

# Scientist devoted to measuring Earth's shrinking ice sheets

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Isabella Velicogna, assistant professor of Earth system science, has shown that glaciers are losing mass at an increasing rate — a trend with dire implications for the planet. Credit: Nicole Del Castillo

(Phys.org)—Isabella Velicogna's office in UC Irvine's Croul Hall looks like it belongs to an artist instead of a university scientist. Her paintings and drawings—including charming sketches of mice—adorn the walls, and colorful, handcrafted mobiles dangle from the ceiling.

"In my next life, I will be a children's book illustrator," says Velicogna, who loves to paint, draw and sew. For now, though, she's too busy conducting pioneering research on global warming and publishing her less-than-rosy findings on the planet's shrinking ice sheets.

The assistant professor of Earth system science has been documenting

the deterioration of the immense frozen masses in Greenland and Antarctica through data she's carefully culled via [satellite technology](#). Velicogna has shown that the ice sheets are thawing at an accelerating pace, and if the trend continues, the would-be children's book illustrator sees no happy ending. The [meltdown](#) will raise the sea level and have a major impact on [coastal populations](#) worldwide.

A native of Italy, Velicogna began studying the Earth's ice masses a decade ago as a postdoctoral student at the University of Colorado, Boulder. Back then, she didn't realize her work would have the impact or urgency it does today. She wasn't a climate crusader—she simply loved research. "I ended up concentrating on something more meaningful than I initially thought," she says.

Still, there's more work to be done before she can devote time to her art. Velicogna continues to monitor the ice sheets to better understand what's happening on the Earth's surface. She recently discussed her research and concerns for the planet's future:

## **What's the main focus of your research?**

I study the mass balance of ice sheets—how they are changing and why. I use [NASA](#)'s GRACE [Gravity Recovery and [Climate Experiment](#)] mission technology to measure variations in the Earth's mass and [gravity field](#). GRACE was launched in 2002 and is an amazing tool. With its twin satellites, it weighs the Earth from space and tells us every month how much ice Greenland and Antarctica are losing.

## **What do you consider to be your most important findings to date?**

In 2006, we published a paper in [Science](#) showing that Antarctica was

losing significant mass. It was the first time that we could weigh the entire ice sheet. When I started this work, most scientists assumed the [ice sheet](#) in Antarctica would grow and Greenland's would shrink a little. We found that both ice sheets are rapidly shrinking. Greenland loses a huge amount of water every year: 230 gigatons. By comparison, Los Angeles County uses 1 gigaton [1 billion metric tons] of water a year. Antarctica is losing about 150 gigatons annually. We're seeing more loss every year; it's accelerating.

## **What has been the reaction to your findings?**

They've contributed to increased awareness of changes taking place in the polar regions. The data brought new insights about Antarctica. Today, more scientists are convinced global warming is a serious issue. But there's a lot more we have to learn about our planet. In particular, it's not easy to predict what will happen to the ice sheets.

## **What will happen if the ice sheets continue melting at this rate?**

By the end of the century, the melt-water flowing into the ocean will probably raise the sea level by 1 meter or so globally. It will affect people living in coastal areas and be especially devastating for low-lying, under-developed countries such as Bangladesh. The economic toll will be high. People will have to be relocated; building codes will have to be changed. There's a lot of resistance to act on global warming now, but if we don't do something, the costs will be higher down the line.

## **What can we do to mitigate climate change now?**

There are a lot of things people can do to slow down our impact on the global climate, such as not running their air conditioning or heating so

often, installing solar panels on their house, riding bikes or changing the kind of car they drive, and promoting the use of renewable energy. It's in everybody's interest to start making those changes.

## **You earned your doctorate in applied geophysics at the University of Trieste, in Italy. How did you end up in the U.S.?**

I've always wanted to do research. I came to the U.S. as a postdoctoral fellow at the University of Colorado and started working on GRACE. I loved it so much that I'm still working here today.

Your husband, UCI [Earth system science](#) professor Eric Rignot, also is an expert on polar ice sheets and [global warming](#). Do you collaborate on your research?

We've always talked about science, but we started collaborating only in recent years. Now we even write papers together.

## **What are your plans for the future?**

A GRACE follow-on mission will be launched in 2017. I'll be involved in that. We'll combine the new data with other observations to better understand the evolution of ice sheets. The advent of satellites has given us the ability to observe Antarctica and Greenland with unprecedented accuracy. We're starting to develop models of changing ice sheets. We have a lot of data we didn't have even a few years ago, and we're really improving our understanding of the Earth. It's a magic time to be doing this research.

Provided by University of California, Irvine

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