

## **Microbial nitrogen cycling in cold oceanic crustal fluids at North Pond**

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Oceanic crust is the largest aquifer on Earth. The volume of seawater flowing through the basaltic crust is massive and the microbiome of this deep marine subsurface biosphere has been estimated to be substantial. Consequently their metabolic activity may significantly contribute to global biogeochemical cycles. Earlier and recent studies provide insight into the microbial community composition of oceanic crustal fluids, but information on the microbial ecophysiology is broadly missing. In order to investigate the microbial transformation of fixed nitrogen compounds in crustal aquifer fluids, fluids were sampled from different horizons of two neighbouring CORK (Circulation Obviation Retrofit Kit) observatories at the North Pond sediment pond. This site is located on the western flank of the Mid Atlantic Ridge and is characterized by relatively young oceanic crust and cold fluids. The crustal fluids contained nitrate, which potentially may serve as electron acceptor for respiration, while ammonium may serve as electron donor. Here, we present nitrogen conversion rates. In a multidisciplinary approach these data are combined with the determination of the natural isotopic compositions and the analysis of relevant functional genes from a metagenomic dataset to investigate microbial nitrogen cycling at North Pond.