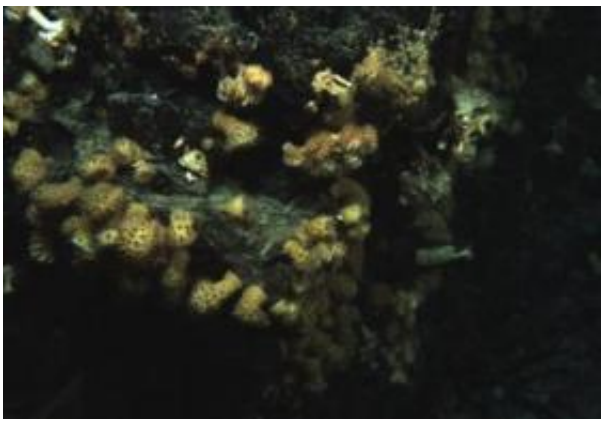
Deep-sea researchers uncover several new species and thousands of fossilized coral samples

February 4 2009



The coral the researchers were looking for, d. dianthus, can be seen in the upper middle of the picture. Its look-alike anemone, a new species, is below and to the left. Credit: Advanced Imaging and Visualization Laboratory, WHOI/Jess Adkins, Caltech

Scientists from the California Institute of Technology (Caltech) and an international team of collaborators have returned from a month-long deep-sea voyage to a marine reserve near Tasmania, Australia, that not only netted coral-reef samples likely to provide insight into the impact of climate change on the world's oceans, but also brought to light at least three never-before-seen species of sea life.

"It was truly one of those transcendent moments," says Caltech's Jess

Adkins of the descents made by the remotely operated submersible Jason. Adkins was the cruise's lead scientist and is an associate professor of geochemistry and global environmental science at Caltech. "We were flying--literally flying--over these deep-sea structures that look like English gardens, but are actually filled with all of these carnivorous, Seuss-like creatures that no one else has ever seen."

The voyage on the research vessel RV Thompson explored the Tasman Fracture Commonwealth Marine Reserve, southwest of Tasmania. The voyage was funded by the National Science Foundation and was the second of two cruises taken by the team, which included researchers from the United States--including scientists from Caltech and the Woods Hole Oceanographic Institution in Massachusetts, which owns and operates the submersible Jason--and Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO). The first of those voyages was taken in January 2008, with this most recent one spanning 33 days from mid-December 2008 through mid-January 2009.

This is one of the new species seen during the voyage of the RV Thompson. Credit: Advanced Imaging and Visualization Laboratory, WHOI/Jess Adkins, Caltech

Up until now, the area of the reef the scientists were exploring--called

the Tasman Fracture Zone--had only been explored to a depth of 1,800 meters (more than 5,900 feet). Using Jason, the researchers on this trip were able to reach as far down as 4,000 meters (well over 13,000 feet).

"We set out to search for life deeper than any previous voyage in Australian waters," notes scientist Ron Thresher from CSIRO's Climate Adaptation and Wealth from Oceans Flagships.

The cruise had two main goals, says Adkins. One was to try to use deep-sea corals to reconstruct the paleoclimate--with an emphasis on the changes in climate over the last 100,000 years--and to understand the fluctuations in CO2 found in the ice-core records. Investigators also wanted to look at changes in the ocean over a much smaller slice of time--the past few hundred to one thousand or so years. "We want to see what's happened to the corals over the Industrial Revolution timescale," says Adkins. "And we want to see if we can document those changes."

The second goal? "Simply to document what's down there," says Adkins.

"In one sense, the deep ocean is less explored than Mars," he adds. "So every time you go to look down there you see new things, magical things."

Among the "magical things" seen on this trip were

• a new species of carnivorous sea squirt that "looks and behaves like a Venus fly trap," says Adkins;
• new species of barnacles (some of which Adkins says may even belong to an entirely new family); and
• a new species of sea anemone that Adkins calls "the bane of our existence," because it looks just like the coral they were trying to collect.

The sea anemone was particularly vexing for the researchers, because

they were hoping to find deep-sea (or abyssal) samples of the fossilized coral, but were unable to find the coral much below 2,400 meters (nearly 7,800 feet). The look-alike sea anemone, on the other hand, kept popping up all over the place on the deep-sea floor, raising--and then dashing--the scientists' hopes.

"Not being able to find the coral down deeper was our single biggest disappointment on the trip," says Adkins.

Still, the 10,000-plus samples collected will help the researchers begin their work of deciphering just what has been happening to the ocean throughout the centuries of climate change, and during and between glacial cycles. First up: dating the fossils collected on this trip in order to determine which slice of history they came from.

"The deep ocean is part and parcel of these rapid climate changes," says Adkins. "These corals will be our window into what their impact is on climate, and how they have that impact. The info is there; now we just have to unpack it."

Source: California Institute of Technology