

## ***Interactive comment on* “Different sensitivities of litter decomposition and nutrient release to ultraviolet radiation” by Weiming Yan et al.**

### **Anonymous Referee #2**

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Yan et al. conducted a meta-analysis to compare the sensitivities of litter mass loss and nutrient release to UV manipulation. This study has the potential to contribute to the current literature on the roles of UV radiation in terrestrial biogeochemical cycles. However, there are significant issues with the presentation of results and the use of English language. Several figures are very hard to understand because of poor figure captions and missing methodological details. As there have been three meta-analyses on the same general topic of the UV effects on decomposition processes, a significant portion of the results did not offer much new information. The UV effects on litter mass loss and nutrient release were not compared in a statistically meaningful way.

Specific comments: Abstract, the abstract does not include any result regarding the comparison of UV effects on litter mass loss and nutrient release, which was supposed

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to be the main research question, judging from the title.

Page 1 Lines 20, 25, 'sensitivity' is a vague term. Please define how sensitivity was quantified.

P1L22-24, I cannot follow this sentence. If the key is 'three-stage pattern', then describe what these three stages are.

P1L25, the final sentence was too generic. It's not clear how this study helps to move the field forward.

Introduction, in general, I find the introduction quite wordy and lack of focus. For example, the authors discussed the specific UV effects on decomposition twice in two paragraphs. Some knowledge gaps that the authors identified have been studied by previous meta-analysis, e.g., the effects of precipitation (P3L14-15) and the effects of experimental duration (P4L26). Please think carefully about the unique contributions of this study and highlight them in the introduction.

P2L7, UV radiation doesn't directly contribute to photosynthesis or C fixation.

P2L27, this is a good place to discuss the indirect effects of UV radiation.

P3L4, the term 'photodecomposition' needs to be defined.

P3L4, try 'sparse vegetation'

P3L19-30, this is the 2nd time the authors described the specific pathways through which UV radiation affected decomposition processes (1st time: P2L23-27). Please try pooling these materials together.

P3L29, explain 'the effects of UV enhancement \_on the soil\_'.

P4L10-24, this paragraph introduces the main novelty of this study: the UV effects on C vs. nutrient release. Consider highlighting this instead of burying it at the end of introduction.

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P4L13, King et al. 2012 Biogeochemistry also included a meta-analysis.

P4L18, compared to previous meta-analyses, this study included a smaller number of published studies (i.e., 54) due to the goal of comparing C vs. nutrient release. I don't find it fair to criticize the sample sizes of previous studies.

P4L27, I don't understand how the authors defined 'datasets'. A paired observation or a published experiment?

P5L19, what are the chemical properties included in this study? Please list all of them here. This is a good place to explain how 'C/N/P remaining' or 'C/N/P release' were calculated. In addition, does 'wood' mean woody tissues or leaves of woody species?

Results, direct and indirect effects of UV radiation represent fundamentally different processes. One involves exposing litter to various levels of UV radiation, while the other refers to growing plants under UV manipulation and then accessing decay processes. Figure 2 is the only place where the direct and indirect were differentiated, but I find it impossible to understand. I have the impression that the direct and indirect effects were mixed together in most figures, except in Figure 2. I strongly believe that mixing the two is wrong.

In all figures, it's not clear how sample size was counted. Does it include the number of replicates in original studies?

Figure 1, are the results about the 'direct effects' only? What does the error bar represent? It is more intuitive to show 95% confidence intervals with error bars.

Figure 1, I find it very surprising that there were less published studies on C remaining than on P remaining.

Figure 2, I am having a hard time understanding this figure. Were soil and plant supposed to represent direct and indirect effects, respectively?

P7L16, please consider merging UV-B and UV-(A+B) results in the figure 1.

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P8L1, you mean 'results from field experiments'?

Figure 4, if one experiment lasted exactly 4 months, was it categorized as '2-4' or '4-6' months? Please add text in the figure to cue readers about UV amendment vs. attenuation.

Figure 4, there are not enough data over 500 mm precipitation to draw reliable conclusion.

P8L25-26, use of stats is questionable. The authors need to compare the slopes with 1 statistically.

P9L5-9, a summary of key results will be more useful to start the discussion.

The discussion overall does not offer much original interpretation of data. In many places, it repeats the results or cites the findings from literature (e.g., P9L20-25, P9L6-10).

P9L14-15, this should be presented in the results.

P10L20, you mean no effects were observed in the lab?

P11L7, Figure 4 presents the data in an interesting way. I consider it a stronger component of the manuscript. However, it is debatable whether the temporal patterns clearly show three different stages. For example, the UV attenuation results seem to follow a two-stage pattern.

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