

Flood risk will be ten times higher in many places within 30 years: Study

March 23 2023



Blokweerschekade 5, 2954 LA Alblasterdam, Netherlands. Credit: Unsplash/CC0 Public Domain

After the North Sea Flood of 1953, it took nearly 45 years to finalize the Delta Works. If we want to protect The Netherlands against sea-level rise, we shouldn't wait too long. But how much time do we have left? An

international team of researchers from Utrecht University, Deltares, and NIOZ, among others, devised a new method to calculate when we can expect an increase in flood probability in a specific area. The calculations show that within 30 years, the estimated probability of flooding will be 10 times higher in more than a quarter of the places studied. The researchers published their results in *Nature Climate Change*.

Sea-level rise is causing extremely high water levels to become more frequent. This is a problem because floods often result from extremely high water during a storm. So, the probability of disasters is increasing as the Earth continues to warm. However, researchers did not yet know when to expect an increase in flood probability in specific places. That's because protection levels vary quite a bit around the world (see below). So, in this study, researchers devised a new method of calculation. They then applied this method to nearly 500 places around the world.

Little time

The calculations show that in more than a quarter of those places, the estimated probability of flooding will be 10 times higher within the next 30 years. Estimates are used because the probability of flooding is not exactly known at all places. The increase is most rapid in central America, southern Europe, South Africa and parts of Asia and Australia.

To counteract this increased risk, coastal defenses will have to be adjusted in time. "Generally, this is [bad news](#)," says Tim Hermans, a climate researcher at Utrecht University, "because in some places there is little time left to take adaptive measures."

Flood probability in Den Helder

A place also included in the calculations is the Dutch province of North Holland. The standard for the coastal defenses near the city of Den Helder is a probability of flooding at a water level that now occurs only once every thousand years. The new method shows that in the year 2116, this water level will occur 100 times more often on average due to [sea-level rise](#). The probability of flooding near Den Helder therefore becomes much higher.

Hermans adds, "We have to take into account that this point could even be reached in the year 2067. This is because uncertainties of the observed water levels and the expected sea-level rise are included in the calculations."

Measures take time

According to the researchers, knowing when an increase in [flood](#) probability will be reached is very important. Marjolijn Haasnoot, climate adaptation expert at Deltares and Utrecht University, said, "Planning and realizing new adaptation measures takes time. For example, it took decades to realize the Delta Works after the North Sea Flood of 1953, even though the plans were there already," she says. "Our new calculations give policymakers insight into how much time is left to realize new measures in different places. That is important information for planning adaptation."

"Especially in scenarios in which we continue to emit a lot of greenhouse gases, the decline in the degree of coastal protection will accelerate. The time for adaptation will therefore become increasingly shorter," says Aimée Slangen, climate researcher at NIOZ. That's why the researchers stress the importance of making flexible adaptation plans and detecting when additional measures may need to be implemented faster. When such measures need to be taken also depends on what increases in the probability of flooding policymakers find unacceptable.

Different degrees of protection

The height of dikes and other barriers is often based on to the height of extreme water levels. The lower the probability of the extreme water level the dike can withstand, the higher the degree of protection. In the Netherlands, the standard for the probability of flooding of dikes varies considerably.

In most areas on the northern coast and in Zeeland, the lower limit is a probability of flooding of once every 1,000 years, whereas the maximum probability of flooding in place near The Hague and Rotterdam is smaller, at once every 10,000 to 30,000 years. In areas such as Zeeuws-Vlaanderen and Ameland, on the other hand, the maximum probability is higher. Worldwide, the degree of protection also varies widely.

More information: Tim Hermans, The timing of decreasing coastal flood protection due to sea-level rise, *Nature Climate Change* (2023).

[DOI: 10.1038/s41558-023-01616-5](https://doi.org/10.1038/s41558-023-01616-5).

www.nature.com/articles/s41558-023-01616-5

Provided by Utrecht University

Citation: Flood risk will be ten times higher in many places within 30 years: Study (2023, March 23) retrieved 25 April 2024 from <https://phys.org/news/2023-03-ten-higher-years.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.