

As COVID-19 halts climate expeditions, scientists grapple with uncertainties

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Many important climate research expeditions have been put on ice during the COVID-19 travel bans. Credit: Jonathan Kingslake

Around 128,000 years ago, the temperatures in the Bahamas were one to two degrees higher than they are today. A group of geologists and geodynamicists from Columbia University's Lamont-Doherty Earth Observatory visited the area in 2019 to gain a better understanding of how high sea levels were back then—and how future climate change might further exacerbate the effect of surging sea levels on land.

Although they collected coral fossil samples last year in the southern Bahamas, the researchers had planned another fieldwork trip along the shorelines of the northern Bahamas in the late spring of 2020. Rising and falling land levels have confounded calculations of past sea levels, and the researchers think their coral fossil samples will be useful in decoding this conundrum, because the corals grow very close to the sea surface. Together, the 2019 and 2020 datasets would have given valuable insights into solving the mystery.

But, amidst the [coronavirus pandemic](#), worldwide travel bans, and lockdowns, all of the researchers' plans to travel to the northern Bahamas have come to a screeching halt. The laboratories at Lamont closed in mid-March, so the samples of coral fossils that were painstakingly collected from the southern Bahamas have remained untouched since then. The researchers won't be able to access or analyze them for the foreseeable future.

Jacqueline Austermann, an [earth scientist](#) at Columbia University's Lamont-Doherty Earth Observatory, says the National Science Foundation (NSF) had awarded them a grant for this project, which is led by Lamont's Maureen Raymo. "Now that everything is postponed, we have to wait and see how the NSF deals with this situation. We might have to ask for a cost extension in the future and I'm sure a lot of other scientists will be in the same situation," said Austermann.

Although some scientists borrowed microscopes, sediments, and cores

from their laboratories before they closed, to continue their analyses at home, Austermann and the rest of the team don't have that luxury. The coral fossils need to be closely studied and evaluated inside the laboratory in order to accurately determine at what point in history they were alive.

"I mostly work by running simulations of sea level change on my computer. So, for me, it has been not too difficult to work from home," said Austermann." But for the others who need to be in the laboratory, it has been challenging for them to continue working on this project."

Austermann's team is far from being the only ones in dealing with situations like these. Scientists across the Earth Institute, Columbia University, and the world are finding themselves barred from their laboratories and having to postpone important research trips. In addition to its devastating impact on human life, the COVID-19 pandemic is creating significant setbacks for climate research.

Hoping against hope, despite canceled fieldwork

Lamont paleoclimatologist and adjunct senior research assistant Nicole Davi was scheduled to travel to Medellin, Colombia, to study the tree rings of high-altitude tree species.

By gathering data from [tree rings](#), paleoclimatologists can understand how ecosystems have responded to climate change over the years. In South American countries like Colombia particularly, there is a dearth of tree-ring data because of civil war and decades-long political unrest.

Davi explained that most trees in tropical regions don't produce rings because the growing seasons are constant—there isn't a distinct winter and summer. However, a few species have shown some promise of having rings, because when there's a fairly long dry season, these trees

can go into dormancy. "That's how you get annual rings that can be analyzed in a lab," said Davi. "And it's also what we need to create paleoclimate records."

As part of a Fulbright project, Davi had planned on working with the faculty at Medellin's EAFIT University to sample trees during fieldwork in April and try and produce tree ring records. Davi hopes that collaborating with the team of EAFIT scientists could potentially help to reconstruct the ancient climate in this region.

This fieldwork trip has now been cancelled. "I am not going to Colombia at this point. But I am hoping that when things settle down, I will still be able to pursue this research project. I am going to prepare for it like I'm still going. I'm still researching and networking with the climate scientists in Medellin," said Davi. "I'm also thinking about how I could potentially apply for permits to do research."

Being creative with limited resources

Another paleoclimatologist and Lamont associate research professor, Laia Andreu-Hayles, won an NSF grant to travel to Tacna in southern Peru and Madidi National Park in Bolivia in June and July to collect samples from ancient tree rings. Her team had planned on merging the new data with another study on tree trunks that had washed into caves, to get a clearer picture of climate variations in these regions. "I was supposed to be working on three different projects, but everything is so uncertain now. The fieldwork has been cancelled. We can't even do any lab work," said Andreu-Hayles.

To prevent any data gaps from taking place during the lockdown, a Ph.D. student is analyzing their data on a computer. A technician on the team borrowed a stereomicroscope and [computer equipment](#) from the lab in order to measure tree rings that they had previously collected. "We

realized that we need to be creative with the limited resources that we now have," Andreu-Hayles added.

But when it comes to extracting the cells from [tree rings](#), that can only be done in the wet lab, and so that work had to be halted during the lockdown.

Longer-term impacts

The looming possibility that Antarctica's massive Thwaites glacier could collapse within a few centuries or even worse, in the coming decades, is a major concern for climate scientists. The rapidly melting glacier is estimated to contain enough water to raise global sea levels by more than [three feet](#).

In 2018, around [100 scientists from seven countries](#) and various organizations, including Lamont-Doherty Earth Observatory, were brought together to study the Thwaites glacier and its future. Jonathan Kingslake, a Lamont assistant professor, says he is all set to collect data on the properties of rocks and sediments while camping by the Thwaites glacier in November. The expedition is expected to last for four months.

The field trip is not cancelled yet. "Our biggest concern at the moment is whether the equipment we need for the expedition that is meant to be shipped in July or August will go as planned or not," said Kingslake.

The equipment includes GPS systems, ice-penetrating radar, hot water drilling equipment, long cables, and explosives, among other things. By ship, it takes several months for these heavy and expensive types of equipment to safely reach Antarctica. If all of this equipment had to be transported by airfreight, the costs would increase exponentially.

"Everything is so uncertain at the moment. We could be looking at a

much longer period of intermittent disruption, which could presumably cause the cancellation of the project," added Kingslake.

Provided by Columbia University

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