CANUTE

THE SEA LEVEL CALCULATOR

Climate Systems

National Environmental Science Program
Oceans and coasts

Communicating extreme sea level estimates through Canute

Our coastal environments and oceans are changing as a result of climate change. To adapt to future change there is an increasing need to understand the connection between climate-driven ocean variability, observed changes and projected marine and coastal impacts. Events that are currently considered rare will become more frequent as sea levels rise.

Canute is an online, open access, sea-level calculator. It provides estimates of the likelihood of extreme sea levels. Canute takes into account sea-level rise and the effects of tides, storm surges and ocean waves, also known as 'wave setup'. It ingests data from the tide gauge network, providing a direct observational analysis of extreme sea levels, and national coastal models to provide extreme sea level estimates at virtual gauges every 5 km along Australia's coast.

Access to this easily consumable information on sea-level change and coastal extremes can support the management of infrastructure to ecosystems. Tools such as Canute have a critical role to play in educating and supporting management of future changes to our coastal environment.

What's available in the latest version of Canute?

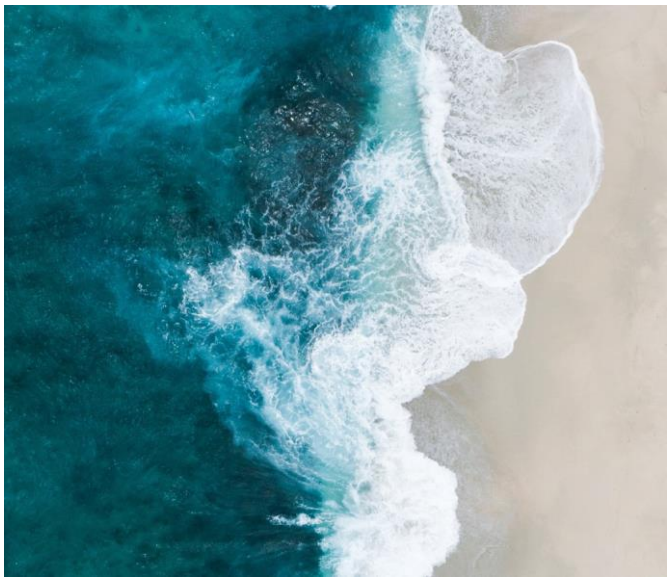
Canute 3 provides a map interface to choose from locations around Australia's whole coastline. Users can explore over 12,000 model output virtual gauge points to answer questions like:

- What will the future sea-level be under different future scenarios?
- How high is a current one in 100-year storm tide water level, and what will it be with future sea-level rise?
- What is the additional impact that waves contribute to water levels at beaches?
- Will extreme sea-level events happen more often with sea level rise?

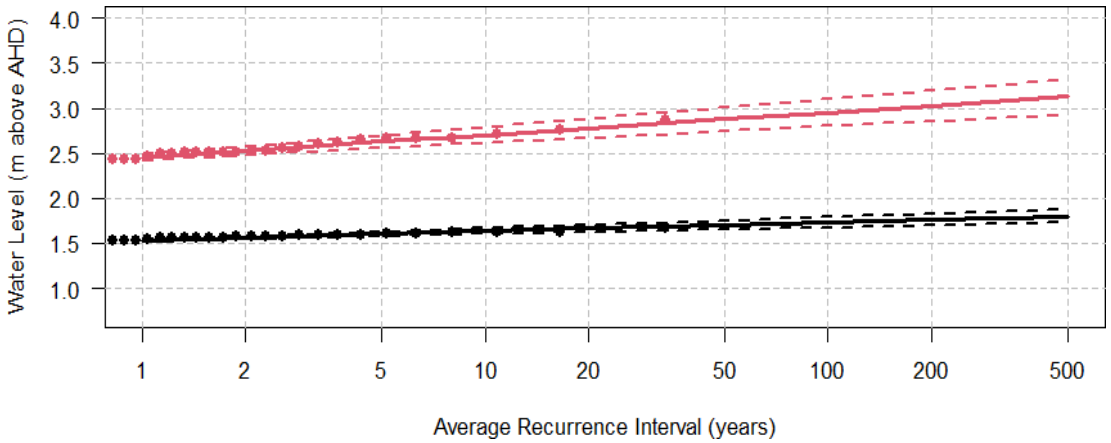
Map of Australia showing more than 12,000 coastal locations you can choose from when using Canute.

Data is also presented as graphs. Discover more about:

- Return Levels: Estimates of extreme sea levels, taking into account the effects of astronomical tides, storm surges, sea-level rise and the additional calculation of wave setup on beaches.
- Multiplication Factors: Estimates in the change in frequency of extreme sea levels for different sea level rise scenarios.
- Future Waves: Projected future extreme significant wave height, and changes to wave setup.



Visualising shifting ocean extremes



Canute allows users to visualise sea level rise with and without wave setup

Red lines show the water level including dangerous surf (wave setup). Black lines are the water levels modeled without dangerous surf. The dashed lines represent the 95% confidence intervals and dots represent ranked semi-empirical extreme water level estimates. The 95% confidence limit represents the uncertainty on the extreme values.

What's new in Canute 3?

New data and information has been added to this latest version of Canute.

Data from the processing of tide gauge records from the Global Extreme Sea Level Analysis project (GESLAv3) and Manly Hydraulics Laboratory (MHL) add an extra 75 gauge locations with at least 15 years of data to the locations already available. These updated datasets also extend the observation record by a decade. This means prediction for extreme sea levels can now be made at more locations and from 10 more years of observations, providing a clearer picture for coastal planners and managers.

The new release also includes a simple summary page that provides expected sea-level rise impacts for a selected coastal location under different scenarios with updated data.

A 'read more dropdown' directs you to Canute's advanced features which include graphs and tables that accompany the summary. It also describes how the Canute data can be used in conjunction with other sea-level rise tools such as:

Coastal Risk

Coast Adapt

OzCoasts

About Canute

Canute is developed by CSIRO's Sea level waves and coastal extremes scientists and delivered as part of the Climate Systems Hub's Oceans and Coasts project.

The most recent version Canute 3 is a continuation of the previous Canute 2, operated by the Antarctic Climate and Ecosystems CRC. Historically, the tool was made for an expert user-base of trained coastal engineers and planners. The tool is now open to everyone and is continually improving to further inform coastal adaptation.

Canute makes links to other tools such as CoastAdapt. CoastAdapt contains regional information on extreme sea levels, including future sea-level rise for every coastal local council in Australia and provides additional information to assist practitioners to build their knowledge and take action.

Find out more about Canute.

Try CANUTE to find out more

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Learn more about the Oceans and Coasts project

nesp2climate.com.au

The Climate Systems Hub is funded by the Australian Government under the National Environmental Science Program