

# How can changing climate affect a civilization?

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Credit: Columbia University

William (Billy) D'Andrea is a Lamont-Doherty Earth Observatory paleoclimatologist and a Center for Climate and Life Fellow; he studies how environments have changed over time by reconstructing climate

history using the molecules preserved in lake sediment cores. Fat molecules from plants and algae are preserved in the sediments that accumulate each year on the bottom of lakes and the ocean. D'Andrea analyzes these to learn how temperature, precipitation, and evaporation have changed through time.

D'Andrea received funding from the Center for Climate and Life to investigate the interactions that took place among the people of Easter Island, their environment, and the [climate](#) of the eastern Pacific. He'll visit the island in early 2018 to collect sediment cores from the island's lakes, which he'll use for these new analyses.

## **Q. What exactly are the climate questions you're trying to address?**

A. This project is about trying to understand the [climate history](#) on Easter Island over the last few thousand years. More specifically, it's about trying to learn how communities dealt with past climate change and whether natural climate changes were an important factor in the demise of the Rapa Nui culture, the original people of Easter Island.

One key aspect of the problem is determining the natural climate variability of the island. What has the climate been like in the last few thousand years? How has the hydrology changed on timescales that are relevant to human beings and human decisions, such as those related to water management? We have some indication that the island has gone through periods of prolonged drought, and this is something that we can potentially expect in the future too.

The research is really about trying to understand exactly how future changes in climate, the decisions people are making, and the impacts we're having on the [global climate](#) system are going to impact this part of

the world, the people that live on Easter Island and other [islands](#) in the South Pacific.

## **Q. What do you find most exciting about this work?**

A. There's a controversy about whether the Easter Islanders represent an example of people whose own resource use and potential resource mismanagement led to the downfall of their culture. But the evidence for that narrative is weak and incomplete. I think it's exciting that we can actually probe that narrative. I like that we can take a new approach and new types of measurements and try to address the question of whether Easter Island is actually an example of "ecocide," where people's ecological decisions cost them their livelihood. Or if that idea is overblown and it's more that the environmental changes that have happened on the island are due to natural climate variability. We might find that it's true and mismanagement was important in their demise, but we may find the opposite—that it really had nothing to do with their resource use.



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It's cool that we can hopefully provide new objective, observational evidence to try to address and clear up some of these questions. I'm excited to be part of this ongoing discussion and to have the opportunity to go to Easter Island and ask these scientific questions.

**Q. How might this research advance understanding of the challenges posed by climate change?**

A. We'll be generating new, continuous data of how [regional climate](#) naturally varied in the eastern Pacific on Easter Island. Those records

will enable us to pinpoint the timing of when certain climate events took place. For instance, any periods of drought: We'll be able to quantify the magnitude of drought, understand how long droughts lasted and when. And this allows us to try to understand how the climate of the eastern Pacific is related to other forces and the climate system as a whole.

One of the primary goals of the project is trying to understand how the climate system works and how different regions are sensitive to large-scale perturbations in the climate system. Anytime we generate a new data set that's quantitative and interpretable in a climate context, it's helpful for understanding the climate system—and that then helps make better projections for the future.

## **Q. What gives you hope?**

A. Thinking through this research and seeing how people have responded and adapted to past natural changes in climate reminds me that humanity is adaptable. When we're forced to adapt, we can because humans are creative and we use technology in amazing ways. So that provides me with hope.

## **Q. What's your favorite climate read?**

A. The Two-Mile Time Machine by climate scientist Richard Alley. It's one of the things that got me interested in doing paleoclimate research. He describes the record of the Greenland ice cores and how you can use stratigraphy to go back in time. It's a really inspiring page-turner.

Provided by Columbia University

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