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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.

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Review of cp-2017-119

The authors are to be commended on a careful piece of work, well within the remit of the journal. It is impressive analytically to obtain secure results on such small samples, and this study will be a useful addition to the literature.

In a composite date, if the preponderance of measurements were representative of the age of the sediment (albeit with a long tail), this would increase the accuracy of the

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date, as the inaccurate ages would contribute proportionally less to the composite age. Can the authors comment on any statistical manipulation that could be used in this instance to improve accuracy? Also, how would one properly calculate (even semi-quantitatively) the uncertainties associated with composite measurements? Can the authors offer any suggestions for this? It would be good to see these points considered within the manuscript.

The addition of older material would have a proportionally smaller effect on the measured age than the addition of (much) younger material. Can the authors comment on how this would affect how the precision on measurements should be calculated (mass balance approach?).

One interesting point is that perhaps the changes in PDSM that could be identified with this approach could tell us something about sediment dynamics. I appreciate this is a little outside the scope of the paper, but could be mentioned as a 'silver lining'.

One reference that would be good to include is: Berger, W.H. and Johnson, R.F. 1978: On the thickness and the 14C age of the mixed layer in deep sea carbonates. Earth and Planetary Science Letters 41, 223–27. The findings in this support the authors results

From line 217 on- give more information about the palaeoclimate reconstructions and their significance- I appreciate that is not the thrust of this paper, but it would be useful to highlight the utility of the author's proposed approach.

How many samples would the authors advocate measuring in order to get a decent idea of the true amount of sample heterogeneity?

âĂć State how many different layers the forams were selected from? How many forams per layer? âĂć It might be good to expand a little on the evidence for PDSM in core T86-10P, just to give the reader an idea of what was observed âĂć Were the forams pretreated in any way? i.e. washing/ agitation with distilled water, or removal for sur-

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face C by preliminary acid dissolution? âĂć How were the measurements background corrected (i.e. explicitly state what blank was used) âĂć Line 112. IRMS spelled incorrectly âĂć Line 142. Effect âĂć Line 39: analysis of multi-specimen âĂć Line 38: Accelerator Mass Spectrometry âĂć

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