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Experimental Climate Monitoring and Prediction

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Highlights

An increase in the rainfall events was observed during the previous week from 28th September - 4th October compared to the previous week. The highest rainfall of 140 mm for the period was recorded in Ahungalla area on 28th. The minimum temperature of 20 °C was recorded from Nuwara Eliya district while the maximum temperature was recorded from the northern eastern coastal areas to be between 35-40 °C. Up to 35 km/h north westerly winds were recorded in the southern regions of the country. For the period from 12th - 18th October the NOAA NCEP model predicts up to 25 mm rainfall for the western regions of the island. Up to 55 km/h north westerly wind is expected in the southern part of the country.

Monitoring

Rainfall

Weekly Monitoring: On 28th rainfall up to 140 mm was observed in Ahungalla and nearby sea region. Also Pitigala, Elpitiya and Baddegama regions of Galle district and the southern sea near the island received up to 30 mm rainfall. In addition up to 20 mm rainfall was observed in Middeniya area of Matara district. On 29th a significant increase in rainfall was observed in the island with Hanwella, Labugama, Wadduwa, Horana, Matugama areas of Western province, Avissawella, Ratnapura, Kuruwita and Kalawana and Ratnapura areas of Sabaragamuwa province, Nawalapitiya, Gampola, Kotmale areas of Central province and Wellawaya of Uva province receiving up to 30 mm rainfall. On the same day adjacent sea regions to the island experienced rainfall with north eastern sea receiving up to 20 mm and the southern sea region receiving up to 30 mm rainfall. On 1st of October up to 10 mm rainfall was observed in Pussella, Kuruwita and Ratnapura areas. On 2nd Kirinda, Tissamaharama and Katagamuwa areas of Hambantota district received rainfall up to 10 mm. No significant amount of rainfall was observed in any part of the country on the 3rd. On 4th Hembarawa, Girandurukotte and Beligalla areas of Badulla district received rainfall up to 10 mm. For the past week, the RFE 2.0 tool shows rainfall up to 100 mm for the adjacent sea of Ahungalla. Up to 75 mm rainfall is shown for surrounding areas of Ratnapura. Rainfall between 10-25 mm is shown in Kegalla and Kalutara districts including surrounding regions of Monaragala, Nuwara Eliya, Kandy, Beligalla, Balangoda and Nelluwa. The same amount of rainfall is shown for western and southern sea regions near the island. It also shows an above average rainfall of 50-100 mm in Ahungalla region. A below average rainfall of 25-50 mm is shown for Kurunegala, Anuradhapura, Matale, Kegalla, Balangoda and Monaragala regions. A below average rainfall of 10-25 mm for the rest of the island.

Monthly Monitoring: Below average rainfall conditions were experienced in the entire island in the month of September. Monthly average amount to 4 mm/day in Ahungalla and Ratnapura town while everywhere else the rainfall did not exceed 2 mm/day. The CPC Unified Precipitation Analysis tool shows ~75 mm of total rainfall in Ratnapura, ~25 mm of rainfall in Colombo, Kegalla, Nuwara Eliya, Bandarawela and Matara areas.

Temperature

During the period from 25th September -1st October the lowest temperature of 15-20 $^{\circ}$ C was recorded in Nuwara Eliya. The maximum temperature to be recorded was between 35-40 $^{\circ}$ C in the north eastern coastal belt. The maximum temperature of Kandy, Kegalla and Badulla areas was 25-30 $^{\circ}$ C. The maximum temperature of rest of the country was between 30-35 $^{\circ}$ C. During this period an above average temperature of 0-3 $^{\circ}$ C was observed by the entire island except for the north eastern and south western coastal regions where an above average temperature of 0-1 $^{\circ}$ C was observed.

Wind

At 850 mb level 30-35 km/h north westerly wind was experienced by the southern part of the country while northern region experienced up to 20 km/h wind in the same direction. At 700 mb level southern regions of the island experienced north westerly winds with speed up to 20 km/h while northern and central regions experienced wind with speed less than 18 km/h in the same direction.

Ocean State

Pacific sea state: September 15, 2016

During mid-September 2016 the tropical Pacific SST anomaly was close to -0.5C, the weak La Niña threshold. However, not all of the atmospheric variables support weak La Niña conditions. Although the upper level winds in the tropical Pacific are somewhat suggestive of La Niña, the lower level winds remain near average. The Southern Oscillation index and the pattern of cloudiness and rainfall in the equatorial Pacific are somewhat suggestive of weak La Niña conditions, but could also be interpreted as being in the cool-neutral range. The collection of ENSO prediction models indicates SSTs hovering at levels near borderline La Niña during fall, then weakening to cool-neutral in late fall and into winter. (*Text Courtesy IRI*)

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Indian Ocean State

0.5 °C below average sea surface temperature was observed in the western sea of Sri Lanka.

Predictions

Rainfall

14-day prediction: NOAA NCEP models predicts total rainfalls between 5-15 mm in several regions of Kalutara, Ratnapura and Galle districts during 5th-11th October. For the period 12th-18th October total rainfall between 15-25 mm is expected in the western coastal belt of the island with central and southern region expected to receive rainfall between 5-15 mm.

Weekly prediction: IMD GFS model predicts rainfall between 10 - 20 mm in Western, Sabaragamuwa, Uva and Northern provinces including Trincomalee, Kandy, Nuwara Eliya and Galle districts on 6th of October. On 7th Jaffna peninsula is expected to receive rainfall between 10 -20 mm. No rainfall is expected in any part of the island on 8th. On 9th and 10th up to 20 mm rainfall is expected in central and western regions of the island. On 11th the Western province and southern sea adjacent to the island is expected to receive up to 20 mm rainfall. On 12th the rainfall is expected to decrease with only Western province experiencing rainfall up to 20 mm.

IMD WRF & IRI Model Forecast: According to the IMD WRF model up to 35 mm of rainfall is expected in the Western province including Ratnapura, Kegalle, Trincomalee and Eravur regions on 7th. Several areas in the eastern, western coastal regions and the central region of the country is expected to receive up to 10 mm rainfall. On 8th the rainfall is expected to be decreased with Western province receiving light rainfall and north eastern coastal region receiving rainfall up to 10 mm.

Seasonal Prediction: As per IRI Multi Model Probability Forecast for October to December, the total 3-month precipitation shall be climatological in the northern half of the island. However the southern half of the island has 30-40% likelihood of being in the below-normal tercile. 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 40-45 ^oC maximum temperature in the areas along the border of Eastern and Uva provinces. The maximum temperature along the coastal belt in the Northern and Eastern sides of the country and in Vavuniya, Polonnaruwa and Anuradhapura districts will be between 35-40 ^oC. The maximum temperature of Kalutara and Ratnapura areas will be between 25-30 ^oC while in Kandy, Matale, Puttalam, Kurunegala, Galle and Matara districts the maximum temperature will be between 30-35 ^oC. For the same period minimum temperature is expected in Nuwara Eliya to be between 15-20 ^oC.

Wind

The 850 mb level predicts up to 55 km/h north westerly wind in the southern part of the country. Up to 35 km/h south westerly wind is expected for the rest of the island. The 700 mb level predicts up to 28 km/h north westerly wind for the southern half of the country while rest of the island is expected to receive wind with speed less than 20 km/h in the same direction.

MJO based OLR predictions

MJO shall highly suppress rainfall in Sri Lanka in the next 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.



FECT BLOG

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http://www.climate.lk and http://www.tropicalclimate.org/

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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.















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)

RFE2 7—Day Total Rainfall (mm) Period: 28Sep2016 – 040ct2016



2 5 10 25 50 75 100 150 200 300 500 750 1000 1500 2500

RFE2 7-Day Total Rainfall Anomaly (mm) Period: 285ep2016 - 040ct2016



-500 -300 -200 -100 -50 -25 -10 10 25 50 100 200 300 500

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



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.



CPC Unified Gauge 30-Day Percent of Normal Rainfall (%) Period: 055ep2016 - 040ct2016





RFE2 30-Day Percent of Normal Rainfall (%) Period: 055ep2016 - 040ct2016



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



Data Source: CPC (Gauge-Based) Unified Precipitation (Climatology 1981-2010) (updated on 00Z040CT2016)

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



PREDICTIONS

NCEP GFS 1-14 Day prediction







(Background does not depict political boundary

(Background does not depict political boundary







WRF Model Forecast (from IMD Chennai)

18°N 16°N 14°N 12°N 10°N 8°N 6°N 75°E 80°E 85°E 90°E RAINFALL (mm) 2.5 7.6 35.6 64.5 124.5 1

WRF MODEL FORECAST (48 HR.) RAINFALL(mm)\ based on 00 UTC of 06-10-2016 valid for 03 UTC of 08-10-2016 RAINFALL (mm)

WRF MODEL FORECAST (72 HR.) RAINFALL(mm)\ based on 00 UTC of 06-10-2016 valid for 03 UTC of 09-10-2016



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.



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.



OLR prediction of MJO-related anomalies using CA model reconstruction by RMM1 & RMM2 (D4 Oct 2016)

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)



GFS 700mb week1 Mean Vector Wind Total (m/s) Ending: 00z13Oct2016



Seasonal Rainfall and Temperature Forecast



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