

## Predictions drop for future sea-level rise

Global sea levels are rising and will continue to rise in the future, causing serious problems for low-lying areas. But the ocean will not rise as quickly as predicted, and the West Antarctic ice sheet will not melt in the next century, climate experts said last week at a meeting of the American Geophysical Union in San Francisco.

"We have revised rather drastically our best estimates of how much global sea level will rise due to greenhouse warming," says Mark F. Meier of the University of Colorado at Boulder, who in 1985 chaired a National Research Council committee investigating changes in sea level. He adds, however, that many uncertainties plague these latest predictions.

Scientists believe the expected global warming will partially melt glaciers as well as cause the oceans to expand. According to Meier, the information available in 1985 led his committee to predict that sea levels would rise about 1 meter with a 3°C increase in global average temperature. At the time, scientists estimated the meter rise would occur by the year 2100, when carbon dioxide concentrations in the atmosphere are expected to reach double their 1950 value. The committee also reported the slim

possibility that part of the West Antarctic ice sheet could slide into the sea within that time frame, causing a catastrophic rise in sea levels in the next century.

On the basis of information presented last week, Meier says the best predictions now call for a rise of only one-third meter with a doubling of 1950 carbon dioxide levels. This rise should occur before 2100, perhaps by midcentury, he says, because growing levels of other greenhouse gases are also heating the atmosphere.

Recent research on the West Antarctic ice sheet indicates this structure will not disintegrate within the next century, Meier adds.

The lower predictions for global sea-level rise primarily reflect new information concerning how the Antarctic climate will respond to a warmer world. Instead of shrinking, the ice cap atop Antarctica will most likely grow in the coming decades, pulling water out of the ocean, says Charles R. Bentley of the University of Wisconsin-Madison.

Climate models have suggested the polar regions will warm more than the rest of the globe, but the most pronounced warming should occur during the coldest season, when Antarctic temperatures are in no danger of rising above

freezing. The models also indicate that even a slight warming will allow the atmosphere to hold significantly more water vapor than it does now, causing more snow to fall on Antarctica. This process will transfer water from the ocean onto the continent, Bentley says.

On its own, Antarctica would actually lower sea levels around the world, but other effects should overshadow the Antarctic response and cause a modest climb in global sea levels, according to the new predictions. Like the melting of ice from alpine glaciers and along Greenland's margin, drainage of underground water reservoirs for human use enhances sea-level rise because much of this water eventually runs into the ocean.

Given the uncertainties in the estimates, Meier and his colleagues offer a broad spread to the predictions of a one-third-meter rise. At the extreme, ocean levels could rise by 0.7 meters; or they could fall by 0.1 meter.

Citing one example of the "horrendous" uncertainties plaguing researchers in this field, Meier points out that when scientists add up all known contributions to the current sea-level rise, they cannot match the observed rate of about 1.3 millimeters a year.

"This means our understanding of the system is not very good at the moment," he says.

— R. Monastersky

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The Washington, D.C.-based Environmental and Energy Study Institute, an independent bipartisan group established in cooperation with environment leaders in the House and Senate, brings in experts to brief members of Congress and their staffs on a wide range of climate-change issues—from corporate concerns to the latest scientific findings and environmental issues.

Though lacking the CO<sub>2</sub> freeze initiative, the Noordwijk consensus demonstrated that world leaders—including the United States—already support the idea of stabilizing and eventually reducing greenhouse-gas releases. But most participating nations also believe it will take an international accord—comparable to the CFC-curbing Montreal Protocol but covering a broader range of greenhouse gases—to put the brakes on global warming in time to head off irreversible ecological damage. And that's why many heads of state, like British Prime Minister Margaret Thatcher in her Nov. 10 speech before the United Nations General Assembly, advocate completing a framework for international controls on greenhouse gases in time for adoption at the 1992 World Conference on Environment and Development. International scientific and policy groups are working to draft such a framework now. □

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