

Monthly Climate Statement — December 2014

Key messages

- Monthly sea surface temperature anomalies in the central equatorial Pacific have been warmer than average since April this year and remain close to El Niño thresholds.
- Monthly values of the Southern Oscillation Index have been negative since June and strongly negative since August.
- The probability of exceeding median rainfall over summer (November to March) is below normal for most of Queensland.
- There is a low probability of widespread drought-breaking rainfall across the state over the coming summer.

Findings for December 2014

The Science Division of the Department of Science, Information Technology, Innovation and the Arts (DSITIA) considers that **the current borderline El Niño conditions and warm phase of the Inter-decadal Pacific Oscillation (IPO) increases the probability of below-median summer (November to March) rainfall for most of Queensland and reduces the probability of widespread drought-breaking rainfall.**

DSITIA's rainfall outlooks for Queensland are based on the current and projected state of the El Niño–Southern Oscillation (ENSO) phenomenon and on factors which alter the impact of ENSO on Queensland rainfall (i.e. the more slowly changing extra-tropical sea surface temperature (SST) pattern in the Pacific Ocean).

At this time of year the prevailing ENSO pattern (as measured by indices such as the Southern Oscillation Index (SOI) or central equatorial Pacific Ocean SST anomalies) offers a useful basis for providing seasonal outlooks for summer.

Monthly values of the SOI have been negative since June, averaging -6.3 for the last six-month period since June and -7.6 for the last three-month period since September. Monthly SST anomalies in the central equatorial Pacific have been warmer than average since April this year and remain close to El Niño thresholds. The six-month average SST anomaly since June was +0.4 °C and the three-month average since September was +0.6 °C. These conditions indicate 'coupling' of the atmosphere and ocean, an important component of El Niño development.

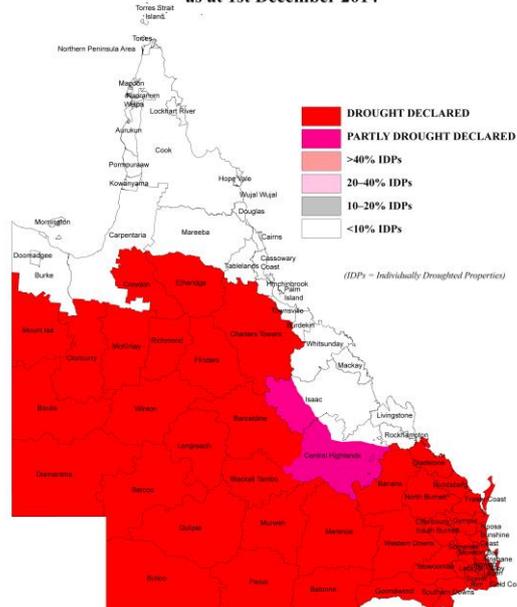
Currently:

- In November, the monthly SST anomaly in the Niño 3.4 region of the central equatorial Pacific Ocean was +0.9 °C. As at 3 December, the latest weekly SST anomaly in the Niño 3.4 region of the central equatorial Pacific Ocean was +0.8 °C.
- The SOI was -8.0 in November. As at 14 December, the 30-day mean value of the SOI was -5.5.
- More than 75 per cent of Queensland remains drought declared under state government processes, including most inland regions and all of south-eastern Queensland (see map below).
- Rainfall in November was extremely low in many drought affected parts of the state.

Borderline El Niño

Although the definition of 'El Niño' varies between agencies, DSITIA considers current conditions to be bordering on El Niño. However it is immaterial to the seasonal outlook presented on the following page, as to whether or not an 'El Niño event' is eventually declared by national and international agencies in coming months. The seasonal outlook discussed on the following page indicates that there is an increased probability of below-median to well below-median summer rainfall for most of Queensland. As such, an increased risk of current drought conditions becoming more protracted should be factored into decision-making and allocation of resources.

QUEENSLAND DROUGHT SITUATION as at 1st December 2014



Outlook for summer rainfall

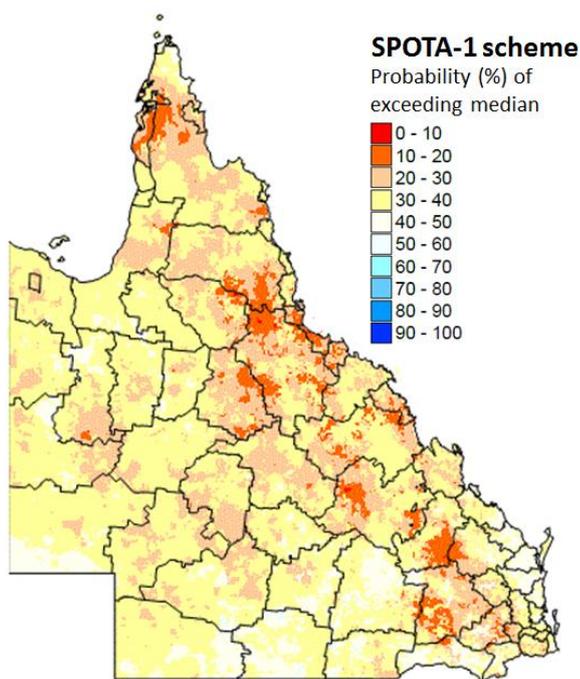
DSITIA scientists have shown that extra-tropical SST anomalies, when measured in specific regions of the Pacific Ocean in March each year, provide a useful basis for long-lead forecasting of summer rainfall in Queensland. This outlook can be modified, with increasing accuracy, as the monthly ENSO-related SST pattern is also taken into account from June to November.

This understanding has been incorporated in an experimental system known as SPOTA-1 (Seasonal Pacific Ocean Temperature Analysis version 1), which has been operationally evaluated by DSITIA scientists for over a decade. SPOTA-1 relies on the gradient in SST across the South Pacific Convergence Zone, as an indicator of ENSO conditions. This gradient remains quite neutral, despite warm conditions in the central equatorial Pacific.

As at 1 November, DSITIA's final long-lead outlook for summer (November to March 2014/15) indicates a higher than normal probability of below-median to well below-median rainfall for most of Queensland and, conversely, a low probability of widespread drought-breaking rainfall.

This outlook for summer rainfall has been consistent since April this year and is strongly related to the extra-tropical SST pattern measured in March this year, which is indicative of a warm phase of the IPO.

Probability of Exceeding Median Summer Rainfall
November 2014 – March 2015 based on the SPOTA-1 Index
as at November 1, 2014



Why is SPOTA-1 labelled “Experimental”?

The SPOTA-1 system is currently labelled 'experimental' and will continue to be labelled as such until the details of the system, including its strong operational track record, are published in the international peer-reviewed scientific literature. Until then, further details on the current outlook and access to previous outlooks (since 2001) are currently provided on a password-protected area of the Long Paddock website (see the link at bottom of page to request password).

In summary, it should be noted that:

- The current long-lead outlook for summer rainfall is based on both extra-tropical and central equatorial Pacific Ocean SST anomalies.
- Central equatorial Pacific Ocean SST anomalies over summer will define the state of ENSO ('El Niño', 'La Niña' or 'ENSO-neutral') for 2014/15.
- Should international agencies officially declare an El Niño event, it is most likely to be a weak event. However, both 'weak' and 'strong' El Niño events have an equal tendency to produce dry conditions in Queensland.
- For Queensland, the state of the extra-tropical Pacific Ocean determines whether an El Niño event (weak or strong) is most likely to result in a dry summer.
- A range of analyses (based on different approaches) support DSITIA's view that there is a low probability of widespread wet conditions across Queensland over summer (although this can't be totally ruled out).
- The Bureau of Meteorology have advised that 'near-average' tropical cyclone activity is likely for Queensland and the Coral Sea this cyclone season (November to April).
- On average, two tropical cyclones make landfall in Queensland during the tropical cyclone season.

For more information, please visit:
www.longpaddock.qld.gov.au/seasonalclimateoutlook
or contact Stuart Burgess at:
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