

Byrd Polar and Climate Research Center

[Ice Core Facility Renovation Project](#)

FAQ

Why is Byrd raising funds for the Ice Core Renovation?

The [Byrd Polar and Climate Research Center](#) at The Ohio State University has one of the largest and most comprehensive collections of ice cores in the world. This includes a rare collection of ice cores from remote tropical and sub-tropical glaciers that were painstakingly drilled, extracted, and returned to the campus from 16 different countries. If the cores — each 4 to 5 inches across and about a yard long were lined up they would stretch about 4.5 miles long. The samples are in imminent danger of being lost. The facility is over 30 years old, has exceeded its storage capacity and reached the end of its useful life. If the facility is not replaced immediately, we are at risk of losing the current core collection and already lack the space to add cores from future drilling projects.

How are ice cores used to the study climate change?

Each layer of ice tells a story about what Earth was like when that layer of snow fell. The ice layers preserve tiny bubbles of the atmosphere—including greenhouse gases like carbon dioxide and methane. Scientists can directly measure the amount of greenhouse gases that were in the atmosphere at that time by sampling these bubbles. The cores also contain information about past climate changes as described below.

Is the study of climate science still important? Isn't the link between greenhouse gasses (GHG) and climate change generally accepted today?

While there is a scientific consensus regarding the link between GHG emissions and climate change, scientists continue to use ice core data to validate climate models that predict Earth's future climate. However, predicting the climate of the future is complicated. To test the climate models under potentially very different future environmental conditions, scientists test the models by simulating past climates. Ice core records are an essential part of creating and checking these simulations. As technology improves, so does the amount and quality of information that can be extracted from the cores. Climate modeling becomes more precise and is more reliable for global policy makers as they implement actions to achieve net zero emissions.

What are the other uses of ice core data in addition to climate research?

The ice cores also hold particles—aerosols such as dust, ash, pollen, trace elements and sea salts—that were in the atmosphere at that time. These particles remain in the ice thousands of years later, providing physical evidence of past global events, such as major volcanic eruptions. The ice also holds data about pollution and provides evidence linking pollution to human health. <https://vpm.org/articles/5350/can-ice-cores-tell-us-about-human-history>

What is unique about the collection of ice cores stored at Byrd?

The Center's facility houses 4.5 miles of ice core samples from around the globe, including some from tropical glaciers that no longer exist, enabling researchers to better understand our past in a way that is directly affecting environmental and public health issues. The ongoing loss of these glaciers has serious implications for water resources and the nearly 2 billion people who live in these tropical regions. *Ohio State's Ice Core Facility is the only place in the world where ice from many vanishing tropical glaciers still exists.* Thus, it is important to understand both the past natural climatic variability and the drivers of the current accelerating loss of glaciers on tropical mountain ranges.

How much more scientific information can be obtained from existing cores?

Future generations of scientists will deploy new methods and technologies to answer questions about our future informed by Byrd's glacial archive. But this will happen only if we have the skilled researchers and facilities with conditions to properly preserve the existing collection and additional space to house unique ice cores acquired from remote mountains before they disappear from nature permanently. When Lonnie Thompson and Ellen Mosley-Thompson started collecting the cores decades ago, they only measured for dust particles. As time has passed, technology has evolved and will continue to evolve. Today, teams from all over the world use the Byrd cores to simulate climate history. Technology is continuing to unlock new uses for the ice cores. For example, Byrd cores are being studied for a 20,000-year record of tropical methane. Cores are being measured for black carbon, a product of forest fires, to reconstruct the long-term fire history of the Amazon Basin. And more recently, it has been discovered that the ice also holds data about newly discovered viruses and bacteria from thousands of years ago, contributing to the study of overall human health.

<https://www.livescience.com/unknown-viruses-discovered-tibetan-glacier.html>

How will maintaining these cores spur learning about climate risks?

The archive is an insurance policy for the next generation of young scientists. Because these tropical and other low-latitude glaciers are melting, we're not going to be able to go out and collect more samples. The collection at Byrd will eventually contain the only remaining ice core-derived historical climate records, once these glaciers are gone. The cores are essential to understand our past and understand it in a way that's directly affecting us through climate change. And as time goes on, we understand more, and we develop smarter tools and thus this archive becomes more valuable. No one in the future will ever be able to access those histories that are permanently lost.

What is the remaining life span of the existing facility?

The current facility has several problems, most caused by age and ice forming under the surface of the freezers causing the floor of one freezer to heave. Heater rods had to be installed in the floor to melt the ice very slowly to allow the floor to slowly drop back down. The heater rods are always running and tested monthly. In addition, warm outside air now leaks into the 32-year old freezers that no longer have a proper seal as they have shifted on their foundation. Although it is hard to predict failures, the renovation and replacement is getting into the critical stage, and the planning and approvals involved in this major renovation will take several months to get underway.

Visit this link to view some of the age and structure related issues experienced with the facility:

<https://byrd.osu.edu/giving/ice-core-facility-renovation/freezer>

What are the specifics of the renovation?

These freezers have been in continuous operation since 1989 and are currently at capacity with approximately 4.5 miles of ice drilled over 64 expeditions. A recent feasibility study recommends renovation of the 2 existing freezers as well as the phased addition of 2 additional freezers that will utilize more modern technologies and efficiencies. This will help OSU meet its sustainability goals while supporting world-class research. The planned expansion includes 2 new freezers, 2 new workrooms, new mechanical equipment, and new shelving. The expansion will hold 6,776 additional 1-meter long cores and feature a new educational space with displays and accommodations for groups touring the facility. This project has a \$7 M budget for the physical space. The Byrd Center also seeks to start an endowment (\$1M+) that will support the yearly costs of preventative maintenance on the new facility.

For more information please visit: [**Ice Core Facility Renovation Project**](#)