Extraction of paleo seawater Nd isotope compositions: A case study from the Indonesian Throughflow

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Over the past decade, radiogenic Nd isotope compositions have increasingly been used as a paleo seawater proxy for the reconstruction of past ocean currents and water mass mixing. For this purpose, the Nd isotopes have been extracted from various marine archives, such as ferromanganese crusts and nodules, Fe-Mn oxyhydroxide coatings on detrital sediment surfaces, as well as in foraminiferal shells, cold water corals and fish teeth. However, it is still under debate if all these archives reliably preserve unaltered paleo seawater Nd isotope compositions.

In this study, the Nd isotope compositions of reductively cleaned foraminiferal shells (bulk planktonic & monospecific), of Fe-Mn oxyhydroxide coatings leached from the de-carbonated detrital fraction of the sediment, as well as Nd isotope compositions leached directly from the bulk sediment were extracted from carbonate-rich sediment core MD01-2378 (1783 m water depth) located in the outflow region of the Indonesian Throughflow (ITF) in the eastern Timor Sea. We focus on the comparison of the Nd isotope records from these three archives covering the time period of marine isotope stage 3 (~23 – 64 ka B.P.) in order to reconstruct variations of intensity and the relative contributions from different outflow pathways of the ITF.

A comparison of core top Nd isotope compositions extracted from planktonic foraminiferal shells shows good agreement with water column Nd isotope data [1]. Data from a core top sample at a location close to core MD01-2378 showed that there is no significant difference in Nd isotope composition between monospecific (εNd = -4.3) and bulk (εNd = -4.4) planktonic foraminiferal samples.

The Nd isotope variability observed in the downcore planktonic foraminiferal records of core MD01-2378 ranged from εNd = -3.5 to -5.5 with minimum values occurring during the Last Glacial Maximum and either documents variations between different ITF outflow pathways or variable surface water contributions from Northern Australia or even from the Southern Ocean. These data are compared with bottom water Nd isotope variations newly obtained from oxyhydroxide coatings of the same sediment core.

[1] Jeandel *et al*., (1998). *Geochim Cosmochim Ac*, 62(15), 2597-2607.

Record of historical mercury trends in sediments from the Laguna del Plata, Córdoba, Argentina

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Mercury concentrations and main carrier phases were determined in sediments of a 120 cm core from Laguna del Plata (LP). This lake is a part of the Laguna Mar Chiquita (LMC) system as it is connected to LMC itself during water highstands. LMC is one of the largest saline lakes in the world representing a sensitive climatic indicator due to its frequent lake level variations at millennial and interdecadal scales [1], with the most recent major variations during the early 1970s and after 2004. Total mercury (Hg_{TP}) concentrations analyzed by Atomic Absorption spectrometry after sample calciantion in an O_2 stream (DMA 80) varied between ~13 and ~131 $\mu g\ kg^{-1}$ and reflected changes.in water and sediment supply to the LP. Selective extractions performed on the sediments using ascorbate, HCl and H_2O_2 revealed that in the base of the core corresponding to a low water level period, Hg is mainly associated to reactive sulfides. In contrast, in the middle and upper part of the core Hg is rather associated with sedimentary organic matter and was interpreted as reflecting Hg deposition at the watershed scale. Core dating, performed with ^{210}Pb and ^{137}Cs, allowed to determine that the highest Hg peak corresponds to the years 1990-1995. This was attributed to the eruption of Lascar volcano in 1993 in the Central Andes of northern Chile rather than anthropogenic pollution sources.

[1] Piovano *et al*. (2002). *Sedimentology* **49**, 1371-1384. [2] Schäfer *et al*. (2006) *Appl*. *Geochem*. **21**,515–527.

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