

# Queensland Climate Change Centre of Excellence

## Monthly Climate Statement—December 2011

### Key messages

- The current La Niña climate pattern strengthened during November.
- Although November was drier than normal in eastern Queensland, most of Australia received above-median November rainfall.
- There remains a higher than normal probability of above-median summer rainfall for Queensland.
- The Bureau of Meteorology anticipates a higher than average number of tropical cyclones for the current cyclone season.

### Findings for December 2011

**The Queensland Climate Change Centre of Excellence (the Centre) considers that the probability of above-median rainfall for summer (from December 2011 to March 2012) remains higher than normal** for most of Queensland. The Centre's view, which is based on a comparison of historical rainfall records and climate indices, is also supported by a range of evidence provided by national and international climate agencies. Furthermore, the Centre notes that the Bureau of Meteorology has indicated that the tropical cyclone season (November to April) is likely to be [more active than normal](#). The Queensland Regional Office of the Bureau of Meteorology is encouraging communities to [be prepared for 'perhaps one or two' tropical cyclones](#) making landfall in Queensland during the cyclone season.

Although rainfall over much of western Queensland was higher than average during November, there has been a dry start to summer for much of eastern Queensland. However the Centre notes that there remains a high probability of above-median rainfall for the remainder of summer based on the current strengthened La Niña climate pattern. As at 1 December 2011 the Centre notes that Niño 3.4 region sea-surface temperature anomalies in the central equatorial Pacific, a key indicator of the El Niño-Southern Oscillation (ENSO) phenomenon, exceed La Niña thresholds. The [Southern Oscillation Index](#) (SOI), an atmospheric measure of ENSO, has averaged +13.9 over the last 90 days (to 22 December) and

remains quite positive (+20.7 over the last 30 days to 22 December). However, these indicators are weaker than at the same time in 2010.

The Bureau of Meteorology, in their latest '[ENSO Wrap-Up](#)' (issued 21 December 2011), notes that the current La Niña event, which has shown recent strengthening, may be at its peak but it is likely to last through the remainder of the summer. The Bureau also notes that Australia's climate has responded to these recent changes, with above average rainfall across large parts of the country since October.

The Centre has closely monitored [sea-surface temperatures](#) in specific regions of the Pacific Ocean since April this year to provide long-lead rainfall probabilities for the coming summer. These long-lead outlooks are based on the Centre's experimental Seasonal Pacific Ocean Temperature Analysis (SPOTA-1) scheme. SPOTA-1 takes into account both ENSO and a more persistent, but related, coupled ocean-atmosphere phenomenon known as the Pacific Decadal Oscillation (PDO). Like last year, the SPOTA-1 scheme has consistently indicated that the probability of above-median rainfall for the 2011-12 summer is higher than normal. Last month's SPOTA-1 update was the final update for the current summer season (November to March). The SPOTA-1 scheme indicates a higher than normal probability of above-median summer rainfall (November to March), including any three-month period falling within summer (i.e. November to January, December to February and January to March). Although these probabilities won't be revised, the Centre will continue to monitor the SOI and sea-surface temperatures and provide commentary on this basis.

There are various approaches used to provide rainfall outlooks. These approaches tend to differ in terms of the components of the climate system that are considered and, for this reason, each approach may convey a different outlook, particularly for specific locations.

The Centre produces two statistical climate risk assessment schemes. They are:

- the experimental [SPOTA-1 scheme](#), which integrates sea-surface temperature information, including indices of ENSO and the PDO, and



- the [SOI phase scheme](#), which relies solely on the SOI, an atmospheric measure of ENSO.

The Centre's experimental [SPOTA-1 scheme](#) provides long-lead probabilities of summer (November to March) rainfall for Queensland from mid-April through to mid-November each year. The sea-surface temperature gradient (west to east) across the South Pacific Convergence Zone (i.e. between eastern Australia and the central Pacific) remained positive (+1.37 °C) in October. According to the Centre's experimental SPOTA-1 scheme, a positive sea-surface temperature gradient across this region is favourable for summer rainfall in Queensland. The final SPOTA-1 scheme, issued in November, indicated a higher-than-normal (60 to 80 per cent) probability of above-median summer rainfall throughout Queensland.

The Centre's SOI phase scheme provides probabilities of rainfall for the coming three-month season based on SOI values over the previous two months. The SOI phase scheme currently indicates that the [probability of exceeding median rainfall](#) across most of Queensland is 50 to 70 per cent, which is higher than normal (50 per cent) for the next three-month period (December to February). This analysis is based on the fact that the SOI has remained consistently positive from October to November as discussed further in the Centre's [commentary on rainfall based on phases of the SOI](#).

The SPOTA-1 and SOI-Phase schemes indicate probabilities based on historical relationships. It is important that the probabilistic nature of seasonal outlooks is understood and long-term risk management is undertaken. For example, if an outlook indicates a 70 per cent probability of above-median rainfall, this also means there is a 30 per cent probability of below-median rainfall.

Additionally, an increased risk of above- or below-median rainfall in Queensland due to ENSO will not necessarily result in above- or below-median rainfall occurring throughout all of the state (see [Australia's Variable Rainfall poster](#), or the Centre's [archive of historical rainfall maps](#)).

The Centre understands that each of the above schemes may have their own particular following. Although such schemes cannot provide outlooks with absolute certainty, users of the information who follow a skilful scheme should benefit from doing so in the long-term. Users should consider the historical track record of any scheme, and such historical information is becoming increasingly available. The Centre's Long Paddock website provides the historical archive of [SPOTA-1 reports](#) and [past commentaries](#) on the SOI

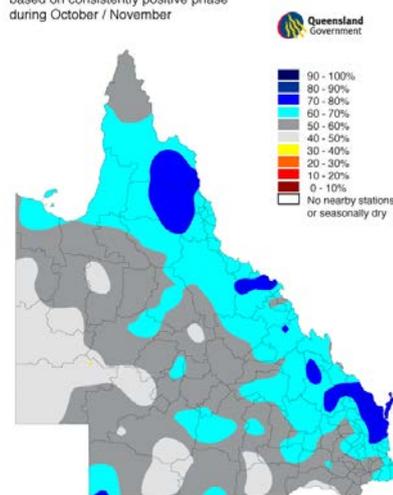
phase scheme. Users should also consider the wide range of information available each month describing the current state of the ocean/climate system, for example the ['ENSO Wrap-Up'](#).

ENSO influences other climate variables apart from rainfall (e.g. temperature, pan evaporation and vapour pressure). This means that the impact of ENSO on crop or pasture growth can be stronger than on rainfall alone. The impact of ENSO on pasture growth is also dependent upon current pasture condition and soil water status. The Centre's AussieGRASS model takes these factors into account in producing [seasonal pasture growth probabilities](#).

### Probability of exceeding Median Rainfall

for December / February  
based on consistently positive phase  
during October / November

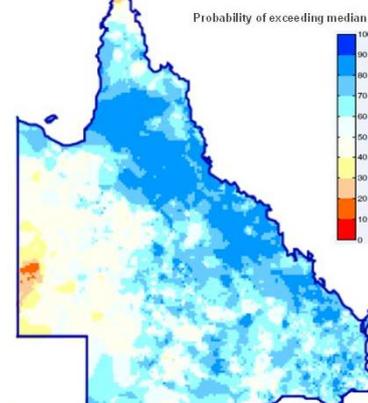
### SOI Phase scheme



### Probability of Exceeding Median Rainfall

December 2011 – February 2012 based on the SPOTA-1 Index  
as at November 1, 2011

### SPOTA-1 scheme



For more information, please visit [www.LongPaddock.qld.gov.au/climatestatement](http://www.LongPaddock.qld.gov.au/climatestatement) or contact [QCCCE@climatechange.qld.gov.au](mailto:QCCCE@climatechange.qld.gov.au).