

Microbial and Geochemical Variations in Sediments along the Arctic Mid-Ocean Spreading Ridge System

STEFFEN L JØRGENSEN^{1*}, RUI ZHAO^{1,2}, DESIREE
ROERDINK¹, INGEBORGB ØKLAND¹, TAMARA
BAUMBERGER¹, INGUNN THORSETH¹, ROLF B PEDERSEN¹

¹Centre for Geobiology, Department of Earth Science,
University of Bergen, Norway (*correspondence:
steffen.jorgensen@uib.no)

²Centre for Geobiology, Department of Biology, University
of Bergen, Norway

The Arctic mid-ocean spreading ridge system, which includes the Kolbeinsey, Mohns, Knipovitch, Molloy and Gakkel ridges and the Lena Trough, runs along the seafloor for more than 3500 km [1]. Due to the ultra slow spreading rate and relatively short distance to land this ridge system is one of few where a considerable amount of sediment accumulate along the flanks and within the rift valley. The origin of the sediments varies between the different ridge segments and between the Eastern and the Western flank. In addition the sediments accumulating in the rift valley are likely to be influenced, to a varying degree, by the geochemical input from the considerable number of active and extinct vent fields located along the ridge system. Hence, studies along the Arctic mid-ocean ridge provide an opportunity to investigate the impact of geochemical and geophysical variability on sedimentary microbial communities and their activity, which in turn impacts the geochemical fluxes in and out of the seafloor.

Here we present the data from 15 sediment cores with respect to down-core microbial community structure and geochemical pore fluid concentrations. The sample material cover the Western and Eastern ridge flanks as well as the rift valley and are distributed over three of the six ridge segments. Data from more than 200 discrete sediment horizons was analysed and reveal a highly diverse environment both in terms of geochemistry and microbiology. The variability even within relatively small areas was high and resulted in significant differences in the geochemical fluxes. This comparative study show that the sedimentary ridge system is highly diverse and suggest that extrapolations from one deep-sea area to another should be made with caution in these regions.

[1] Pedersen et al. (2013), *AGU monograph* chapter