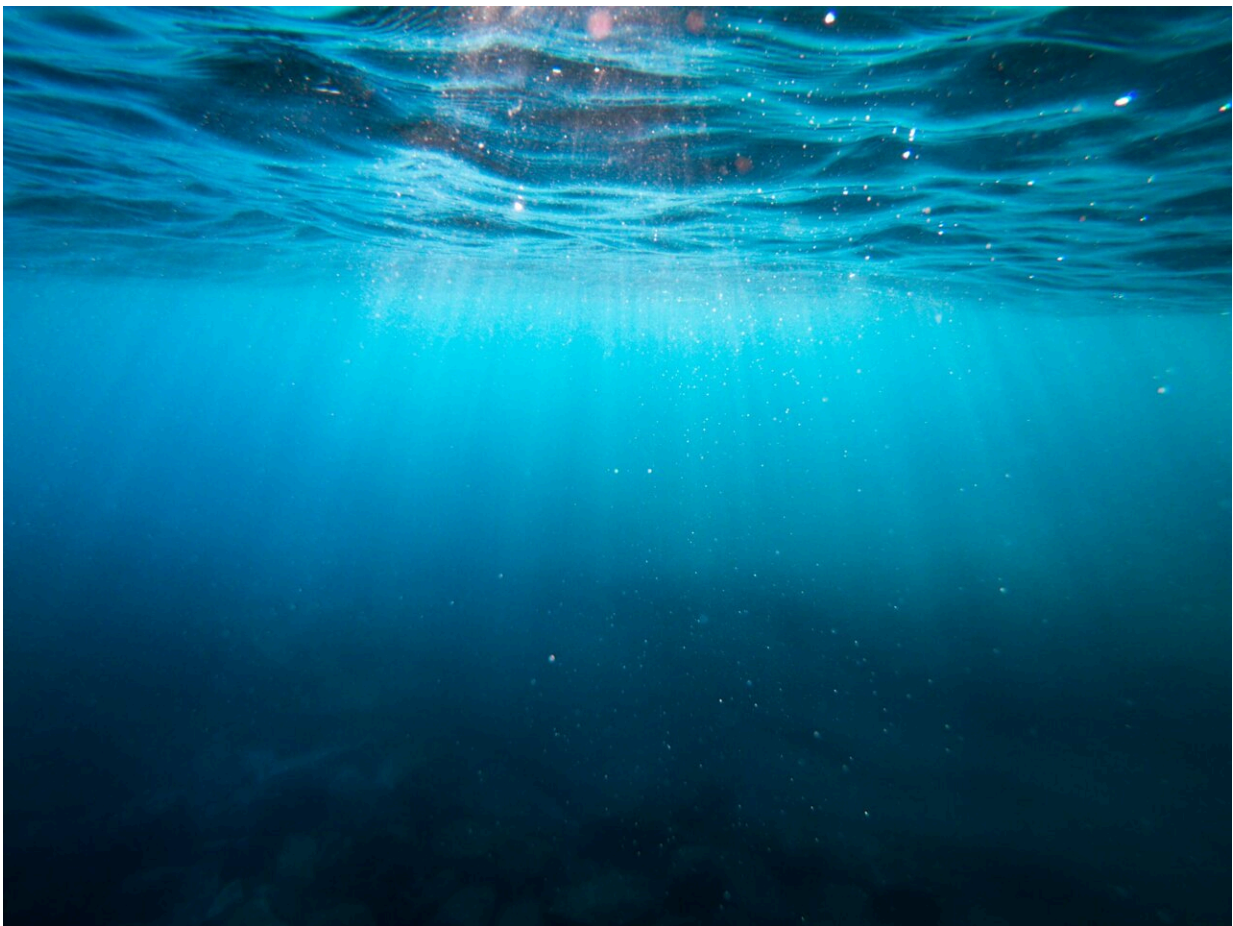


How climate scientists communicate risk is still imperfect but shows improvement, finds assessment

June 19 2023



Credit: Unsplash/CC0 Public Domain

Scientists have long struggled to find the best way to present crucial facts about future sea level rise, but are getting better at communicating more clearly, according to an international group of climate scientists, including a leading Rutgers expert.

The consequences of improving communications are enormous, the scientists said, as civic leaders actively incorporate climate scientists' risk assessments into major planning efforts to counter some of the effects of rising seas.

Writing in *Nature Climate Change*, the scientists review the language and graphics used in climate "assessment" reports between 1990 and 2021 by members of the United Nations' Intergovernmental Panel on Climate Change (IPCC).

"Future sea level rise emerges from a lot of different processes," said Robert Kopp, a lead author of the study and a professor in the Department of Earth and Planetary Sciences at the Rutgers School of Arts and Sciences. "The challenge is that, for some of those processes we understand the physics quite well—for example, how the ocean takes up heat and expands in response to that—and so can quantify and convey those risks. But other processes, particularly some of those acting on ice sheets, involve factors we don't understand that well and that are difficult to put into quantitative terms, but might nonetheless be able to cause rapid sea-level rise."

This means, statistically speaking, future sea level change is characterized by two different types of uncertainty, said Kopp, who is the director of the Megalopolitan Coastal Transformation Hub, a 13-institution partnership led by Rutgers, and co-director of the Rutgers [Office of Climate Action](#).

"There's quantifiable uncertainty, which can be measured and presented

with a degree of confidence," he said, "and then there's ambiguity, a form of deep uncertainty that cannot be well represented quantitatively."

The analysis shows aspects of sea level rise where the level of risk could be quantified have been presented accurately, informing public bodies effectively.

But when conveying sea level uncertainties that have been and remain difficult to quantify, the language in the reports often has fallen short, either oversimplifying projections or conveying the information in a confusing manner, according to the analysis. Such language could lead policymakers to neglect the risks associated with possible high-end, sea-level outcomes.

Ambiguity arises in situations in which analysts can interpret a common set of facts in highly divergent ways—or can't interpret them at all, Kopp said.

"Sea level projections extending only a few decades into the future and under lower emissions scenarios exhibit less ambiguity than do projections in the longer term and under higher emissions scenarios," he said.

The study contrasts the language used to convey ambiguities in the risk of late-century sea level rise in the [IPCC reports](#) in 1990, 1995, 2001, 2007, 2013 and 2021, along with the UN's [Special Report on the Ocean and Cryosphere in a Changing Climate](#) issued in 2019.

In the First Assessment Report, released in 1990, the authors characterized a rapid disintegration of the West Antarctic Ice Sheet because of global warming as "unlikely in the next century."

In contrast, in the Sixth Assessment Report, published in 2021, scientists

warn that higher rates of sea level rise before 2100 could be "caused by earlier-than-projected disintegration of marine ice shelves, the abrupt, widespread onset of marine ice sheet instability and marine ice cliff instability around Antarctica."

The report goes on to explain that the processes are characterized by "deep uncertainty." It concludes, "In a low-likelihood, high-impact storyline, under high emissions such processes could in combination contribute more than one additional meter of sea level rise by 2100."

Communicating complex risk scenarios to the public in an effective manner is an ongoing process. If the approach taken in the most recent climate [report](#) in 2021 is successful, it will be accurately reflected in future regional assessments and will ultimately be judged by policymakers, along with climate and social scientists.

It matters that scientists get it right, the study concludes.

"The presence and magnitude of ambiguity in sea-level projections can affect how planners make decisions, and thus is important to communicate clearly and effectively," Kopp said.

Kopp led the study with Jessica O'Reilly, an anthropologist at Indiana University Bloomington who studies the IPCC, and Michael Oppenheimer, a Princeton University [climate](#) scientist who has served with the IPCC since the First Assessment Report.

The other authors in the study, all of whom were involved with the Sixth Assessment Report, include those from Brown University and the University at Buffalo in the U.S., as well as others in China, France, Germany, Great Britain, the Netherlands, New Zealand and Singapore.

More information: Communicating future sea-level rise uncertainty

and ambiguity to assessment users, *Nature Climate Change* (2023). [DOI: 10.1038/s41558-023-01691-8](https://doi.org/10.1038/s41558-023-01691-8)

Provided by Rutgers University

Citation: How climate scientists communicate risk is still imperfect but shows improvement, finds assessment (2023, June 19) retrieved 3 May 2024 from <https://phys.org/news/2023-06-climate-scientists-communicate-imperfect.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.