

Biogeosciences Discuss., referee comment RC3
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Comment on bg-2022-18

Richard A. Birdsey (Referee)

Referee comment on "Updated estimation of forest biomass carbon pools in China, 1977–2018" by Chen Yang et al., Biogeosciences Discuss.,
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This is an important contribution to the series of studies about biomass C of China's forests. Using standard methodology developed in previous published works, the authors have compiled a credible time series of estimated net C uptake for natural and planted forests that can help inform China's GHG policies as well as help the world understand how massive reforestation as well as deforestation of older forests in China are influencing the global C budget. Although not particularly innovative in methodology, the study is comprehensive and informative, and I recommend publishing after some relatively minor revisions. Most recommended revisions are for clarity of language, though two comments about the analysis are more substantive. First, there have been several papers written that challenge the success of large-scale plantings especially in areas of China subject to drought. Do the results here conclude that most plantings have been successful as measured by the forest inventory over time? Second, the large reduction in area and C density of natural forests in the 1994-1998 time period is quite significant, and I would like to hear more about this in the discussion. The authors provide a few insights in lines 196-202, particularly related to aging forests and slower growth, but the references tend to be from other regions and so I would like to see some exploration of literature that is more relevant to China. In addition, the idea that harvesting old forests and converting them to younger managed forests will result in higher growth rates is very misleading as a "natural climate solution" in that the loss of accumulated carbon in the harvested forest will not be replaced by accumulated growth of young forests for decades or centuries.

Here are some specific comments for consideration:

Lines 46-48: is there a difference between "forest census data" and "survey data"?

Line 51: replace "sequestrating" with "sequestering".

Line 52: replace "have" with "has".

Line 54: add "net" between the words "reducing greenhouse".

Line 102: replace "increase" with "increasing".

Line 106: replace "may lead" with "has led".

Line 112: replace "average" with "average increase"..

Line 127: delete "during"

Lines 148-149: please provide a clear definition of the 5 terms that describe age of forest. Explain how these terms are associated with stages of forest succession and that the associated forest ages are different among different forest types.

Figure 2 uses 3 age classes that are different than the 5 classes described in lines 148-149. Are the 3 classes aggregated from the 5 classes, or defined differently?

Line 163: Forest inventories based on sample plots are not really "spatial" in that they are based on sample points spaced some distance apart. It is more a "statistical" approach to data rather than "spatial".

Line 188: this would be a good place to add some further explanation for the reduction of area and stock in 1994-1998.

Line 211: replace "promoting" with "the increase of".

Lines 228-231: The errors seem rather small – what is included in the estimation of error? Are both sampling and modeling errors estimated? How the errors were calculated should be referenced in the methods, perhaps in the “statistical analysis” section.