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Loss of Antarctic Ice Increases

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Two new satellite surveys show that warming air and water are causing Antarctica to lose ice faster than it can be replenished by interior snowfall, and thus are contributing to rising global sea levels.

The studies differed significantly in estimates of how much water was being added to the oceans this way, but their authors both said that the work added credence to recent conclusions that global warming caused by humans was likely to lead to higher sea levels than previous studies had predicted.

The earlier projections presumed that snowfall over Antarctica, as well as Greenland, would increase as warming added moisture to the air, compensating for the losses of ice from crumbling or melting along coasts.

Several independent experts agreed with the new conclusions, saying they meshed both with more localized studies of trends in Antarctica and with evidence from warm spells before the last ice age.

"Snowfall will matter less and less," said Robert Bindschadler, an expert on polar ice at the National Aeronautics and Space Administration who was not involved in either study. "We know that warmer climates eventually lead to less ice."

Most of the ice is being lost in western Antarctica, where warming air and seawater have recently broken up huge floating shelves of ice, resembling the brim of a hat. That, in turn, has allowed ice in the interior to flow more readily to the coast.

One of the new surveys, led by H. Jay Zwally, a NASA scientist, used satellites and aircraft to measure changes in the height of ice sheets in Antarctica and Greenland over the decade ended in 2002. It found a loss of volume in Antarctica and a small overall gain in Greenland, where inland snows have outpaced ice flowing into the sea, at least temporarily. It was just published in The Journal of Glaciology.

The other study, by scientists at the University of Colorado, looked at changes from 2002 to 2005 using NASA satellites that detect subtle changes in Earth's gravitational field that can be used to estimate the weight of water in an ice sheet.

"The changes we are seeing are probably a good indicator of the changing climatic conditions there," said Isabella Velicogna, the lead author of the gravity-sensing study, which was published online yesterday by the journal Science.