

ENVIRONMENT

Melting glaciers contribute a third of sea-level rise

Thousands of glaciers dot the planet's high mountain regions. Now scientists know how fast they are melting, and how much they are filling the ocean.

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Like an ice cube on a hot summer day, many of Earth's glaciers are shrinking.

Last January, a study in *Nature Climate Change* showed the world's glaciers are the smallest they've been in human history, revealing radiocarbon material that hasn't been exposed for 40,000 years.

Now, new research published in *Nature* quantifies how much the world's lost glaciers have contributed to rising sea levels.

From 1961, when reliable record keeping began, to 2016, the ocean crawled up 27 millimeters as a result of ice sloughing off the world's non-polar glaciers. Scientists had known that melting glaciers contribute to sea-level rise, but the new study takes a comprehensive look at how much and how quickly they're melting.

They found mountain glaciers contribute roughly a third of measured sea-level rise—the same contribution to sea-level rise as the Greenland ice sheet and more than the contribution of the Antarctic ice sheet. Their research also highlighted that many of the world's glaciers may disappear in the next century.

In total, NASA estimates that sea levels rise by three millimeters each year. As oceans warm further, scientists estimate thermal expansion will force sea levels up even more.

How do they know?

The study looked at 19 geologically distinct regions that had been previously segmented by the Randolph Glacier Inventory.

For each of these regions, they relied on field data from the [World Glacier Monitoring Service](#). In any of these regions, field measurements are generally only available for one or two glaciers, says [Frank Paul](#), a geographer from the University of Zurich and author on the study.

To get a more detailed analysis, the researchers used data collected from airborne and satellite surveys to calculate changes in a glacier's volume.

Not only did they find that sea levels have risen as much as 27 millimeters in the past 50 years, they also calculated change in glacial mass from 2006 to 2016, finding that sea level roughly increased one millimeter each year.

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