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Microbial diversity in low temperature iron deposits at the 71˚N hydrothermal vent field along the Arctic-ocean ridge

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Iron is the fourth most abundant element in the Earth's crust and thus represents one of the most abundant redox active metals widely available for microbial energy generation. In this study rust coloured mounds and chimney-like deposits of the newly discovered71˚N hydrothermal vent fields at the south-western part of the Mohns Ridge have been investigated. We have studied the microbial communities present in these low-temperature rust coloured deposits in order to elucidate the phylogenetic and physiological diversity of the microbial populations inhabiting these deep-sea environments. Polyphasic characterisations by using geochemical and biological analyses have been performed. The deposited material has a highly porous microtexture of branching, twisted filaments resembling stalks of the iron-oxidising *Gallionella sp*, but numerous other unidentified filamentous structures were also found to be present. Phylogenetic analysis of clone libraries has so far demonstrated that the bacterial community is dominated by members of the Proteobacteria, Planctomycetes and Chloroflexi. The archaeal community consists of both *Crenarchaeota* and *Euryarchaeota* and the *Crenarchaeota* sequences affiliates with other previously reported uncultivated Deep-Sea archaeal sequences. Microbial Fe-oxidation has proven to be a widespread process in the deep-sea environments, but only recently studies elucidating these processes and description of the microbial communities that mediate them have been initiated. Therefore studying the process by which iron is oxidised and how this influence these

cold deep-sea communities is of significant importance. Therefor we are specifically focusing on enrichment of iron oxidizing bacteria from these iron mounds. Preliminary results indicates that iron oxidizers related to the newly described *Mariprofundus ferrooxidans* as well as iron reducers related to *Rhodoferax ferrireducens* are present in these environments, but we have so far not been able to obtain pure isolates form this site. Strains isolated from these systems will provide an opportunity to explore the phylogenetic diversity of neutrophilic Fe metabolism and to establish model systems for molecular metabolic studies.