# Stable isotope signature of Fe to understand the Fe bio-cycle in the hydrothermal-vent

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Iron is typical essential inorganic nutrients for all plants and animals. Stable isotope studies using Fe has been widely adopted to understand both the mechanism of Fe metabolism in marine organisms and the bio-cycling of Fe in marine environment. For the land animals or plants, the Fe isotope ratios ($^{56}Fe/^{54}Fe$ and $^{57}Fe/^{54}Fe$) can change significantly with the increase of the trophic level. In strike contrast, for marine organisms, because of very limited availability of Fe in marine environments low concentration of Fe in seawater, the intake efficiency for Fe could be higher than those for the terrestrial animals. These studies revealed that magnitude of the isotope effects on Fe could provide key information concerning both the nutritional status of Fe in animals and the availability of Fe in marine environments. To understand the bio-cycling of Fe at the hydrothermal vent field, we have measured the Fe isotope ratios for various organs from deep-sea organisms.

In this study, *Chrysomallon squamiferum* called "Scaly-foot" gastropod (n=5) and *Gigantopelta aegis* (n=5) from a deep-sea hydrothermal field at the Longqi vent field were subsidized to the Fe isotope ratio analysis. The Fe isotope ratios of sclerite samples and soft body samples of muscle, ctnidium (gill), blood, heart, were analyzed by a multiple collector-ICP-mass spectrometer (MC-ICP-MS) technique (Nu Plasma II). The resulting $\delta^{56}Fe$ values obtained here demonstrate the clear difference between *Chrysomallon squamiferum* and sulphur-oxidizing bacteria. The Fe isotope signatures obtained here revealed the clear difference in the intake efficiency of the dietary Fe for these organs. The details of the mechanism why separate the $\delta^{56}Fe$ values of these two samples will be discussed in this presentation.