

Sea Levels Will Rise Faster Than Ever

The Atlantic coast will be one of the hardest hit regions

By Scott Waldman, ClimateWire on November 8, 2016



A member of the South Carolina Army National Guard dumps sand while cleaning up after Hurricane Matthew at Edisto Beach, South Carolina, Oct. 12, 2016. Credit: U.S. DEPARTMENT OF AGRICULTURE Flickr, CC BY 2.0

Sea levels across the globe will rise faster than at any time throughout human history if the Earth's warming continues beyond 2 degrees Celsius.

The Atlantic coast of North America will be one of the worst-hit areas as melting glaciers cause the sea level to rise over the next century, a new study published yesterday in the *Proceedings of the National Academy of Sciences* finds.

However, that rise is not expected to be uniform, as gravity and the movement of the ocean will play a role in how the water is distributed, and some areas will be hit worse than others. New York and other cities along the East Coast could see seas rise by more than 3 feet by the end of the century if the Earth warms by

4 or 5 degrees beyond preindustrial levels.

If the rate of carbon emissions continues unabated, the authors said, the globe would warm by 2 degrees and cause significant sea-level rise by 2040. It would be worse along the East Coast of North America and Norway, which are expected to experience a sea-level rise of about a foot. The relative speed of the sea's rise means many areas won't have time to adapt, researchers found. And from there, warming would accelerate even faster.

“The coastal communities of rapidly expanding cities in the developing world and vulnerable tropical coastal ecosystems will have a very limited time to adapt to sea-level rises after the ‘2 degrees Celsius’ threshold is likely to be reached,” said Svetlana Jevrejeva, a researcher at the National Oceanography Centre in Liverpool, England, and lead author of the study.

The sea-level rise comes as the Earth's record-breaking warmth is expected to become the “new normal,” according to another study published this week in the *Bulletin of the American Meteorological Society*. While 2015 was the hottest year on record, it could be the average within the next decade if carbon emissions continue to rise at their current rate, it found. And even if countries take action to limit carbon dioxide, humanity may have already locked in the increased warmth by 2040.

But limiting emissions now will mean some of the regions of the globe are not locked in for the new levels of warmth, and that they can still have significant variability.

“It gives us hope to know that if we act quickly to reduce greenhouse gases, seasonal extremes might never enter a new

normal state in the 21st century at regional levels for the Southern Hemisphere summer and Northern Hemisphere winter,” said Sophie Lewis, a researcher at the Australian National University.

MILLIONS OF URBAN DWELLERS AT RISK

Nations that signed the Paris Agreement limiting warming to a maximum of 2 degrees are meeting this week in Morocco to put the accord into motion. Meanwhile, the United Nations has already cautioned that the emission targets countries voluntarily set may not be strict enough to meet the 2-degree goal.

Two degrees of warming is expected to cause an average global sea-level rise of 8 inches, but virtually all coastal areas will see more of a rise, Jevrejeva found. If warming exceeds 2 degrees by 2100, as some climate scientists worry it might, about 80 percent of the global coastline could experience a rise in sea levels of 6 feet. Such a rapid rise in sea levels is unprecedented since the dawn of the Bronze Age about 5,000 years ago, according to the study.

The research takes further the potential for sea-level rise posed by the Intergovernmental Panel on Climate Change, which argued that sea-level rise of 11 to 38 inches is possible by 2100. Many climate scientists have since claimed that estimate is too conservative.

Absent a concerted effort to limit warming, cities and island nations across the globe are at risk, researchers found.

“Coastal communities, notably rapidly expanding cities in the

developing world; small island states; United Nations Educational, Scientific and Cultural Organization Cultural World Heritage sites; and vulnerable tropical coastal ecosystems will have a very limited time after midcentury to adapt to these rises,” they wrote.

The rise for New York is predicated on a warming of 5 degrees by 2100, which some researchers have contested may be too high. But at the upper scale of that level of warming, tens of millions of people around the world would be displaced. That includes “2.5 million living in low-lying areas of Miami; 2.1 million in Guangzhou [in China]; 1.8 million in Mumbai; and more than 1 million each in Osaka [in Japan], Tokyo, New Orleans, New York, and [Vietnam’s] Ho Chi Minh City,” researchers contended.

The study is part of a growing body of research that looks for possible scenarios that involve the potential for catastrophic sea-level rise, but more attention should be paid to the loss of land ice, as well, said Tad Pfeffer, a glaciologist at the University of Colorado, Boulder. While researchers typically focus on the loss of glaciers in Antarctica and Greenland, the loss of land ice in other spots across the globe is now contributing to sea-level rise at almost the same rate as the Arctic’s melting ice, he said. It’s the full scope of the current glacial loss that concerns political leaders and policymakers because it has already presented a pressing need to be addressed, he said.

“This near-term time scale is the time of greatest concern to decisionmakers,” he said. “Research that reaches out to 2100 and beyond is scientifically exciting, but really of secondary

importance to the people who are trying to make sense of the science for decisionmaking.”

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