Biochemistry meets geochemistry: Sulfur isotope fractionation factor of the APS reductase and implications for interpreting biological sulfur isotopes signals.

\*Shawn E McGlynn<sup>1</sup>, Min Sub Sim<sup>2</sup>

1. ELSI - Tokyo Institute of Technology, 2. Seoul National University

Sulfur isotopes have a long history of use to gauge the occurrence and extent of biogeochemical processes on Earth, and the advent of modern techniques including multiple isotope measurements and secondary isotope mass spectrometry indicate that much knowledge remains to be obtained through their analysis. A significant portion of microbial sulfur isotope fractionation occurs through the process of dissimilatory sulfate reduction (DSR); however very little data are available which describe the extent and variability of sulfur isotope fractionation at the level of the individual enzymes which carry out intracellular sulfur conversions. Here, I will present new data on the fractionation of sulfur by the enzyme adenylylsulfate reductase, which catalyzes a two electron reduction of adenylylsulfate to form sulfite (Asr in the figure below). The results will be interpreted in the context of enzyme evolution, cellular physiology, and also associated geochemical implications.

Keywords: Enzymes, Isotopes, Sulfate Reduction, Biogeochemistry

