

# Study validates East Antarctic ice sheet to remain stable even if western ice sheet melts

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Team members taking a short ice core to study properties of sediment coming from the East Antarctic ice sheet. Credit: Lamont-Doherty Earth Observatory

A new study from Indiana University-Purdue University Indianapolis validates that the central core of the East Antarctic ice sheet should remain stable even if the West Antarctic ice sheet melts.

The study's findings are significant, given that some predict the West Antarctic ice [sheet](#) could melt quickly due to global warming.

If the East Antarctic ice sheet, which is 10 times larger than the western ice sheet, melted completely, it would cause sea levels worldwide to rise almost 200 feet, according to Kathy Licht, an associate professor in the Department of Earth Sciences in the School of Science at IUPUI.

Licht led a research team into the Transarctic Mountains in search of physical evidence that would verify whether a long-standing idea was still true: The East Antarctic ice sheet is stable.

The East Antarctic ice sheet has long been considered relatively stable because most of the ice sheet was thought to rest on bedrock above sea level, making it less susceptible to changes in climate. However, recent studies show widespread water beneath it and higher melt potential from impinging ocean water.

The West Antarctic ice sheet is a marine-based ice sheet that is mostly grounded below sea level, which makes it much more susceptible to changes in sea level and variations in ocean temperature.

"Some people have recently found that the East Antarctic ice sheet isn't as stable as once thought, particularly near some parts of the coast," Licht said.

Recent studies have determined that the perimeter of the East Antarctic ice sheet is potentially more sensitive and that the ice may have retreated and advanced much more dynamically than was thought, Licht said.

"We believed this was a good time to look to the interior of the ice sheet. We didn't really know what had happened there," Licht said.

The research team found the evidence confirming the stability of the East Antarctic ice sheet at an altitude of 6,200 feet, about 400 miles from the South Pole at the edge of what's called the polar plateau, a flat, high surface of the ice sheet covering much of East Antarctica.

To understand how an ice sheet changes through time, a continuous historical record of those changes is needed, according to Licht. The team found layers of sediment and rocks that built up over time, recording the flow of the ice sheet and reflecting climate change. Finding that record was a challenge because glaciers moving on land tend to wipe out and cover up previous movements of the glacier, Licht said.

The big question the team wanted to answer was how sensitive the East Antarctic sheet might be to climate change.

"There are models that predict that the interior of the East Antarctic ice sheet wouldn't change very much, even if the West Antarctic ice sheet was taken away," Licht said. According to these models, even if the ice sheet's perimeter retreats, its core remains stable.

"It turns out that our data supports those models," she said. "It's nice to have that validation."

The team's research findings are presented in a paper, "East Antarctic ice sheet stability recorded in a high-elevation ice-cored moraine," that was published today online in the journal *Geology*.

Provided by Indiana University

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