Microbes, Time Series, and Electrochemical Noise: How Sensor-Based Environmental monitoring reveals real-time energy transduction

Abstract

Identifying microbial contributions to aqueous and environmental geochemical processes is a vexing scientific question at the intersection of biogeochemistry and environmental science. Many geological processes, such as groundwater chemistry, Earth's chemical evolution, climate, and global element cycles are tightly coupled with evolution and energy transfer carried out by microbial and biological processes. Nuanced understanding these geological processes requires understanding the energetic and mass action contributions of microbes.

New developments for in situ environmental instruments are making it possible to record biogeochemical processes in real-time, teasing apart contributions from microbial and abiotic geochemical reactions, as they are happening. Distinguishing between microbial and abiotic mass transfer has implications for origins of life research, understanding of mineralogical and isotopic signatures in the rock record, and the search for life beyond Earth.

Bio

Allison is an Assistant Professor in the Earth Sciences Department at UNB – Fredericton. She completed her PhD at the University of Toronto in 2015. Her PhD work focused on electrochemical agnostic biosignatures. Her research program is focused on in situ sensor-based monitoring strategies for geochemical and microbial environmental processes.