THE CLIMATE OVER SRI LANKA

MAHA SEASON (2016 &2017)

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Summary

There was a drought in Sri Lanka during the Maha 2016/2017 which was alleviated only in March 2017. Going into the Maha of 2016, there was an El Nino driven drought for the latter half of Yala 2016 from July to September. There was deficient rainfall in the months of October to December compared to the usually high rainfall. Even though rainfall picked up in parts of Sri Lanka from in March, it was too late for profound impacts during this season.

The climate anomalies are consistent with the extremely unusual switch between La Nina and El Nino that took place in mid-2016 – both conditions causing drought in Yala and Maha respectively. The Indian Ocean Dipole Event contributed as well. This sequence has only been seen about 4 four times in 150 years.

Data

We use ground observations and satellite derived estimates. Ground observations although more accurate are not immediately available and are expensive – thus we rely largely on satellite estimated data. We have found that satellite derived data approximately follow the ground observations in the past with a systematic under-estimation of about 10-20% particularly in the hill country. This small systematic deviation is due to reasons such as double cloud cover (affecting satellite readings), wind conditions, topographical features of the region, and time of measurement and possible measurement errors of ground data. Until ground readings are collated, quality controlled and made available affordably, we can use satellite data with some confidence.

Island-Wide Rainfall over the last Five Years

In 2016, rainfall within Sri Lanka was low at the start of the Maha season (Jun- Sep). Rainfall increased during mid-October to mid-November period; and low rainfall was observed until mid-January of 2017. Rainfall received during the second half of Maha season was higher than that of 2016 but was lower compared to 2013.

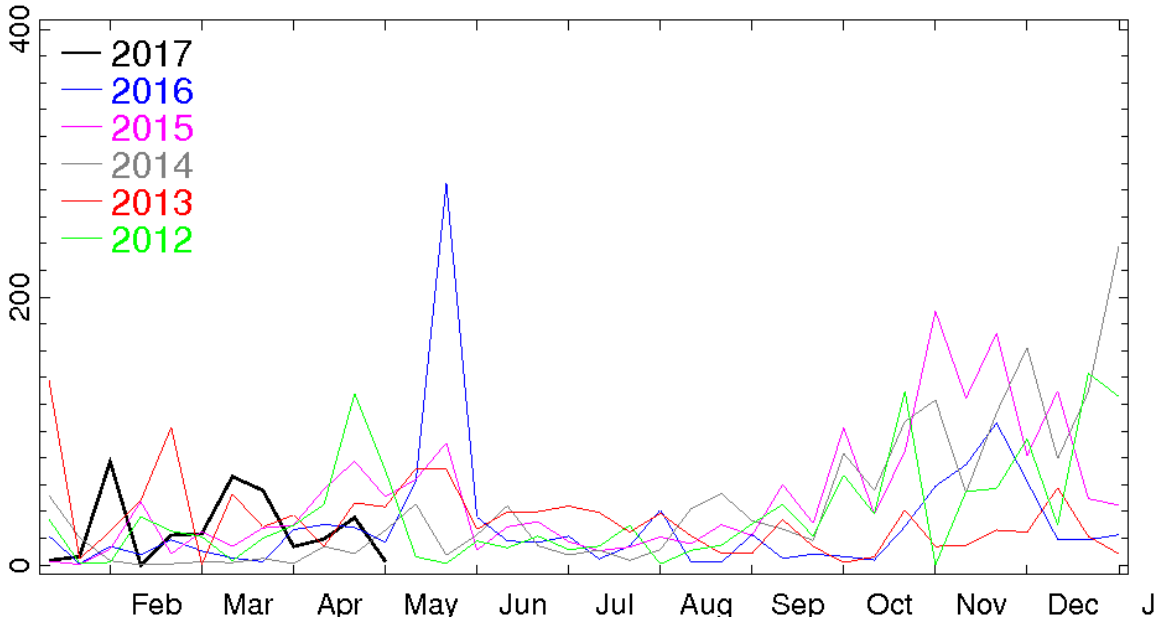


Figure 1: Multi-year decadal (10-day) precipitation comparison. *The average rainfall for each dekad (roughly 10d days) over Sri Lanka estimated from satellites and ground observations is shown for the last 6 years as a line in a separate colour over a common January – December axis with 2017 in bold black.*

Recent Rainfall Surpluses/Shortfalls

The severity of drought could be expressed in terms of rainfall-deficits and its duration. The monthly rainfall surpluses and deficits for the last three years with respect to the average for 2002 to 2017 period is shown in figure 4. In Sri Lanka mostly below average rainfalls were observed during the Maha season of 2016/17.

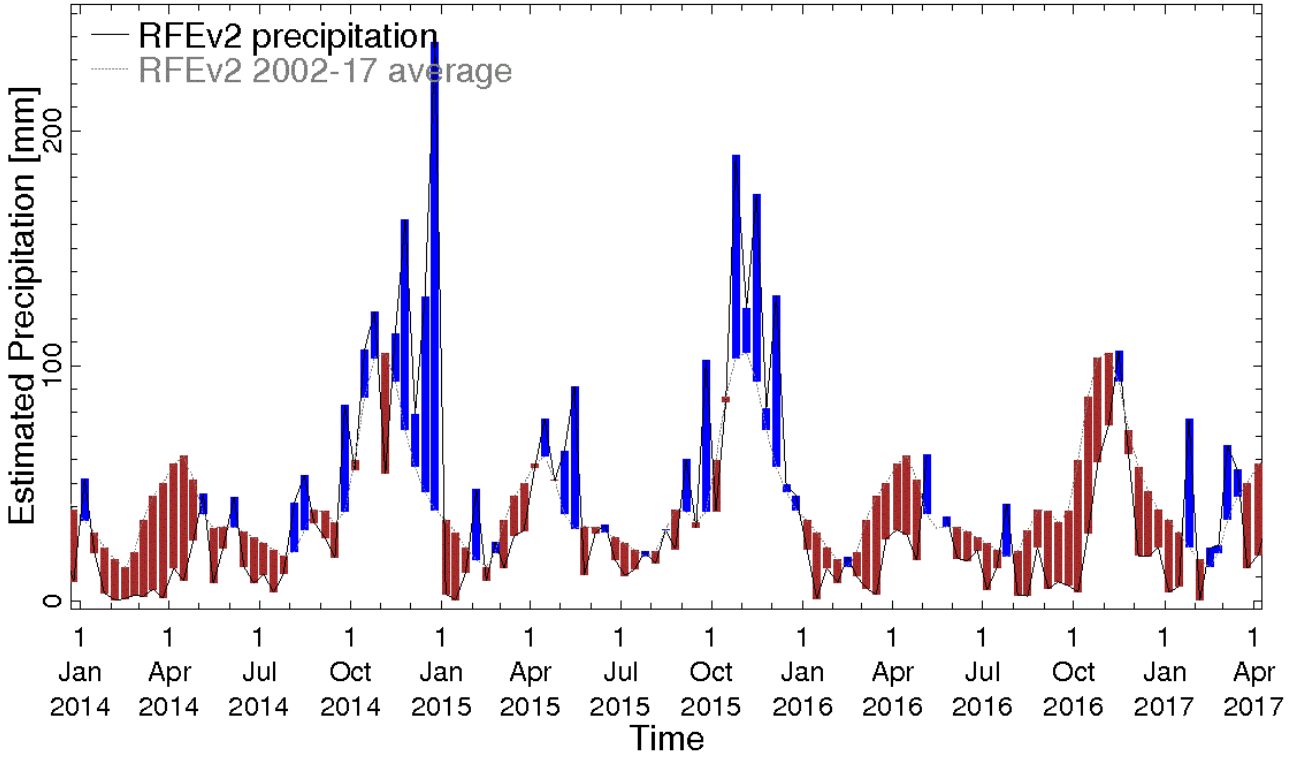
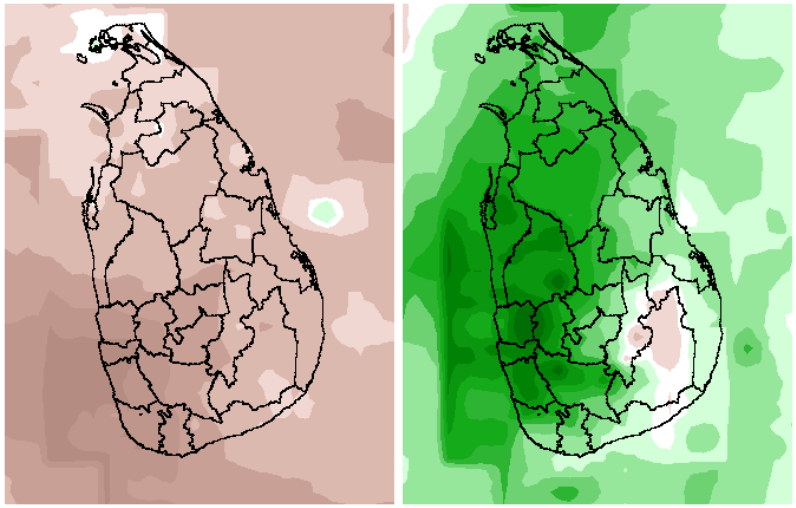


Figure 2: Dekadal precipitation and 2001-2017 average. *The smoother curve shows the average over 2001-2017 – this annual cycle is reproduced for each year in the above figure. The departures from this average are shown in blue when wetter and brown when dryer for each month for the last three years. A dekad refers roughly to 10 days or more accurately as each month ivided into three.*

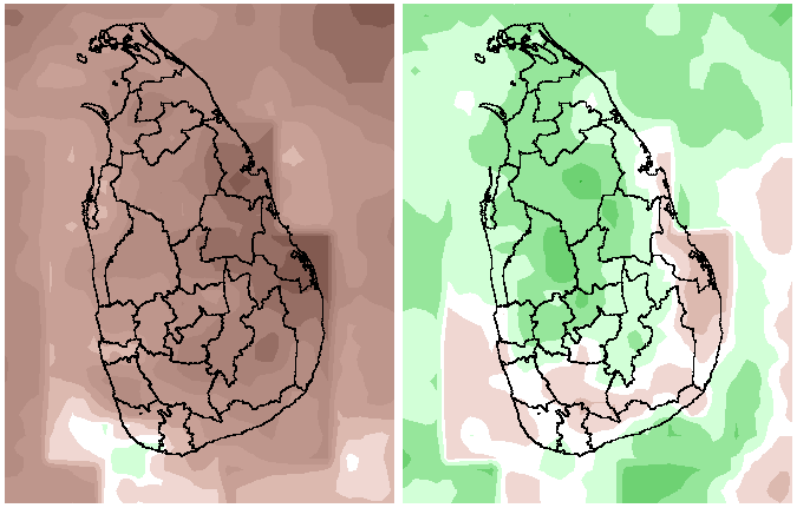
Comparison of 2016/17 Maha season with Past

In 2016, severe drought conditions were observed during late Yala (July-August) and early Maha (September-December) season after very high above average rainfall in May of that year. During the second half of Maha season (January-March) the mean rainfall in most parts of the country was above average. This is mostly due to heavy rainfall observed in March. In 2015/16 and 2014/15 Maha seasons also, above average rainfall was observed during the first half and below average in

the second. During 2012/13 Maha season the entire country received above average rainfall during the whole period.



Apr - Jun 2016 July - Sep 2016



Oct - Dec 2016 Jan - Mar 2017

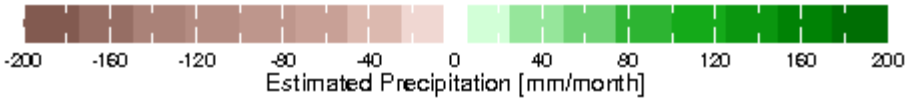


Figure 3: Quarterly seasonal rainfall anomalies for Sri Lanka for 2016/17. *Rainfall anomalies for January-March (late Maha), and the first (April-June) and second (July-September) half of Yala are shown. The average rainfall is calculated for January 1979-April 2017*

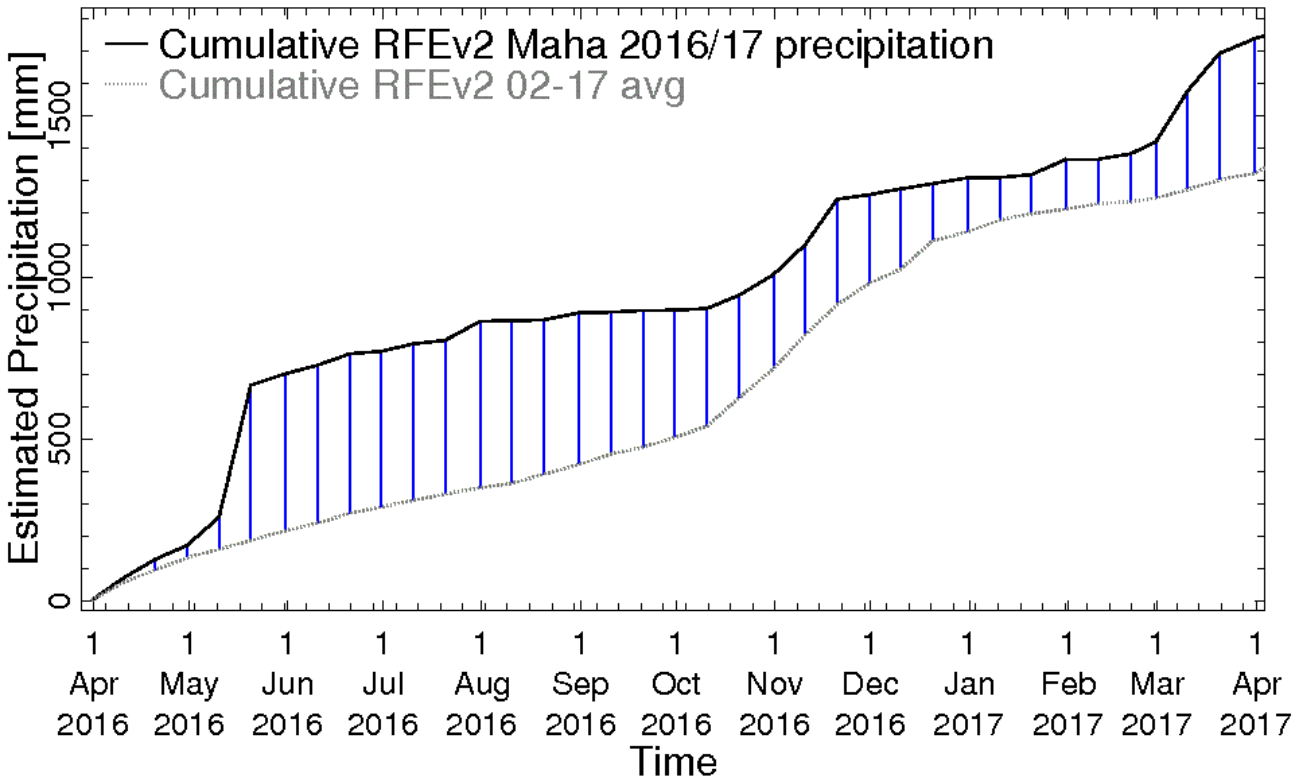


Figure 4: Decadal Cumulative Rainfall Graph. *Cumulative decadal satellite derived estimates are shown in solid black line and the cumulative recent short term average precipitation is show in grey dotted line for the most recent 12- months period in the selected region. The blue bars are indicative of estimates that are above the short-term average.*

Monthly Rainfall by District

Anomalies – departures from the average for each month and district – are shown in Figure 5. The average rainfall has been calculated for the base period 2001-2017. Wetter than normal is shown in green and dryer than normal in brown.

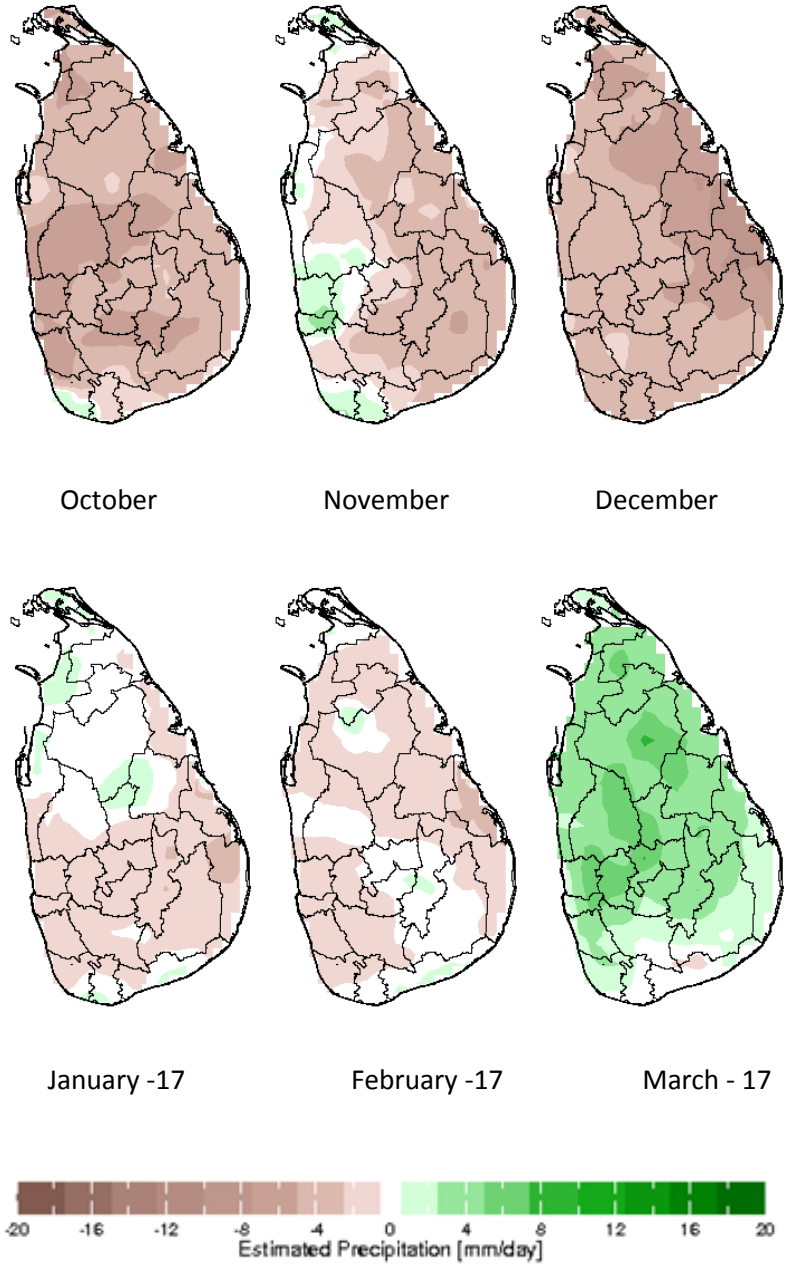


Figure 5: Monthly precipitation anomalies for Maha of 2016/17 by district

In October and December, the entire country received below average rainfall with November also being mostly dry. Dryer weather conditions declined during January and February and March was considerably wetter than normal.

Climatic Teleconnections Driving the Drought in Maha

The Role of El Nino and Indian Ocean Dipole

An El Nino event which had developed to a borderline state for many months became a fully-fledged event by July 2015. Usually during an El Nino, the rainfall is deficient from January to March and June to August. Rainfall in October to December is above normal and in May too is usually above normal.

In addition, a positive Indian Ocean Dipole event took place – what this means is that the Arabian sea is warmer than normal in relation to the Bay of Bengal seas surfaces near Sumatra. In positive dipole events, usually there is a weak drop in rainfall from June to August and a significant rise from September to November. So these years, rainfall is following close to the historical averages for a combined El Nino and positive Indian Ocean Dipole event.

Role of Madden Julian Oscillation

In addition to this the amplitude of the Madden Julian Oscillation (MJO) in 2015 has been a mixture of very high amplitude events and weak events. During March- April and June- July the MJO was strong. During February, May, August- September the MJO was mostly weak.

Further Information

Technical details regards the Maha climate are provided in a series of research papers published in the International Journals cited below and available via www.climate.lk. Our seasonal and weekly updates are available at http://fectsl.blogspot.com

References

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