Fungi from submarine volcanic rocks, Vesteris Seamount, Greenland basin

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Life in the igneous oceanic crust has been the subject of intense research for the last decades, yet, due to difficulties with sampling, largely underexplored. As with the marine sediments, investigations have mostly focused on prokaryotes while micro-eukaryotes consistently have been ignored. However, a growing awareness of fossil fungi in modern as well as ancient oceanic crust, the presence of live fungi in marine sediments, at hydrothermal vents, and rare reports of live fungi from oceanic crust, has sparked the exploration of fungi in igneous oceanic crust.

In vesicular seafloor basanites from the Vesteris Seamount, Greenland Basin, in the northern Atlantic Ocean fossil cryptoendolithic fungi have previously been described. The fossils were filamentous and some displayed different stages in zygospore formation, indicative of the reproductive cycle seen in Zygomycetes. Altogether, they were interpreted as belonging to both Ascomycetes and Zygomycetes, suggesting a high fungal diversity.

In August 2019, the RV *Maria S. Merian* MSM 86 cruise, returned to the Vesteris Seamount and basanites were sampled for isolation of live cryptoendolithic fungi. So far, five fungal isolates from enrichments obtained from internal parts of vesicular basalts sampled at Vesteris have been identified as being related to: *Rhodotorula diobavata, Acremonium sp., Penicillium rubens, Aureobasidium pullulans* and *Debaryomyces hansenii.* These are known marine fungi, some of which are implicated in manganese oxidation and siderophore production, thus indicating a strong connection to the fungal functionalities and the geochemistry of the mafic host rock. Our results demonstrate that fungi exist as vital members of communities in submarine rock and that they are a key but neglected ecological and biogeochemical force in this biome.