Queensland Climate Change Centre of Excellence Monthly Climate Statement

Key messages for the summer season

- High probability of above median rainfall
- Bureau of Meteorology expects higher than average number of cyclones in the Queensland region
- Above median rainfall already recorded during the early part of summer

Findings for December 2010

The Queensland Climate Change Centre of Excellence (the Centre) considers that there is an increased probability of above-median rainfall throughout most of Queensland this summer.

The Centre's understanding is based on the current and projected state of the El Niño-Southern Oscillation (ENSO) phenomenon and on factors which modulate the impact of ENSO on Queensland rainfall (for example the Pacific Decadal Oscillation).

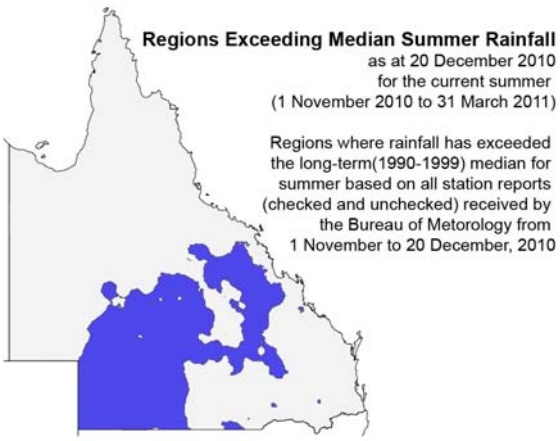
What is La Niña?

La Niña is the positive phase of the El Niño-Southern Oscillation (ENSO). La Niña events generally begin in autumn and mature during winter, spring and early summer. La Niña events generally decay in late summer and finish in autumn. La Niña is normally associated with above median winter, spring and summer rainfall in eastern Australia and increased tropical cyclone activity in northern Australia.

As at December 1 2010, the Centre notes that:

The current La Niña climate pattern remains well-established in the Pacific (see the latest Bureau of Meteorology 'ENSO Wrap-Up') and is likely to persist throughout summer. In particular:

- The Southern Oscillation Index (SOI) remains very positive when averaged over the last month (November: +16.3), two months (October-November: +18.0), and three months (September-November: +20.6).
- Observed sea surface temperatures in the key Niño 3.4 and Niño 4 regions remain much cooler than normal – typical of a well-established La Niña pattern.
- Associated with this La Niña pattern, the sea surface temperature gradient (west to east) across the South Pacific Convergence Zone (i.e. between eastern Australia and the Central Pacific) was extremely positive leading into summer (e.g. +1.9°C in October). According to the Centre's experimental SPOTA-1 scheme, a positive sea surface temperature gradient across this region, particularly in October, tends to be associated with above-median rainfall in Queensland during the following summer (November to March). November was extremely wet (rainfall between the 90th and 100th percentile) and December so far has also been extremely wet. Many regions have already received rainfall totals which exceed the long-term median for the entire summer (November to March).
- As reported in recent months, historical evidence suggests that the current La Niña pattern is highly likely to persist through summer. The strong likelihood of a La Niña pattern persisting through summer is also supported by global climate models.



The recent sea-surface temperature pattern in the North Pacific remains consistent with a 'Cool Phase' of the Pacific Decadal Oscillation (PDO). The PDO modulates the impact of ENSO on summer rainfall in Queensland, particularly under La Niña conditions.

A cool phase of the PDO, coupled with La Niña conditions, is particularly favourable for summer rainfall in Queensland (e.g. see the Centre's experimental SPOTA-1 scheme which incorporates a measure of both ENSO and the PDO). These conditions are also usually associated with enhanced tropical cyclone activity in the Coral Sea, which is discussed in the Bureau of Meteorology's Seasonal Outlook 2010-11 for Queensland and the Coral Sea.

There are various approaches to developing probabilistic rainfall outlooks based on the information considered above. These approaches tend to differ in terms of which components of the climate system are considered. As such, each approach might convey a different outlook, particularly for specific locations. However the ENSO and PDO signals have historically had the strongest impact on rainfall in north-eastern Queensland and the weakest impact in south-eastern Queensland.

The Centre produces two statistical climate risk assessment schemes:

- The Centre's experimental SPOTA-1 scheme integrates the above sea-surface temperature information, including indices of ENSO and the PDO. The final SPOTA-1 outlook for this summer (November to March), issued in October this year, indicated a high probability of exceeding median rainfall across the state.
- The Centre's SOI Phase scheme, which relies on the SOI, currently indicates a higher than normal probability of exceeding median rainfall across much of the state over the coming three-month period (December to February).

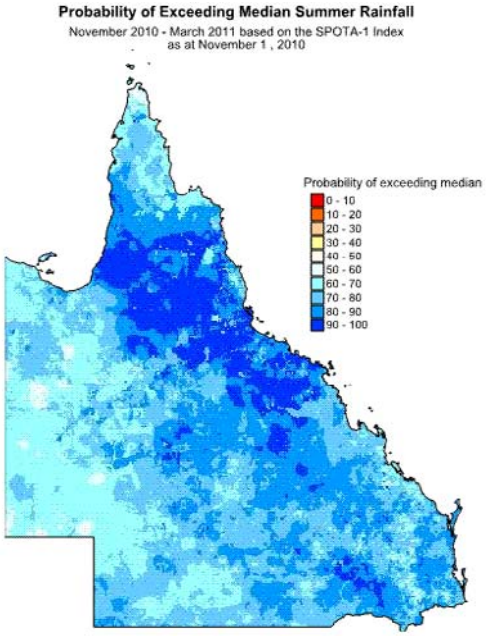
It is important that users understand the nature of seasonal outlooks and take a long-term risk management approach to such information. The above schemes indicate rainfall probabilities based on historical relationships. Users should appreciate that if, for example, an outlook is for a 70 per cent probability of above-median rainfall, this also means there is a 30 per cent probability of below-median rainfall. As such, users should also be aware that 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 the state (for example, see Australia's Variable Rainfall poster or our archive of historical rainfall maps).

The Centre understands that each of the schemes may have its own particular following. Although such schemes cannot provide outlooks with absolute certainty each year, those 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 information is becoming increasingly available. For example, an historical archive of SPOTA-1 reports is available on the Long Paddock website. Users should also consider the wide range of information available each month describing the current state of the ocean/climate system.

South West Queensland Floods Disaster at St George and nearby Towns in 2010

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 on current pasture condition and soil water status. The Centre's AussieGRASS model takes these factors into account in producing pasture growth seasonal probabilities.

For further information on climate change science and information, visit www.longpaddock.qld.gov.au or contact QCCCE@climatechange.qld.gov.au



For more information about actions you can take to address climate change, visit www.climatesmart.qld.gov.au or www.climatechange.qld.gov.au