

Interactive comment on “Global concentrations of microplastic in soils, a review” by Frederick Büks and Martin Kaupenjohann

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Dear referee #1

Thank you very much for your comments. In the following we want to explain how to consider your questions.

1. The methods for extracting microplastics from soils is not uniform among those studies listed in this reviewer, and different density suspensions can separated different types of microplastics. Whether is it meaningful to analyze and compare the concentration of microplastics extracted by different separation methods? E.g. line 272-274..... The density cut-off has indeed influence on the amount of extracted plastic as discussed in lines 466-480. However, we expect that this doesn't take place in a

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degree which affects the order of magnitude (power of ten). Following PlasticsEurope (2016), the most commonly produced plastic types are PP ($\sim 0.91 \text{ g/cm}^3$), PE ($0.87\text{-}0.97 \text{ g/cm}^3$), PVC (mostly $1.2\text{-}1.4 \text{ g/cm}^3$), PU ($1.0\text{-}1.25 \text{ g/cm}^3$), PET (1.38 g/cm^3) and PS (1.05 g/cm^3), and at different terrestrial sites, PE and PP, which are both low density plastics, were found to be much more abundant than PVC, PET and PU items (Büks et al., 2020a). As the great majority of studies used dense solutions with $\geq 1.2 \text{ g/cm}^3$, these light plastics are extracted unhindered by the solution. Future investigations with standardized methodology and a cut-off of 1.6 g/cm^3 will then give us data that include all plastics and are precise on a scale smaller than order of magnitude.

-> We propose to insert in line 470: "In different terrestrial environments, low-density plastics like PE and PP were found to be much more abundant than denser materials such as PU, PET and PVC (Büks et al., 2020a). The great majority of studies that used dense solutions with $\geq 1.2 \text{ g/cm}^3$ therefore extracted large parts of soil plastic independently from the chosen density cut-offs leading to trustable orders of magnitude."

2. The sample base is small, is the conclusion representative? E.g. line 20 "Microplastic concentrations in soils in the vicinity to municipal areas were thereby 10 times larger compared to rural sites"; line 368-370, the microplastic concentrations in sites with sewage sludge application are approximately one order of magnitude above values measured in fields with plastic mulching.....; line 385-386....

-> Although this is a small number of separated sites compared to the possibilities of future comprehensive monitoring programs, the data shows clearly different clusters of concentrations and are therefore sufficient to give a first approximation of the order of magnitude of soil microplastic concentrations. For more exact determinations, indeed, additional measurements are needed especially in the underrepresented categories.

We therefore propose to insert in line 402: "Measurements with larger sets of separated sites e.g. in the frame of national monitoring programs will allow to estimate more precise and localized values of soil microplastic contamination."

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3. Notices some of the details, please. E.g. line 119: 0-10 and 10-20 mm? line 200: double "for" etc.

->Thank you for your mindfull proofreading. In fact, these are cm. Done.

Best regards,

Dr. Frederick Büks and Prof. Dr. Martin Kaupenjohann

References

Büks, F., van Schaik, N. L., and Kaupenjohann, M.: What do we know about how the terrestrial multicellularsoil fauna reacts to microplastic?, SOIL, 6, 245–267, <https://doi.org/10.5194/soil-6-245-2020>, 2020a.

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