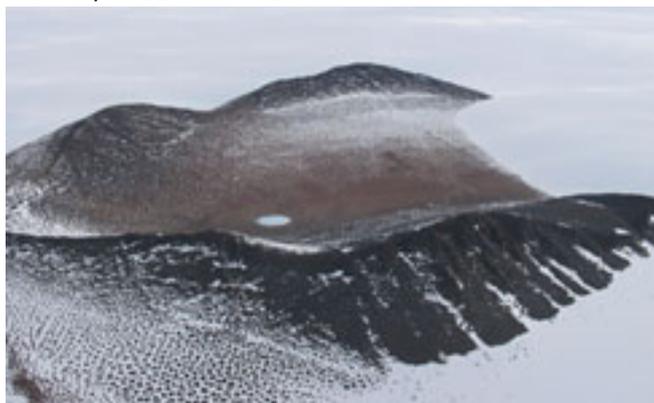


Scientists find life near the South Pole

Planet Earth Online

Scientists have found a simple but functioning community of bacteria and micro-organisms thriving in the lakes and soils of the Dufek Massif region in Antarctica. These are the southernmost terrestrial and aquatic ecosystems ever described on Earth, less than 800km from the South Pole.



The lakes range from small ponds a few metres in diameter to a proglacial lake 750m in diameter.

The ecosystems were found in glacial lakes, ponds and soils in the Davis and Forlidas valleys, part of the Dufek Massif at 82°S latitude. The lakes are covered by ice for most of the year, but in some summers the ice melts around the edges.

British Antarctic Survey biologist Dr Dominic Hodgson led a scientific expedition to the site in December 2003. This was only the third visit to the Davis and Forlidas valleys since their discovery in 1957. 'Our aim was to do a bit of traditional descriptive science to find out what is there, and combine this with some of the latest techniques in molecular biology,' he says.

The team collected samples of the water and the mats of blue-green algae in the lakes and soils. 'In the lakes the mats are surprisingly abundant covering most of the lake floors, whereas on the soils the mats look like dried lettuce; they grow very large there because there are no grazers eating them,' says Hodgson. They also photographed a few pin-head sized lichens, so small and rare that sampling was impossible.



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Published on Chem.Info (<http://www.chem.info>)

Cyanobacteria around boulder.

The team didn't find any evidence of the roundworms or arthropods (invertebrates with external skeletons, like crabs) common in other Antarctic ecosystems, and identified only one diatom shell - a type of phytoplankton - which was likely brought to the lake by the wind. They found six species of blue-green algae (cyanobacteria), one type of green algae and 32 different bacteria. The only animals living in the area are some small aquatic creatures called rotifers and three species of tardigrade, a group of microscopic invertebrates common in aquatic environments. And that's it.

'The list is incredibly limited and it fits on a normal sheet of paper,' says Hodgson, who reported the findings in *Polar Science*. 'If you would apply the same analytic methods to samples from anywhere else, you would get pages and pages listing hundreds of species.'

Hodgson says that the community found in the lakes and soils of the Dufek Massif is a functional ecosystem, but 'this is as simple as ecosystems get,' he adds.

The Dufek Massif is a cold desert with a harsh climate and isolated by its remote location, which probably explains the extreme lack of biodiversity encountered by the scientists. So how do these species relate to organisms found elsewhere?

Genetic analysis revealed that the Dufek Massif's blue-green algae are similar to the strains found in other extreme environments. But the local tardigrade species, the lichen and some bacteria aren't found anywhere else.

The discovery of Antarctic endemic species, which evolved locally in such harsh conditions, suggests that Antarctica may not be as barren as we thought. 'The evidence suggests that the some elements of the Antarctic fauna and flora have evolved in ice-free areas, throughout all the glacial cycles, since the time of Gondwana,' says Hodgson.

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