Silicon isotopes of deep-sea sponges and these new insights ino the micro and macro scale of the silica cycle

LUCIE CASSARINO[1] , CHRISTOPHER D. COATH[1] , KATHARINE R. HENDRY[1]

[1]School Earth Sciences, University of Bristol (email: l.cassarino@bristol.ac.uk)

The silicon isotope ($\delta^{30}Si$) composition of deep-sea sponges recently has become a key tool for understanding the silicon cycle. Deep-sea sponges $\delta^{30}Si$ reflects silicic acid (DSi) concentration of their surrounding water. In order to reconstruct the past silica cycle it is essential to better constrain the mechanisms of biosilicification, which are not yet well understood.

Deep-sea sponges from the equatorial Atlantic show a significant isotopic fractionation ($\Delta\delta^{30}Si$), which range from -1.6 to -7.2‰ in relatively low DSi concentrations. This wide range highlights the difference in sponge skeletal morphology of the two classes, Demosponge and Hexactinellid, from loose spicule to more complex structures such as the fused dictyonal framework. For the latter, our data show that secondary silicification results in an extremely light $\delta^{30}Si$ signature, which could provide insights into the process involved during silica deposition. Secondly, our data also imply that reliable silicon isotope ratios derived from sponges are limited to certain spicule shapes.

.