

Interactive comment on “Direct and indirect metabolic CO₂ release by humanity” by Y. T. Prairie and C. M. Duarte

Anonymous Referee #1

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In this paper the authors attempt to assess the magnitude of the direct emissions of CO₂ to the atmosphere due to the respiration of humans and domesticated animals. In addition, they estimate the CO₂ emissions derived indirectly from the decomposition of the resulting wastes derived from these two sources. The authors estimate that human respiration releases 0.6 Gt C yr⁻¹ and domesticated animals 1.5 Gt C yr⁻¹, and 1.0 Gt C yr⁻¹ is released from the decomposition of the organic waste and garbage produced from these sources, giving a total of 3.1 Gt C yr⁻¹ from direct and indirect metabolic sources. It should be pointed out (as the authors do) that the total emission estimate is approximately 45% of the current fossil fuel emissions of CO₂ to the atmosphere and nearly twice that emitted from land use changes (a poorly known value). This paper perhaps deserves publication but before doing so the authors should provide some

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documentation of the accuracy and precision of the estimates given in Table 1. Discussion of this should appear in the text and perhaps also in table form in terms of ranges for the different estimates, where appropriate. In addition, some comments would be appropriate and perhaps necessary on net vs simple one-way CO₂ emissions and on how if these metabolic CO₂ emission estimates are net emissions, the global carbon balance would be affected by heretofore (according to the authors) not accounted for CO₂ emissions to the atmosphere. For example, although variable year to year, the oceans take up about 2 Gt C yr⁻¹ of the total anthropogenic CO₂ emissions to the atmosphere from fossil fuel combustion and changing land use practices, the atmosphere is a sink for about 3.3 GT C yr⁻¹, and the rest of the anthropogenic emissions are apparently taken up by the terrestrial biosphere owing to fertilization due to rising atmospheric CO₂ concentrations, excess nutrients applied to the landscape, and some regrowth of forests. If the authors' metabolic estimates are net releases, then we have a major problem with balancing the global carbon cycle. I suggest the estimates are not net releases and represent mostly rapid recycling of atmospheric CO₂ taken up in photosynthesis, passed through the food chain, and ultimately respired back to the atmosphere. I could be mistaken in terms of my interpretation of the authors' paper but that remains to be seen, and the authors should at least comment in their paper on the difference between one-way and net emissions of anthropogenic CO₂ and the effect of their metabolic emission estimates on the global carbon cycle balance.

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