

Interactive comment on “CO₂ and CH₄ fluxes are decoupled from organic carbon loss in drying reservoir sediments” by Tricia Light et al.

Tricia Light et al.

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We sincerely thank this anonymous reviewer for their time and insight. We are confident that their feedback has helped us improve our manuscript during our revisions.

We only studied drying in a single reservoir, so we cannot conclusively determine the effect of reservoir carbonate weathering on global carbon budgets. However, we agree that more context regarding the global carbon budget could help frame our discussion. Thus, we will incorporate the following text into our manuscript.

To be inserted into the last paragraph of Methods- Data Analysis:

"Global scaling of hypothesized inorganic carbon consumption was calculated using satellite-derived estimates of global surface water area loss (Pekel et al. 2016) along

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with Global Lakes and Wetlands Database water mass designations (Lehner and Doll 2004) to estimate the global extent of water reservoir drying between 1984 and 2015."

To be inserted into the first paragraph of Discussion- Implications for drying reservoir carbon dynamics:

"However, it is important to note that the likely scale of hypothesized inorganic carbon consumption is small relative to the global freshwater carbon budget. If all drying water reservoirs exhibited the inorganic carbon consumption suggested by "Incubation: Wet-Drying" cores during our 40 day incubation, global inorganic carbon consumption by drying reservoir sediments from 1984 to 2015 would have been 0.311 +/- 0.127 Tg C. This value is 0.2% of estimated inland water carbon burial for just one year (0.15, range 0.06-0.84 Pg year⁻¹) (Mendonça et al. 2017)."

Additional References:

Lehner, B. and P. Döll. "Development and validation of a global database of lakes, reservoirs and wetlands." *Journal of Hydrology* 296, no. 1-4 (2004): 1-22.

Mendonça, R., R. A. Müller, D. Clow, C. Verpoorter, P. Raymond, L. J. Tranvik, and S. Sobek. "Organic carbon burial in global lakes and reservoirs." *Nature communications* 8, no. 1 (2017): 1694.

Pekel, J., A. Cottam, N. Gorelick, and A. S. Belward. "High-resolution mapping of global surface water and its long-term changes." *Nature* 540, no. 7633 (2016): 418.

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