Clumped Isotope Signature of H_2S, New Insights into the Process of Sulfate Reduction by the Various Microbial Mediators

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Microbially-mediated dissimilatory sulfate reduction (SRM) is a globally important process and plays a significant role in biogeochemical cycling of sulfur as well as carbon. This process likely plays an even more impottant role in cycling of organic carbon in hadal trenches, given the recent unexpected discoveries of high total organic carbon content and elevated microbial activities in trench sediments. Dissimilatory sulfate reduction can be mediated by bacteria (SRB), archaea (SRA), or some eukaryotes (e.g. fungi, SRF). The ability to use sulfate as a terminal electron acceptor for energy conservation is characteristic of the microbial taxa involved. Furthermore, SRM can take place in various environments, including the cold seeps, hydrothermal vents, organically-riched continental margin sediments, and in hot spring mats. Analysis of clumped isotopes is a powerful tool in deciphering the origin of biogenic gases (e.g. methane). In this research, we determined the relative abundances of several isotopologues of H_2S produced by various SRM. Our results provide new insights into sulfate-reducing process mediated by the different microorganisms.