Actuaries add sharper climate risk insight, especially sea level rise

In Winter 2025, released with the launch of version 2 of the Australian Actuaries Climate Index (AACI), Southern parts of the Queensland coast and Tasmania saw record high sea level index values for those regions.

Rising sea levels increase the risk of coastal flooding and erosion, especially when combined with storm surge and high tides. Coastal flooding and erosion are often excluded from home buildings insurance policies. These risks highlight a potentially significant protection gap for households, communities, banks and government, and disruption risk to critical infrastructure and services across Australia.

Other insights for Winter 2025 are the ongoing warming of temperatures throughout 24-hour time periods. Both the extreme high and low temperature indices remained positive for the country as a whole, indicating temperatures remain elevated above the historical (reference) period average.

These signals of rising sea levels and warming temperatures are consistent with Australia's first National Climate Risk Assessment, released in September by the Australian Climate Service, and the State of the Climate 2024 report published earlier by the Bureau of Meteorology.

"Over the full time period for which we have data, the Australian Actuaries Climate Index shows clear signals of warming temperatures and rising sea levels. This is an important call that we must start investing more in climate change adaptation," says Rade Musulin, lead collator of the AACI and Principal at Finity Consulting.

"The landmark National Climate Risk Assessment forecast that by 2050 more than 1.5 million Australians could face coastal flooding risk assuming the current projections for climate change and current adaptation efforts," he adds.

A sharper picture of how extreme weather conditions and sea levels are changing around the country is highlighted in a new version of the AACI released today by the Actuaries Institute.

The revised version draws on a significantly stronger data set that was not available at the time the Index was originally launched. The new data set provides improved geographic coverage, is available almost immediately at the end of each season, can support global comparisons and provide additional metrics on how the climate is changing. This will improve the usefulness of the AACI for all users, including policy decision makers, organisations and the public.

A key insight from the revised version is the strong signal of how the risk of sea level rise from climate change has already occurred. The sea level index roughly doubled between v1.0 and v2.0 for Australia as a whole, and some regions saw markedly higher increases, especially on the east coast.

Actuaries Institute CEO, Elayne Grace, notes, "As a data-driven profession looking to provide insights on issues critical for societal wellbeing, the launch of the AACIv2 represents an exciting milestone for the Actuaries Institute and its members. It is also a timely reminder that improving the quality of data is a key enabler of effective mandatory climate disclosures by Australia's largest companies beginning this year."

The Spring 2025 AACI results will be available approximately mid-December, reflecting the improved timeliness of the new version. Subsequent updates will be available every three months.

About the Index

The Index measures the frequency of extreme weather conditions and sea levels across Australia and how these are changing over time. Components cover extreme high and low temperatures, extreme rainfall, consecutive dry days (as an indicator of drought), extreme wind and sea level. The Index was

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first launched in November 2018 by the Actuaries Institute and version 2.0, which includes enhancements not available at the time of the original Index, is released today. The Index is updated four times a year by Finity Consulting for the Actuaries Institute.

The AACI v2.0 incorporates major improvements to data sources and regional definitions. Instead of relying solely on weather station data, the Index now uses reanalysis data. This is a comprehensive, globally recognised, gridded dataset that combines observations from weather stations, satellites and other sources. Reanalysis is widely used in applications ranging from water resource management and renewable energy planning to climate trend analysis and the study of extreme weather events such as tropical cyclones and heatwaves.

This richer dataset delivers improved geographical coverage across Australia. It has enabled the regional boundaries used in the AACI to be refined, giving a more detailed view of climate impacts at the local level. It has also allowed for Wind to be included in the composite index, which was previously excluded due to historical data being incomplete. The Institute will consider the possibility of including additional metrics, such as soil moisture and sea surface temperature, in the future.

Read the article on the AACI v2.0 release and Winter 2025 Index results.

Explore the AACI v2.0 interactive results by weather component and region.

Read how to interpret the AACI v2.0 by reading the sample calculations.

Read the Design Documentation for AACI v2.0.

Rade Musulin is available for interview.

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About the Actuaries Institute and the Profession
As the peak professional body for actuaries in Australia, the Actuaries Institute represents the profession to government, business and the community. Our members work in a wide range of fields including insurance, superannuation and retirement incomes, enterprise risk management, data analytics and AI, climate change and sustainability, and government services.

Actuaries use data for good by harnessing the evidence to navigate into the future and make a positive impact. They think deeply about the issue at hand, whether it's advising on commercial strategy, influencing policy, or designing new products. Actuaries are adept at balancing interests of stakeholders, clients and communities. They're called upon to give insight on complex problems and they'll look at the full picture. Actuaries analyse the data and model scenarios to form robust and outcome-centred advice.

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