

Interactive comment on “An analysis of forest biomass sampling strategies across scales” by Jessica Hetzer et al.

Anonymous Referee #2

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This manuscript assesses the ability of different sampling strategies to characterise the overall mean biomass of tropical forests. Although there have been previous studies looking at this, the multi-scale approach and the point-pattern simulation to replicate the spatial clustering of previous studies add novelty, and mean that there is enough new for this to be a useful contribution. There are a number of issues that need to be addressed, primarily through improved discussion.

##Major comments

I agree with the major points raised by Ref1, and won't elaborate on them more here except to say that it would make more sense to me to restrict the allocation of sampling points to a single biome (i.e. moist tropical forests) and areas with forest cover (i.e. above a given threshold in the Baccini map) to more realistically reflect real sampling

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efforts.

The analysis of clustered sampling strategies implies a very naïve analysis approach to get an overall mean – just taking an average across plots without considering their configuration. To what extent the performance of clustered plot networks at estimating the overall mean can be improved by analyses accounting of climate and soil covariates and/or spatial autocorrelation to account for this oversampling? I would assume that there would be considerable potential to remove the disruptive effect of non-random sampling, and instead move estimates to a point on the random sampling curve equivalent effective sample size of spatially random plots. Thus existing plot networks, with appropriate analysis, may provide much better estimates of continental mean biomass than implied by this study.

It is worth noting that the remote sensing maps used as reference have serious limitations (some pointed out by Ref1). Most importantly, they miss the effect of species composition on biomass, which is driven by wood density and leads to marked spatial patterns in Amazonia. This isn't so much of a problem for this study if the remote sensing reference maps are interpreted as providing realistic examples of large-scale spatial variation in biomass, rather than as real references. I do wonder if this means the large scale reference maps underestimate the extent of fine scale variation due to compositional differences across soil types (for example).

Specific comment

The barplots in Figures 3 and 4 could be misinterpreted as giving strong evidence that big plots are best, as they show that the smaller plot size the more plots are needed. It would be good to also display the change in the area of sampling needed (as is done in the text and table), as that is more relevant to sampling effort.