

Climate is changing fast in West Antarctica

November 23 2015, by Stacy Morford, Earth Institute, Columbia University



Glacier retreat near Palmer Station, Antarctica. Credit: U.S. Antarctic Program

When the ship pulls up at Palmer Station each Antarctic spring, the arriving scientists glance up at the massive glacier that covers most of Anvers Island. It has been retreating about 7 meters per year, and this year is no different.

In this part of Antarctica, on the peninsula that sweeps toward South America, the climate is changing fast.

"Global warming is affecting Antarctica just as it's affecting everywhere in the world at this point, but it is proceeding faster in both of the polar regions than it is anywhere else on the planet. What happens here is an early warning of what will be happening to ecosystems elsewhere – it's

just happening sooner and faster in Antarctica," said Hugh Ducklow, the lead principal investigator at Palmer Station and a biogeochemist at Lamont-Doherty Earth Observatory.

Temperatures have been warming on the West Antarctic Peninsula at about 0.5° Celsius per decade since the early 1950s, a rate about four times faster than the global average. While winter [sea ice](#) extent in the Southern Ocean as a whole has changed little, the sea ice here begins to advance about 2 months later than it did in the 1980s and retreat about a month earlier. The West Antarctic Peninsula is bathed by relatively warm waters from the Antarctic Circumpolar Current that comes close to the surface near the peninsula, and that current is gaining heat as the oceans warm, [studies show](#).

The changes and their cascading effects are showing in the ice and in the numbers and species of marine wildlife. The population of native Adélie penguin has declined from 15,000 pairs in the area around Palmer Station in the 1980s to fewer than 3,000 today. Penguin species from farther north, the Chinstrap and Gentoo, have started moving in, while Adélie numbers are increasing farther south in a region that hasn't experienced as much warming. Fur seals and elephant seals, neither native to the area, are also now appearing near the Anvers coast.

Warming temperatures and changes in the sea ice matter for the entire marine food chain in this region where whales feed in the summer and large numbers of sea birds breed.

The ice is an important factor in the strength of the spring phytoplankton bloom and for the growth of ice algae, which are both important food sources for krill, which in turn are the main food source for the region's penguins, whales and seals.

When sea ice covers the coastal water in early spring, it prevents the

spring bloom from starting too early, when it could be disrupted by storms, explained Jeff Bowman, a marine biologist from Lamont who is currently working at Palmer Station. [As temperatures rise](#), the sea ice leaves earlier, and climate phenomena that drive weather patterns could impact marine life in different ways. Studies suggest that the Southern Annular Mode (SAM) is more likely to be positive, meaning stronger winds will be more common, likely disrupting phytoplankton growth, and tropical storms could send precipitation across the Southern Ocean that can put penguin eggs and chicks at risk. (Read more about phytoplankton and what Bowman is seeing at Palmer Station in his research blog, [Polar Microbes](#).)

The scientists at Palmer Station see changes like these up close every year, and they have collected data through the Long-Term Ecological Research program for the past two decades to track ecological and environmental changes and how those shifts cascade through the ecosystem. Two years ago, a video team joined them. You can watch the Palmer Station scientists at work and see the surrounding environment in the movie [Antarctic Edge: 90 Degrees South](#).

Provided by Earth Institute, Columbia University

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