



Centre for Applied Climate Sciences

Climate Outlook Review – Northern Australia

November 2018

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Overview

Rainfall: Generally average to below average for most regions (see maps).

Day time temperatures: Above average

Night time temperatures: Average to above average

The Australian and international long-term dynamic climate models that focus on forecasting central Pacific sea surface temperatures are continuing to predict further development of an El Niño within the next few months (November 2018 to January 2019).

Consequently, with the exception of the SOI-based system, most rainfall forecasts for northern Australia, especially north east Australia, currently indicate only low probability values of exceeding the respective long-term median rainfall right through to and including summer 2018/19. As the SOI is back on the rise again (somewhat unexpectedly) SOI phase-based forecasts show a varied pattern for Queensland and northern Australia (see maps).

The average Southern Oscillation Index (SOI) values for the month of October was close to plus 2.6 (+2.6).

Both minimum and maximum temperatures are expected to be above average for the months of November 2018 to January 2019.

Due to the further development of El Niño-like conditions, there is a higher than average chance of a later start to the monsoonal wet season than usual.

Australian Bureau of Meteorology forecasts:

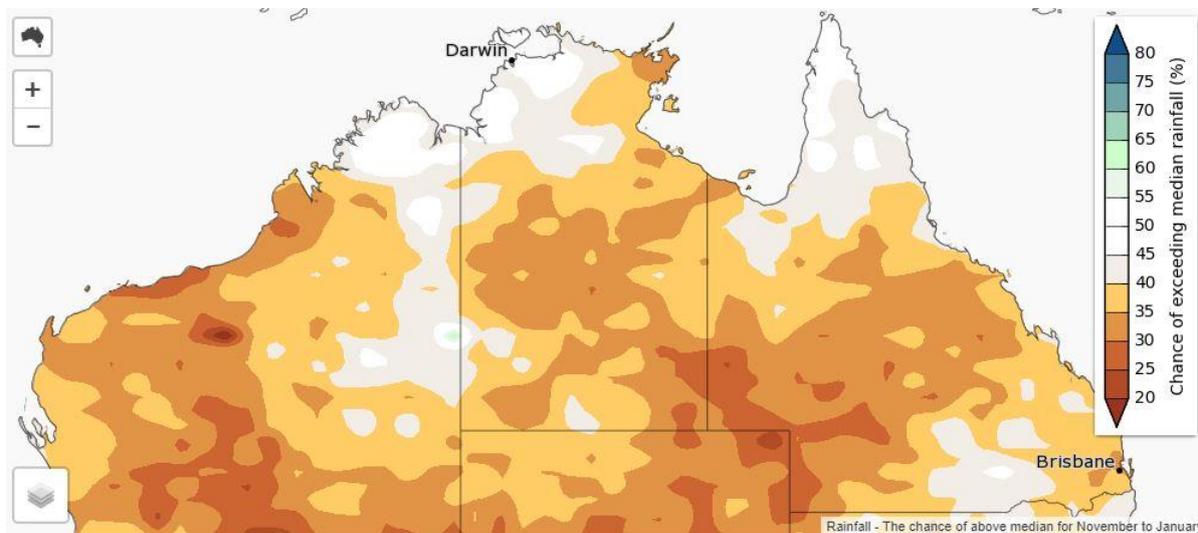


Figure 1: Bureau of Meteorology Forecast 'Chance of exceeding median rainfall' probability values for northern Australia for the overall period November 2018 to January 2019. The majority of northern Australia is showing a less than 50% chance of exceeding median rainfall.

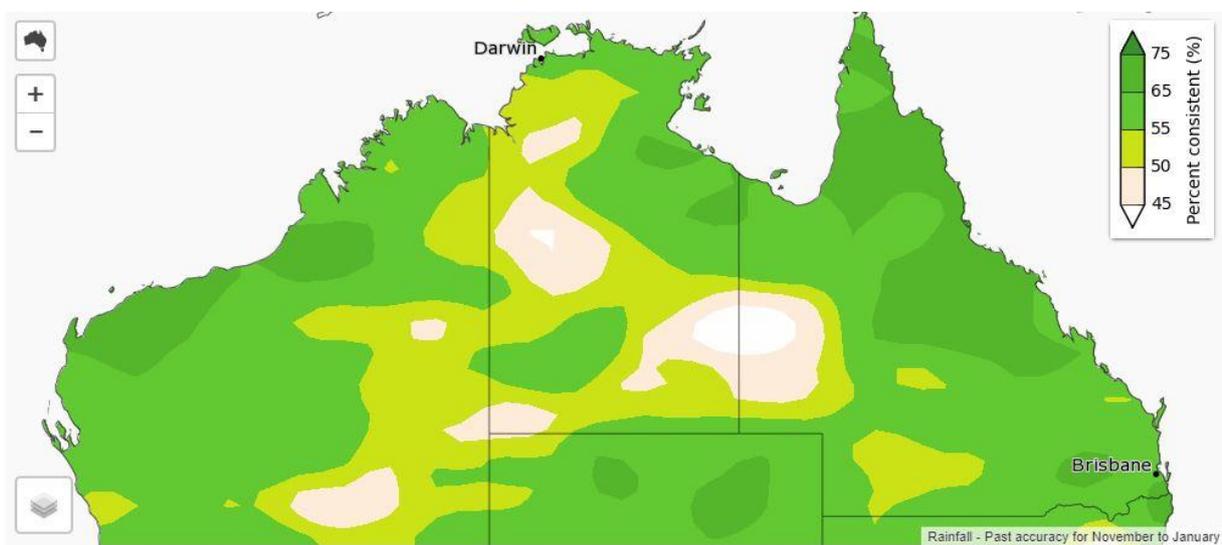


Figure 2: Past accuracy of rainfall from November to January, indicating how accurate past rainfall forecasts have been for these months.



Figure 3: Bureau of Meteorology Forecast 'Chance of exceeding median maximum temperatures' for northern Australia for the overall period November 2018 to January 2019. The majority of northern Australia is showing at least a 70% chance of exceeding median maximum temperatures. This indicates that **day time temperatures are likely to be above median.**

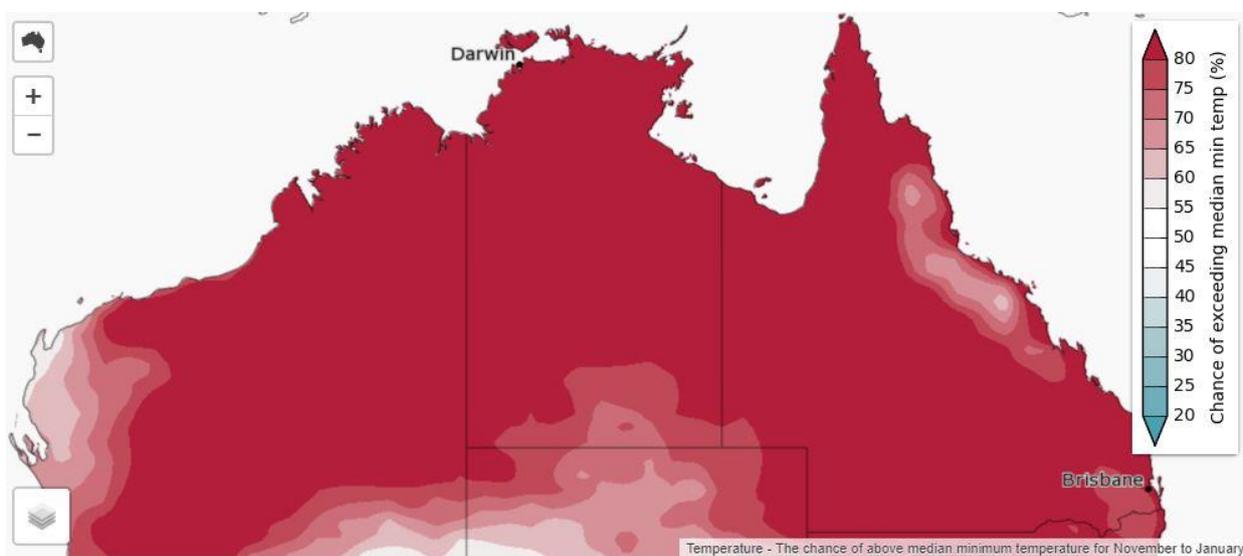


Figure 4: Bureau of Meteorology Forecast 'Chance of exceeding median minimum temperatures' for northern Australia for the overall period November 2018 to January 2019. The majority of northern Australia is showing at least a 60% chance of exceeding median maximum temperatures. This indicates that **night time temperatures are likely to be above median for much of the area outside of the eastern coasts.**

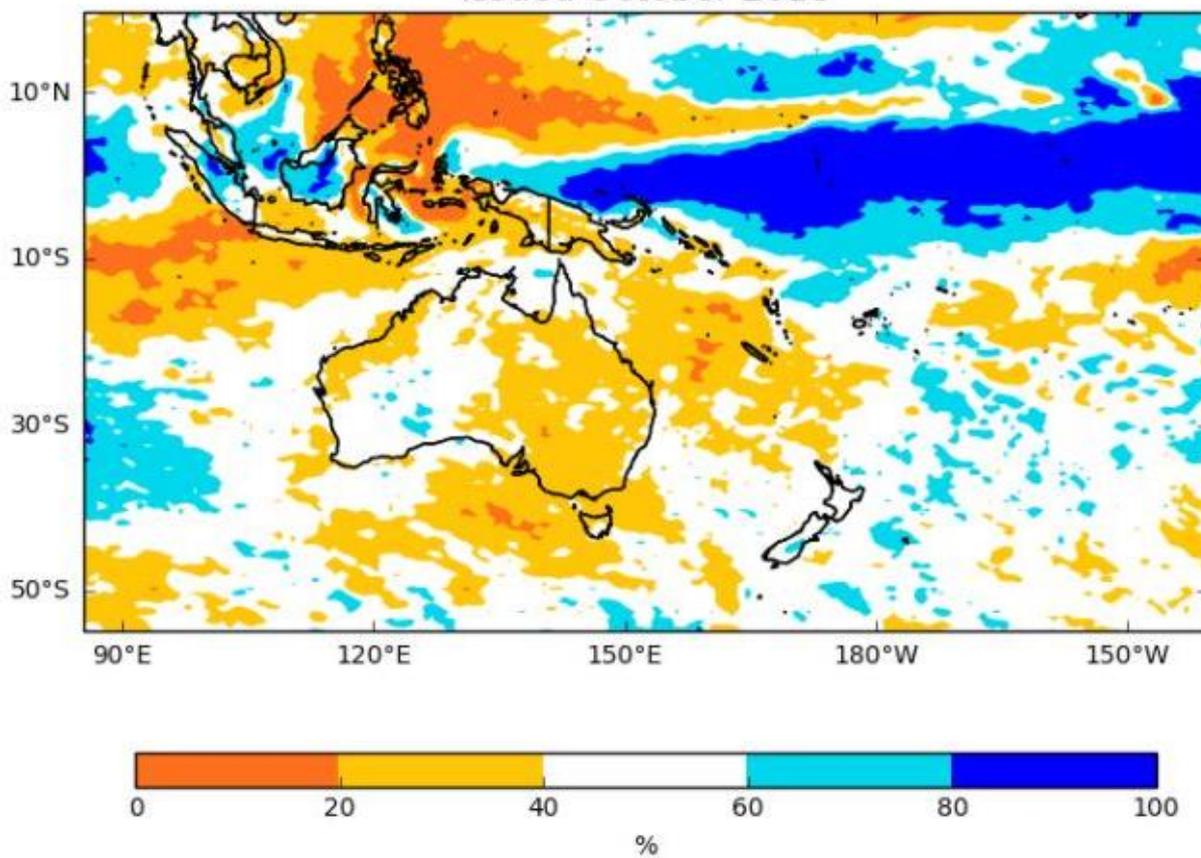
UKMO forecasts:**Probability of above median precipitation Nov/Dec/Jan
Issued October 2018**

Figure 5: Probability of above median precipitation during the months of November, December and January. For the majority of eastern Australia, there is a 20-40% chance of receiving above median rainfall.

The Southern Oscillation Index:

The Southern Oscillation Index (SOI) is an index based on the difference between surface pressure in Darwin, Australia and Tahiti, which are related to ENSO phases.

The SOI consists of five different categories that take into account both rate of change and consistency in the SOI: Consistently Negative – when values are consistently below negative 5, indicating an El Niño phase; Consistently Positive – when values are consistently above positive 5, indicating a La Niña phase; Rapidly Falling – often the transition period between a La Niña and El Niño phase; Rapidly Rising – often the transition period between an El Niño and La Niña phase; and Near Zero, during which time there is not, at that period, a strong ENSO signal or phase.

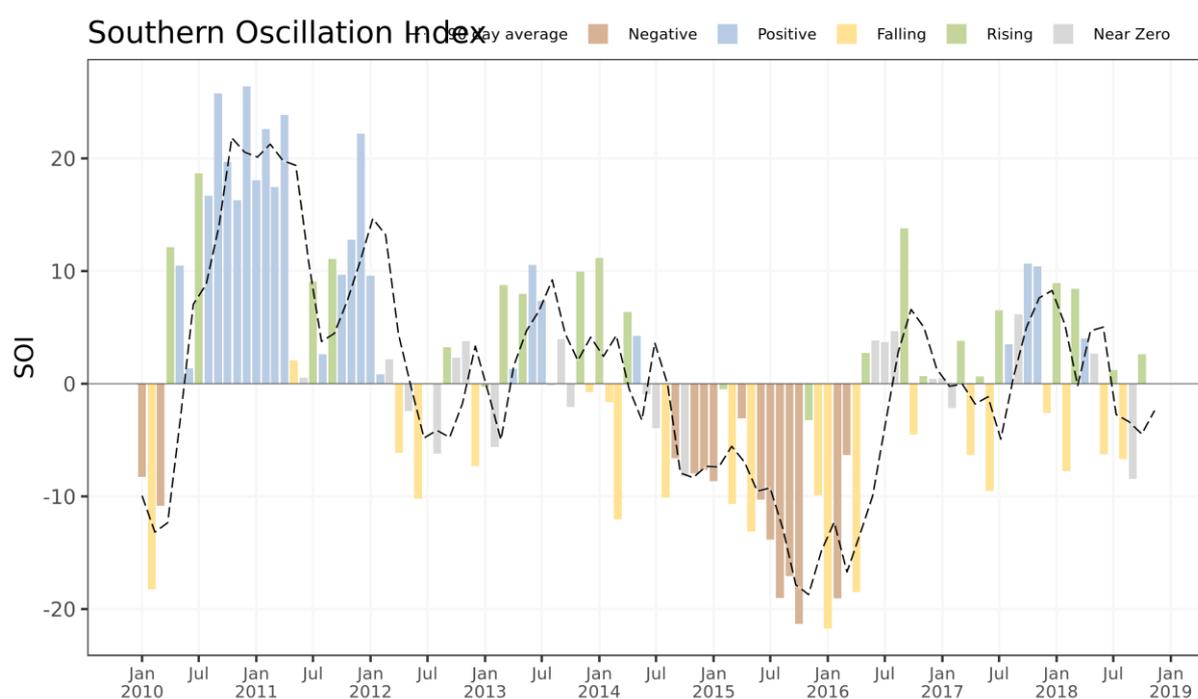


Figure 6: Monthly SOI values since January 2010 – the most recent phase was rapidly rising, reflecting a continuing widely oscillating SOI.

Probability of Exceeding Median Rainfall

November / January

Based on Rapidly Rising phase
during September / October

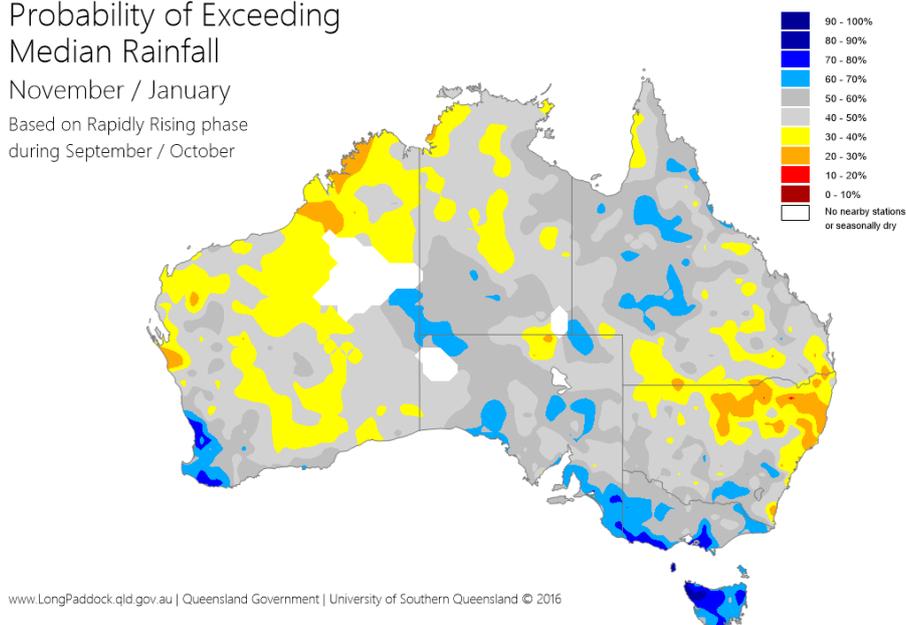


Figure 7: 'Probability of exceeding median rainfall' values for Australia for the overall period November 2018 to January 2019 based on 'rapidly rising' SOI pattern during September and October. The majority of northern Australia is close to or occasionally higher than normal rainfall probability values for this particular period.

Chance of Exceeding Median Growth November 2018 to January 2019

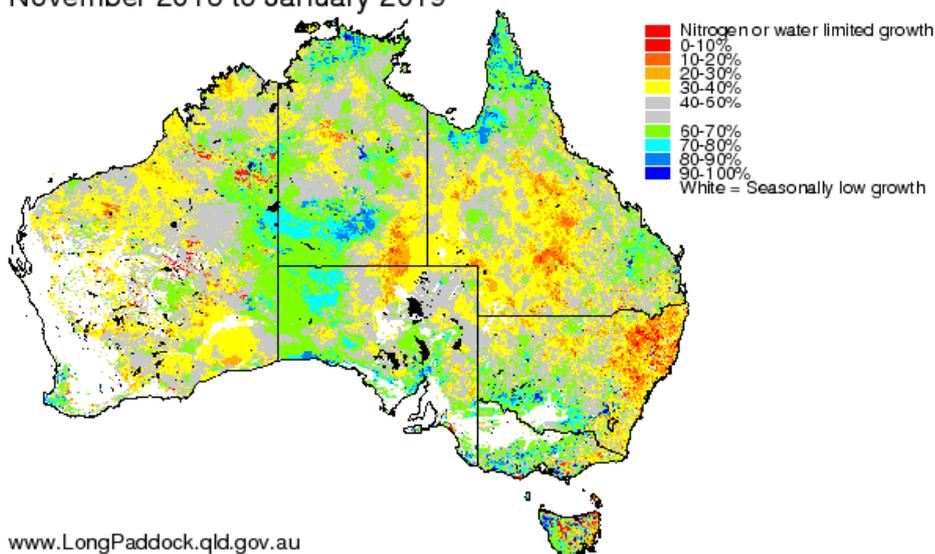


Figure 8: Chances of exceeding median pasture growth for Australia for November 2018 to January 2019 period. This output integrates antecedent moisture and forecast rainfall, temperature, within a pasture growth model.

Explaining the differences between models:

BOM, UKMO, and SOI rainfall 'Probabilities of exceeding median' differ slightly. This is due to the BOM and UKMO using dynamical models for predicting rainfall, while the SOI is applied as a statistical system. Dynamical models use the current state of the oceans and atmospheres combined with our understanding of the physical processes behind weather and climate to forecast the likelihood of future rainfall. Each dynamical model is based on certain model calibrations, which differ from model to model, providing slightly different outcomes. Statistical models use historical climate data to determine when conditions were similar in the past and what rainfall resulted from those past conditions.

While all of the models may be slightly different, it is important to focus on the overall predicted outcomes. All three of the models presented here show that there is an average to below average likelihood of receiving median rainfall.

El Niño-Southern Oscillation (ENSO)

ENSO events generally begin in the Southern Hemisphere winter, peak during summer, and then usually end during autumn. The El Niño phase is often associated with warmer and drier conditions while La Niña phases are often associated with cooler and wetter conditions. The main areas of Australia impacted by ENSO phases are the eastern seaboard, north-eastern Australia and south-eastern Australia. Currently, ENSO conditions are neutral, with some models predicting an El Niño phase beginning sometime in October or November while other models predict neutral conditions to prevail. Impacts of and El Niño (dry and warm conditions) can occur even if conditions do not meet thresholds for an official event and can occur in eastern Australia while El Niño is developing.

Madden Julian Oscillation (MJO)

The MJO impacts weather in tropical Australia (and occasionally in higher latitude areas) on a weekly to monthly timescale. The MJO can either be active (line outside of the circle in Figure 9) or weak/inactive (line inside the circle in Figure 9).

According to multiple forecasting systems (BoM, NOAA, USQ) and analyses, the MJO emerged in sector 1 on the 1st of October, indicated by the green line. When the line is outside of the circle in sectors 8 or 1, as it is here from 1 – 8 October, there is an increased chance of clear conditions (reduced rainfall). The beginning of November, indicated by the blue line, shows that there is potential for rainfall, as the blue line is outside of the circle and headed in to sector 4. When the line is outside of the circle in sectors 4 and 5, there is an increased chance of rainfall for tropical Australia. When the line is inside of the circle, such as from 16 October to 26 October, it indicates that the MJO is very weak to the point of not being active. Also, when the MJO is in sectors 2, 3, 6, and 7, there is little influence on Australia, even if the line is outside of the circle. Please also refer to the interesting BoM website (below) for updated information on the MJO.

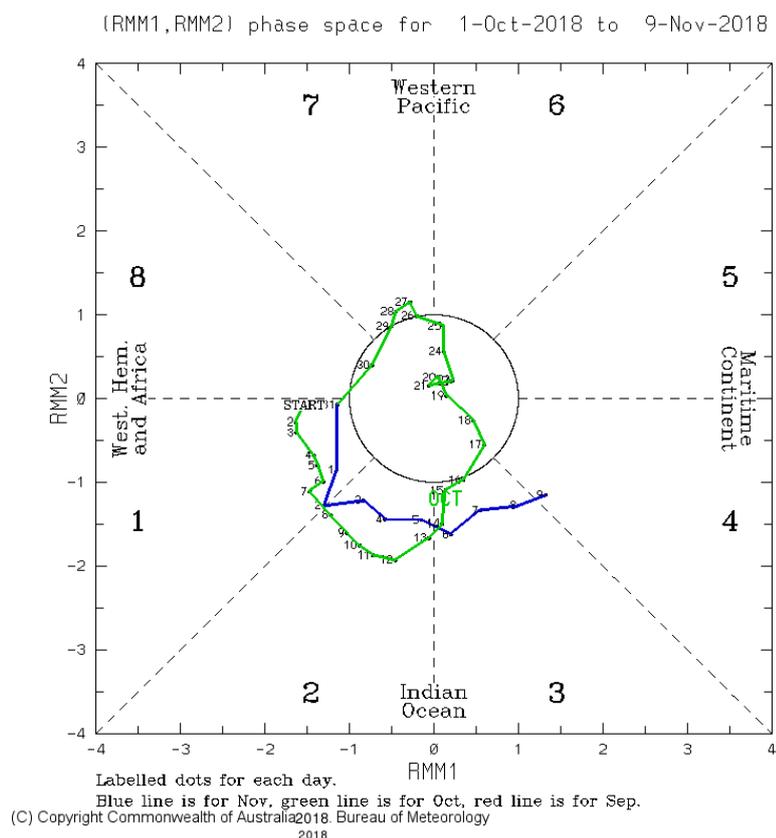


Figure 9: MJO phase diagram for 1 October to 9 November 2018. The green line shows values for October and the blue line for November. The numbers indicate the day of the month. When the line is in the circle, it indicates a weak/inactive MJO phase and when the line is outside of the circle, the MJO is active with strength indicated by distance from circle.

Monsoon/Wet Season Onset (Included seasonally)

The wet season onset is predicted to be average to slightly late in timing. This is due to the El Niño-like conditions developing in the equatorial Pacific Ocean.

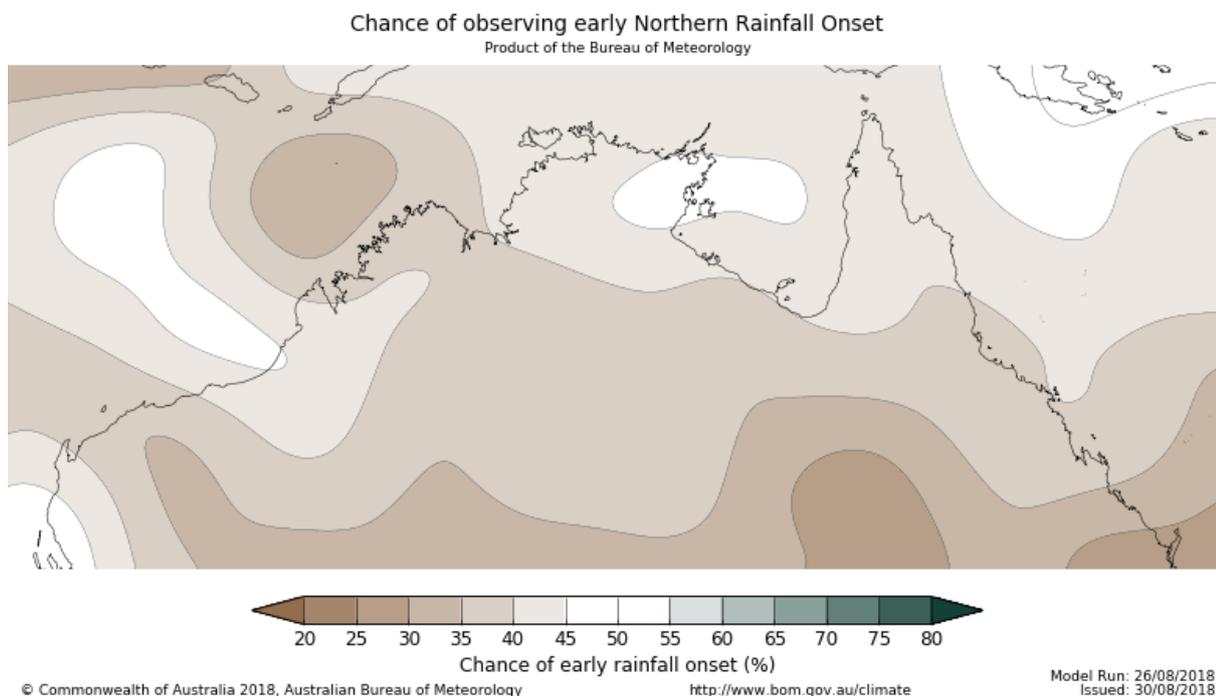


Figure 10: Chance of observing early onset of rainfall is below 45% for the majority of regions in northern Australia. This means there is above average chance (greater than 55%) of average or later than average onset.

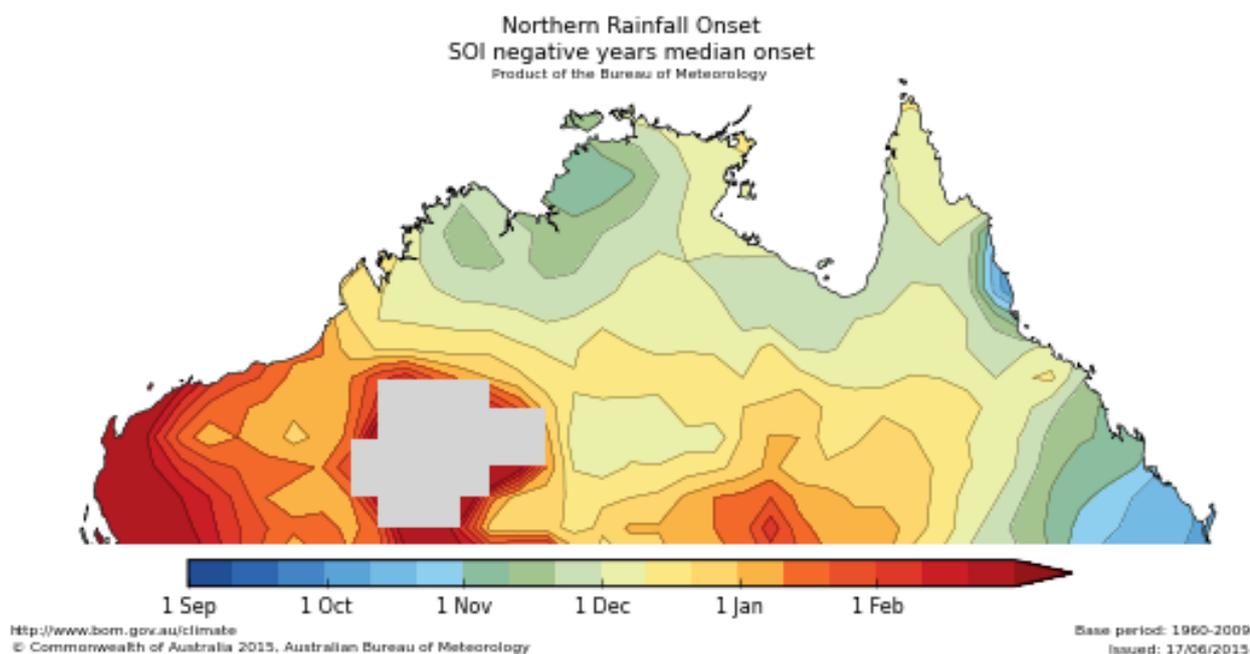


Figure 11: Average wet season onset during SOI negative (El Niño) years.

Northern Australia Climate Program

Click on the following links:

- For the MJO
- For weekly SSTs
- For easterly (and westerly) wind anomalies across the Pacific
- For sub-surface temperatures across the Pacific
- For ECMWF forecast products (note the web site for this output has changed)
- For 'plume' forecasts of SSTs in the central Pacific
- For a complete history of the SOI
- The Long Paddock
- Additional information on ENSO

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