

Water 'microhabitats' in oil show potential for extraterrestrial life, oil cleanup

August 7 2014



A site at Pitch Lake where liquid oil ascends to the surface. Credit: Rainer Meckenstock

An international team of researchers has found extremely small habitats that increase the potential for life on other planets while offering a way to clean up oil spills on our own.

Looking at samples from the world's largest natural asphalt lake, they found active microbes in droplets as small as a microliter, which is about 1/50th of a drop of water.

"We saw a huge diversity of bacteria and archaea," said Dirk Schulze-Makuch, a professor in Washington State University's School of the Environment and the only U.S. researcher on the team. "That's why we speak of an 'ecosystem,' because we have so much diversity in the [water droplets](#)."

Writing in the journal *Science*, the researchers report they also found the microbes were actively degrading [oil](#) in the asphalt, suggesting a similar phenomenon could be used to clean up [oil spills](#).

"For me, the cool thing is I got into it from an astrobiology viewpoint, as an analog to Saturn's moon, Titan, where we have hydrocarbon lakes on the surface," said Schulze-Makuch. "But this shows astrobiology has also great environmental applications, because of the biodegradation of oil compounds."

Schulze-Makuch and his colleagues in 2011 found that the 100-acre Pitch Lake, on the Caribbean island of Trinidad, was teeming with microbial life, which is also thought to increase the likelihood of life on Titan.

The new paper adds a new, microscopic level of detail to how life can exist in such a harsh environment.

"We discovered that there are additional habitats where we have not looked at where [life](#) can occur and thrive," said Schulze-Makuch.

Analyzing the droplets' isotopic signatures and salt content, the researchers determined that they were not coming from rain or

groundwater, but ancient sea water or a brine deep underground.

More information: "Water droplets in oil are microhabitats for microbial life," by R.U. Meckenstock et al. *Science*, www.sciencemag.org/lookup/doi/10.1126/science.1252215

Provided by Washington State University

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