

Interactive comment on “A spatial resolution threshold of land cover in estimating regional terrestrial carbon sequestration” by S. Zhao et al.

Anonymous Referee #1

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The Manuscript on A spatial resolution threshold of land cover in estimating regional terrestrial carbon sequestration addresses relevant features of spatial resolution on carbon sequestration in a managed area in the southeastern United States. The MS is well written, but needs major revisions.

The surveyed spatial resolution thresholds are based on nearest neighbor interpolation. I would assume nearly all land cover datasets as used for biogeochemical modelling so far using a rather majority based resampling algorithm. Despite one of the major aims of this study to preserve the disturbance information probabilistically at the regional scale, another main interest evolves on the effect of aggregation to a major land cover type. The analysis would benefit if different resampling methods would be considered.

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Page 7993 line 10 -14 Although the mean in carbon sequestration is equal between 250, 500 and 1000m resolution the interannual variability (standard deviation) at 1000m is twice as much as that of the higher resolution. When interpreting this it is not clear what the term critical at 1km means. For me, looking at year 2001 transitional barren was lower at 1000m than for 250 and 500m, creating a different response in carbon sequestration. If I think of a wider spread of such areas, the interpretation of exaggerated IAV would start already at 1000m resolution. In this context an assessment of the relevance of certain degrees of land use/cover change would lead to more general assumptions. Possibly such analysis could start in an area defined by the coarse resolution pixel size, which did not experienced land use/cover change towards heavily affected areas.

Figure 5 What does white color represent - No carbon sequestration? If so an explanation in proceeding like this is needed. Why did you exclude these areas? Why does it represent developed areas of Muscogee exactly, but not Chattahoochee (includes large parts of forest)? Additionally there is an evident unrealistic shift at 4km resolution for the region of Chattahoochee. Further, doesn't the polygon character of the research area introduce biases when thinking of the resampling, instead of defined equal rectangular regions?

Discussion section Talking about the implication of spatial resolution thresholds at continental to global scales, I think it is necessary to mention latest implementations of land use changes in terms of fractionation in global biogeochemical models (Zaehle 2005, Bondeau etal 2007)

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