

## Australian Actuaries Climate Index: high volumes of rain and unusually high temperatures marked Spring as season of extremes

21 February 2022

- **Above average rainfall in Spring.**
- **Minimum temperatures were below Climate Index reference period.**
- **Northern Queensland records second highest extreme temperature value.**

Australia experienced above average rainfall in the Spring of 2021, with the Bureau of Meteorology (BoM) flagging it as the wettest Spring since 2010<sup>1</sup>. This was reflected in the extreme rainfall component of the Australian Actuaries Climate Index, which was above reference period averages for all regions nationally (as shown in Figure 1).

High volumes of rainfall marked November, which was the wettest November in 122 years nationally<sup>2</sup>, according to the BoM. Parts of NSW and QLD suffered flooding. Some residents were evacuated after areas experienced up to 40mm of rain in 30 minutes<sup>3</sup>. Greater Sydney dams collected almost four times as much water as in November of 2020<sup>4</sup>.

The high level of rain towards the end of the season was likely influenced by the El Niño-Southern Oscillation (ENSO) weather system entering a La Niña phase on November 10<sup>5</sup>. This leads to wetter than usual weather for eastern, northern and central parts of Australia, said Rade Musulin, Convenor of the Actuaries Institute's Climate Risk Working Group and lead researcher on the Index.

Despite these events, no records were set for the extreme rainfall index. This is in part because the index measures the frequency of extreme weather, from September to November, while many other metrics focus on averages.

The Australian Actuaries Climate Index, which was launched in November 2018, is an objective measure of extreme weather conditions and changes to sea levels.

"The Index is an example of actuaries using complex data sets to provide insights on an important social issue," said Actuaries Institute President, Annette King. "It uses a large range of data to help map extremes, helping businesses, communities and individuals get a better idea of risks," she said.

The Index is updated quarterly. It shows changes in the frequency of extreme high and low temperatures, heavy precipitation, dry days, strong winds and changes in sea levels across 12 Australian regions that are climatically similar. Each season is compared to the same season in previous years, and against a reference period from 1981-2010.

In Spring, the extreme low temperature index for Australia was the lowest it has been since 2011, indicating that minimum temperatures were lower than the reference period, as shown in Figure 2. This was driven by the Rangelands (South) and the South and South Western Flatlands (East) regions, which cover much of south and south western parts of Australia. The BoM recorded lower than average minimum temperatures for parts of southern and central Australia<sup>6</sup>.

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

<sup>2</sup> [http://www.bom.gov.au/clim\\_data/IDCKGC1AR0/202111.summary.shtml](http://www.bom.gov.au/clim_data/IDCKGC1AR0/202111.summary.shtml)

<sup>3</sup> <https://www.theguardian.com/australia-news/2021/nov/11/warnings-of-life-threatening-flooding-in-queensland-and-nsw-after-deluges-trigger-emergency-rescues>

<sup>4</sup> [https://www.watarnsw.com.au/\\_\\_data/assets/pdf\\_file/0019/217027/Greater-Sydney-Monthly-Operations-Report-November-2021.pdf](https://www.watarnsw.com.au/__data/assets/pdf_file/0019/217027/Greater-Sydney-Monthly-Operations-Report-November-2021.pdf)

<sup>5</sup> <http://www.bom.gov.au/climate/enso/outlook/#tabs=ENSO-Outlook-history>

<sup>6</sup> <http://www.bom.gov.au/climate/current/season/aus/summary.shtml>



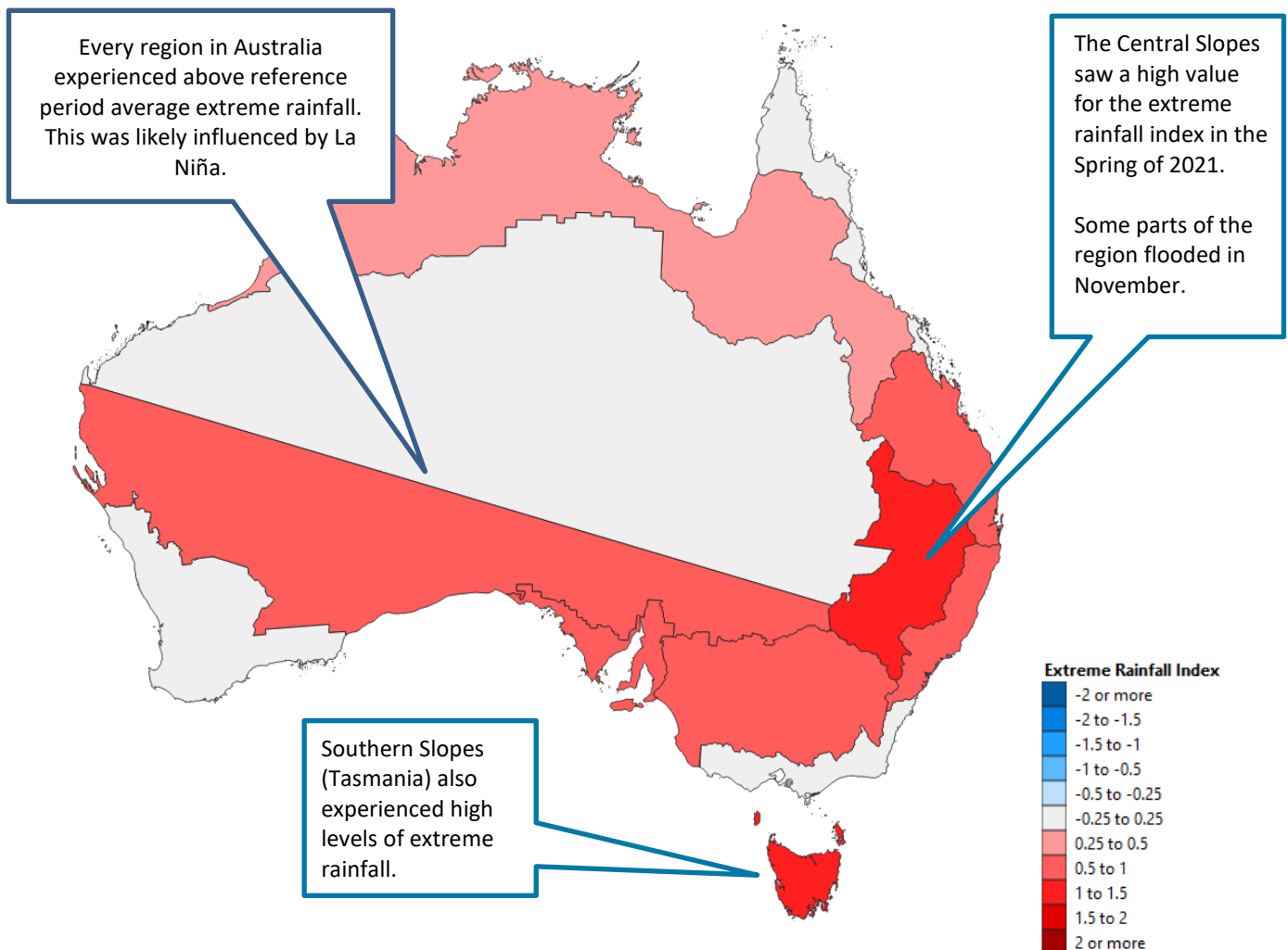
During Spring, unusually high temperatures were recorded across northern Australia. The Wet Tropics region, which covers the most northern parts of Queensland, recorded the second highest index value ever, as shown in Figure 3. The BoM recorded the highest ever mean maximum temperature at Cape York Peninsula<sup>7</sup>.

La Niña will continue through the Summer of 2021/2022, increasing the possibility of above average cyclone activity. It may also decrease the severity of the upcoming bushfire season if it results in wetter and cooler weather.

The Index is calculated at the end of each season by Finity Consulting following the release of data from the BoM.

Footnote: References 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.

**Figure 1: Current Values of the Extreme Rainfall Index**



This map shows the current index values.

<sup>7</sup> <http://www.bom.gov.au/climate/current/season/aus/summary.shtml>  
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Figure 2: Extreme Low Temperature in Australia

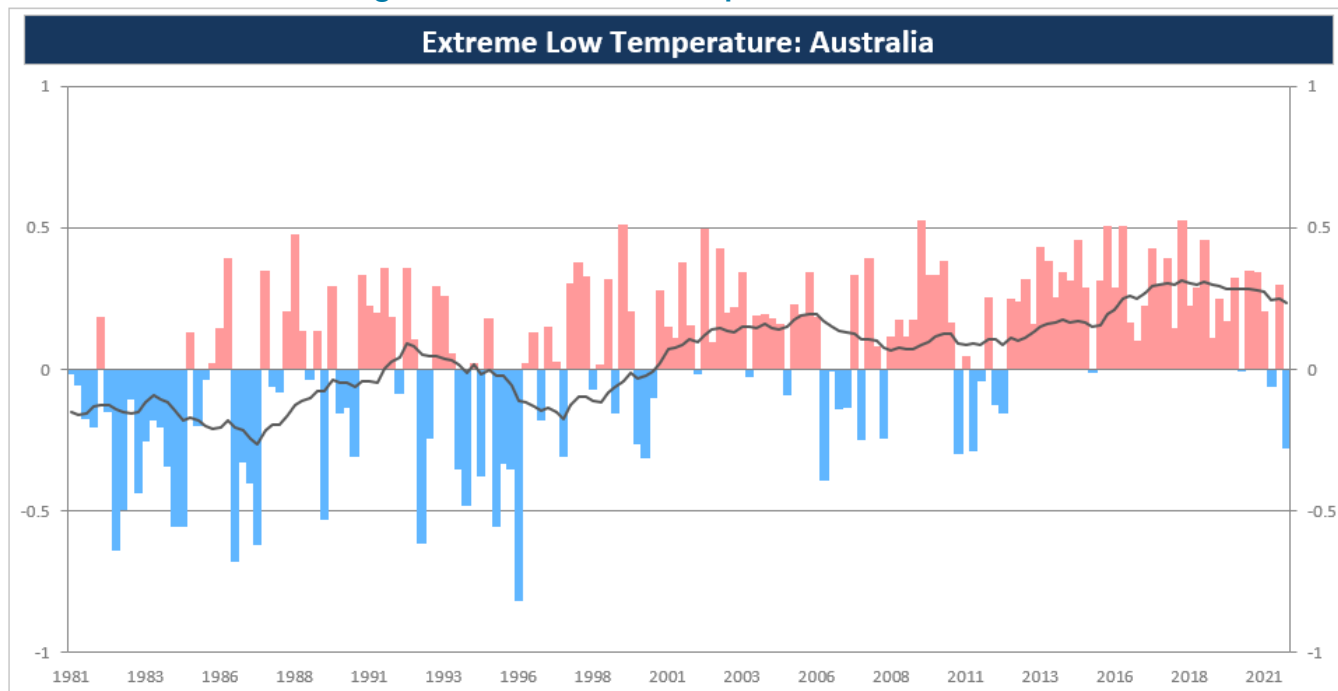
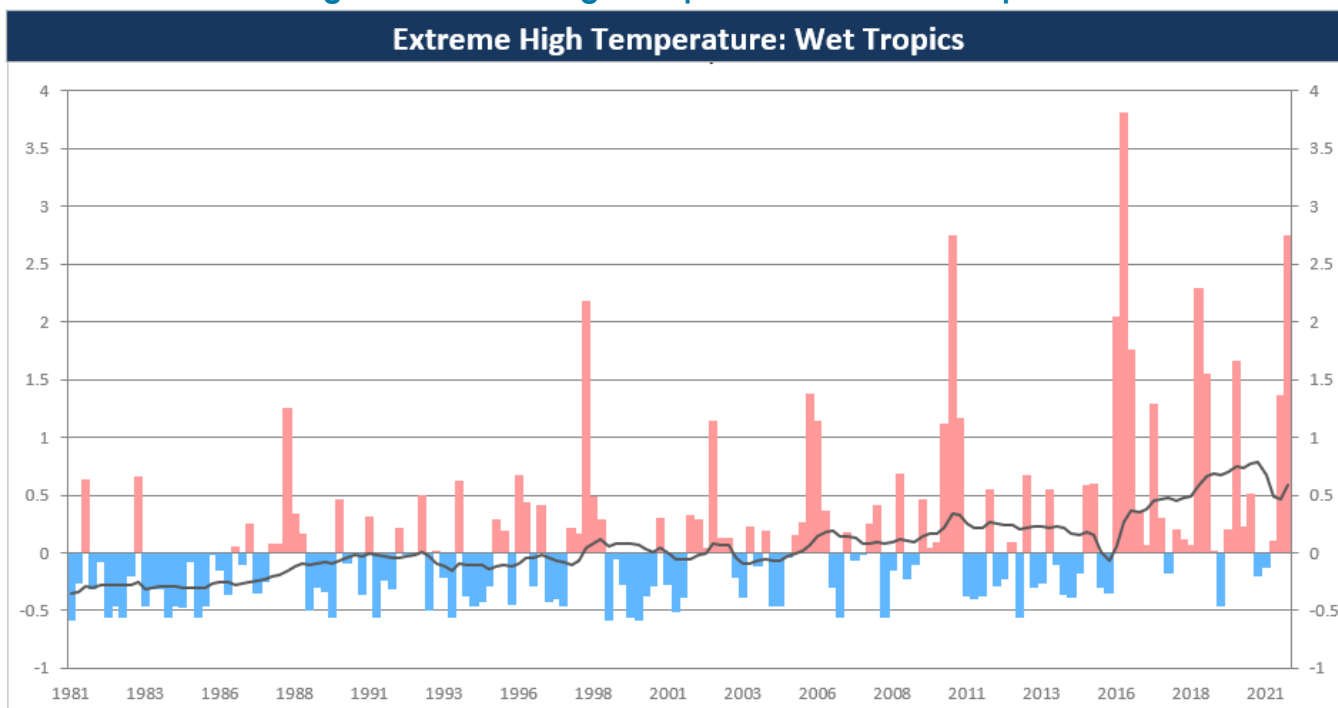


Figure 3: Extreme High Temperature in the Wet Tropics





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

The Actuaries Institute's broad range of papers on climate risk can be found here: [Climate Risk Resource Centre](#).

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

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