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Interactive comment on "Tropical montane forests are a larger than expected global carbon store" *by* D. V. Spracklen and R. Righelato

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General comments

This manuscript contributes to a better understanding of the important role of TMFs in carbon storage. Based on remote sensing data the authors show that land-surface area of TMFs is globally about 40% higher than horizontal area. Since many TMF studies do not correct their AGB estimates for slope angle that may result in an underestimation of carbon stored in TMFs.

Some minor corrections of the present version could improve the present version.

Specific comments

It becomes not clear how AGB data have been synthesized. Could you describe the selection of data sources?

And I think it is important to mention which allometric equations were used to calculate AGB in your data sources (probably mostly the equations of Chave et al. 2005 that were not developed for montane forests) and to critically show limitations of AGB estimation (e.g. not including tree heights in the Chave-equations could lead to overestimation of AGB in TMFs).

Technical corrections

18895, l11:more recent references (replacing Lieberman et al.): e.g. Benner et al. 2010, Bruijnzeel et al. 2010.

18895, l17-24:additional recent studies covering two altitudinal gradients from the Ecuadorian Andes: Leuschner et al. 2013, Unger et al. 2012, Unger et al. 2013.

18896, first paragraph:you should mention the range in plot size in the included studies.

18898, l17: Girardin et al. (2014) found the decline in AGB with elevation only in 3 out of 6 of their transects.

18899, l13-14:additional references for effects of nutrient availability on AGB and productivity: Unger et al. 2012, Homeier et al. 2012.

18899, l23-25:many studies show a decrease of woody species richness with elevation but there seems to be no general trend and a peak at mid-elevations has not been recorded frequently.

18899, l25-27:see also Unger et al. 2012.

18902, l9-14:Variation of AGB seems to depend a lot on topography and related soil conditions too, so from our results from the S Ecuadorian Andes (comparing AGB at different slope positions and elevations) we find no effect of slope angle on AGB but a decrease of AGB from lower slope to upper slope with equally high variance in AGB at

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all elevations.

18902, l17-18:add (or replace Leuschner et al 2007) by Leuschner et al 2013.

18902, l21-23:Bruijnzeel et al. (2010) compiled the major threats to TMFs and Homeier et al. (2012) gave an example for the effects of increasing nutrient inputs.

Table 1:Plot size could be included in this table. Another important data is the equation that was used to calculate AGB.

Additional references:

Benner et al. (2010) Nutrient cycling and nutrient limitation in tropical montane cloud forest. in: Bruijnzeel et al. (eds.) Tropical montane cloud forests: Science for Conservation and Management. Cambridge University Press, Cambridge. 90-100.

Bruijnzeel et al. (2010) Tropical montane cloud forests: state of the knowledge and sustainability perspectives in a changing world. in: Bruijnzeel et al. (eds.) Tropical montane cloud forests: Science for Conservation and Management. Cambridge University Press. 691-740.

Homeier et al. (2012) Tropical Andean forests are highly susceptible to nutrient inputs - Rapid effects of experimental N and P addition to an Ecuadorian montane forest. PLoS ONE 7(10), e47128.

Leuschner et al. (2013) The carbon balance of tropical mountain forests along an altitudinal transect. in: Bendix, J. et al. (eds.) Ecological Studies Vol. 221, Springer Verlag, Berlin, Heidelberg, New York, chapter 10., pp 117-139.

Unger et al. (2012) Effects of soil chemistry on tropical forest biomass and productivity at different elevations in the equatorial Andes. Oecologia 170, 263-274.

Unger et al.. (2013) Relationships among leaf area index, below-canopy light availability and tree diversity along a transect from tropical lowland to montane forests in NE Ecuador. Trop. Ecol. 54(1), 33-45.

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Unger et al. (2010) Variability of indices of macronutrient availability in soils at different spatial scales along an elevation transect in tropical moist forests (Ecuador). Plant Soil 336, 443-458.

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