

## ***Interactive comment on “Drivers of atmospheric methane uptake by montane forest soils in the southern Peruvian Andes” by S. P. Jones et al.***

### **Anonymous Referee #2**

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General comments: This was a well-written study summarizing up to 2.5 years of soil-CH<sub>4</sub>-flux monitoring along an elevation gradient of tropical montane forests in Peru. Supporting measurements included soil CO<sub>2</sub> fluxes, soil O<sub>2</sub>, available N, moisture and temperature. The introduction provided a solid basis for the study, methods were described in detail and results were presented concisely. The figures and tables were well designed and informative. However, I would like to see the authors spend a little more time polishing the discussion; there were several instances where statements made were too vague to contribute anything substantial to what was being discussed (see below for specific cases). Altogether, the very interesting contrasting results of this study with those of previous studies makes this an important contribution to research focused on understanding soil CH<sub>4</sub> fluxes in tropical montane regions.

Specific comments: - Pg 11, lines 6-8: this sentence is rather vague - can you rephrase

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it to state specifically what you think is occurring (perhaps with a reference)? - Pg 11, line 15: can you suggest what you might have done differently? - Pg 11, line 32: 'dissimilarities' is vague - please rephrase this sentence to explain specifically what you mean. - Pg 12, line 11-12: the purpose of this sentence is unclear, please rephrase and/or expand on what you are trying to say here. - Pg 13, line 10: discussed where? Are you referring to Pg. 11? If so, this is again quite vague. Can you suggest another possible driver? - Pg 13, line 17: what mechanism? You comment on differences and go on to suggest they may be related to soil structure, but can you specifically describe a possible mechanism? - Figure 4: Double-check your statistical theory here, but as they are currently presented, I don't think these graphs should have regression lines. I believe that once you choose to treat the 3 elevations as forest replicates, the within-elevation replicates would need to be averaged in order to avoid pseudoreplication.

Technical corrections: - Throughout the paper (most mistakes occur in the discussion) use only past tense rather than mixing past and present. - When citing references, it is more helpful for the reader if you put references directly behind the information they refer to instead of grouping them at the end of the sentence (i.e. Pg 11, line 5, Pg 12, line 3, Pg 13, line 21). - To avoid unnecessary confusion, consider using 'efflux' or 'emissions' to refer specifically to positive fluxes. For example, on Pg. 8, line 3, one could argue that larger fluxes actually occurred at the higher elevations. - Pg 8, line 3,16: at lower 'elevations' - Pg 8, line 11: use consistent language. Rather than saying 'negative fluxes', use 'uptake' as you do elsewhere. - Pg 9, line 2, Pg 10, line 31, Pg 13, line 13: A semi-colon is used to join two related (complete) sentences. Whilst or while are conjunctions, which can be used to compare two (normally contrasting) ideas in a single sentence. - Pg 9, line 14: by 'species' do you mean 'forest type'? - Pg 9, line 28: plot 'means' - Pg 10, line 2,8: delete 'for example' - Pg 10, line 28: delete 'together' - Pg 10, line 30: did you do this statistical comparison over time or only comparing wet vs dry season? If the latter is true, then you can't say "with the procession of..." - Pg 11, line 1: 'differences', the fact 'that' - Pg 11, lines 12-13, Pg 12, line 32: 'source activity' is awkward. Change to 'emissions' or 'efflux'. - Pg 11, line 32: 'underpinned' sounds

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awkward here, perhaps 'supported'? - Pg 11, line 29-33 (and elsewhere): This part of the discussion would be improved if you indicated which tables/figures correspond to the results you are discussing. - Pg 12, line 17: 'Similar' to - Pg 12, lines 20, 26: 'the' positive correlations, 'the' wet and dry seasons - Pg 13, line 1: 'constrained' seems odd in this context, do you mean 'understood'? - Pg 13, line 4: move the reference to Table 5 from line 1 to here, after 'for these studies' - Pg 13, line 5: 'in this respect' doesn't fit here, can you reword?

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