

Interactive comment on “Deglacial carbon cycle changes observed in a compilation of 117 benthic $\delta^{13}\text{C}$ time series (20–6 ka)” by Carlye Peterson and Lorraine Lisiecki

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The authors present a compilation of benthic $\delta^{13}\text{C}$ records during the last deglaciation. The work contributes to a better understanding of carbon cycle and ocean circulation changes and is appropriate for Climate of the Past. I think the paper is well written and nicely illustrated. I have a few questions and comments that the authors may want to consider in a revision.

I think typically the relationship between the terrestrial carbon storage and whole-ocean $\delta^{13}\text{C}$ changes is calculated using a closed system approach with land, ocean and atmospheric reservoirs of carbon (e.g. page 1, lines 14–15; Ciais et al. 2012). I

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wonder if this is appropriate for glacial-interglacial changes because it is likely that ocean sediments responded by adding/removing alkalinity and carbon from dissolution/accumulation of calcium carbonate. This would also affect $\delta^{13}\text{C}$ of DIC. Is this considered here? It would be good to discuss this point.

Benthic $\delta^{13}\text{C}$ is affected by carbonate ion and pressure effects (e.g. Schmittner et al., 2017). Were these effects considered here? I guess not since carbonate ion changes are not available. In this case it may be useful to try one of their regression equations that don't require carbonate ion to calculate $\delta^{13}\text{C}_{\text{DIC}}$.

Page 5, 9–11: include study by Schmittner and Somes (2016, Paleoceanography, doi:10.1002/2015PA002905)

Page 7, 12: I didn't find this number (0.15 permil for the standard deviation) in Gebbie et al., (2015). Schmittner et al. (2017) suggest a larger error of ~ 0.25 permil.

Page 8, 21: “DSA $\delta^{13}\text{C}$ begins increasing at 18 ka” This finding seems to be at odds with Lund et al's (2015, doi:10.1002/2014PA002657) findings that the DSA begins increasing only later (after HS1). Are those data included here? Discuss.

Page 9, 13: The North Pacific ($>30\text{N}$) is also not included.

In Figure 5, which relationship between $\delta^{13}\text{C}$ and land carbon was used? See comment above. Does it consider sediment carbon changes?

Page 10, 9: what volume was used for the deep Pacific box? $<30\text{N}$?

Page 11, 1–3: Schmittner and Lund (2015, Climate of the Past, doi:10.5194/cp-11-135-2015) have suggested a different mechanism. Please consider.

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