

The authors provided a well revised version of their manuscript “What if publication bias is the rule and net carbon loss from priming the exception”. They replied to all my raised concerns and points and the current version is well suitable as a forum contribution. It is timely to stimulate the discussion and future research regarding priming effects. The new figure and table help to convey the authors aspects.

I make some more specific comments below.

Beside these comments, I wonder if the authors could be clearer regarding the final conclusion they make in the abstract. This is coming short in the manuscript but to me a relevant point. I would even support a more provocative statement. As the authors discuss, priming is conceptually studied a lot as a C and climate effect. This was over the past few decades the main focus. At the same time, we have the bias that it is mainly positive and the perception was built that priming is always an emission source of soils. I would argue that in real ecosystems and not experimental set ups that focus on C fluxes only, priming is an essential mechanism for ecosystem function. Thus, I would argue that priming studies focusing on the more holistically on the full effect in soils and not on the less relevant C effect only. This is in the manuscript, but could be clearer. I specified this below also for the conclusion.

>> We revised the final conclusion in the abstract to be clearer that priming is not only about C-cycling, but about ecosystem functioning (lines 27ff).

This does not mean that C addition experiments are not useful at all. They are a tool to understand the soils responses and relate different nutrient and energy effects between soils at similar conditions. It is still a useful tool. A tool that should start to be more complex by adding full rhizosphere effects.

Regarding the display items, I would suggest to allow the four items. However, if this is not possible, I would consider to move the Figure 2 (Funnel figure) to the SI. In addition, this figure might require some improvements in the visualization. I appreciate Fig. 3 as this supports the authors points very well.

>> Thank you, we're happy to keep the four display items.

Title: I think the grammar and readability should be improved. I suggest “What if publication bias is the rule, and priming is the exception”. Thus. Adding a “,” before the “and” and a second “is” before “the exception”.

>> We'd like to keep the longer version, because it is not priming which is the exception, but carbon loss from priming.

Specific comments:

Line 15 and throughout the manuscript: "Labile" is not well defined and can be confused with some specific pool/fractions. I would recommend to use "fast cycling", which is not more precise in terms of dynamics but better in terms of the meaning regarding its mineralisation. In fact, right here, it would be possible to just remove labile.

>> Here and elsewhere, we changed “labile” to “fresh” or removed completely.

Line 22 and whole manuscript: Make sure to be consistent in the use of element names (ie. carbon) or symbols (ie. C)

>> Checked and corrected throughout. We write “carbon (C)” on first mention in the abstract and main text. We keep the full word “carbon” in headings and in table 1 we also keep the full word if it is in direct speech. Otherwise, we abbreviate consistently.

Line 28-29: "nutrient cycling and plant nutrition" could be rephrased to "ecosystem and soil functioning" or similar to align with more the broadscale effect.

>> We rewrote this sentence to read “Future research should focus on scalable experiments linking priming to plant nutrition via C, nutrient and water cycling to understand priming in context of ecosystem functioning.” (lines 27ff).

Line 32: I would also argue that not only root exudates but also root litter is important here. I would make clear that root exudates are the active pathways for roots to initiate or inhibit priming.

>> We rewrote these sentences to be clear about the sources of the main C-inputs: root exudates, root litter, leaf litter (lines 31ff).

Line 23: See comment regarding "labile", I would suggest here "...relative fast cycling carbon compounds compared to existing SOC can "

>> We rephrased this sentence to omit “labile”.

Line 41-44: It is missing here that rhizosphere input can also be directly in interaction with the mineral surface (e.g Sokol et al. 2019, 2024). This depends on biotic as well as abiotic conditions. The authors could add here the degree of complexity, that we do not fully understand the abiotic effects as well and this will ultimately affect the priming responses, depending on soil conditions.

Sokol, N.W., Foley, M.M., Blazewicz, S.J., Bhattacharyya, A., DiDonato, N., Estera-Molina, K., Firestone, M., Greenlon, A., Hungate, B.A., Kimbrel, J., Lique, J., Lafler, M., Marple, M., Nico, P.S., Paša-Tolić, L., Slessarev, E., Pett-Ridge, J., 2024. The path from root input to mineral-associated soil carbon is dictated by habitat-specific microbial traits and soil moisture. *Soil Biology and Biochemistry* 193, 109367. <https://doi.org/10.1016/j.soilbio.2024.109367>

Sokol, N.W., Sander, J., Bradford, M.A., 2019. Pathways of mineral-associated soil organic matter formation: Integrating the role of plant carbon source, chemistry, and point of entry. *Global Change Biology* 25, 12–24. <https://doi.org/10.1111/gcb.14482>

>> Thank you, we added this aspect (line 49-51).

Line 43: with respect to my comment of the use "labile", "complex" refers here to rather slow cycling organic matter.

>> Here and elsewhere, we changed “labile” to “fresh” or removed completely.

Line 88-90: It might be useful to extend a little bit here and say what the misleading means. Basically it resulted in the perception that positive priming results in soils as emission source.

>> Yes, we rephrased this to be clear that priming is often misleadingly presented as net C loss (now line 91ff).

Table 1: is a great addition and valid for the discussion and forum format. The Hindsight bias example should be more focused on priming to align with the other examples. Like: "I knew that positive priming will occur"

>> Thank you. We would like to keep "I knew that would happen" as example here, because it is such a common and relatable phrase that almost everyone will find themselves having said that at some point in their lives. Therefore, we think this sentence will help the readers to truly self-reflect. No-one is immune to biases, so it is important to raise bias awareness, and we think this generic examples could help in this regard.

Line 103: Link to Fig. 2 is not clear here as the funnel plot is discussed later, where the link is missing.

>> We moved the reference to figure 2 later in the text where it ties directly to publication bias and funnel plots (line 129) and clarified the funnel plot is of a meta-meta analysis and does not correct underlying meta-analysis (lines 139/140).

Line 109-113: What specific studies to the authors mean here?

>> It may vary from reader to reader which study in particular got caught in their mind as the "top of mind" reference, so we don't want to point to any particular paper here. Similarly, there are numerous "common studies" reporting varied priming effects, so we don't necessarily want to highlight any individual studies here. These lines aim more to introduce the reader to the concept of the availability heuristic, where one study gets "hyped" to represent a situation, while the majority of the body of literature, which might point to more nuanced circumstances, gets ignored.

Line 176-178: Also more efforts to measure in-situ priming. My personal experience is that experiments in fields fail (I had two studies with isotopic material and not even growing plants, not publishes with any priming focus in the end) because the even very small-scale variability in soils (e.g. cores in <20cm vicinity) makes it extremely difficult to separate relatively small changes by priming from SOC variability. Not to mention any shifts in conditions in treatments compared to control (e.g. all roots grow in the added material to mine nutrients and no shift in controls). This means a change in input of organic matter that is not easy to account for. We need to manage to have a better signal to noise ratio in in-situ studies. I would argue that this is more important than linking incubation studies to real ecosystems.

>> We added this aspect (lines 181/182).

Conclusion:

Personally, I think the question "do we need to care at all about priming?" is interesting and could be asked here.

In terms of C changes it might not be interesting, as proposed here. Thus, one could say we do not need to care at all. However, and maybe more importantly, priming has an important role in ecosystem functioning. The role of this for resilience and overall functioning of the soil-plant system is valuable to understand. Meaning, what substrate do microbial communities prefer, how does plant affect the substrate-switch of microbes and for which benefit (nutrients and not C).

Therefore, I would argue to shift from a climate only perspective on priming to an ecosystem function of priming and which factors control positive and negative priming as well as temporal shifts of positive and negative priming.

>> [We extended on this point in lines 184-188.](#)