

## ***Interactive comment on “Compared impact of compost and digestate on priming effect and hydrophobicity of soils depending on textural composition” by Amrei Voelkner et al.***

### **Anonymous Referee #1**

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The authors of the manuscript entitled ‘Compared impact of compost and digestate on priming effect and hydrophobicity of soils depending on textural composition’ address an important question of the effect of addition of composted organic substances on physical and biological soil properties. The study investigates the effect of compost and anaerobically fermented digestates on wettability of soils and the soil respiration. The study is novel and of potentially large interest, however, the research design and the overall description of the study present some potential problems.

I find this extremely hard to understand the research design used in this study. The authors mixed two soils of different texture with digestate and compost and investigated the effect of addition on wettability and microbial respiration soon after the soil was pre-

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dried to -60hPa matric potential. I think the real effect of organic substance addition on wettability can't be assessed only based on such immediate measurement after mixing, instead soil should be exposed to wetting/drying processes or possibly incubation for a period of time before testing water repellency. It is not clear why the authors chose to measure carbon content of the soil-amendment mixtures immediately after mixing (and air drying), water repellency immediately after pre-drying of soil samples to -60hPa and analysing BAS 6 days after the incubation at 22°C. I find this research design very inconsistent and therefore unable to answer stated research question.

The results presented in the study are extremely surprising especially the depletion in carbon content after addition of compost or digestate. The authors argue that the reason behind the carbon depletion can be the boosted organic matter decomposition after addition of the organic amendments but it is a very unlikely case given that C content has been measured immediately after mixing soil with the organic amendments. The discussion contains a lot of speculations not supported by the results. Authors discuss the increase in soil hydrophobicity where in fact the results show a slightly higher repellency index in amended soil samples but still classified as a wettable (RI<1.95). At this state I find the manuscript not suitable for publication.

Detailed comments: P1 Abbreviation for soil types Ut3 and SS are not intuitive, I suggest to change it to something more logical P2L21 exudates P3 The samples are claimed to be collected from A-horizon 0-10cm depth, but the samples from Dikopshof are sampled from a Cv horizon so the subsoil is that correct? P4 digestate and compost addition has been stated in different units and therefore hard to compare the amounts, please convert to the same units P4 Did the digestate and compost soil mixtures resulted in similar soil moisture contents? Or was the digestated more in a liquefied state and resulted in higher soil moisture contents after mixing. This information could help understanding why soil C content was lower after amendment addition P4 research design is very unclear, what is the rationale to measure the wettability after -60hPa pre-drying and respiration 6 days later? P5 explain more about the interpreta-

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tion of RI results, most of the results from the study had RI between 1-1.95 so were the wettable or water repellent? P5 very hard to read values for Ut3 soil C content P7 why C content was lower after addition of digestate and compost? The high respiration is very unlike to cause such a quick depletion in SOC within a few days P8-9 discussion very speculative and doesn't correspond with the results, water repellency is basically undetected in the samples therefore there speaking about hydrophobicity and BAS correlation seems incorrect

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