POLAR CAREERS

I am a **geophysicist**.

Hi, I'm Jacky Austermann!

I study **sea-level change**, which means I work to understand how **ice sheets**, oceans, and coastlines are changing today—and how they changed in the past (thousands to millions of years ago!).

When most people think about sea-level change, they think about the sea surface (the water surface you see when you stand on the beach) rising and falling. In reality, this is only one possible way through which sea level can change.

Did you know that...

sea level isn't rising by the same amount everywhere? In some places—including Antarctica and in many places in Canada—sea level is actually falling!

Another way sea level can change is through **land uplift** (rising) and **land subsidence** (sinking). As ice sheets grow or shrink (melt), their weight pressing on the solid Earth changes, which causes the land to sink or rise. If land is gradually subsiding (i.e., the coast you're standing on is slowly sinking), sea level is also gradually rising. My work focuses on understanding sea-level change as a result of land uplift and subsidence.

And did you know that...

ice sheets are so massive they exert a **gravitational pull** on the ocean? This leads to water moving away as ice sheets melt (when they have less gravitational pull).

In our models, we need to account for this and **land deformation**, since they affect how much an ice sheet interacts with the ocean around its **periphery**. We also account for these processes when we model how ice sheet change causes sea level change **globally**.

I write **computer models** to study how the Antarctic Ice Sheet has changed over thousands (and maybe millions!) of years. I run models that make predictions of ice sheet change, accounting for the physical processes that affect the ice sheet and sea level.

Comparing our model predictions to **data** and observations from the SWAIS2C **sediment cores** will help us understand which parts of our models are right and which are wrong.

This can better tell us how much ice sheets have responded to past warming and what global sea-level rise impact this had in the past (and may have again in the future!).

When I was a kid...

I always loved being outside and thinking about why the world looks like it does. Why is there a mountain? Why is there a lake? I also always liked math because I like how everything is logical! As a geophysicist, I get to combine the two.

Becoming a scientist...

I always liked puzzles. As a scientist, especially an **Earth scientist**, I still feel like I do puzzles. I learn a lot of information about different things—from rocks, from ice, and from models—and I try to understand how they all fit together.

I work...

in an office, where I sit at my computer and write **code**. I run **computer simulations** to understand how ice sheets, the underlying Earth, and the ocean change. Some days, I teach students at the university.

I also do **fieldwork**, where I travel to various places (the Caribbean, Patagonia, Greenland) to study coastlines and ice sheets.

If I weren't a scientist...

That's a really hard one. There are so many fun jobs out there! Maybe a teacher? My biggest triumphs now are when my students are successful. Seeing them give great talks, have **papers** accepted, and generally being happy, well-rounded scientists is what makes my day.

The biggest challenge in my work:

time management. I always have way more to do than I have time for.

I have two little boys, Thomas (newborn) and Philip (three years old). I spend any free time I have with them. I love taking them on new adventures!

What I do for fun...

hiking, climbing, painting—all things I enjoy very much! :)

Want to be a scientist?

Jacky says:

Don't be afraid to ask questions and follow your passion!

Find out more about Jacky and her work here.

Glossary

Antarctic Ice Sheet – the thick sheet of ice that covers the continent of Antarctica

code – the instructions (called programs) that a computer can understand and follow

computer models – programs that run on a computer using data, mathematics, and computer instructions to represent how something works or how it might behave under different conditions

computer simulations – the results of running computer models that show what things might look like or how they might change over time

data – information such as facts, numbers, observations, or anything that provides clues about something

Earth scientist – a scientist who studies the processes and events that impact the form and environment of Earth; includes geology (study of how Earth formed, its structure and composition, and the process acting upon it), meteorology (study of weather and climate), oceanography (study of oceans), and astronomy (study of neighboring planets).

fieldwork – scientific research, exploration, or observation conducted in "the field"—in Jacky's case, places like Greenland—rather than the laboratory or classroom

geophysicist – a kind of **Earth scientist** who studies Earth's properties and processes, using principles of physics (such as measurements of gravity and Earth's magentic field) to understand its structure, composition, and dynamics (the way it changes).

globally – involving the whole world; worldwide

gravitational pull – the force of attraction that pulls objects with mass together. In this case, the mass of ice sheets is enough to pull the ocean toward them. The more massive an object is, the stronger its gravitational pull.

ice sheets – massive blankets of ice over a large area of land. They form over thousands to millions of years as snow falls, compacts, and hardens into ice, and they gradually flow down toward the sea.

land deformation – changes in the shape or elevation of Earth's surface, including **uplift**, **subsidence**, or sideways movement

land subsidence – a sinking or settling of Earth's surface due to natural or human-caused processes

land uplift – a rising of Earth's surface due to a natural process—such as the removal of weight from the land as an ice sheet melts

papers – detailed reports that scientists write to share their findings and ideas with other scientists

periphery – the boundary or outermost part—in this case, the outer edge of the ice sheet where it meets (and is affected by) the ocean

sea-level change – a change (rise or fall) over time of the level of the world's oceans

sediment cores – a cylindrical sample of sediment, including mud, rocks, minerals, and the remains of organisms deposited on the bottom of a body of water, in this case, the seafloor

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SWAIS 2°C