

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

Anonymous Referee #2

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The study on a spatial resolution threshold of land cover data for regional estimates of carbon sequestration aims at one of the important topics in the modelling of terrestrial carbon dynamics.

This study describes a carbon sequestration modelling exercise over a spatially limited domain. The authors demonstrate the importance of the spatial resolution of the land cover classification used in this study for this particular domain. The authors state that 1 km is an upper threshold on the land cover spatial resolution for a correct representation of land cover information. The aggregation of the land cover information from 250m to coarser scales is performed by nearest-neighbour algorithm.

Major remarks.

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My general concern: authors present their findings (critical threshold on the spatial resolution for the land cover data) based on a very local modelling study using a single resampling method.

At the moment the study does not suggest universal applicability of its findings.

The title and the abstract of the paper are misleading.

Reasons for this: The title says, "threshold of land cover in estimating regional terrestrial carbon sequestration". However, the term "regional" is generally used in ecosystem terrestrial modelling for coarser scales and larger areas of a country or a subcontinent. Accordingly, the Abstract also does not reflect the local character of the study and can be mis-interpreted.

Is the domain of this study representative for a larger region, let's say at least for the state of Georgia or Alabama?

Until the end of the discussion section (end of the paper) the limitations of the findings and importantly of the setup for this study are not mentioned. In Discussion authors admit that their findings cannot be generalized for studies at regional and continental scales. But the representativity of the study's setup should be described at the earlier stage of the paper i.e. in Methods section.

Minor comments.

In the abstract, line 4: Authors write "...the influence of the spatial resolution of land cover change information on the estimated terrestrial carbon sequestration is not known". Jung et al (2007) investigated exactly the dependencies of the carbon sequestration estimates on the spatial resolution of the land cover (fractional vs. aggregated). Authors even refer to this study later themselves.

Page 7985, line 17: add reference to the previous study

Page 7987, line 9: what properties?

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Page 7987, line 15: what parameters?

Page 7993, line 5: from the numbers given here for the minimum interannual carbon sequestration the threshold on the land cover resolution would be rather 500 m, not 1 km. Page 7993, line 9, line 21: same as in the line 5. from the numbers given here the threshold on the land cover resolution would be 500 m, not 1 km.

The choice of the critical threshold on the spatial resolution of the land cover

Page 7994, line 20: Jung et al(2007) found that the the effect of the spatial land cover resolution on the carbon sequestration estimate was small RELATIVELY to the choice of the terrestrial ecosystem model or its drivers.

Figure 4. Are the plotted data (lines) a product of interpolation? Mention the interpolation algorithm here.

My final recommendation:

The quality of this scientific contribution can be greatly improved by one of combination of the following: 1) test the threshold for other(s) resampling methods 2) test the validity of the 1 km threshold for a larger domain of a regional scale study

if none of the suggested is possible to do, the results of the study still could be suitable for publication in a form of a technical note.

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