A COMPARISON OF STABLE SILICON ISOTOPE COMPOSITIONS OF BIOGENIC OPAL AND DIATOM ASSEMBLAGES: A DEGLACIAL TO HOLOCENE RECORD OF THE PERUVIAN UPWELLING

K. Doering[1, 3*], X. Crosta[2], M. Frank[3] and R. Schneider[1]

[1] Institute of Geoscience, University of Kiel, Germany; * (kd@gpi.uni-kiel.de)
[2] EPOC, UMR 5805, Université Bordeaux 1, CNRS, Talence, France
[3] GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel, Germany

The stable silicon isotope composition ($\delta^{30}Si$) of diatom frustules has proven to be a powerful tool to reconstruct surface water nutrient utilization in the past as lighter isotopes of silicon are preferentially incorporated by the diatoms leaving seawater enriched in the heavier isotopes. The fractionation factor during incorporation of silicon in diatoms had previously been assumed to be species independent (La Rocha et al. 1997). However, results of a recent study (Sutton et al., 2013) suggested first species dependent fractionation factors between -0.5 to -2.1‰, which possibly influenced past Si isotope records. It is thus important to constrain how changes in diatom assemblages affect their $\delta^{30}Si$ record.
We compare the $\delta^{30}Si$ signatures of different size fractions of biogenic opal (11-32 and 32-150µm) and of handpicked diatoms (>150µm; mono-specific e.g. *Coscinodiscus spp.*) with the diatom assemblages from sediment core M772-003-2 at 15°S off Peru. Combining these records enables more reliable reconstructions of past silicate utilization related to changes in the intensity of the Peruvian upwelling, as well as of variations in the source water isotope compositions over the last 20,000 years.

References:

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Sutton, J.N. et al., 2013. Species-dependent silicon isotope fractionation by marine diatoms. *Geochimica et Cosmochimica Acta*, 104(C), pp.300–309.