

Project Application # 125127

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Project Description:

Ancient microbial mats preserved in chert provide the most effective mechanism for understanding Earth's early biosphere, yet visual analyses of microbial morphologies are rarely accompanied with in situ chemical data. More insight about which microbial processes, such as metabolic processes or decomposition, were active during preservation can be gained from such chemical data. The carbonate rocks and sedimentary chert of the Angmaat Formation, near White Bay, Baffin Island contain the most exquisitely preserved 1.2 billion-year-old microbial mats. This project aims to correlate the well-preserved mat morphologies to the preserved geochemical signatures in the mats. Samples collected by Linda Kah during a 1993-1994 field season for a separate, earlier project focused on the geochemistry preserved in the carbonate rocks. With recent advancements in geochemical tools, we can now investigate the preserved chemistry in greater detail. Select samples from the previous field season have been used to begin this research project; however, larger sample volumes are required to perform the chemical analyses. Black chert was targeted during the earlier field season because they were known to contain preserved microbial morphologies.

The purpose of this trip will be to collect chert and carbonate rocks from surficial outcrops near White Bay, Baffin Island. Hand-held rock hammers and chisels will be used for sample collection. To our knowledge, none of these rocks have been used as carving stones. Our group will consist of 4 people. We will pack-in and pack-out and camp in tents for the 18 days that we will be in the field. Local resources that will be used include water, which we will filter for drinking and cooking. We are working with the Polar Continental Shelf Program (PCSP) to arrange logistics. Once the helicopter drops us off, we will be walking as our mode of transportation. The closest community is Pond Inlet (about 80 km to the northeast). Sirmilik National Park is about 40 km to the east of our camp site and about 100 km to the northwest. We will not collect rocks from the national park.