

# **Interactive comment on “Precipitation alters plastic film mulching impacts on soil respiration in an arid area of Northwest China” by Guanghui Ming et al.**

**Guanghui Ming**

Authors’ responses (blue color) start with “response”.

The paper titled “Precipitation alters plastic film mulching impacts on soil respiration in an arid area of Northwest China” investigates the influence of plastic film mulch on soil respiration and illuminates the complex relationship precipitation has on these processes. The paper is generally well written, of sufficient scientific quality and of interest for publication in Hydrology and Earth System Sciences, with some modification (see below). However, there are several larger issues with the structure of the paper that need to be addressed. Chiefly, the discussion does not integrate the results of the study and discuss the implications of the work on the broader literature and “real world” scenarios in enough detail. One critical question that I do not believe has been sufficiently answered is “what is the importance of the work?”. This is a critical question that needs to be clearly addressed in the discussion. Additionally, there are also several issues with flow and brevity in the manuscript, particularly the introduction and discussion, that needs to be addressed. I suggest a re-writing/structuring of the discussion to improve the flow of the manuscript and further discussion on the implications of their results to the broader community

Response: Thanks the anonymous referee a lot for the constructive comments that helped us to improve the quality of our manuscript. We have restructured our manuscript and rewritten some sentences to broaden the research meaning and make it more logical and readable as the referee suggested. Below we address all the comments on a point-by-point basis.

Specific Comments:

Introduction:

The introduction is quite long and should be condensed, only keeping what is critical to the paper. Ideally, the introduction would be shortened by \_1 page.

Response: Done. The introduction has been shortened by about 1 page with moving “the effect of different climates on soil respiration” paragraph to the discussion, and removing other non-relevant sentences.

To that end, I suggest condensing the temperature and moisture effects into 1 paragraph.

Response: Done. The temperature and moisture effect paragraphs have been condensed into 1 paragraph.

Additionally, the first paragraph is very long, I suggest separating them into two paragraphs at line 67, as it is a natural break in the topics from general background to China focused.

Response: Done. The first paragraph has been separated into two paragraphs as per the referee's suggestion. Also, the sentence about the expansion of PFM cultivation around the world has been moved to the second paragraph to ensure that the first paragraph focuses on anthropogenic effect and the second paragraph focuses on the specific PFM effect.

#### Results:

Throughout the results there are statements that belong in the discussion, particularly where the authors state a reason for a given trend. For instance, P22L496-513 are relating the current work to past work, while giving the regional/climatic context. This paragraph is not results but discussion. Please move these sentences/paragraphs, and others like it, to the discussion. Additionally, there are many instances of the results being repeated in the discussion (see comment below).

Response: The paragraph has been moved into the discussion. The repeated instances of the results have been removed.

The analysis between other studies of differing climates (P22L496-513) is interesting but needs further clarification and integration into the discussion. Furthermore, it would be very instructive to have each of the studies highlighted in Figure 10, where each point is displayed as a unique symbol or color to help the reader differentiate which point is from which study.

Response: Done. The paragraph has been clarified and moved into the discussion as per the reviewer's suggestion. The climate and reference of each study has been highlighted in Figure 10.

#### Discussion:

There are several sentences in the discussion where the results are being restated (e.g., "Our results indicate that the soil respiration in the ridges of the mulched field (mr) as measured by uncovering the plastic mulch was greater than in the furrows (mf). This finding indicates that much of the CO<sub>2</sub> gathers beneath the plastic mulch because of the plastic barrier.") Although at times this is useful, I suggest removing these sentences to help with flow and brevity of the manuscript, which is quite long. Alternatively, these sentences can be reworded to combine both the results and the implications, which would greatly improve the flow of the discussion. For instance, the above quotation could be rewritten as "Soil respiration in the ridges of the mulched field (mr) was much greater than in the furrows (mf), indicating that CO<sub>2</sub> gathers beneath the plastic mulch barrier". Please go through the manuscript and adjust instances of this issue. The discussion needs to be significantly shortened; however, this can be mostly achieved through removing repetition of results.

Response: Thanks for your patient guidance and the constructive advice. We have

reworded the discussion with removing repetition of results and combining the results and the implications throughout the manuscript.

How do your fitted respiration/soil temperature or SWC curves compare to the literature? Are your values representative of the broader literature? This would be a useful comparison in the discussion (particularly section 4.2).

Response: We have compared our results about the soil temperature and moisture sensitivity of soil respiration with other studies around the world.

Although the discussion is long, it lacks a strong comparison of the results to global trends, nor does it integrate the components (temperature, soil moisture, etc.) of soil respiration adequately. There needs to be a final paragraph that integrates the effects of plastic mulch on soil respiration and the broader implications of the work. Within this paragraph it is critical to highlight what the new findings of this study are within the context of the broader literature.

Response: We have added another paragraph by combining our new findings and the implications to the global trends.

Conclusions:

In the conclusion, the authors state that there was increased mineralization, yet this was not discussed in the discussion. It would be prudent to include a short discussion of the effects of the plastic mulch in this context, perhaps including it in the above discussion.

Response: The effect of plastic mulch on mineralization has been added into the first paragraph of discussion.

Technical comments:

P1L33 missing comma before “while”.

Response: Done. The missing comma has been added.

P3L113-117 this sentence is awkward and long, I suggest breaking the sentence into two separate sentences.

Response: Done. The sentence has been reworded into two separate sentences as per the referee’s suggestion.

P9L295 remove the “-“after 10

Response: Done.

P21L477 remove the “s” from Soil respirations.

Response: Done.

P21L478 missing comma before “although”

Response: Done.

P22L494 please provide the statistics for the use of significantly. If statistics were not

used to quantify the significance of the relationship, please remove significantly as it specifically refers to a statistical significance.

Response: Done.

P23L526 missing space between “the” and “accelerated”

Response: Done.

P24L533-534 this is an awkward sentence, I suggest rewording to “This finding indicates that CO<sub>2</sub> from soil respiration gathers beneath the plastic mulch barrier, resulting in a greater flux of CO<sub>2</sub>.”

Response: Done. This sentence has been reworded as per the referee’s suggestion.

P24L563 the period at the end of the sentence is misplaced.

Response: Done. The period has been properly placed.

P25L574-581 these sentences are a repeat of results, please delete.

Response: Done.

P25L574-594 this paragraph does not add to the manuscript at simply restates the results and part of the introduction. I suggest removing the paragraph.

Response: Done.

P25L596 please remove the “-“between “high water content”.

Response: Done.

P26L608-609 awkward sentence, please reword to “There was poor correlation between soil respiration and the soil temperature in different parts of the mulched and non-mulched fields”.

Response: Done.

P26L627-630 this is a run-on sentence, please revise into two separate sentences.

Response: Done.

P27L657 please remove the “s” from respirations.

Response: Done.

Figure 3: it is unclear from your methods why certain datasets are left out of these graphs (e.g., mp in 2014 and 2015). Was the data not collected? Please clarify this discrepancy between your methods, which states that each was measured for all years, and your display of the data in the text of the methods or results.

Response: The missed datasets in 2014 and 2015 were due to no observation. This has been clarified in methods and the Figure heading.