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Interactive comment on "Effects of microplastic and microglass particles on soil microbial community structure in an arable soil (Chernozem)" *by* Katja Wiedner and Steven Polifka

Anonymous Referee #2

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This manuscript investigates the effects of microplastic and microglass particles on the structure of microbial communities in soil using soil microcosms that have been spiked with these contaminants. The issue of micro-particles in the environment is very topical, and while there is a lot of information about the impact of macro-plastics on wildlife e.g. marine animals, there is relatively little information on the impact of microparticles on microbial populations in terrestrial environments. In this respect, this manuscript is timely. However, the explanation of the experimental design was lacking, and therefore the results should be interpreted with care.

Are the authors confident that an incubation period of 80 days was sufficient to observe

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Discussion paper

full effects of the addition of micro-particles? How was 80 days selected as the end point of the experiment? Was it based on published literature or observations? The apparent lack of significant alterations in the bacterial and fungal communities may be due to a relatively short incubation time. In addition, the authors did not consider the effects of transfer of the field soil into the lab environment and compartmentalisation of the soils as a cause of the observed changes in PLFAs. This could be remedied if the authors provide PLFA profiles before the soils were used in the microcosms for comparison, or consider such changes in the discussion section.

The amounts of microparticles used in the microcosms (1%) is very high compared to what is observed in the field. The authors state that this is comparable to an industrial site, but this is a rare case, and so these results will not be relevant for most environmental scenarios.

If the authors think that colonisation on the microplastics could explain the increase in PLFAs, they could use SEM to confirm this, especially when they had already used SEM to characterise the micro-particles at the beginning of the experiment.

In the discussion section, the authors discuss the changes of PLFAs after the addition of microparticles, but also state that overall, soil organisms were not significantly affected. If the latter is true, then the relative changes are of no consequence. Instead, there should be a discussion on the apparent lack of impact of microplastics on the microbial communities, especially when the literature that they cite points to the contrary. On the other hand, the PLFA may not be able to detect finer microbial community changes that e.g. a DNA-based method will be able to detect – there needs to be a discussion on this. There should also be more of a discussion on why microglass should only affect protozoa and not bacteria. The authors only cite one paper, but it confuses matters as they found that microglass inhibits bacterial growth, which was not the case in the experiment.

Minor points:

The manuscript could do with a native English speaker to correct the grammar.

The paragraph in the discussion section on the effects of micro-particles on macro-fauna seems irrelevant when the experiments were about testing microbial populations.

Figure 1 does not add anything to the manuscript.

I don't understand the use of lowercase a and b to denote p-values. Better to state the p-values.

The use of the plastic cylinders to adjust water holding capacity will also contaminate the soils with plastic.

'WHC' should be defined.

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