

Dear authors,

Thank you again for sending your very interesting manuscript to SOIL.

The comments of the reviewers as well as my comments have been considered and have improved the manuscript from my point of view. Before the manuscript can be accepted for publication, the following minor changes are necessary (comments refer to the document with tracked change).

Authors (AC): We would like to thank the Topical Editor Peter Fiener for having appreciated our changes and for the suggestions which further increased the clarity of our manuscript

Abstract: In the first sentence, you write "affecting many environmental compartments". Since the effects are not well studied, I would suggest using the expression "contaminating many environmental compartments".

AC: done

Page 2 - Literature regarding the influence of MP on the bulk density: Here you should state more precisely which MP concentration was used in the different studies, otherwise the statements cannot be set into a context.

AC: done

Page 2: "... soil characteristic and MP type, shape and size...". You should add "MP concentration"

AC: done

Page 4 - Description of the soils: Was it checked whether the soils were already contaminated with MP fibers before the addition of the MP?

AC: We visually checked for plastic particles during the sieving process, however, we cannot exclude that the soils already contained an analytical detectable amount of microplastic particles. We added the following sentence to the text: "At the sampling time, we checked and ensured that the three soil types were not contaminated with meso- and/or macroplastic particles; however, we did not carry out analytical procedures to assay the contamination of smaller plastic particles and therefore we cannot exclude that the control treatments might already contain a detectable amount of micro- and/or nanoplastic particles."

Page 10: "This new experiment ... 14.9% slope". I recommend omitting this sentence, which is supposed to relate the laboratory experiments to field experiments. Reasons: (i) the reference to a new experiment is too unspecific; (ii) just because there is a plot

experiment on a rather steep slope does not mean that this slope is representative for a larger area (e.g. clearly too steep for classical arable land in most regions of Europe).

AC: The sentence was omitted as suggested

Page 20 - Discussion of effects on bulk density: Overall, the effect of an MP addition of 0.5 w % on the bulk density of the Vertisol (-9%) seems to me to be quite substantial. Is this a short-term effect, or would this change be stable over time (discussion)?

AC: Many thanks for this very important point. Unfortunately, we have no data to discuss it without speculating. We agree with the Topical Editor that the effect of microplastic in soil along a time scale should be investigated with high priority. We added the following sentence to the conclusion section of the new version: *"The effects we observed are short-term (the incubation period applied in our experiments was ~6 months) and we currently do not know whether such effects would be maintained in the long term."*

Page 20 - Discussion on aggregate formation: Here you should include in the discussion that you have not used aged MP. Would a similar effect occur with aged MP. This should also be placed in the context of the literature (including in each case whether aged MP was used).

AC: Many thanks for this important point. However, as for the point above, the data currently available do not allow us to discuss whether or not aged microplastic can have different effects on soil properties compared to not aged microplastic. To the best of our knowledge only survey studies have collected and analyzed aged microplastics, while not aged microplastics (both primary or secondary generated) have been used in pot and field experiments specifically designed to investigate the effects of microplastics on soil properties. In the new version of the manuscript we specified that one of the cited studies was a survey to highlight that their results come from aged microplastics: *"Zhang & Liu (2018) in a survey study of microplastic contamination in agricultural soils found..."*. Moreover, we added the following sentence to the conclusion section of the new version: *"Moreover, in this study, we used fresh MP particles and the contamination with aged MP particles may lead to different results (Waldman and Rillig, 2020). However, there is insufficient information about aged MP particles at this time."*

Page 22 - discussion of erosion tests: in this paragraph, you often talk about "... slight decrease..." or "... pronounced decrease..." when comparing the treatments. Here you should add significance levels of the differences.

AC: We added the unpaired mean differences and the respective 95% confidence intervals for the suggested parameters in the Result section of the new version. We would like to keep the discussion conversational for the readability of our manuscript

Page 23: "... due to rainfall impact and interrill flow..." should be replaced by "... due to rain splash and sheet flow".

AC: done

Page 23: I suggest omitting the sentences "The effects of polyester MP fibers on rill erosion ... MP fibers addition into the soil.", as the reference to rill erosion seems very speculative and the dependence between erosion and slope has been extensively studied (why should there be a specific MP effect here?).

AC: The sentences were removed. These were introduced in the text during the revision process due to a Reviewer's request.

Best regards,

the Authors