

Microbial functions in the Juan de Fuca Ridge flank crustal deep biosphere revealed through single cell genomics

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The eastern flank of the Juan de Fuca Ridge is arguably the best studied system of ridge flank hydrothermal circulation in upper oceanic crust, yet we still have a relatively poor understanding of the structure and function of microbial communities residing in upper oceanic crust in this location. We employed state-of-the-art single cell genomic techniques to sort individual microbial cells from hydrothermal fluids collected from seafloor observatories, to explore the genetic potential of dominant and rare members of the microbial in this potentially dynamic environment. This approach has revealed details regarding the capacity for carbon, nitrogen, and sulfur cycling by members of the microbial community, and suggests novel adaptations for the crustal hydrothermal deep biosphere. These data will be presented in the context of evidence for microbial activity in this environment, and how it compares to other crustal and hydrothermal systems.