

## ***Interactive comment on “Pliocene diatom and sponge spicule oxygen isotope ratios from the Bering Sea: isotopic offsets and future directions” by A. M. Snelling et al.***

**A. M. Snelling et al.**

asnel@bgs.ac.uk

Received and published: 17 May 2014

We thank Dr Hendry for her comments on our manuscript.

There are insufficient quantities of sponge spicules in the samples to pick pure aliquots for sponge  $\delta^{18}\text{O}$  by our method (fluorination).

With regards to the apparent match between the  $\delta^{18}\text{O}_{\text{sponge}}$  and the stacked benthic  $\delta^{18}\text{O}$  record (Lisiecki and Raymo, 2007), we do not have a conclusive explanation as to why the amplitude of the modelled  $\delta^{18}\text{O}_{\text{sponge}}$  is much greater. Whilst we speculate in the manuscript that this could be due to a mixture of non-equilibrium fractionation and/or inter-species variations in the fractionation of  $\delta^{18}\text{O}_{\text{water}}$ , modern day

C487

calibrations of  $\delta^{18}\text{O}_{\text{sponge}}$  are needed to address this further.

With regards to whether we expect the Bering Sea to record a “global”  $\delta^{18}\text{O}$  signature, we would expect both surface and deep water  $\delta^{18}\text{O}$  to be strongly dominated by local oceanographic conditions including changes in the Bering Sea gateway and regional ice-sheet dynamics. We are currently working on a longer diatom  $\delta^{18}\text{O}$  record from which we hope to reconstruct some of these changes, which in turn may help to explain why the “relationship” between  $\delta^{18}\text{O}_{\text{sponge}}$  and stacked  $\delta^{18}\text{O}$  appears to breakdown at c. 2.8 Ma. Whilst local effects may mean that it is not ideal to compare the  $\delta^{18}\text{O}_{\text{sponge}}$  record to the global stacked benthic  $\delta^{18}\text{O}$  record, there are no local benthic  $\delta^{18}\text{O}$  records available from the Bering Sea for this time period.

References Lisiecki, L. E. and Raymo, M. E.: Plio–Pleistocene climate evolution: trends and transitions in glacial cycle dynamics, *Quaternary Sci. Rev.*, 26, 56–69, 2007.

---

Interactive comment on *Clim. Past Discuss.*, 10, 2087, 2014.