Federation for Environment, Climate and Technology

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EXPERIMENTAL CLIMATE MONITORING AND PREDICTION

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

HIGHLIGHTS

Rainfall Forecast

- *The NOAA weekly rainfall forecast predicts up to 100 mm in, Colombo, Kalutara and Galle districts during 16 - 21 July.*

Monitored Rainfalls

- *Between 8 - 9 July: up to 110 mm of rainfall was recoreded in Anuradhapura, and Polonnaruwa districts on 8th and 9th July.*

Monitored Wind

- *From 8 - 14 July: up to 15 km/h, northwessterly winds were experienced by the entire island.*

Monitored Sea Surface

- *1.5 ^{0}C above average sea surface temperature was observed in the seas around Sri Lanka.*

Monitoring

Rainfall

Weekly Monitoring

Date	Rainfall
8th July	Up to 110 mm in Anuradhapura district, up to 100 mm in Matale, district; up to 90 mm in Polonnaruwa district; up to 80 mm in Vavuniya district; up to 40 mm in Kandy and Nuwara Eliya districts; up to 30 mm in Ratnapura, Badulla, Monaragala, Hambantota, Puttalam and Kurunegala districts; and up to 20 mm in Colombo, Kalutara, Galle, Matara, Kegalle, Mannar, Jaffna, Kilinochchi and Mullaitivu districts.
9th July	Up to 110 mm in Polonnaruwa district; up to 100 mm in Matale district; up to 90 mm in Ampara district; up to 80 mm in Kurunegala, Anuradhapura, Badulla and Puttalam districts; up to 50 mm in Mannar, Vavuniya, Mullaitivu, , Kandy, Ratnapura, Monaragala, and Trincomalee districts; up to 20 mm in Gampaha, Colombo and Kalutara districts.
10th July	Up to 100 mm in Monaragala and Ampara districts; up to 90 mm in Vavuniya district; up to 80 mm in Anuradhapura district; up to 50 mm in Trincomalee and Badulla districts; up to 40 mm in Ratnapura and Nuwara Eliya districts; up to 30 mm in Polonnaruwa and Mannar districts; and up to 20 mm in Puttalam, Kurunegala,

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Date	Rainfall
	Kalutara, Kandy and Kegalle districts; and up to 15 mm in the rest of the island except Jaffna.
11th July	Up to 40 mm in Mullaitivu, Ampara and Monaragala districts; up to 30 mm in Kilinochchi, Colombo and Kalutara districts; up to 20 mm in Nuwara Eliya, Badulla, Gampaha, Kegalle, Kandy, Batticaloa, Polonnaruwa and Trincomalee districts; up to 15 mm in Galle, Matara, Hambantota and Jaffna districts; up to 10 mm in Kurunegala, Puttalam, Anuradhapura, Matale and Mannar districts.
12th July	Up to 20 mm in Kalutara district; up to 15 mm in Colombo, Ratnapura and Galle district; up to 10 mm in Gampaha, Batticaloa and Kegalle districts; and up to 5 mm in Matara, Monaragala, Badulla, Nuwara Eliya, Kandy, Anuradhapura, Ampara and Trincomalee districts.
13th July	Up to 40 mm in Monaragala and Ampara districts; up to 30 mm in Anuradhapura, Mannar, Vavuniya, Trincomalee and Mullaitivu districts; up to 20 mm in Kilinochchi, Jaffna, Galle, Puttalam and Ratnapura districts; up to 10 mm in Nuwara Eliya, Badulla, Matara, Hambantota and Kalutara districts; and up to 5 mm in the rest of the island.
14th July	Up to 30 mm in Hambantota and Monaragala districts; up to 20 mm in Matara district; up to 10 mm in Jaffna, Vavuniya, Mullaitivu and Galle districts; and up to 5 mm in Anuradhapura, Puttalam, Trincomalee, Mannar, Kilinochchi, Kalutara and Ratnapura districts.

Total Rainfall for the Past Week

The RFE 2.0 tool shows total up to 75 – 100 mm in Anuradhapura, Polonnaruwa, Vavuniya, Monaragala, Ampara and Matale districts; up to 50 – 75 mm in Mannar, Mullaitivu and Kurunegala, Badulla districts; up to 25 -50 mm in the rest of the island while up to 10 – 25 mm in Batticaloa and Jaffna districts.
Above rainfall average up to 50-100 in Anuradhapura, Polonnaruwa, Matale, Ampara, Vavuniya and Monaragala districts; up to 25 – 50 mm in Badulla, Kandy, Kurunegala, Puttalam, Trincomalee, Mannar, Mullaitivu and Kilinochchi districts; and up to 10 – 25 mm in Ratnapura, Nuwara Eliya, Hambantota, Batticaloa and Jaffna districts.

Monthly Monitoring

During June – Above average rainfall conditions up to 6 mm were experienced by Vavuniya and Anuradhapura districts; up to 4 mm in Mannar, Kurunegala, Polonnaruwa, Trincomalee, Kegalle, Kandy, Badulla, Ampara, Batticaloa, Monaragala and Hambantota districts and below average rainfall conditions up to 2 mm were experienced by Galle, Matara and Ratnapura districts.

Ocean State *(Text Courtesy IRI)*

Pacific sea state: June 19, 2020

SSTs in the east-central Pacific are in the cool-neutral range in early July, and the atmospheric variables were either ENSO-neutral or indicative of weak La Niña conditions. The average of the forecasts of many models for fall and winter slightly exceed the borderline of weak La Niña SST conditions. The official CPC/IRI outlook is similar to these model forecasts, calling for a likely

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continuation of ENSO-neutral in summer, with a 55% chance of La Niña for fall and 50% chance for continuing through winter. A La Niña watch is now posted.

Indian Ocean State

1.5 ^{0}C above average sea surface temperature was observed in the seas around Sri Lanka.

Predictions

Rainfall

14-day prediction: NOAA NCEP models

From16th June – 22nd July: Total rainfall up to 85 mm in Galle and Matara districts; up to 75 mm in Hambantota and Ratnapura districts; up to 65 mm in Badulla and Monaragala districts; up to 55 mm in Ampara, Nuwara Eliya, Kegalle and Colombo districts; up to 45 mm in Kandy and Gampaha districts; up to 35 mm in Kurunegala and Matale districts; and up to 25 mm in Puttalam, Anuradhapura, Polonnaruwa, Batticaloa, Trincomalee and Vavuniya districts

From 23rd – 29th July: Total rainfall up to 55 mm in Galle and Ratnapura districts; up to 45 mm in Gampaha, Matara and Hambantota districts; up to 35 mm in Monaragala, Badulla, Nuwara Eliya, Kegalle, Kandy and Matale districts; and up to 25 mm in Kurunegala, Puttalam, Ampara, Anuradhapura, Polonnaruwa and Batticaloa districts.

NOAA Model Forecast:

From 16th – 21st July: Total rainfall up to 100 mm in Colombo, Kalutara and Galle districts; up to 75 mm in Gampaha, Kegalle, Ratnapura, Nuwara Eliya, Badulla and Matara districts, up to 50 mm in rest of the island while up to 25 mm in Mannar district.

MJO based OLR predictions

For the next 15 days:

MJO shall enhance the rainfall during the next 10 days and shall slightly enhance the rainfall during 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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NCEP GFS Weekly Average Surface Wind Speed Forecast
NCEP GFS Weekly Average Surface Wind Direction Forecast
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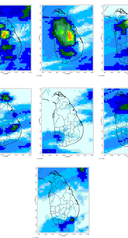
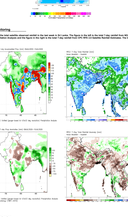
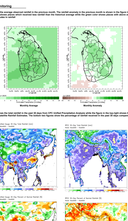
Daily Rainfall Monitoring

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

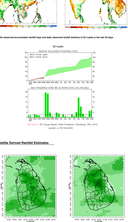






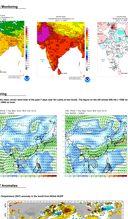
Weekly Rainfall Monitoring

The following figures show the satellite observed rainfall in the last week in Sri Lanka. The Figure to the left is the total 7-day rainfall from Global Satellite Precipitation Data Distribution System (GSPDDS) Rainfall Estimates and the Figure to the right shows the Global Satellite Rainfall Anomalies. The Global 3-D Figure on the right shows the rainfall in 3-D.

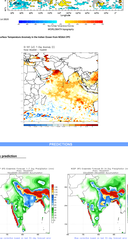


Monthly Rainfall Monitoring

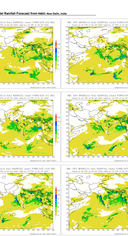
The following figures show the monthly rainfall in the last two months. The rainfall anomaly is the difference between the monthly rainfall and the long term average (climatology) rainfall. The Global 3-D Figure shows the rainfall in 3-D.



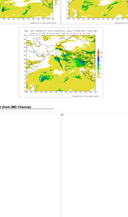
The figure in the top-left shows the rainfall observed in the last month in the previous month. The rainfall anomaly in the previous month is shown in the figure in the middle. The figure below shows the rainfall anomaly for the last two months. The Global 3-D Figure shows the rainfall in 3-D.



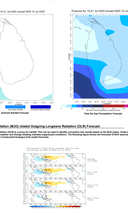
The following figure shows the observed accumulated rainfall (red) and daily observed rainfall (blue) in Sri Lanka in the last 30 days.



Detailed (10 Day) Satellite Derived Rainfall Estimates

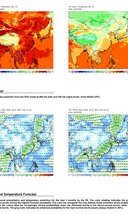


Weekly Temperature Monitoring



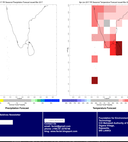
Weekly Wind Monitoring

The following figures show the wind speed and direction of the past 7 days over Sri Lanka at sea levels. The figure on the left shows MM-wind (1000 MB-wind) 7 days average and the figure on the right shows the 7 days wind anomaly.



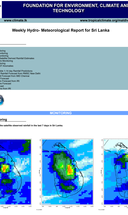
Weekly Average SST Anomalies

Weekly average Sea Surface Temperature (SST) anomaly for the Indian Ocean (last week)



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

NCEP GFS 1- 14 Day prediction



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

NRF Model Forecast (from IMD Chennai)

Weekly Rainfall Forecast from IRI

Total rainfall forecast from the IRI for week one (top) is provided in figures below. The figure to the left shows the exceedance of heavy rainfall events during these six days. The figure to the right shows the probability of rainfall amount exceeding 25 mm.

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

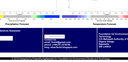
The Madden Julian Oscillation (MJO) is a tropical, 30-60 day wave that propagates eastward through the tropical Indian Ocean and the tropical ocean west of the dateline. It is characterized by a region of enhanced rainfall and strong upward motion followed by a region of suppressed rainfall and strong downward motion. The following figure shows the forecast of MJO-related anomalies that will be observed in the Indian Ocean and the western Pacific Ocean.

Weekly Temperature Forecast

Weekly Minimum and Maximum Temperature forecast from NRF model from NCMRWF, India

Weekly Wind Forecast

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



Seasonal Rainfall and Temperature Forecast

Following is the regional climatological one month temperature probability for the month of Januarry to the 4th. This color coding indicates the probability of the most probable temperature range. The probability of the most probable temperature range is shown in the legend. The color coding indicates the probability of the most probable temperature range. Blue colors are for cooler than normal and red colors are for warmer than normal. The grey area is indicating a zero probability for the most probable temperature range. Grey colors could also be interpreted as the most probable temperature range is the climatological normal (or climatology) for this region.

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Comments

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