December 2020 Climate Update

Summer Climate Outlook

Over the next 3 months, South Australian livestock producers across the north and west of the state can generally expect above average rainfall with near average maximum temperatures, while producers in the southeast are most likely to experience above average temperatures with near average rainfall.

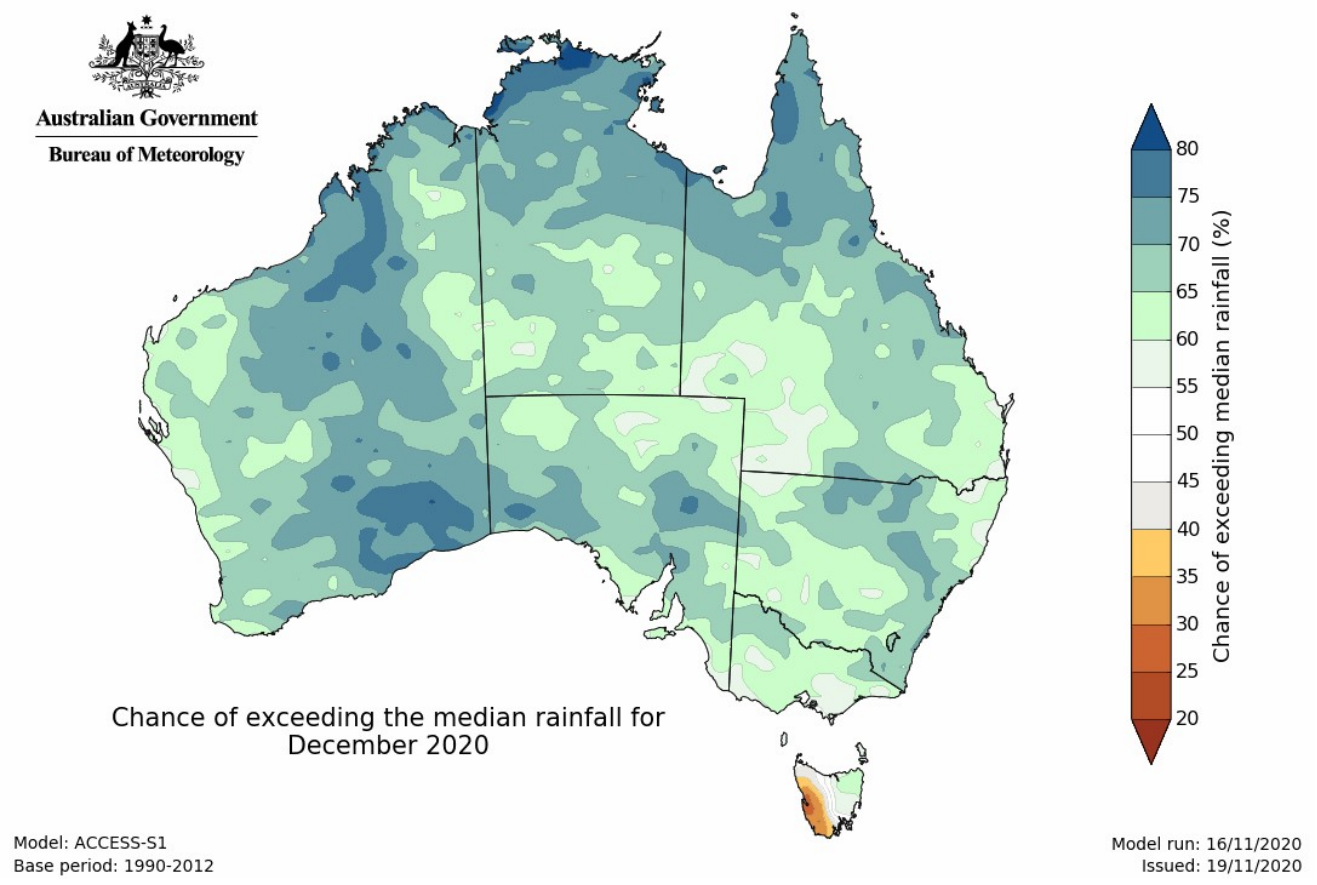
The Bureau of Meteorology's climate outlook for the month of December indicates wetter than average conditions are likely for large areas of Australia, including much of South Australia. The chance of exceeding the median December rainfall is generally 65 to 75% in parts of the north and west of the state, but only 50 to 65% over southern agricultural districts (Figure 1).

For December to February, the outlooks suggest rainfall is also likely to be above average over most of Australia during summer. For South Australia, the chances of exceeding median rainfall during summer are again greatest in the north and west, generally above 70%, with around 60 to 70% in the southeast districts (Figure 2). Increased moisture during summer can also lead to increased thunderstorm activity, potentially resulting in more fires started by lightning and increased impacts from severe storms.

It is important to note that a 70% chance of above median rainfall still means there is a 30% chance that rainfall will be below the median and does not guarantee exceptionally wet conditions are going to occur this summer. Also, given that summer is typically a dry time of year in South Australia, above median rainfall can still result from just 1 or 2 heavier rainfall events amongst extended dry periods. The historical accuracy of the seasonal rainfall outlooks is also low at this time of year, and generally around 60% across South Australia. The Bureau's climate outlooks now allows you to explore the rainfall outlook scenarios in more detail at your specific location at http://www.bom.gov.au/climate/outlooks/#/rainfall/summary.

The temperature outlooks indicate a very high likelihood of above average minimum temperatures across South Australia during December and throughout summer. For maximum temperatures, the chance of exceeding the December mean maximum is around 60 to 70% in part of the southeast and northeast but around 50% elsewhere (Figure 3). For summer, the likelihood of hotter than average conditions in the southeast increases to above 75% (Figure 4).

With both hotter than average night and daytime temperatures likely for some areas of South Australia, heatwaves are a risk this summer. While extreme heat events are less likely with La Niña, heatwaves can last longer and be accompanied with more humid conditions. The Bureau monitors for conditions where maximum and minimum temperatures are unusually hot over a three-day period, taking into consideration the local climate and past weather. The heatwave forecasts can be found at http://www.bom.gov.au/australia/heatwave/.



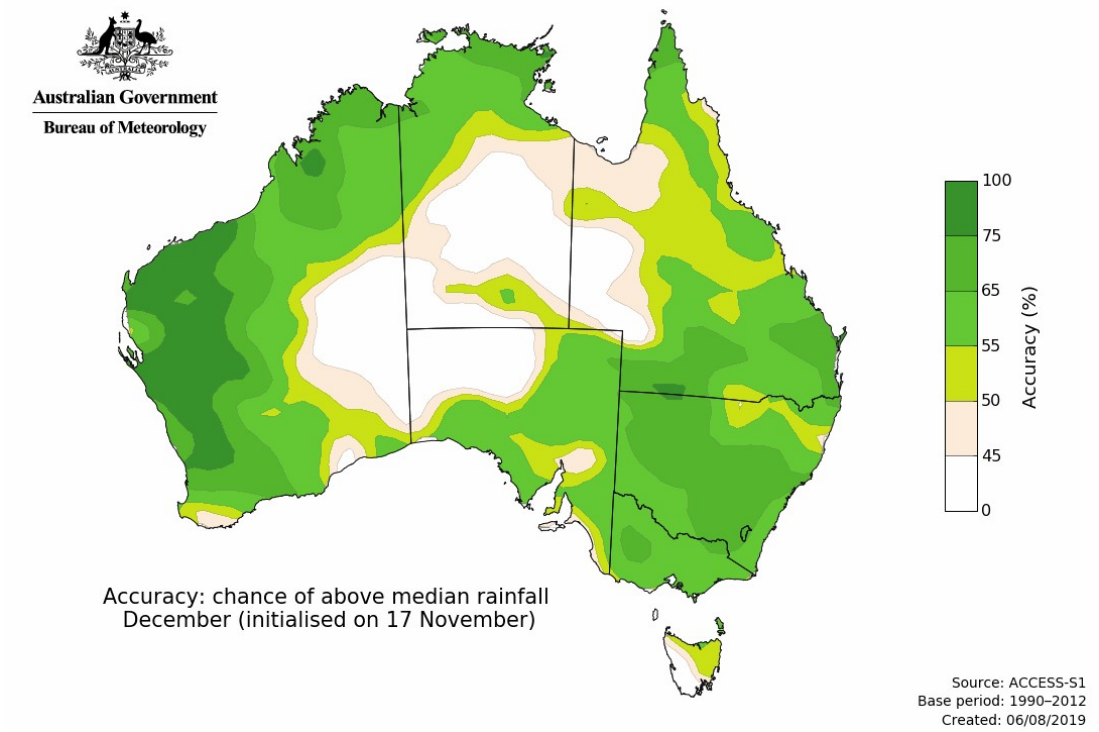
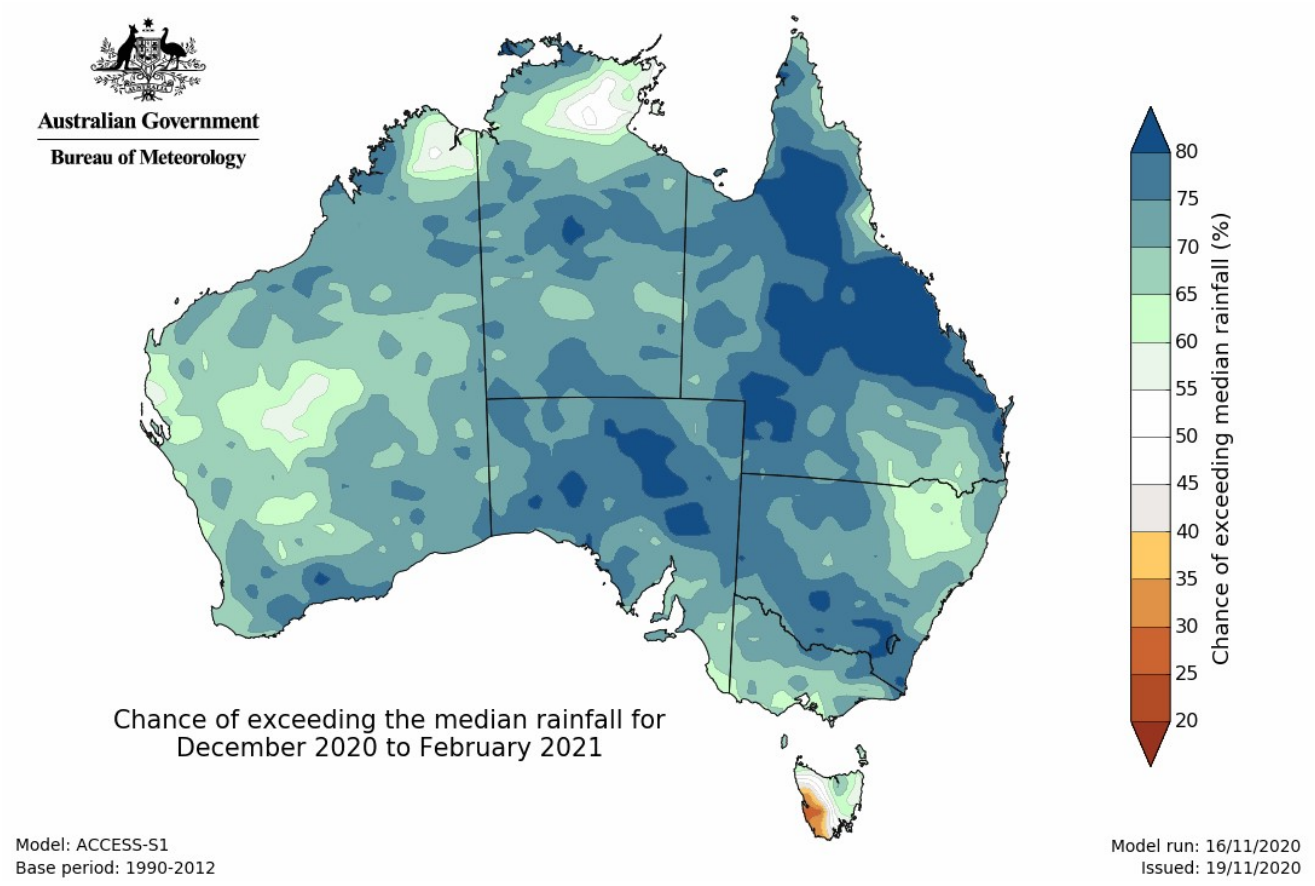


Figure 1: Rainfall outlook for Australia for December 2020 (top) and the historical outlook accuracy for the December (bottom).



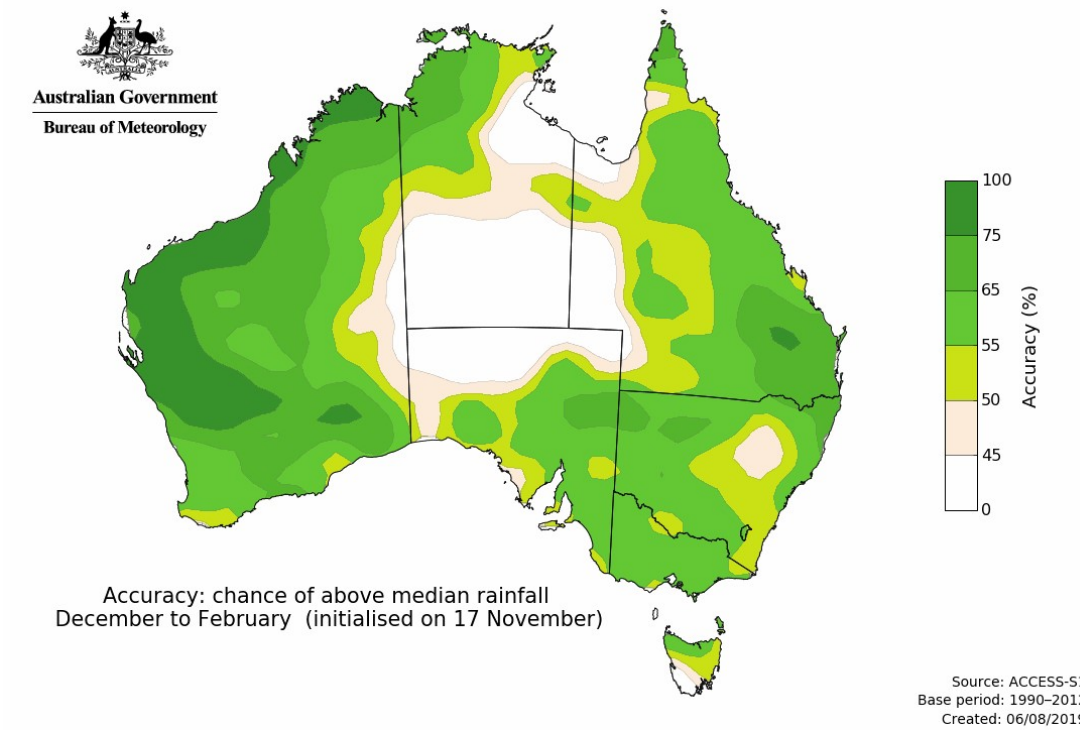
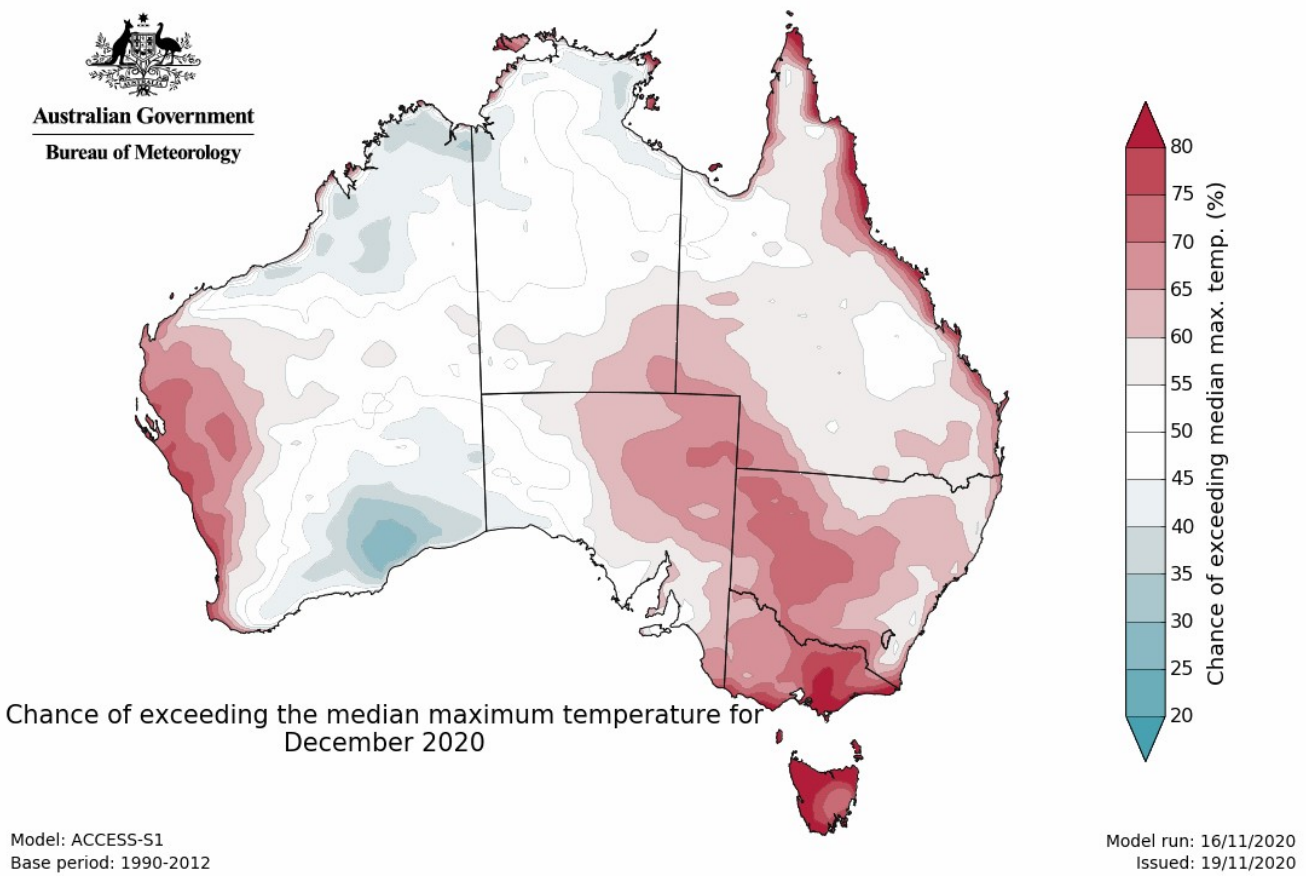


Figure 2: Three-month rainfall outlook for Australia for December 2020 until February 2021 (top) and the historical outlook accuracy for the December to February period (bottom).



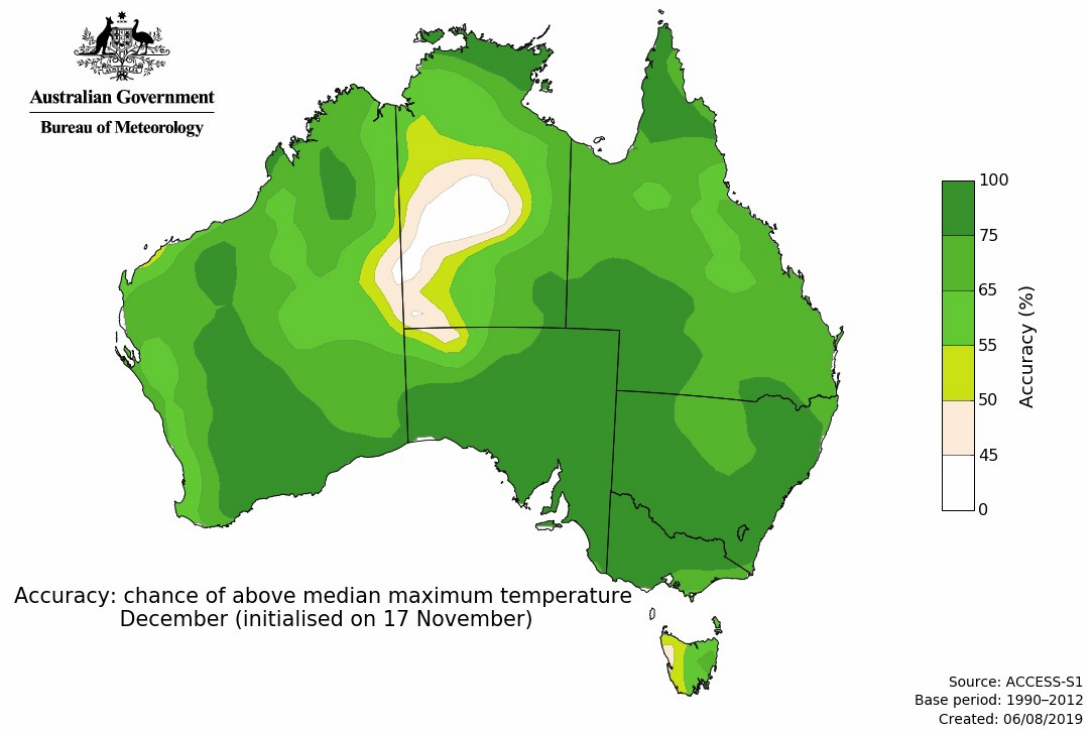
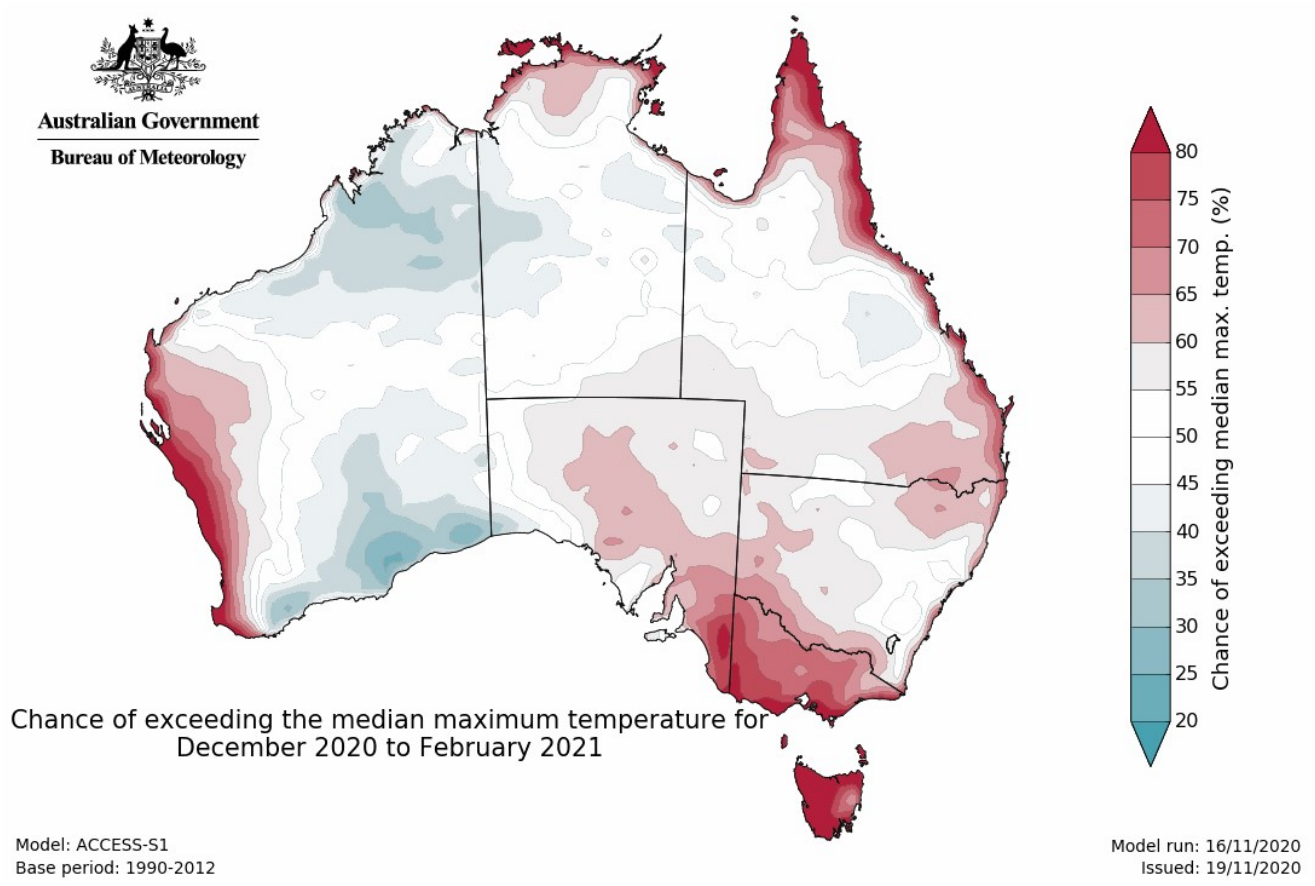


Figure 3: Maximum temperature outlook for Australia in December 2020 (top) and the historical outlook accuracy for the December (bottom).



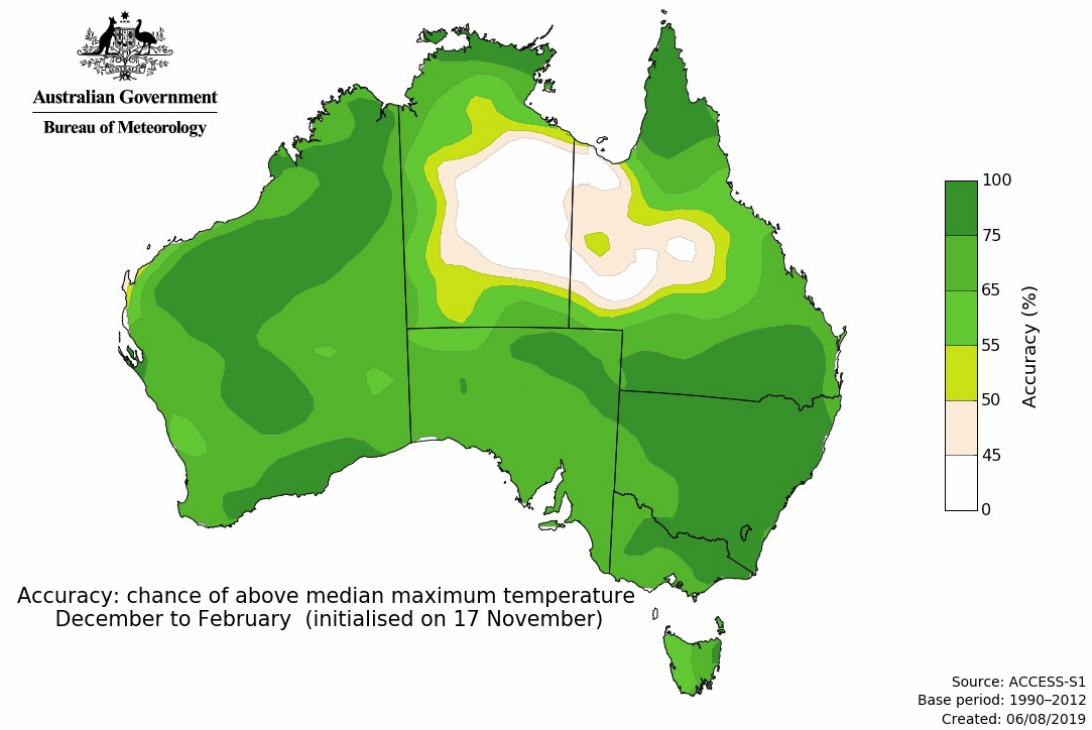


Figure 4: Maximum temperature outlook for Australia December 2020 to February 2021 (top) and the historical outlook accuracy for the December to February period (bottom).

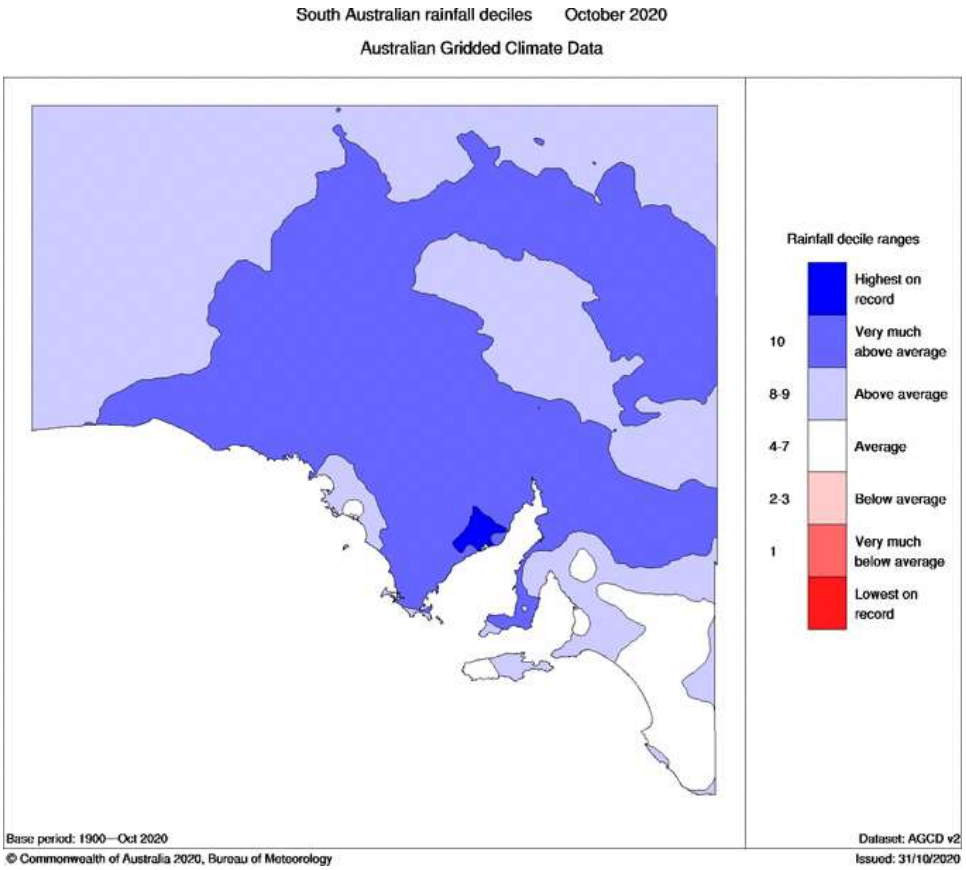
Recent conditions

Following the dry conditions across South Australia during winter, October rainfall was above to very much above average in the north and west and close to average across the southeast. October rainfall across South Australia was the ninth wettest on record, and many locations observed highest October daily rainfall records. More information on past conditions across South Australia during October can be found at http://www.bom.gov.au/climate/current/month/sa/archive/202010.summary.shtml. This has resulted in January to October rainfall close to average over most of South Australia (Figure 5).

So far (to the 24th) November 2020 has been relatively dry with below average rainfall throughout, and less than 10 mm recorded in many areas (Figure 6). Further information and maps of recent and past rainfall can be found at http://www.bom.gov.au/climate/.

Soil moisture increased in many areas due to the above average October rainfall, with soil moisture becoming above to very much above average, particularly in the north and west. However, following the dry conditions so far in November soil moisture has now reduced, and is now near average and even below average in some areas across southern South Australia (Figure 7). Soil moisture observations can be analysed in more detail at http://www.bom.gov.au/water/landscape/

The final week of November will be mainly dominated by very hot and dry conditions. Maximum and minimum temperatures are forecast to be well above average, particularly inland away from the coast, leading to a severe heatwave (Figure 8). No significant rainfall is expected for the remainder of this week (Figure 9), but a change moving over the state during the weekend may lead to showers and thunderstorms across most regions during Monday and Tuesday next week. Latest forecasts and warnings for South Australia can be found at http://www.bom.gov.au/sa/forecasts/index.shtml and at http://www.bom.gov.au/australia/meteye/



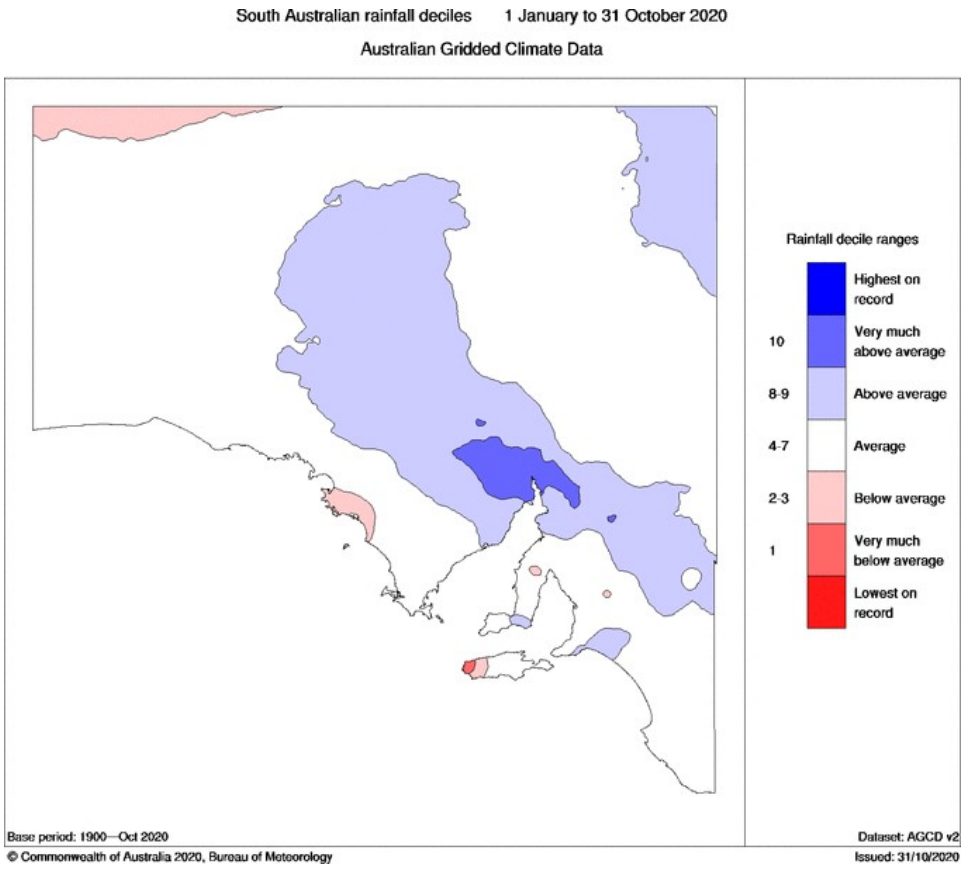


Figure 5: Rainfall deciles for October 2020 (top) and January-October 2020 (bottom).

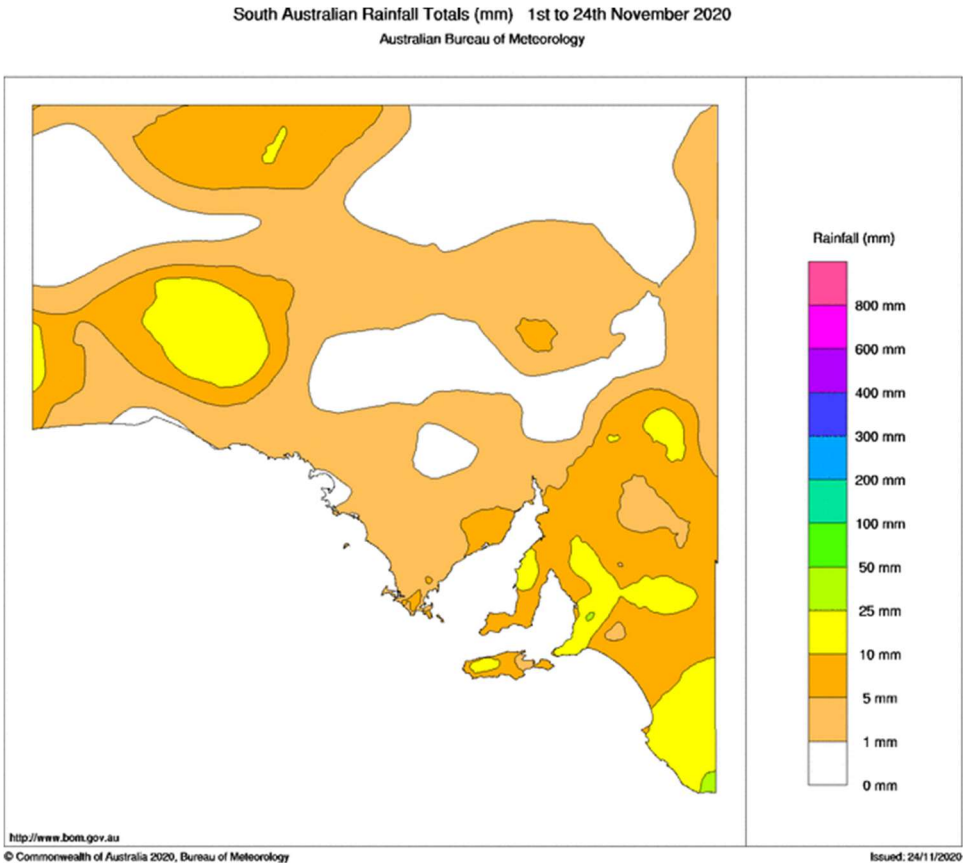


Figure 6: Observed rainfall for 1st to 24th November 2020.

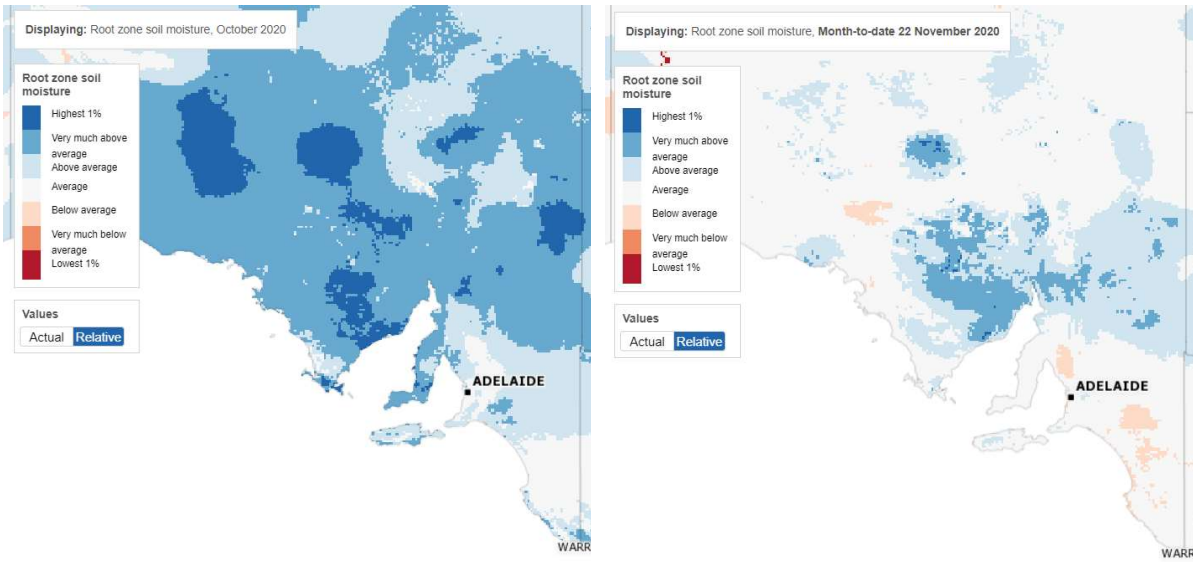


Figure 7: Relative root zone soil moisture across South Australia for October 2020 (left) and November 2020 up to the 22nd (right).

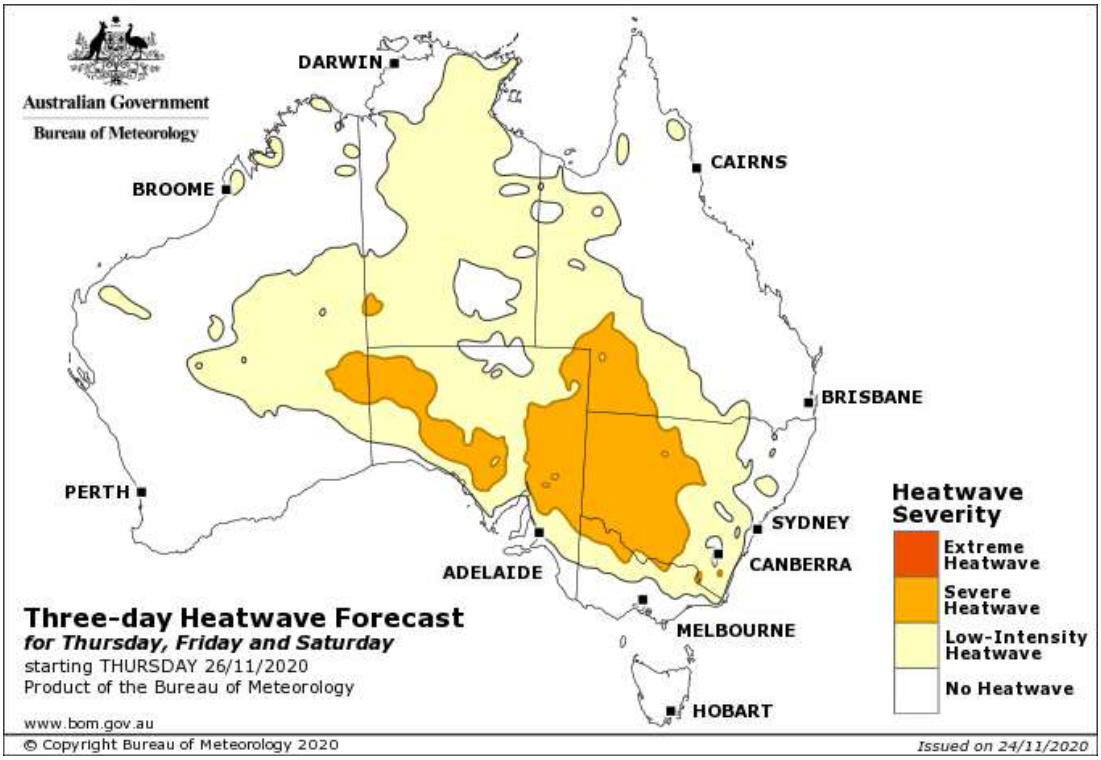


Figure 8: Heatwave forecast for the three days starting Thursday 26/11/2020 (issued Tuesday 24/11/2020).

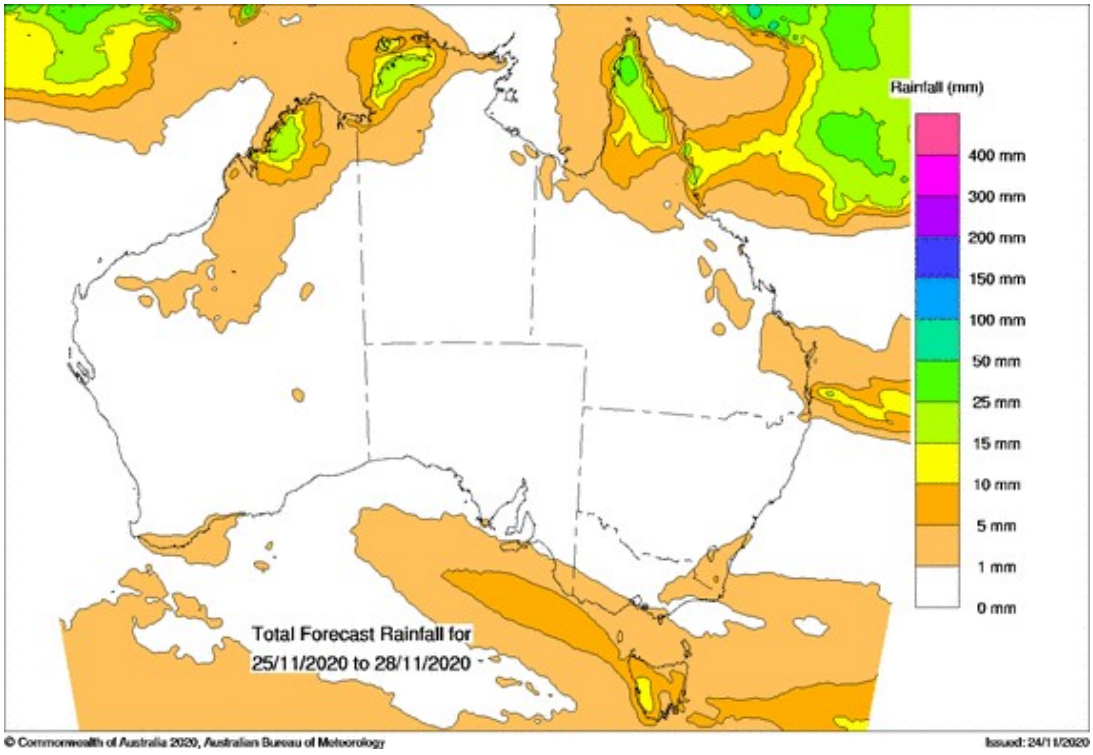


Figure 9: Forecast rainfall over Australia until November 28th.

Climate Drivers

La Niña is active in the tropical Pacific Ocean and will be the main climate driver influencing Australia's weather over the coming months, contributing to the outlook for above average rainfall. La Niña is predicted to reach peak intensity during December and continue until at least February or March 2021. While some predictions indicate the current La Niña could reach a similar strength to the La Niña of 2010-12, conditions are currently weaker than at the same point in 2010, which means that widespread flooding that was observed during that event is less likely this summer. La Niña typically increases the chances of above average rainfall over eastern Australia during summer, but the influence over South Australia can be variable.

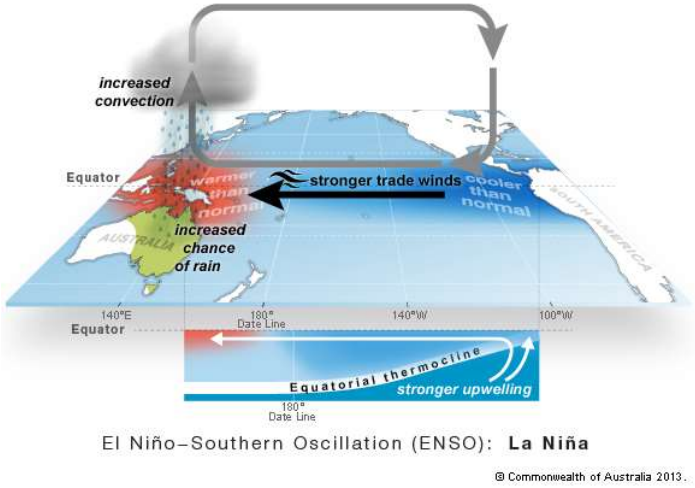


Figure 10: The La Nina phase of the El Nino Southern Oscillation (ENSO).

The **Southern Annular Mode** (SAM) is currently neutral but predicted to become positive during December. A positive SAM during summer results in the subtropical high-pressure ridge moving further south than normal, expanding the area that can receive tropical moisture and increasing the chances of above average rainfall over southeast Australia. The **Indian Ocean Dipole** (IOD) is currently neutral and is expected to remain neutral throughout summer. Further information about the current climate drivers and their impacts upon likely rainfall can be found at http://www.bom.gov.au/climate/enso/

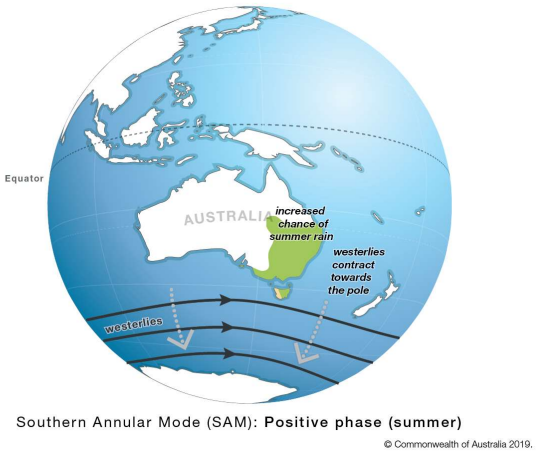


Figure 11: The summer positive phase of Southern Annular Mode (SAM).