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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 #1

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Increasing loads of microplastic waste potentially burden our soils. In this regard the paper is timely, as it investigates potential effects of microplastic and microglass pollution on soil microbial community in a laboratory incubation study. The manuscript is concise, very well written and organized, and it has improved in regard to a previous version. However, still the paper includes the risk of presenting artificial results, which should be very openly discussed. The shortcomings refer to: 1. Microplastic loads: The authors state that they refer to microplastic loads near industrial areas. However, 12 t ha-1 is a huge amount, far from being realistic. The authors should spell out clearly, also in abstract and conclusions, that their data refer to worst-case conditions that do not necessarily apply to common plastic and microglass loads in

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Discussion paper

agricultural soils, because concentrations exceed natural loads at least by a factor of about 10.000! 2. I like the finding for protozoa, and appreciate that an explanation is offered related to the hydrophilic surface. Nevertheless, why should this apply to glass but not to increased amounts of sand grains? Can enhanced amoutns of quartz grains also be toxic for protozoa and has this been published beforeß And if not, why should the glass be more toxic than pure sand? Here the authors should elaborate the physiological explanations a bit more in detail and also outline why microglass should be toxic whereas quartz particles in the fine sand fraction is apparently not (or is it?). It is also not clear why a specific toxicity should only apply for protozoa while one of their main food sources, bacteria, are not affected. 3. Experiment conditions: Usually soil has to be stored cool but should not be air-dried. Air-drying soil prior to incubation in known that it includes the risks of artifacts, even if pre-incubated. The authors should discuss this issue based on some literature which investigated related effects of sieving and air-drying for a range of microbial parameters

Some minor comments: - L 164: Do not show any instead “show no”

- . 204; What do you mean by !”trend” Please, show p-value

- PLFA are only biomarkers, not as sensitive as DNA analyses for specific taxa. The authors should be careful in taking each PLFA biomarker for granted, and they should add a discussion on potential misinterpretations and uncertainties, maybe in an extra paragraph towards the end of the methods section.

- Note that 10Me16:0 is not only used for Actinomycetes, for instance, but has largely been suggested for S utilizing bacteria (see, e.g., work done by R. Evershed and others)

- Figure 1 is nice but it does not really relate to the contents of this paper. If he authors want to leave it, I suggest they should go a bit more into detail into the consequences of comparing the different sizes.

- The stirring for microglass and microplastic incorporation into soil likely interfered with soil aggregation? Can it be that this stirring jointly with glass treatment also impaired protozoa? For me this would be a reasonable explanation for the results presented. . ..

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