

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.

Anonymous Referee #3

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General comments

Relationship between plant functional traits and soil microbial functions is totally important research to estimate forest soil carbon and nutrient budget at present conditions and at the global climate change conditions. And meta-analysis using multi-site data or samples is one of the major methods to know it. However in this case, we need discreet data handling, appropriate hypothesis because each forest has specific and different conditions (e.g. plant, soil, environment, history) and interaction between functions and conditions is always complex. In this MS, authors used 9 forests' soil samples and examined plant, carbon and microbe data. And authors defined this study as the re-

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lation between “plant function and the latitudinal variations in soil microbial functions (title). And authors also mentioned that this study related with a counter-hypothesis about functional redundancy of microbe (L90-L111). However this MS has some unclear points in (1) hypothesis testing, (2) relation between plant and microbe and (3) latitudinal distribution. In my opinion, this research has much, reasonable and complex information however needs major revision.

Specific comments (1) Hypothesis testing At different forests and in different environmental conditions, specific (different) microbe distribution (species and activities) can happen and this must be common. Therefore in case mentioning on functional redundancy of microbe functions, careful definition of hypothesis is necessary because dissimilarity or similarity at multi sites does not directly mean functional redundancy of ecosystem. In the papers authors referred (L90-L111), Balsler, Banerjee, Waldrop and Philippot used 1 site (or near 2 site transplanting) data and samples, and had a very clear hypothesis and testing. Strickland used several sites but experimental design was clear. In the study of Fierer, they used 71 site's samples but they focusing on bacteria (I recommend authors check this MS well.). Most of all studies conducted a specific manipulation and experiment for hypothesis testing because verification of functional redundancy in the steady state condition is difficult. On the other hand, I could not find one or several clear hypothesis in this paper. Please set more appropriate and clear hypothesis

(2) Relation between plant functional traits and soil microbial functions

In this MS, plant functional traits were defined in table S2 and used in Fig 4. Plant functional traits authors used were unclear in representativeness as plant functions. Because many researches focus on various plant functional traits which could regulate microbial activities and species distributions (e.g. priming effect, home field advantage, and fine root production). At least, I think authors need to mention why they choose these variables as plant functional traits. And several variables were discussed in section 4.2. Each relation was reasonable but not seemed to lead to functional redundancy

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of microbe functions along forest sites

(3) Latitudinal distribution

This MS was defined as “the latitudinal variations in soil microbial functions”. However I could not know about latitudinal distribution in soil microbial functions but comparison between forest and forest types. If authors wanted to assert this, I think they need focus more not on simple negative-positive relation but distribution (e.g. focusing on MAT vs plant type).

Technical comments

1. Scatter plots CSU vs leaf N (L298), CSU vs leaf C (L308) and LDMC(L321) may support readability. 2. Definition of CWM and H' was not clear.

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