

Interactive comment on “A synthesis of marine sediment core $\delta^{13}\text{C}$ data over the last 150 000 years” by K. I. C. Oliver et al.

Anonymous Referee #1

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The paper by Oliver et al. presents a compilation of benthic and planktic carbon isotope values for the last 150,000 years. Compilations of paleoceanographic data are important because they allow (i) identifying patterns and (ii) because they can be used to validate model experiments. I know from my own experience that this kind of investigation can be extremely time consuming, which is probably one of the reasons why only a very few compilations are to date available. The clear advance of the approach by Oliver et al. over other compilation studies is the assessment of the error associated with the reconstruction of carbon isotopes. The paper is a data report rather than a conventional IMRAD paper – it lacks a clear testable working hypothesis and a detailed discussion of the paleoceanographic implications. Personally, I feel that CP should support the publication of this kind of product since the field of Paleoceanography generally lacks data synthesis efforts. Alternatively, the paper might also be

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submitted to “Earth System Science Data (ESSD)”, which specifically aims at publishing data sets. However, as outlined below, the availability of the RAW data seems not to be completely secured in this case (see comment #1). I therefore recommend to accept the paper after a minor revision, but under the condition that the RAW collection will also be made available in an established data base (i.e. Pangaea).

Specific comments

1) Data availability. The Dephi Project page (<http://rock.esc.cam.ac.uk/delphi>) was not accessible to me. Also the authors mention data provided by personal communication. I strongly recommend to submit the raw data to PANGAEA or another data base to secure the long-term availability of the data. Even if the data are already available elsewhere, there is no reason not to include and provide the raw data in consistent form into an archive file. Without this database, a reproduction of the results of this paper will be difficult or even impossible.

2) Age modelling. The quality of the age models is hard to assess. The authors cite an error of “up to 6kyrs”. Picking the d^{18}O maximum as 18K seems to be very dangerous, especially if it is not clear whether the benthic or planktic d^{18}O minimum has been used. For example the d^{18}O maxima in core MD MD95-2042 (Shackleton et al., 2004, Quaternary Science Reviews 23, 1513–1522) are offset by several kyrs. I think it would be better to use local radiocarbon-derived ages for the benthic or planktic d^{18}O maxima where possible, and to translate them to nearby cores. Also for high-resolution benthic records it might be possible to use some of the ice core AIMs in Isotope stage 3 to improve the age model (i.e. Shackleton et al., 2004, Quaternary Science Reviews 23, 1513–1522, Dürkop et al., 2008, Marine Micropaleontology, Volume 66, 208–221).

3) Inclusion of low-resolution cores. The compilation includes a lot of low resolution records (i.e. with sedimentation rates $<2\text{ cm/kyr}$). It seems inevitable that the glacial-interglacial amplitude is suppressed below sedimentation rates of about 2 cm/kyr due to sediment mixing. I recommend excluding those records from the analyses.

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- 4) Error assessment. The effects of light availability (Spero and Lea, 1993, *Marine Micropaleontology* 22, 221-234) and formation of secondary calcite (Duplessy et al., 1981, *Science* 213, 1247-1250) have not been included into the assessment of the error. These effects are neither systematic nor negligible.
- 5) Structure of the paper. It seems that results and discussion are not clearly separated. The short discussion rather seems to be “conclusions” the “data presentation and interpretation” contained much of the discussion (i.e. the comparison to previous results).
- 6) The heading of table 1 should give a full explanation of its content, i.e. the meaning of the flags.
- 7) P2501/L1: The correct citation for the LGM time slice (19-23) is Mix et al. (2001) *Quaternary Science Reviews* 20 (2001) 627-657
- 8) P2501/L20: What do you mean with “...the exclusion of small subsets of data taken from a different species to the majority of the record...” please clarify.
- 9) P2519/L14: Typo “discusses” – > “discussed” (?)

Interactive comment on *Clim. Past Discuss.*, 5, 2497, 2009.

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