



EGUsphere, community comment CC1
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Comment on egusphere-2022-574

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Community comment on "Predicting trends in atmospheric CO₂ across the Mid-Pleistocene Transition using existing climate archives" by Jordan R. W. Martin et al., EGUsphere, <https://doi.org/10.5194/egusphere-2022-574-CC1>, 2022

This is a potentially interesting study, which might gain from some more discussions of what has already been done with respect to CO₂ across the MPT. Some comments, which might be of interest to the authors:

1. To be transparent in what has been done, the equation which calculates CO₂ out of the LR04 benthic d18O stack is missing. Plotting of the LR04 benthic d18O, which is at the core of the approach is also missing.
2. Blue ice CO₂ data from Allan Hills have been extended in Yan et al (2019), now also containing snapshots of CO₂ at 1.5 and 2.0 Ma.
3. A recent paper by Yamamoto et al (2022) calculates CO₂ over the MPT from leaf wax d13C and finds that smaller glacial/interglacial amplitudes in CO₂ before the MPT are based on stable glacial CO₂, but smaller interglacial CO₂ before the MPT. This differs to the d11B-based CO₂, and if I got it right might support the here defined Null Hypothesis, which then cannot easily be dismissed.
4. New CO₂ data based on d11B from Pacific cores have recently been published (Guillermic et al., 2022). Ok, data coverage across the last 1.5Ma might be weak, but worth discussing it.
5. CO₂ as function of benthic d18O has in an inverse modelling approach already been calculated by Stap et al (2016). This approach has been updated by Berends et al. (2021a). So comparison to their results might tell, how (if at all) this study shows something new.
6. Maybe also discuss other approaches of CO₂ across the MPT, eg C cycle simulation results (apart from those in Willeit et al, 2020, which are cited) of Köhler & Bintanja (2006), or the compilation of at that time available CO₂ data and the calculation of a continuous high-resolution CO₂ record in van de Wal et al. (2011), updated in Stap et al. (2018).
7. The recent review on the MPT (Berends et al., 2021b) gives also an idea about processes including a collection of CO₂ data and discusses a potential influence of the carbon cycle on the climate transition.
8. While mentioning the call for the EPICA challenge, maybe also cite / discuss its results (Wolff et al., 2005). They have been shown on 2 posters at AGU fall meeting in 2004 (PDFs for download at: <https://epic.awi.de/id/eprint/11721/>, <https://epic.awi.de/id/eprint/11722/>), on which you see, that one of the participants to the challenge (N Shackleton) also used d18O to predict CO₂ for the 400-800 ky time window.

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