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Climate of the Past Discussions

Interactive comment on "Moving beyond the age-depth model paradigm in deep sea palaeoclimate archives: dual radiocarbon and stable isotope analysis on single foraminifera" *by* Bryan C. Lougheed et al.

J. Gottschalk

julia.gottschalk@geo.unibe.ch

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Dear Authors,

I have read your CPD contribution with great interest. Your study site is "ideal" to emphasize the influence of bioturbation on proxy data, and I agree that it is important to correct for these biases with adequate approaches (you present a novel and elegant one).

As there is very little specific information on sample sizes and data correction/post-

processing in the text and in the supplement (e.g., in Table S1), I wonder how contamination (that has increasing impact with smaller sample size) contributes to the 14C age differences of samples observed in your core (e.g., Brown and Southon, 1997; Hua et al., 2004). If corrections have been made without considering a size-dependent influence from contamination, different sample aliquots with a large size range (from ultra-small to normal size) can have significantly different 14C ages. This difference of course depends on the range of the sample sizes and the age of the sample, and will not compensate for the large bioturbation-driven 14C differences you observe. However, given the absence of specific information on samples sizes, I wonder whether it plays a role, in particular for some data points in Figure 2A. The blank seems to have been obtained on small samples ($\sim$50 μg C) so that data of samples with a size very different from the blank may be slightly over- or undercorrected on the basis of a size-independent, constant blank. Could you provide information on samples sizes and whether correction for contamination was applied or was not required to stress that 14C age differences in sediment core T86-10P are driven by bioturbation?

References

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Hua, Q., Zoppi, U., Williams, A.A., Smith, A.M., 2004. Small-mass AMS radiocarbon analysis at ANTARES. Nucl. Instruments Methods Phys. Res. Sect. B Beam Interact. with Mater. Atoms 223-224, 284–292. doi:10.1016/j.nimb.2004.04.057

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