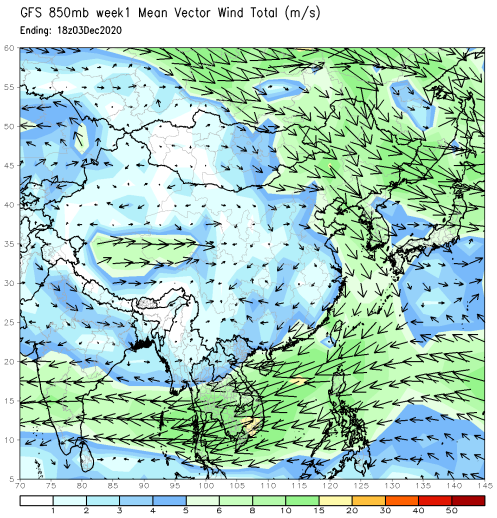
Weekly Minimum and Maximum Temperature prediction from the GFS model (from NOAA CPC)

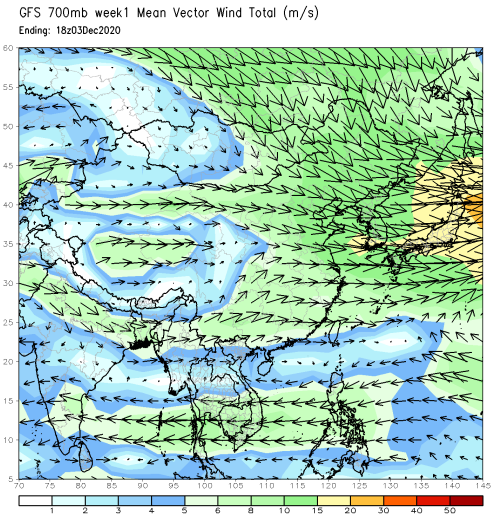




Weekly Wind Forecast

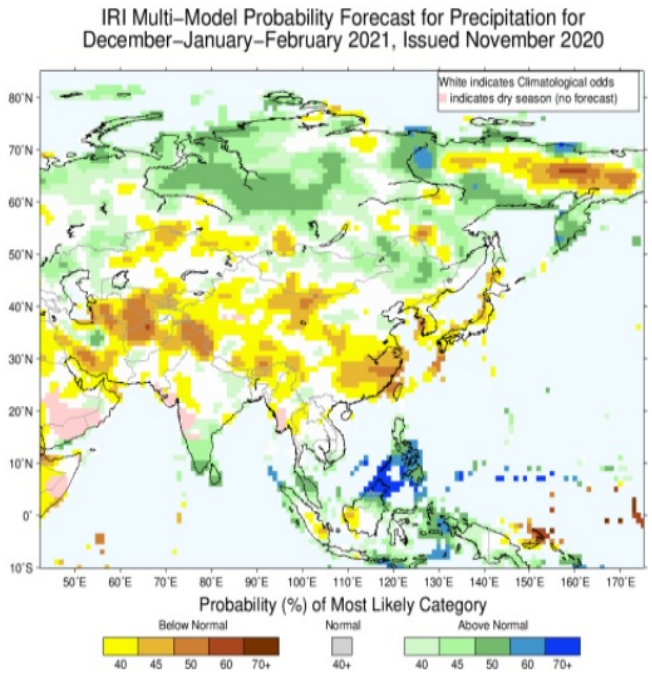
Weekly mean vector wind total prediction from the GFS model at 850 mb (left) and 700 mb (right) levels. (from NOAA CPC)



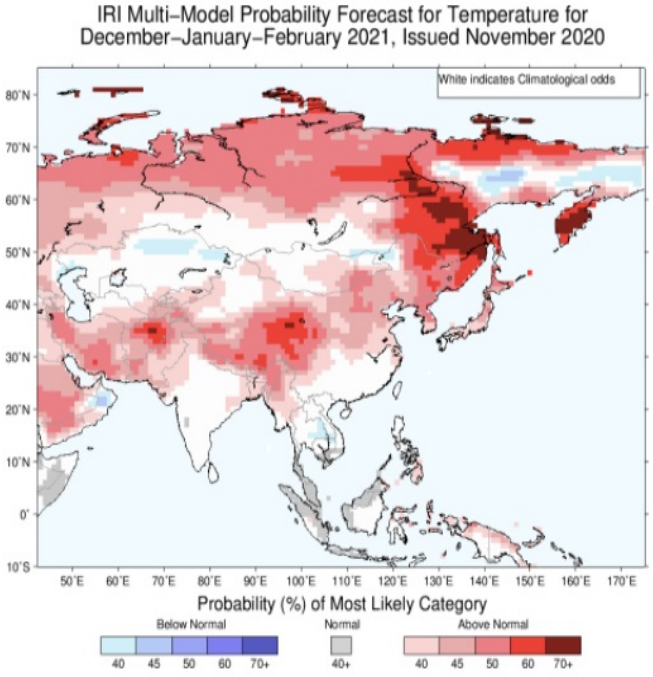


Seasonal Rainfall and Temperature Forecast

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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