Federation for Environment, Climate and Technology

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28 May 2020

EXPERIMENTAL CLIMATE MONITORING AND PREDICTION

By: Piushani Ellegala, Ruchira Lokuhetti, Chayana Gunathilake, Lareef Zubair and Michael Bell[1] (FECT and IRI[1])

Rainfall Forecast

- *The NOAA weekly rainfall forecast predicts up to 100 mm of total rainfall in Galle and Matara districts during 28 May - 2 June.*

Monitored Rainfalls

- *Between 20- 26 May: up to 150 mm of rainfall was recoreded in Colombo, Kalutara and Ratnapura districts on 26th*

Monitored Wind

- *From 20 - 26 May: up to 18 km/h, northwessterly winds were experienced by the nothern regions of the island.*

Monitored Sea Surface

- *1 ^{0}C above average sea surface temperature was observed in the seas around Sri Lanka.*

HIGHLIGHTS

Monitoring

Rainfall

Weekly Monitoring

Date	Rainfall
20th May	Up to 15 mm in Kalutara and Ratnapura districts; up to 10 mm in Colombo, Kurunegala and Nuwara Eliya districts; and up to 5 mm in Gampaha, Kegalle, Kandy, Puttalam, Matara, Hambantota, Badulla, Monaragala and Anuradhapura districts.
21st May	Up to 15 mm in Kegalle, Rathnapura and Colombo districts; up to 10 mm in Kandy, Nuwara Eliya, Matale, Gampaha, Kurunegala, Puttalam, Badulla, Kalutara, Galle and Matara districts; and up to 5 mm in Monaragala and Ampara districts.
22nd May	Up to 20 mm in Ratnapura, Kalutara and Galle districts, 15 mm in Galle district, up to 10 mm in Colombo, Puttalam, Badulla and Monaragala districts; and up to 5 mm in Kurunegala, Hambantota, Nuwara Eliya, Gampaha, Matale, Kandy and Ampara districts.

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Date	Rainfall
23rd May	Up to 40 mm in in Kilinochchi and Mullaitivu districts; up to 20 mm in Monaragala and Galle districts; up to 15 mm in Hambantota, Ratnapura, Badulla, Kandy and Nuwara Eliya districts; and up to 10 mm in Jaffna, Kurunegala, Kegalle, Matale, Colombo, Kalutara, Galle and Ampara districts.
24th May	Up to 50 mm in Monaragala district, up to 40 mm in Ratnapura, Kegalle, Colombo and Galle districts; up to 30 mm in Mannar, Vavuniya, Trincomalee, Polonnaruwa, Gampaha, Kalutara, Badulla and Hambantota districts; up to 20 mm in Galle district; and up to 15 mm in Kurunegala, Anuradhapura, Kandy, Mullaitivu and Mullaitivu districts.
25th May	Up to 70 mm in Vavuniya and Mullaitivu districts; up to 40 mm in Kilinochchi districts; up to 30 mm in Monaragala, Hambantota, Ampara, Badulla, Anuradhapura, Trincomalee, and Mannar districts; and up to 20 mm in Ratnapura, Galle, Nuwara Eliya and Kandy districts.
26th May	Up to 150 mm in Colombo, Ratnapura and Kalutara districts, up to 140 mm in Gampaha and Kegalle districts; up to 90 mm in Nuwara Eliya district; up to 70 mm in Kandy, Ampara, Monaragala and Matara districts; up to 60 mm in Galle district; up to 50 mm in Kurunegala and Hambantota districts; and up to 30 mm in Badulla and Puttalam districts.

Total Rainfall for the Past Week

The RFE 2.0 tool shows total up to 150-200 mm in Ratnapura, Kegalle, Gampaha and Colombo districts; up to 100-150 mm in Kalutara and Nuwara Eliya districts; 75-100 mm in Galle, Matara and Hambantota districts; up to 50-75 mm in Badulla, Monaragala, Kandy, Kurunegala, Ampara and Mullaitivu districts; and up to 25-50 mm in Kilinochchi, Vavuniya, Polonnaruwa, Puttalam and Matale districts.
Above average rainfall up to 100-200 mm in Ratnapura, Kegalle, Gampaha and Colombo and Kalutara districts; up to 50-100 mm in Mullaitivu and Nuwara Eliya districts; up to 25-50 mm in Kilinochchi, Vavuniya, Badulla, Monaragala, Ampara, Hambantota, Galle, Matara, Kandy and Kurunegala districts; and up to 10-25 mm in Polonnaruwa, Matale, Trincomalee and Puttalam districts.

Monthly Monitoring

During April – Above average rainfall conditions up to 360 mm were experienced by Ratnapura, Badulla and Monaragala districts; up to 240 mm in Anuradhapura, Kegalle, Kandy and Matara districts; and up to 120 mm in Vavuniya, Matara, Nuwara Eliya, Colombo, Kalutara, Galle and Hambantota. Below average rainfall conditions up to 240 mm were experienced by Jaffna, Kilinochchi, Mullaitivu and Gampaha districts; and up to 120 mm in Badulla, Polonnaruwa and Trincomalee districts. The CPC Unified Precipitation Analysis tool shows up to 750 mm of total rainfall in Kegalle, Ratnapura and Monaragala districts; and up to 500 mm in Anuradhapura, Kurunegala, Matale, Kandy, Nuwara Eliya, Colombo, Kalutara, Colombo, Galle and Matara districts.

Ocean State *(Text Courtesy IRI)*

Pacific sea state: May 20, 2020

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SSTs in the east-central Pacific were neutral, but above average during mid-May, and patterns in atmospheric variables are split between neutral and weak El Niño conditions. Most model forecasts favor warm neutral SST conditions continuing into summer, becoming below-average but not necessarily into La Nina territory by fall. The official CPC/IRI outlook is consistent with these model forecasts, calling for continuation of ENSO-neutral.

Indian Ocean State

1 ^{0}C above average sea surface temperature was observed in the seas around Sri Lanka.

Predictions

Rainfall

14-day prediction: NOAA NCEP models

From 28th May – 3rd June: Total rainfall up to 105 mm in Ratnapura, Kegalle and Colombo districts; up to 95 mm in Kalutara and Gampaha districts; up to 85 mm in Galle and Nuwara Eliya and Badulla districts; up to 75 mm in Kandy district, up to 65 mm in Kurunegala and Matale districts; and up to 55 mm in Hambantota, Monaragala, Anuradhapura and Puttalam districts.

From 4th – 10th June: Total rainfall up to 105 mm in Ratnapura and Kegalle and Colombo districts; up to 95 mm in Kalutara district; up to 85 mm in Gampaha and Nuwara Eliya and Galle districts; up to 75 mm in Kandy and Badulla districts; up to 65 mm in Kurunegala and Matale districts; and up to 55 mm in Anuradhapura, Polonnaruwa, Vavuniya, Mullaitivu, Mannar, Monaragala and Hambantota districts.

NOAA Model Forecast:

From 28th May – 2nd June: Total rainfall up to 100 mm in Galle and Matara districts; up to 75 mm in Kalutara, Rathnapura and Hambantota districts; up to 50 mm in Colombo, Gampaha, Kegalle, Kandy, Matale, Nuwara Eliya, Badulla, Monaragala, Ampara, Batticaloa, Polonnaruwa and Trincomalee and up to 25 mm in the other parts of the island.

MJO based OLR predictions

For the next 15 days:

MJO shall suppress the rainfall in the next 15 days and shall enhance in the following 5 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.

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Weekly Hydro- Meteorological Report for Sri Lanka

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  - Seasonal Forecast Temperature for Sri Lanka

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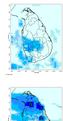
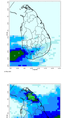
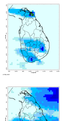
MONITORING

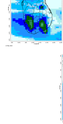
Daily Rainfall Monitoring

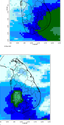
The following figures show the spatial distribution of rainfall in the last 7 days to Sri Lanka.

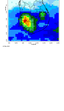












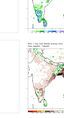
Weekly Rainfall Monitoring

The following figures show the spatial distribution of rainfall in the previous week. The rainfall scenario in the previous month is shown in the figure to the right. The station data of the relatively higher rainfall stations plotted against topographical rainfall that shows the relationship between the spatial rainfall variation and the topography. Rainfall data from the meteorological stations in Sri Lanka is used for this analysis.

Weekly Rainfall

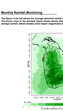
Monthly Rainfall Monitoring

The figure to the left shows the total rainfall in the past 30 days from GPM Satellite Precipitation Analysis while the figure on the right shows the total rainfall in the previous month. The station data of the relatively higher rainfall stations plotted against topographical rainfall that shows the relationship between the spatial rainfall variation and the topography.

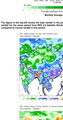


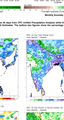
Monthly Rainfall

The following figure shows the observed accumulated rainfall (blue) and daily (observed rainfall (black)) for Sri Lanka for the last 90 days.

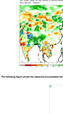


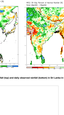
Satellite Derived Rainfall Estimates

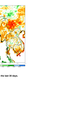




Weekly Temperature Monitoring





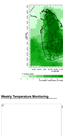


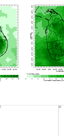
Weekly Wind Monitoring

The following figures show the mean wind field 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 200 mb level.

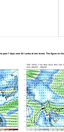
Weekly Average SST Anomalies

Weekly average Sea Surface Temperature (SST) anomaly in the Sri Lanka Ocean (Indian Ocean)



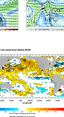


Optimum interpolated Sea Surface Temperature Anomaly in the Indian Ocean from NOAA OPC.

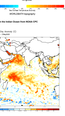


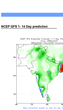
PREDICTIONS

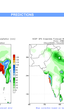
NCEP GFS 1 - 14 Day prediction

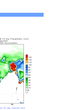


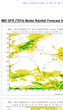
IMD GFS (T574) Model Rainfall Forecast from IMAC-Asia Center, India

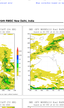


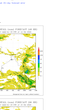




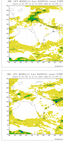


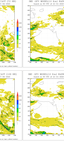


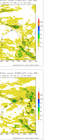




WRF Model Forecast (from IMD Chennai)

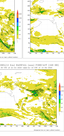






Weekly Rainfall Forecast from WI

Weekly Rainfall Forecast for Sri Lanka based on predictions of Regional Models. The figure to the left shows the ensemblemean, the figure in the middle shows the spatial spread and the figure to the right shows the probability of exceed. Rainfall forecast from Regional Models.

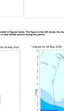


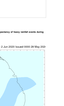
Weekly Temperature Forecast

Weekly Minimum and Maximum Temperature Forecast from the GFS model (from NOAA OPC).

Weekly Wind Forecast

Weekly mean zonal wind and meridional from the GFS model at 850 mb (left) and 200 mb (right) levels. (from NOAA OPC).





Seasonal Rainfall and Temperature Forecast

Seasonal forecast for the coming season is presented in the following slides. The figure to the left shows the probability of the rainfall being above, near or below normal. The figure in the middle shows the probability of the temperature being above, near or below normal. The figure to the right shows the ensemble mean of the rainfall anomaly. Rainfall and temperature forecasts for the coming season are based on the Climate Forecast System version 2 (CFS v2) model.

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