What corals can tell us about climate change

UAlberta scientists use corals as indicators of reef health over the past 500 years—and explore how climate change will affect reefs in the future.

By Andrew Lyle on September 16, 2019

Scientists are using corals from the Cayman Islands to get a glimpse into Caribbean Sea temperatures over the past 500 years—critical information in predicting the effect of climate change on coral reefs.

“Corals are very important for the ocean ecosystem. Upwards of 60 per cent of ocean species live in coral reefs,” said Simone Booker, PhD student in the University of Alberta’s Department of Earth and Atmospheric Sciences and lead author of the paper. “In this study, we’ve looked at how corals have responded to high sea temperatures in the past, giving us a better understanding of how the reefs that depend on them will fare in the future.”

Corals grow in layers, similar to tree rings, and are highly sensitive to ocean conditions. Using X-rays and computerized tomography (CT) scans, the scientists were able to identify four distinct phases of ocean temperature changes, including a drastic increase from 1932 to 2006, with a milder rise from 2006 to 2014.

“With our current global climate variability, a lot of corals are bleaching due to high sea temperatures—an indicator of poor coral health that can lead to death,” explained Booker. “There’s a distinct need to understand how these rising temperatures will affect reef health in the future.”

From accident to opportunity

“All corals around the Cayman Islands are protected—you’re not allowed to collect or touch them,” said Brian Jones, professor in the Department of Earth and Atmospheric Sciences supervising Booker’s research. “But in this case, a cruise ship anchor accident destroyed a patch of the reef, and we were able to work through the Cayman government to obtain these samples for study.”

Though the coral will take 50 to 60 years to regrow, the dead corals represent a unique opportunity for study that gives scientists a window into the seas of the past.

“The oldest of the corals we studied started growing in 1474, while the majority grew from 1815 onward.” said Booker. “Most climate change studies are conducted at higher latitudes than the Carribbean, so by using corals to model climate change impacts in these ecosystems, we’re able to turn an unfortunate accident into yielding important scientific results.”

The paper, “Insights into sea surface temperatures from the Cayman Islands from corals over the last ~540 years,” was published in Sedimentary Geology. (doi: 10.1016/j.sedgeo.2019.06.008)

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