ScienceNews for Students

ENVIRONMENT

Busy bacteria leave big mark

Earth's earliest life-forms built mounds on an Antarctic lake bottom

BY STEPHEN ORNES MAY 4, 2011 — 2:42 PM EST

Scientists recently dove into Lake Untersee, a large freshwater lake in Antarctica, and discovered fields of cone-shaped mounds on the lake floor. Though they look like spooky, alien traffic cones, these mounds aren't the work of extraterrestrials. The scientists say the cones, called stromatolites, were built by bacteria, and the construction project probably took thousands of years.

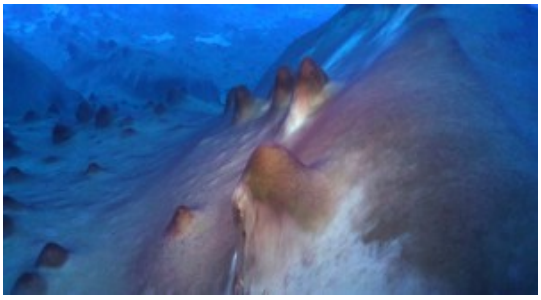
"We had never seen anything like that," Dale Andersen told *Science News.* "It totally blew us away."

Under Untersee: A diver collects specimens from stromatolites, cone-shaped mounds built by bacteria, on the floor of Antarctica's Lake Untersee. © 2011 Dale T. Andersen - http://daleandersen.seti.org

Andersen is a researcher at the SETI Institute in Mountain View, Calif. He studies organisms that live in extreme environments, and he braved Lake Untersee's frigid waters to see the bacteria-built stromatolites and lead a study on them. By studying life in harsh places, scientists like Andersen hope to learn more about life in general.

Over the years, researchers have discovered organisms that can survive in surprising environments not unlike the hostile conditions on other planets. Lake Untersee, for example, is super-cold and contains an abundance of a compound called methane. These same conditions — cold and lots of methane — also describe many of the moons of Jupiter and Saturn.

Stromatolites are some of the oldest signs of life on our planet. Bacteria started building these structures billions of years ago. Scientists study the fossilized remains of those ancient mounds for clues to how the earliest organisms survived. The underwater discovery in Antarctica gave the researchers a way to peer back in time to the beginning of life on our planet.



Kind of Blue: Stromatolites on the floor of an Antarctic lake are bathed in blue light. © 2011 Dale T. Andersen http://daleandersen.seti.org

"It's like going back to early Earth," Dawn Sumner told *Science News.* Sumner, who also worked on the new study, is a geologist at the University of California, Davis. "These are just incredibly beautiful microbial landscapes," she says. Bacteria are a type of microbe, or extremely small organism.

Scientists know of only a few places on Earth where stromatolites develop. Andersen and his team say those at the bottom of Lake Untersee have unusual shapes and sizes. The lake's stromatolites are large: some stand about a foot and a half tall. They're made mostly of cyanobacteria, which

are the earliest known life-form on Earth. Like plants, cyanobacteria convert sunlight to food in the process called photosynthesis.

The View From Above: Beneath the frigid surface of Antarctica's Lake Untersee are mounds built by ancient bacteria.

The team has explored other lakes in Antarctica but hasn't found the same stromatolites. Each lake is different: Some have a thicker ice cover, which affects how much sunlight reaches the water and the organisms beneath the surface. The chemical makeup of the water may also vary from lake to lake. So far, the researchers don't know what makes Lake Untersee a happy home for tall stromatolites.

"There's something very special about this particular example that's allowing these large conical stromatolites to form," Sumner told *Science News.*

Later this year, the scientists have another chance to investigate: In November, they'll return to the freezing waters to collect a few more samples of the bacteria-built mounds at the bottom of Lake Untersee.

BRRRRRRRRRRR! To reach the surface of the lake, researchers have to cut through a thick layer of ice. Here, Andersen gets ready to go under. © 2011 Dale T. Andersen http://daleandersen.seti.org

POWER WORDS (adapted from the New Oxford American Dictionary)

microbe A microorganism, especially a bacterium.

bacteria A large group of single-celled organisms that can live almost anywhere, including extreme physical environments and inside the human body.

stromatolite A mound built of layers of cyanobacteria and trapped sediment. Stromatolites are found in rocks more than three billion years old and are the earliest known fossils. Stromatolites are still being formed in a few places.

cyanobacteria Bacteria that are capable of photosynthesis. They represent the earliest known form of life on Earth.

photosynthesis The process used by plants and some other organisms to convert sunlight into food.

Readability Score:

8.2

NGSS:

- MS-LS4-1
- MS-LS4-2

Further Reading

FURTHER READING

- A. Witze. "**Antarctic lake hides bizarre ecosystem (http://www.sciencenews.org/view/generic/id/72748/title/Antarctic_lake_hides_bizarre_ecosystem).**

." Science News. May 7, 2011.

- If you have Google Earth, you can use your computer to fly over Lake Untersee: "**Lake Untersee Met Station.kmz (https://www.societyforscience.org/document.doc?id=298).** "
- Keep up with Dale Andersen at **his blog (http://daleandersen.seti.org/Dale_Andersen/Dale_Andersens_Website.html).** .
- Keep up with Dawn Sumner at **her blog (http://dawninantarctica.blogspot.com/).** .
- S. Ornes. "**The algae invasion (http://www.sciencenews.org/view/generic/id/59076/title/FOR_KIDS_The_algae_invasion).** ." Science News for Kids. May 11, 2010.
- Learn more about **astrobiology (http://astrobiology.com/).** , the study of how life begins and how it may exist on other worlds.

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