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Interactive comment on "Plant functional traits determined the latitudinal variations in soil microbial functions: evidence from a forest transect in China" *by* Zhiwei Xu et al.

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Critical review: Plant functional traits determined the latitudinal variations in soil microbial functions: evidence from a forest transect in China

Gervolino, J., Irvine, S., Mokokwane, T., Saraogi, V., and Shearer, R. Summary:

The paper seeks to explore relationships between plant traits and microbial communities in soil. This is a pertinent question, especially in the context of ecological resilience and resistance. The main overall finding is that labile carbon is associated with microbial community composition, a clear but relatively unsurprising or limited conclusion.

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Discussion paper

There are some weaknesses in written presentation and in the presentation of data. The Abstract does not mirror the content of the main paper and lacks quantitative information. It is rather difficult to follow. In particular, the title does not reflect the real findings, as it is really a study of litter quality effects rather than plant functional traits.

In terms of format, the paper contains too many acronyms, which make the text hard to follow. Some of the acronyms not explained well enough. The text does flow well in many places and should be checked for readability.

The “community weighted mean” is central to the analysis, but the CMW abbreviation is not defined or discussed.

Specific points:

Introduction

The content lacks coherence and is occasionally repetitive. The text should have a more linear transition from plant to microbial function - and to isolate consideration of activity from diversity of community and community structure. The spatial dependence of microbial activity should be mentioned once at the outset, noting the issues of scales of spatial dependence.

The paper only briefly mentions plant functional traits as a determinant of ecosystem properties, especially for soil biogeochemical processes. The nature of the connection to microbial activity and function is poorly elucidated.

The introduction does not focus down to the study content until the end. It is difficult to understand the context of the study, since most of the introduction addresses how individual factors affects microbial activity individually.

Hypotheses are offered, but not in testable, directional form. They are broad and could be better stated as overarching questions considering how microbial substrates correlate with latitude as a reflection of litter quality / substate input.

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In the last paragraph lines 112-116 consider the specific study sites / transect. This is contrived and should be raised in the Methods section, as the means by which the research question is addressed.

Methods

More detailed information is required concerning the sampling method. It is not adequate to refer only to a previously published article. It is not clear how the soil samples were analysed. It appears that there was no evaluation of the variability of the measured variables within the plots, as a basis for aggregation of the soils. The plots were quite large at 30 m x 40 m, without explanation for this. As such, the representivity of the bulked soil from mixing S-sampling is unknown

Results

The description of statistical analysis mentions correlation but in Fig. 6 and Fig. 7, the caption and associated text references relationships and the the plotted lines imply regression. The study is strictly correlative, since there are is no independent variable defined.

Discussion

This section is well organised by “theme” and well explained, each sub-section focused on one attribute of the results.

The introduction stated that study of relationships between soil microbial communities and microbial function are urgently needed. Here in line 382 the authors state that their findings the “functional dissimilarity hypothesis”. This is useful, but line 382 also states that further studies are required to understand mechanisms that drive relationships between ecosystem functioning and soil microbial groups. Stating further research is needed is a poor way to end this section , without stating what exactly is next required. Was their experimental design suitable for studying the relationships in the first place?

Conclusion

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The conclusion drawn is presumptuous on the limited evidence presented particularly with the lack of description for the term ‘community weighted mean’.

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