

East Antarctic Ice Sheet Gains Mass and Slows Sea Level Rise, Study Finds

Results Reported in Online Edition of Science Suggest Increasing Snowfall is Likely Cause

Current estimates indicate that the global sea level is rising due to global warming and the shrinkage of terrestrial, or land-based, ice. Recent scientific studies have shown that a variety of terrestrial ice sources, such as the Greenland ice sheet, the West Antarctic ice sheet and Alaskan mountain glaciers, are contributing significant amounts to the global sea-level rise. However, in a study to appear in this week's online edition of Science, a researcher at the University of Missouri-Columbia has found that the interior of the East Antarctic ice sheet is actually gaining mass.

From 1992 to 2003, Curt Davis, MU professor of electrical and computer engineering, and his team of researchers observed 7.1 million kilometers of the ice sheet, using satellites to measure changes in elevation. They discovered that the ice sheet's interior was gaining mass by about 45 billion tons per year, which was enough to slow sea level rise by .12 millimeters per year. The interior of the ice sheet is the only large terrestrial ice body that is likely gaining mass rather than losing it, Davis said.

"Many recent studies have focused on coastal ice sheet losses and their contributions to sea level rise," Davis said. "This study suggests that the interior areas of the ice sheet also can play an important role. In particular, the East Antarctic ice sheet is the largest in the world and contains enough mass to raise sea level by more than 50 meters. Thus, only small changes in its interior can have a significant affect on sea level."

The study, funded by NASA's Cryospheric Processes Program and the National Science Foundation's Antarctic Glaciology Program, suggests that increased precipitation was the likely cause of the gain. This was based on comparisons with precipitation model predictions over the same period of time. The most recent U.N. Intergovernmental Panel on Climate Change reported that Antarctica would gain mass due to increased precipitation in a warming climate. However, the study made no direct link to global warming.

"We need more ice core measurements from East Antarctica to determine if this increased precipitation is a change from the past or part of natural variability," said Joe McConnell of the Desert Research Institute in Reno, Nev., who co-authored the study.

The researchers used satellite radar altimeters from the European Space Agency's ERS-1 and ERS-2 satellites to make 347 million elevation-change measurements between June 1992 to May 2003.

The research team found there was a strong correlation between the predicted precipitation trends and measured elevation change over the 11-year period for the ice sheet, which indicated that East Antarctica's interior was likely gaining mass due to the increased precipitation. The results, though, did not assess the overall contribution of the entire Antarctic ice sheet to sea level rise.

"Ice sheet response to climate change is a complex process that is difficult to measure and even more difficult to predict," Davis said. "The overall contribution of the Antarctic ice sheet to global sea-level change will depend on how mass changes in the ice sheet's interior balance mass changes from the coastal areas."

Source: University of Missouri

This document is subject to copyright. Apart from any fair dealing for the purpose of private study, research, no part may be reproduced without the written permission. The content is provided for information purposes only.