

Australian Seasonal Climate Update

Spring 2024





Australian Spring 2024 Climate Outlook

- July's sudden stratospheric warming event led to damaging windstorm events in southeastern Australia.
- It's been a warm winter with the national winter temperature record set for Australia (41.6°C) – and the warmest August on record.
- ENSO is presently neutral, with a chance of La Niña developing in late spring or summer.
- The forecast is for a drier than average spring in Western Australia, wetter than average in Eastern Australia.
- There is the possibility of elevated severe thunderstorm activity through spring.

Winter 2024 Observations

The 2024 winter has tended closer to average in most parts of Australia for rainfall, but has been close to record levels for temperature.

The past year for the southern and western parts of Australia has been well above the long-term average for temperature (see Figure 1), with areas of record average maximum temperatures across much of Western Australia, Queensland, Northern Territory, and New South Wales. Yampi Sound in the Kimberly region, in Western Australia broke the winter temperature record with 41.6°C. Averaged across Australia, we saw the hottest August on record, and the second-hottest winter on record, behind only 2023. These observations are consistent with the recent long run of record global heat, with an unprecedented 15 consecutive months of record global average temperatures to August 2024, fuelled by climate change.¹ Globally, this has also been paired with 14 consecutive months of record atmospheric moisture (precipitable water) since July 2023. While the 12 months to August have seen low rainfall totals in southwest Western Australia, west of Melbourne and in Tasmania (Figure 2), these regions have seen some notable rain since late July. Bunbury in Western Australia saw its wettest winter on record (641.6mm), ameliorating the previously exceptionally dry conditions. However, parts of South Australia, southwest Victoria and western Tasmania had their driest 12 months to the end of winter on record (Figure 2).

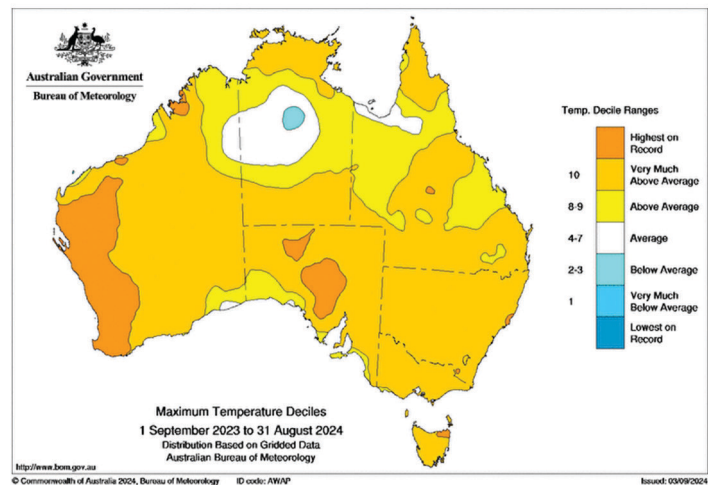


Figure 1: Maximum temperature deciles across Australia from September 2023 to August 2024, with 1 being very much below-average temperature and 10 being very much above-average temperature.² Base period 1900–August 2024.

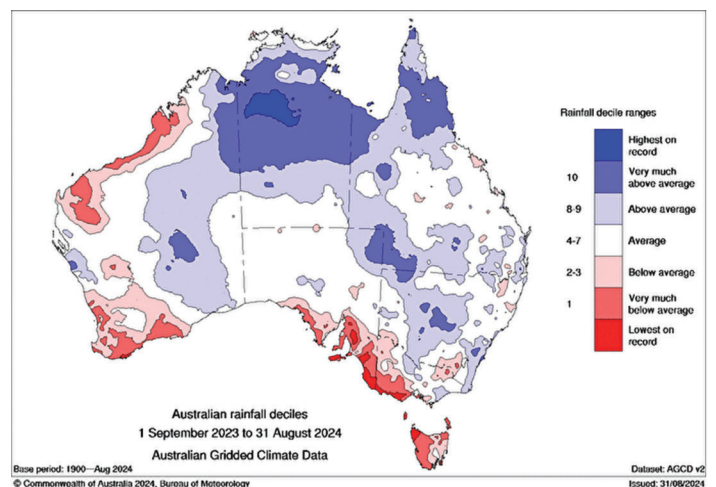


Figure 2: Total 12 monthly rainfall deciles across Australia from September 2023 to August 2024, with 1 being very much below-average rainfall and 10 being very much above-average rainfall.³ Base period 1900–August 2024.

Climate Drivers

The Southern Annular Mode and a rare “Sudden Stratospheric Warming” Event

A rare meteorological event occurred in July: a “sudden stratospheric warming” (SSW). It was a disruption of the stratospheric polar vortex, (high altitude winds around Antarctica) and it raised the temperature at higher altitudes over Antarctica by up to 50°C. This affected winter weather patterns across the Southern Hemisphere, and has since been propagating to lower altitudes and latitudes through late July and August, affecting Australia’s weather. The main impact of such events on Australia is that they favour an expansion of the mid-latitude westerlies toward the equator, bringing rain-bearing frontal systems and cooler air further north than usual.

The Southern Annular Mode (SAM) measures how far north or south the westerlies and their associated fronts are — it turned strongly negative from mid-July to mid-August, but has since returned to a neutral phase.

SSW events are extremely rare in the Southern Hemisphere, with this latest one being only the third within the 60-year record (they are much more common in northern polar regions). They have also all occurred since 2000⁵; a weaker partial event happened in 2019 and was likely one contributing factor in the early phases of the Black Summer bushfires.

2024’s remarkable SSW event helped to bring some rain to previously drier parts of Western Australia, Victoria, and Tasmania.

The strongest spell of westerlies across the mainland of the continent began during the second half of August and continued into early September, with damaging winds impacting Tasmania, Victoria, and New South Wales.

This windy phase of weather brought the first emergency bushfire warning in New South Wales of the season (near Liverpool, southwest Sydney) and many callouts for state emergency services for fallen trees and damage to building, including at least one fatality in Victoria. Gusts of wind in excess of 100km/h were recorded in the Illawarra (south of Sydney), Victoria, and Tasmania on the 28th of August. Gusts up to 156km/h have left over 100,000 people without electricity in Tasmania and Victoria,⁷ particularly during the passage of cold fronts embedded in the strong westerlies. There were significant floods on the Derwent River northwest of Hobart at the start of September.

While the SAM is a globally recorded index and was overall neutral by late August, it is perhaps unsurprising that Australia experienced a period of strong westerlies akin to this pattern in the weeks after the SSW event, as the SSW’s effects flowed through Southern Hemisphere weather systems. It is likely that the impacts of this event have now decayed, and the SAM index is expected to be broadly neutral in coming weeks.



Figure 3: Melbourne café affected by strong winds, 2nd of September 2024 (ABC).⁶



Figure 4: Storm damage in Melbourne, 2nd of September 2024 (ABC).⁷

El Niño Southern Oscillation (ENSO) – Neutral, Chance of La Niña?

Winter 2024 saw a transition as expected to neutral ENSO conditions. There remains much uncertainty as to whether another La Niña event will develop in the Pacific Ocean in late 2024, to make the fourth La Niña event in five years. Presently, the Bureau of Meteorology (BoM) favours neutral conditions but is leaning in the direction of La Nina (Figure 5). The Climate Prediction Center in the USA is favoring development of a weak La Niña in its most recent forecast (71% chance). In the BoM aggregation of forecasts, the NOAA model and three others of the seven surveyed favour La Niña conditions developing by November. It seems certain that El Niño will not return in the 2024–2025 summer.

La Niña is characterised by warmer oceans off the coast of Eastern Australia and a higher chance of significant rain events across Eastern Australia. With ocean temperatures globally exceptionally warm, there is likely to be moisture fuel for rain events, should weather conditions tap into this heat.

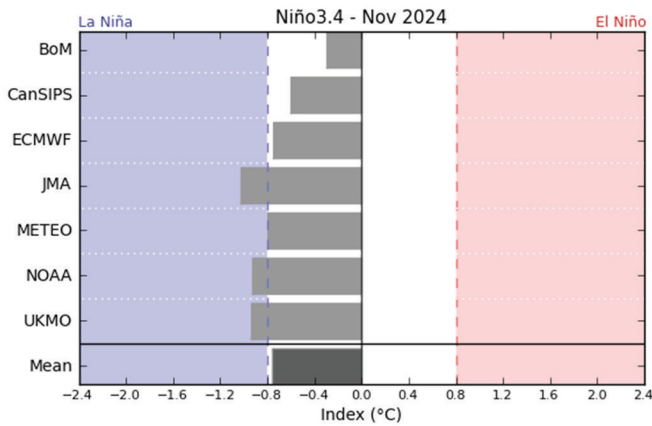
A fourth La Niña in five years, interspersed with what was a relatively “wet El Niño” for Eastern Australia could be notable for elevated flood risk, even after an initial period of drying occurring through 2024 (which has had much more moderate/modest rainfall). However, the uncertainty in the forecast, and the likelihood that any La Niña that develops will be weak may moderate the chances of rain events on the scale of some recent years.

Indian Ocean Dipole

The Indian Ocean Dipole (IOD) tracks the difference in sea surface temperatures between the eastern (off Western Australia) and western tropical Indian Ocean, influencing atmospheric moisture toward or away from Australia.

IOD values have remained neutral since April this year and are forecast to continue neutral through to the end of spring.

In its neutral phase, the IOD has minimal influence on Australia’s climate. The sea surface temperature anomalies off the coast of Western Australia have been up to 2°C warmer than average off the northern Western Australia coast and up to 3°C warmer off the southwest Western Australia coast for the past 12 months.



© Copyright Australian Bureau of Meteorology

Figure 5: ENSO probabilities, November 2024. Red indicates El Niño phase, blue indicates La Niña phase and grey is neutral.⁸

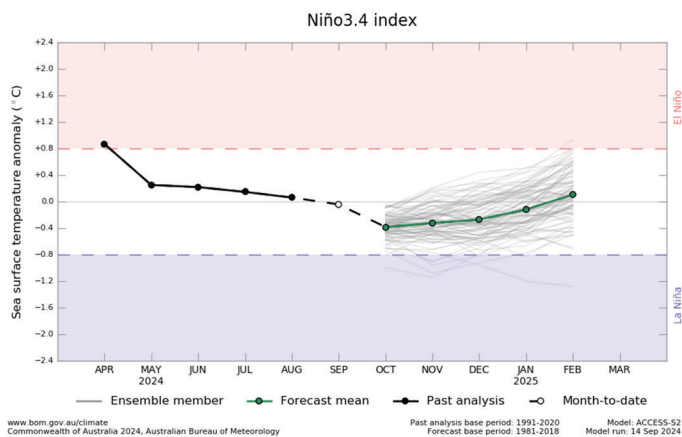


Figure 6: Forecast Niño 3.4 index. Red indicates El Niño phase, blue indicates La Niña phase, and gray is neutral.⁸

Spring 2024 Outlook

Outlook Temperature & Rainfall Forecast

Higher than usual temperature maxima and minima are strongly forecast across Australia for the spring period (Figure 7): it is at least three times more likely than normal for Australia to experience unusually high maximum and minimum temperatures.

With weather patterns tending in the direction of La Niña, rainfall is expected to be above average for most of Northern and Eastern Australia during spring. In Tasmania and Western Australia, rainfall is likely to be within typical seasonal ranges.

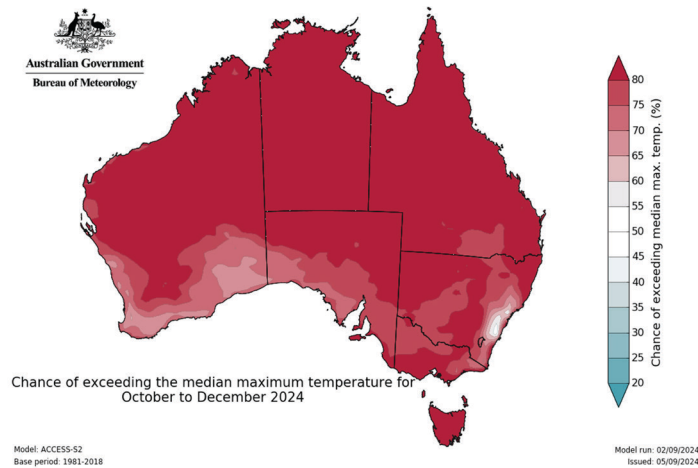


Figure 7: Chance of exceeding median maximum temperature for October to December 2024; red indicates high likelihood of above average temperature.⁹ Base period 1981–2018.

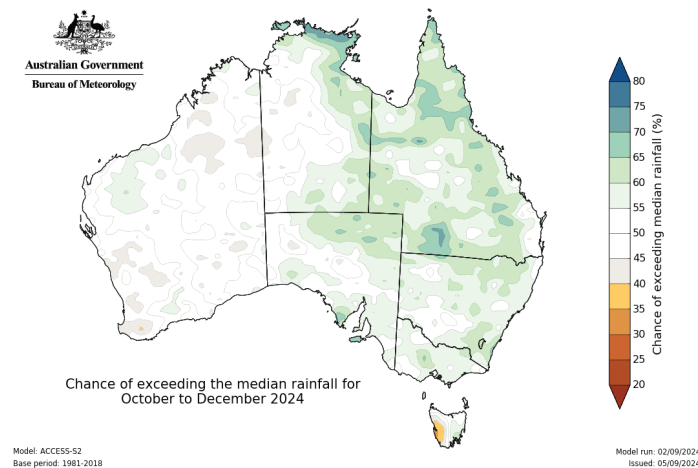


Figure 8: Chance of exceeding median rainfall for October to December 2024. Green to blue indicates above-average temperature.¹⁰ Base period 1981–2018.

Bushfire

The Australian and New Zealand National Council (AFAC) recently released their spring bushfire risk outlook (Figure 9), indicating elevated bushfire risk over large parts of the Northern Territory and northern and southeast Queensland, southwest Victoria and southeast of South Australia.

The high fire danger in the Northern Territory and northern Queensland is driven by the unseasonal rainfall leading to growth of excess vegetation, elevating their fuel load availability.

In southeastern Queensland, the winter frost and dry winds have created dry grasslands, elevating the fire danger levels across the central region.

In Victoria and South Australia, autumn and winter rainfall has been sparse, with low soil moisture conditions leading to a higher available fuel load. Temperature forecasts in this region are warmer than average, further exacerbating the drying conditions. Fire authorities in both states have indicated that the upcoming fire season may begin earlier than normal in areas dominated by drier forests and woodlands.

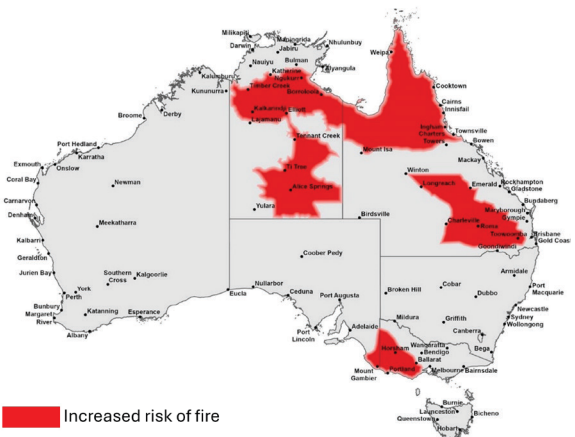


Figure 5: Australian and New Zealand National Council bushfire risk map for spring 2024.⁷

Storms and Flooding

As we enter the spring season for severe thunderstorms in Eastern Australia, the forecast of a warmer atmosphere and higher moisture levels might be expected to lead to an increase in thunderstorm activity. In their spring storm briefing for the New South Wales State Emergency Service, the BoM has indicated that they are anticipating a busy severe thunderstorm season.¹² There may be an elevated chance of some severe storm impacts, such as giant hail, flash flooding, or gusty winds.

These kinds of thunderstorm-related events are different from the late winter frontal systems that caused widespread wind damage at the end of August and the start of September; however, many of the damaging impacts and the need for community preparedness is similar.

A further La Niña event would extend an unusual run of wetter years in Eastern Australia, and there may be an increased chance of flooding events from major rain-bearing weather systems where the ground and river catchments have not dried substantially. Flood impacts from La Niña events typically cause larger losses than losses during El Niño events.

The tropical cyclone season does not typically start until December in Australia, and so we will continue to monitor the development of La Niña and other tropical drivers ahead of the 2024–2025 season in our next update.

Gallagher Re's Analytics

Gallagher Re can help you with valuable analytic insights to enhance your business, before, during, and after an event. If you require specific analysis for your portfolio, please reach out to your Gallagher Re client advocate or the individuals listed on the final page.



References

- ¹Masters,Jeff, and Bob Henson. "Earth has its hottest August and hottest June-August on record." *Yale Climate Connections*, 12 Sept. 2024.
- ²"Monthly maximum temperature decile for Australia." *Australian Bureau of Meteorology*.
- ³"Recent and historical rainfall maps." *Australian Bureau of Meteorology*.
- ⁴Saunders, Tom. "Record 50C temperature increase over Antarctica to shift Australia's weather patterns." *ABC NEWS*, 26 Jul 2024.
- ⁵Jucker, Martin. "Antarctic heat, wild Australian winter: what's happening to the weather and what it means for the rest of the year." *University of New South Wales*, 5 Aug 2024.
- ⁶Brown, Melissa, "Tens of thousands of homes without power as wild weather eases across Victoria." *ABC NEWS*, 1 Sept 2024.
- ⁷"Storms and wet weather over Tasmania may take until next week to shift, BOM says." *ABC NEWS*, 27 Aug 2024.
- ⁸"Warnings current." *Bureau of Meteorology*.
- ⁹"Climate outlooks—weeks, months and seasons." *Bureau of Meteorology*.
- ¹⁰"Climate outlooks—weeks, months and seasons." *Bureau of Meteorology*
- ¹¹"Seasonal Bushfire Outlook." *AFAC*.
- ¹²"Warm, wet spring could bring severe storms to Australia's south-east." *Support the Guardian*.

Learn more about our client-focused, collaborative approach.
Connect with us today at **GallagherRe.com**.

How can we help?

To find out more, please contact your local associate.

Krystelle Ho

Catastrophe Risk Analyst
Analytics and Insights

Level 36, 60 Margaret Street
Sydney, NSW 2000

+61 4 0382 8113
krystelle_ho@GallagherRe.com

Dr. Andy Casely

Senior Catastrophe Risk Analyst
Analytics and Insights

Level 36, 60 Margaret Street
Sydney, NSW 2000

+61 4 5895 9995
andy_casely@GallagherRe.com

Dr. Valentina Koschatzky

Senior Research Analyst
Analytics and Insights

Level 36, 60 Margaret Street
Sydney, NSW 2000

+61 4 0310 8297
valentina_koschatzky@GallagherRe.com

It's the way we do it.



© Copyright 2024 Arthur J. Gallagher & Co. and subsidiaries. All rights reserved: No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, whether electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of Arthur J. Gallagher & Co. Gallagher Re is a business unit that includes a number of subsidiaries and affiliates of Arthur J. Gallagher & Co. which are engaged in the reinsurance intermediary and advisory business. All references to Gallagher Re below, to the extent relevant, include the parent and applicable affiliate companies of Gallagher Re. Nothing herein constitutes or should be construed as constituting legal or any other form of professional advice. This document is for general information only, is not intended to be relied upon, and action based on or in connection with anything contained herein should not be taken without first obtaining specific advice from a suitably qualified professional. The provision of any services by Gallagher Re will be subject to the agreement of contractual terms and conditions acceptable to all parties. Gallagher Re is a trading name of Arthur J. Gallagher (UK) Limited, which is authorised and regulated by the Financial Conduct Authority. Registered Office: The Walbrook Building, 25 Walbrook, London EC4N 8AW. Registered in England and Wales. Company Number: 1193013. www.ajg.com/uk.

GREGLOB102032