

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 d13C of DIC. Is this considered here? It would be good to discuss this point.

Benthic d13C 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 d13C_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 d13C 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 (>30N) is also not included.

In Figure 5, which relationship between d13C 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? <30N ?

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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