Geophysical Research Abstracts
Vol. 13, EGU2011-7398, 2011
EGU General Assembly 2011

Clumped-isotope studies of foraminifer records: inter-species differences, analytical bias and precision limits

Mathieu Daëron (1), Franck Bassinot (1), Eva Moreno (2), Benjamin Passey (3), Gülay Isgüder (1), Hélène Rebaubier (1), and Dominique Blamart (1)

(1) UMR 8212, Laboratoire des Sciences du Climat et de l'Environnement, Gif-sur-Yvette, France, (2) UMR 7207, Muséum d'Histoire Naturel, Paris, France, (3) Department of Earth and Planetary Sciences, Johns Hopkins University, Baltimore, MD, USA

Foraminifer records constitute an attractive target for clumped-isotope paleotemperature reconstructions, because of the abundance of well-dated sedimentary cores containing suitable material, and because of the extensive body of knowledge concerning the bulk oxygen and carbon isotopes composition of foraminifer tests. As reported by *Tripati et al. (2010)*, the relationship between the clumped-isotope compositions ("Δ_{47}") of core-top foraminifers and local, modern water temperatures appear to conform with the calibration function for inorganic carbonates reported by *Ghosh et al. (2006)*.

In order to lay the groundwork for future studies, we analyzed the bulk (δ^{18}O, δ^{13}C) and clumped (Δ_{47}) compositions of two surface-dwelling planktonic species (*G. sacculifer*; *G. trilobus*) of modern, Holocene, LGM, and Pliocene foraminifers from an Indian Ocean core. Each combination of [species; age] was divided into two aliquots which were pre-treated using two different cleaning protocols: (1) a "minimal" cleaning involving breaking the tests open followed by sonication in pure methanol for 10 seconds; (2) an "oxydative" protocol based on published pretreatments used before Mg/Ca analyses.

This preliminary methodological study reveals that Δ_{47} differences between *G. sacculifer* and *G. trilobus* are well below current precision limits. Similarly, in this case there is no detectable bias caused by the choice of oxydative or minimal cleaning protocols. Finally, applying the *Ghosh el al. (2006)* calibration for inorganic carbonates to our samples yields a Δ_{47}-derived SST record which is indistinguishable from local modern observations and independent Holocene / LGM constraints. Provided enough homogeneous and well-preserved material, replicated analyses of 4-5mg samples allow reaching precision limits of $\pm$0.7ºC (1 standard error).

- Ghosh et al. (2006): Geochimica et Cosmochimica Acta 70. doi:10.1016/j.gca.2005.11.014
- Tripati et al. (2010): Geochimica et Cosmochimica Acta 74. doi:10.1016/j.gca.2010.07.006