

# Oceans Warming And Rising

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Ocean levels will rise faster than expected if greenhouse gas emissions continue to rise, a leading German researcher warns.

Using data from the U.S. National Aeronautics and Space Administration (NASA), Stefan Rahmstorf, professor of physics of the oceans at the University of Potsdam near Berlin estimates that sea level could rise 140 cm by 2100.

Rahmstorf, member of the German Advisory Council on Global Change, is considered a leading European researcher on global warming and its effect on oceans.

"The semi-empirical model we used to process NASA data showed a proportional constant sea level rise of 3.4 mm per year per degree Celsius," Rahmstorf told IPS. "Then we applied this constant proportionality to future earth surface warming scenarios of the Intergovernmental Panel on Climate Change (IPPC), and came to estimate that by the year 2100, sea level could rise between 50 and 140 cm above the level measured in 1990."

Through the 20th century, global warming led to an average 20cm rise in sea level. But most computer models of climate change used at present significantly underestimate sea level rise, Rahmstorf said. "Future projections of sea level based on these climate models are therefore unreliable."

Currently, sea level is rising at three cm per decade, faster than projected in the scenarios of the IPCC Third Assessment Report, Rahmstorf added.

The IPCC, an intergovernmental team of scientists carrying out a wide range of research related to climate change, was established in 1988 by the World Meteorological Organisation and the United Nations Environmental Programme. The IPCC aims to assess scientific, technical and socio-economic information relevant for understanding of climate change, its potential impact, and options for adaptation and mitigation.

Scientific research has found that industrial activities have produced greenhouse gas emissions considerably higher than levels observed before the industrial revolution.

Concentration of carbon dioxide (CO<sub>2</sub>), the most potent of greenhouse gases, has risen from about 280 parts per million (ppm) in the atmosphere in the year 1750 to about 380 ppm today.

This rise is primarily due to the burning of fossil fuels, and to a lesser extent, deforestation. Scientists estimate that if the present emissions trend continues, the atmosphere could heat

up by about five 5 degrees Celsius by 2100.

Studies by the Potsdam Institute for Climate Impact Research suggest that this would roughly be the temperature difference between an ice age and a warm stage. But while the rise of average temperatures by some five degrees between the last great ice age and today took 5,000 years, the new global warming would need only 100 years.

Rahmstorf acknowledged that forecasts of global warming and its effects on sea levels continue to be marked by uncertainty. "The fact that we get such different estimates using different methods shows how uncertain our sea level forecasts still are," Rahmstorf told IPS.

A major reason for the uncertainty is the behaviour of the large ice sheets in Greenland and Antarctica.

A likely consequence of a massive melting of the ice masses on the North Pole could be the breakdown of the North Atlantic Current (NAC). The NAC is the northern extension of the Gulf Stream, and constitutes a warm water current flowing between Britain and Iceland. This has considerable impact in moderating the North European and Scandinavian climate.

"One critical factor for the continuation of this current is the amount of fresh water that enters the Northern Atlantic region in the future," Rahmstorf said. "This will depend in large part on the speed at which Greenland's ice sheet melts."

Rahmstorf, who earlier this year co-authored a research paper titled 'The Future Oceans — Warming Up, Rising High, Turning Sour' said that reliable prediction on the risk of a total stoppage of deepwater formation in the Northern Atlantic is not possible given present knowledge.

But he pointed out that experts have evaluated that risk at more than 50 percent if global warming is between three and five degrees.

Rahmstorf said greenhouse gases emissions are also increasing the acidity of oceans. "In the atmosphere carbon dioxide does not react with other gases, but in the ocean it dissolves, contributing to the acidification of seawater," Rahmstorf said. This acidity is a serious threat to marine biodiversity.

"There is a good chance to avoid such dangerous climate change if global warming caused by human activities is limited to two degrees in the coming decades," Rahmstorf said.

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