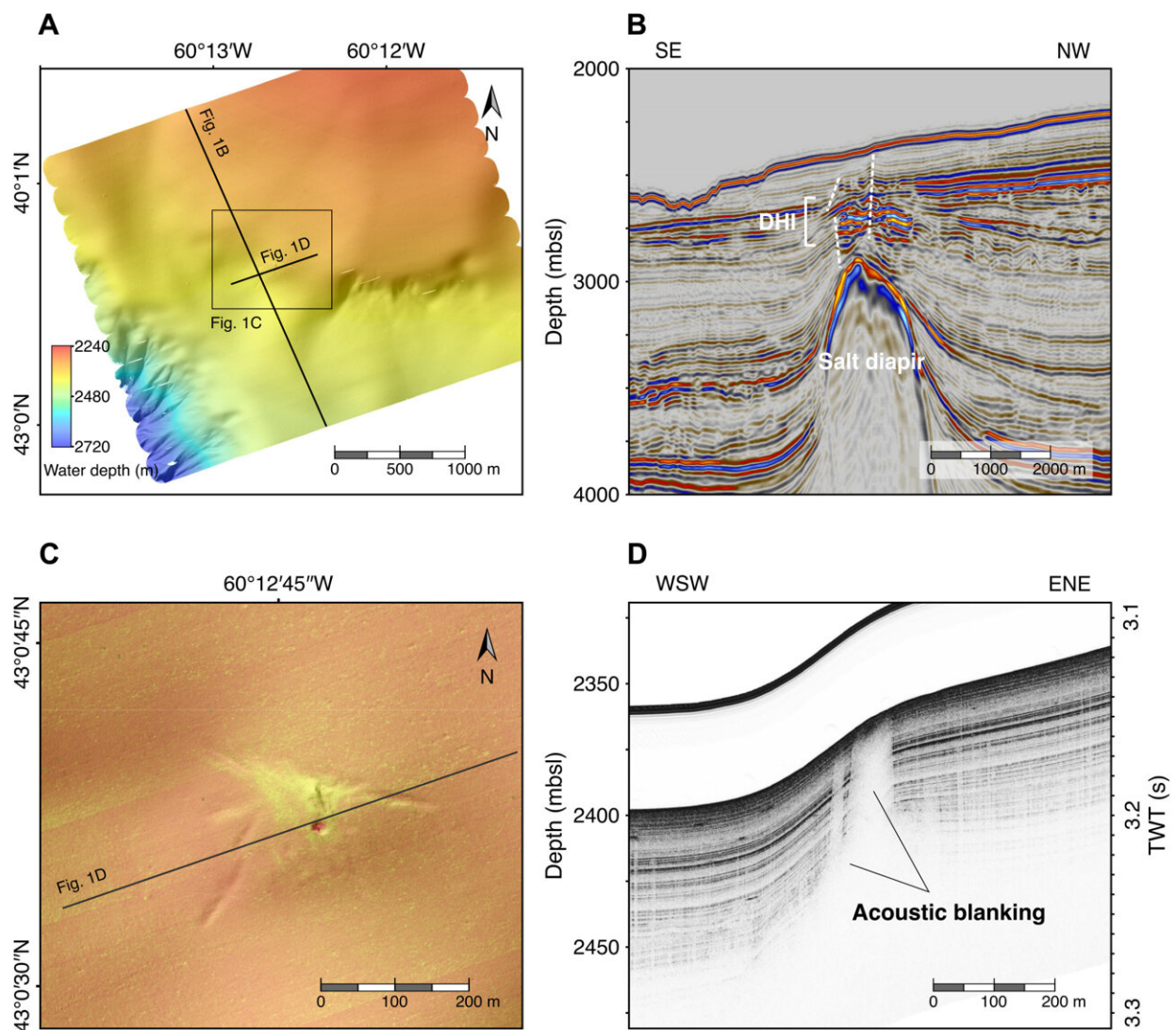


# Genetic analysis of sub-seafloor ocean bacteria suggests seepage carries them great distances

August 29 2022, by Bob Yirka



Deep subsurface to surface geofluid migration. (A) Seafloor surface map

derived from autonomous underwater vehicle (AUV) multibeam bathymetric sonar data. (B) Seismic cross section through the Tangier 3D extending to 4000 m below sea level (mbsl) and >1500 m below sea floor (mbsf), showing a buried salt diapir and the location and direction of crestal faults (white dashed lines), including an interval with direct hydrocarbon indicators (DHI). SE, southeast. (C) Combined mosaic of side scan sonar data and shaded relief bathymetry of the area surrounding a seep structure, indicating a pockmark feature and a small mound morphology. High backscatter intensity, related to distinctive properties of near-surface sediment, is shown in light-yellowish tones. (D) AUV-based sub-bottom profiling showing localized acoustic blanking under the seep structure, indicative of upward migration of fluid originating deeper in the sediment. WSW, west-southwest; ENE, east-northeast; TWT, two-way travel time. Credit: *Science Advances* (2022). DOI: 10.1126/sciadv.abn3485

A team of researchers affiliated with multiple institutions in Canada, working with a colleague from the U.S., has found evidence of long-lived sub-seafloor bacteria seeping up into the ocean and traveling long distances via currents. In their paper published in the journal *Science Advances*, the group describes their genetic study of bacteria samples collected from the seafloor.

Prior research has suggested that huge amounts of bacteria live under the world's oceans, some up to thousands of meters deep. Those at such depths enter a suspended state, waiting for favorable conditions to arise. When that happens, the bacteria awaken and resume their activities.

Prior research has also shown that some of the bacteria that live under the sea consume oil that seeps from the floor up into the sea. Research has also suggested that some oil-loving bacteria seep into the ocean along with the oil. In this new effort, the researchers learned more about such bacteria by first finding oil seeps and then by capturing and studying the bacteria they contain.

The researchers found oil seeps by conducting acoustic surveys on a part of the continental shelf off the southwest coast of Nova Scotia. They sent down an autonomous submarine to investigate the seeps. Next, they lowered tubes from a ship to the oil seeps and sucked up mud samples from 14 sites across a wide swath of [ocean floor](#).

Back in their lab, the researchers heated the samples to awaken dormant bacteria—those that were not the kind they were looking for were killed by the heat. Then, the researchers sequenced the DNA of the remaining bacteria. They found that those living in the oil had [genetic differences](#) to those that did not live in the oil.

They also found that those that did live in the oil were nearly identical to those that lived in oil seeping from sites thousands of meters apart on the ocean floor. The researchers suggest this indicates that once dormant oil-eating [bacteria](#) make their way to the ocean, they awaken and travel thousands of kilometers in [ocean currents](#)—a process, they note, that could take decades.

**More information:** Daniel A. Gittins et al, Geological processes mediate a microbial dispersal loop in the deep biosphere, *Science Advances* (2022). [DOI: 10.1126/sciadv.abn3485](https://doi.org/10.1126/sciadv.abn3485)

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