

Corals Can't Talk, but They Can Tell Us a Lot

As is true for the entire planet, the Galápagos Islands are threatened by climate change. But in what ways? Scientists rely on data from the past to help make accurate predictions about the future. Direct sea surface temperature data from around the Galápagos are, however, limited. Scientists have been able to work around this issue by using corals to help build a record of past temperatures. Coral builds up in layers as individual coral polyps build new skeletons year after year. Calcium carbonate makes up the majority of a coral's skeleton. However, sometimes strontium replaces calcium in the skeleton. The colder the water, the more strontium tends to be added. By examining the ratio of strontium to calcium in different parts of the coral's skeleton, scientists can determine the sea temperatures during that year. In this way, coral can act as a kind of indirect thermometer of past ocean temperatures.

Scientists took small samples from two corals living around Wolf Island in the Galápagos. They measured the ratio of strontium and calcium at different points in the coral samples that corresponded to different years of growth. After examining the corals' strontium to calcium ratios, scientists were able to show that sea temperatures around Wolf Island had increased 1.19°C from 1940 to 2010. This is an increase of 0.17°C per decade. Although that might seem like a small change in temperature, it can have tremendous effects on the ecosystem, including the corals themselves. **Figure 1** shows some of the coral skeletons that have washed ashore after over 90% of the corals around the Galápagos Islands died after extreme El Niño events.



Figure 1. Coral Remains on Isabela Island on the Galápagos Islands. Close up (left) of a dead, bleached coral. The beach on Isabela Island is covered in white coral skeletons (right), which are easy to spot amongst the black rocks that make up this shoreline.

Source: Shannon Morey, used with permission.

This research has important implications for the Galápagos Islands. The Parque Nacional Galápagos is a World Heritage site, meaning that it is recognized internationally for its ecological and historical importance. The park helps drive a great deal of tourism to Ecuador and is the center for many important biological studies. Now that scientists know that larger areas of the park are vulnerable to climate change, it will be important to institute management systems that will help mitigate the damage due to climate change.

Reference

Jimenez, Gloria, Julia E. Cole, Diane M. Thompson, and Alexander W. Tudhope. 2018. "[Northern Galápagos Corals Reveal Twentieth Century Warming in the Eastern Tropical Pacific](#)." *Geophysical Research Letters* 45(4): 1981–988. doi:10.1002/2017gl075323.

BiteScientist Profile



Shannon Morey traveled to the Gálapagos in July 2019 as part of an Ecology Project International teacher professional development and research trip through the Knowles Teacher Initiative. She is pictured here on Isabela Island in the Gálapagos Islands. Shannon teaches physics at Abbott Lawrence Academy in Lawrence, Massachusetts and was the 2022 MA STEM Teacher of the Year. She tries to bring in environmental issues to her physics class as much as possible and engage students in discussions about how these issues impact them and their community. In her free time she enjoys spinning, cooking, and yarn crafts.

This lesson was developed in a partnership between BiteScis and KELP (Knowles Experiential Learning Project). Find more lessons and resources from KELP at www.teachkelp.com.