

Shedding light on microbial communities in deep aquifers

October 21 2021, by Kate Wheeling



Researchers installed a packer system near Ibra, Oman, in January 2019 to study microbial communities in deep aquifers. The tripod installed at one well of a multiborehole observatory was used to suspend the packer assembly downhole. Credit: Nothaft et al.

Underground in peridotite aquifers, the rock can interact with water to produce hydrogen, which microbes can use to power their cells, research suggests. Yet much of the research on these water-rock interactions has

been conducted using water samples collected from open wells or seeps that may have been contaminated by exposure to the atmosphere.

To better understand these [water](#)-rock interactions' impacts on microbial community compositions, Nothaft et al. studied the hydrogeochemistry of these interactions in peridotite aquifers at specific depths using a packer system, which includes inflatable rubber bladders, or packers, that can be used to gather [water samples](#) from targeted areas unreachable from [surface waters](#). The team collected samples from two 400-meter-deep wells in the Samail Ophiolite in Oman, measuring dissolved gases and microbial community compositions using 16S rRNA gene sequencing.

The analyses revealed an ecosystem teeming with chemolithoheterotrophic bacteria in the class Thermodesulfobionia, which yield energy by combining hydrogen oxidation with sulfate reduction and build their cells using organic carbon from the environment. More work is needed to find evidence for microbe-induced sulfurization within these boreholes in Oman, the authors note, but the study provides a new application of a methodology for understanding how hydrologic and biogeochemical processes influence microbial communities in deep aquifers on Earth and perhaps beyond our own planet.

More information: Daniel B. Nothaft et al, Aqueous Geochemical and Microbial Variation Across Discrete Depth Intervals in a Peridotite Aquifer Assessed Using a Packer System in the Samail Ophiolite, Oman, *Journal of Geophysical Research: Biogeosciences* (2021). [DOI: 10.1029/2021JG006319](#)

This story is republished courtesy of Eos, hosted by the American Geophysical Union. Read the original story [here](#).

Provided by Eos

Citation: Shedding light on microbial communities in deep aquifers (2021, October 21) retrieved 24 June 2024 from <https://phys.org/news/2021-10-microbial-deep-aquifers.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.