

Monthly Climate Statement – March 2024

Key messages

- The current El Niño conditions have started to weaken and are likely to break down over autumn.
- Based on the sea-surface temperature pattern in the Pacific Ocean leading up to summer, in November 2023 the Science Division of DESI considered that the probability of exceeding median summer (November to March) rainfall was lower than normal for much of Queensland.
- Whilst El Niño conditions have thus far prevailed over summer, above-average rainfall has been received across much of Queensland since November.
- Whilst the current El Niño event has been unusually wet in Queensland; such an outcome may occur on rare occasions and thus should be factored into climate risk management decisions.

The Department of Environment, Science and Innovation (DESI) monitors sea-surface temperature (SST) anomalies in key regions of the Pacific Ocean over autumn, winter and spring and provides objective outlooks for summer (November to March) rainfall on this basis. Based on the evolving SST pattern in the Pacific Ocean leading up to summer, **in November 2023 the Science Division of DESI considered that the probability of exceeding median summer (November to March) rainfall was lower than normal for much of Queensland.**

The most closely monitored driver of Queensland rainfall is the El Niño-Southern Oscillation (ENSO) phenomenon. Climate scientists monitor several ENSO indices, including the atmospheric Southern Oscillation Index (SOI) and SST anomalies in the central equatorial Pacific Ocean. The average SST* anomaly in the Niño 3.4 region of the central equatorial Pacific over the last three-month period (December to February) is +1.8°C, which falls well within the 'El Niño' range (>+0.5°C as recognised by DESI). However, the corresponding three-month average value of the SOI** is -5.1, which is no longer strongly negative. Most international climate models indicate that the El Niño conditions have started to weaken and are likely to break down over autumn.

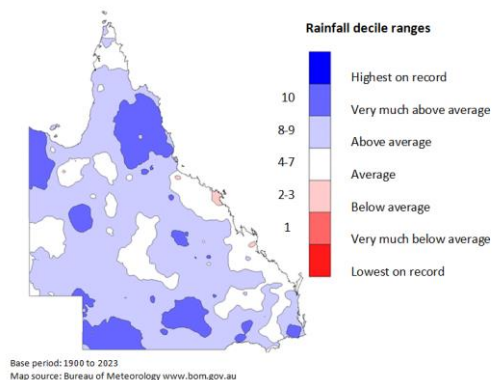
The 'autumn predictability gap'

El Niño and La Niña events tend to form in the austral winter or spring, persist through summer and break down in autumn. Seasonal outlooks are possible due to the persistence of the ENSO signal, and associated rainfall and climate patterns, over spring and summer. However, the lack of persistence of the ENSO signal from autumn to winter leads to a period of low predictability, known as the 'autumn predictability gap' or 'autumn predictability barrier'.

Sea-surface temperature anomalies in the central equatorial Pacific tend to 'lock in' over the winter, spring and summer seasons, and this persistence provides a basis for seasonal forecasting. The DESI outlook for summer rainfall in Queensland, issued at the beginning of November, was based on an objective analysis of SST anomalies measured in key regions of the Pacific Ocean, including those regions related to ENSO. On this basis, the Science Division of DESI considered that the probability of exceeding median summer (November to March) rainfall was less than 30 per cent for much of Queensland.

However, unsettled conditions, not typically associated with El Niño, have prevailed over much of Queensland since November. The northern Australian monsoon and low-pressure troughs have been quite active over Queensland since about mid-December and two tropical cyclones have made landfall on the north tropical coast in Queensland since then ('Jasper' near Wujal Wujal on 13 December and 'Kirrily' near Townsville on 25 January). As a result, rainfall over the four-month period ending 29 February (see map below) was within the highest 30 per cent of rainfall totals on record (greater than decile 7) across much of Queensland. The tropical cyclone season lasts from 1 November to 30 April.

Four-monthly rainfall deciles for Queensland
1 November 2023 to 29 February 2024



Readers are reminded that seasonal outlooks are expressed in terms of probabilities. The probabilities shown on the rainfall outlook map are based on an objective analysis of historical data and show the summer rainfall outcome in years when SST conditions were closest to the current year. An analysis may, for example, indicate that below-median summer rainfall occurred in most of those years. However, this also means that summer rainfall was at, or above, the long-term median in some of those years. Therefore, an outlook which states that there is 'an 80 per cent probability of below-median rainfall' should also be interpreted as there being 'a 20 per cent probability of median or above-median rainfall'.

For more information, please contact Stuart Burgess at:
stuart.burgess@des.qld.gov.au.

* www.cpc.ncep.noaa.gov/data/indices (monthly OISST.v2.1 NINO3.4 1991-2020 base period)
** www.longpaddock.qld.gov.au/soi/soi-data-files (monthly SOI 1887-1989 base period)