

Australian Actuaries Climate Index: mild summer a stark contrast to an extreme spring

29 April 2021

- The Australian Actuaries Climate Index saw a mild summer with moderate temperatures and unusually low levels of wind.
- Australia experienced the first below reference-period average extreme high temperature since 2012; however, the low temperature index indicated ongoing warming.
- Extreme wind gusts have been significantly lower, with new low records being set in several parts of the country.
- La Niña brought more rainfall than usual, but no new records were set for extreme rainfall this summer; the extreme precipitation that led to flooding in eastern Australia occurred after the close of the period.

Australia has experienced a much milder summer this year, with the overall index showing the lowest value since the summer of 2016. Despite this, rising temperatures and the management of major weather events remain high on the agenda.

This lull was most prominent in extreme high temperature, with the country as a whole having the first below reference-period average extreme high temperature value since 2012, as seen in Figure 1. This aligns with the Bureau of Meteorology stating that Australia has experienced below average maximum temperatures in the summer of 2020/21¹. It comes after several consecutive summers of extreme weather, where high temperatures in particular reached new records and contributed to significant damage from bushfires. The reduction in the frequency of extreme high temperatures was primarily seen in the southern parts of the country, including the clusters containing the cities of Sydney, Melbourne, Canberra, Adelaide, and Perth.

Meanwhile, the low temperature index continues to exhibit an increasing trend, with only one of the last 35 seasons showing a negative value for Australia as a whole. This represents an increase in the lowest 1% of minimum temperature, or a warming of the coldest temperatures observed in a given season. Southern Slopes Victoria, which includes Melbourne, reached a new record on the extreme low temperature index this summer. While this may be experienced as benign or even pleasant weather and does not result in immediate damage, it indicates that the climate in Australia continues to warm.

"The results from this season show us that even in the absence of extreme weather, the index provides valuable insight, such as the low temperature index showing continuing warming despite apparently mild conditions," commented Actuaries Institute President Jefferson Gibbs.

Extreme wind gusts were the third lowest on record for Australia as a whole, as seen in Figure 2. The Murray Basin and South and South Western Flatlands (East) clusters, which cover parts of SA, Vic and NSW, experienced the lowest extreme wind gusts index value ever. This may be related to a global trend towards decreased wind speeds, known as global terrestrial stilling. This is thought to be due to changes in large scale atmospheric circulation and in increase in surface roughness. In the long term it may affect wind power generation, while possibly reducing the risk of wind damage to property.

¹ <http://www.bom.gov.au/climate/current/season/aus/summary.shtml>



The ENSO (El Niño–Southern Oscillation) weather pattern remained in a La Niña phase throughout the summer of 2020/21, contributing to a higher level of rainfall across much of the country². The Bureau of Meteorology notes that the summer of 2020/21 was the wettest since 2016/17³. This is reflected in an above reference-period average index for seven of the 12 clusters across the country. No new records were set in the months of December to February, indicating that while rain was consistently above average, extreme rainfall was less frequent than seen in previous seasons. The period covered by the index closed before the extreme precipitation event in eastern Australia in March, which will be included in the next release of the AACI.

Elayne Grace, Actuaries Institute CEO, said “the AACI is a great example of how actuaries can analyse extensive data sets to present evidence-based insights about important policy issues”.

The Australian Actuaries Climate Index is updated every quarter. It shows changes in the frequency, or rate of occurrence, of extreme high and low temperatures, heavy precipitation, dry days, strong winds and changes in sea levels across 12 regions that are climatically similar.

It is calculated by Finity Consulting for the Actuaries Institute at the end of each season, following the release of data from the Bureau of Meteorology.

Each season is compared to the same season in previous years and against a reference period of 1981-2010.

Footnote: References to temperatures, dryness etc. are based on the data underlying the AACI, which tracks changes in the frequency of extreme high and low temperatures, heavy precipitation, dry days, strong wind and changes in sea level, mainly concentrating on the 99th percentile of observations.

A link to the [AACI](#) is here.

Rade Musulin, Convenor of the Actuaries Institute Climate Change Working Group and Principal at Finity Consulting, is available for comment.

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About the Actuaries Institute

As the sole professional body for Members in Australia and overseas, the Actuaries Institute represents the interests of the profession to government, business and the community. Actuaries assess risks through long-term analyses, modelling and scenario planning across a wide range of business problems. This unrivalled expertise enables the profession to comment on a range of business-related issues including enterprise risk management and prudential regulation, retirement income policy, finance and investment, general insurance, life insurance and health financing.

² <http://www.bom.gov.au/climate/enso/soi/>

³ <http://www.bom.gov.au/climate/current/season/aus/summary.shtml>



Figure 1 – Australian Actuaries Climate Index: Extreme High Temperature Index

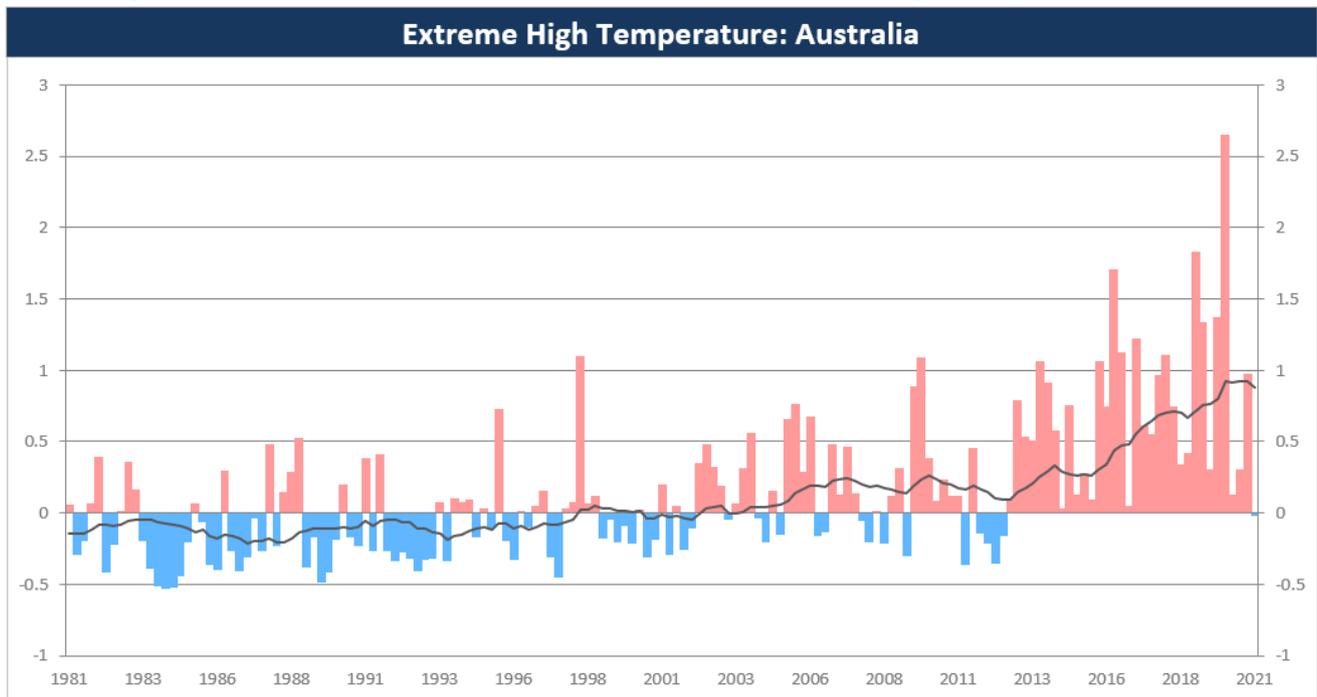
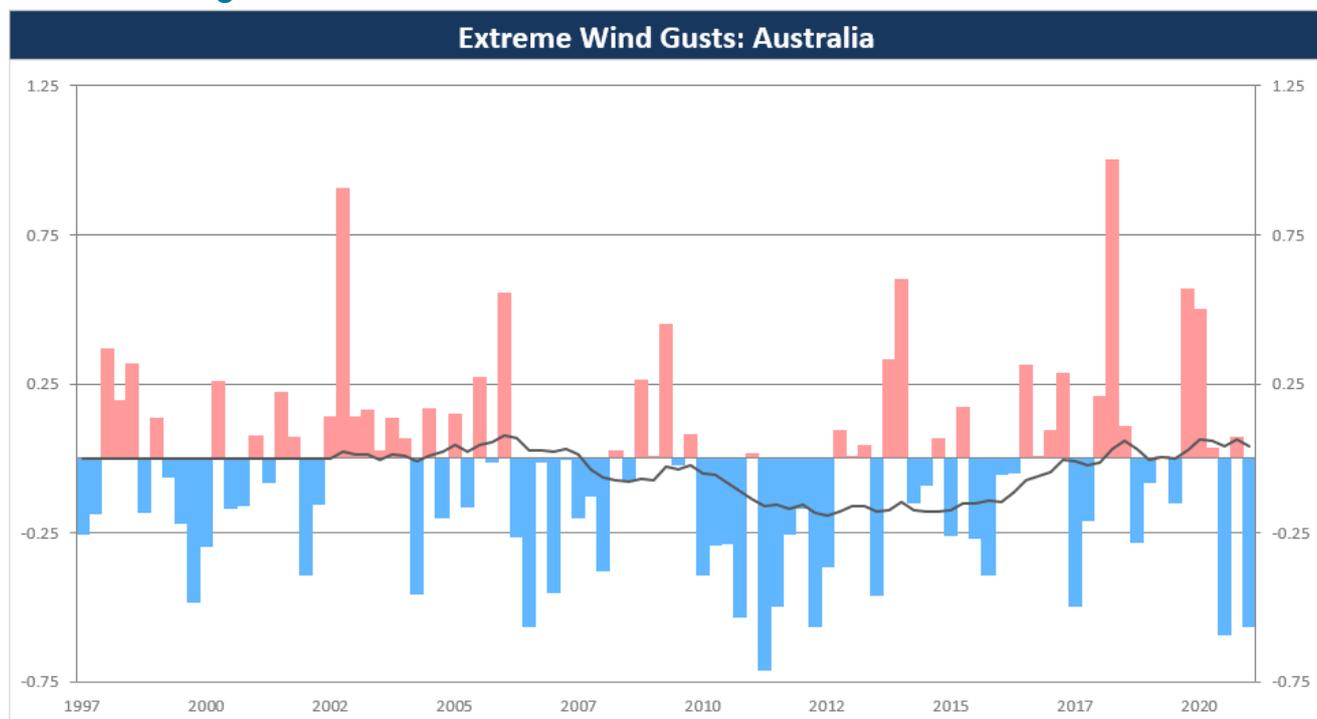


Figure 2 – Australian Actuaries Climate Index: Extreme Wind Index



Notes to charts: Red bars indicate a reading which is above the reference period average and blue bars indicate a reading which is below the reference period average. The black line shows the five-year moving average and provides a robust measure of how the index and weather extremes are trending over the longer term. Further details on calculation and interpretation are available in the Design Documentation [here](#).