

Interactive comment on “Impact of climate and land use/cover changes on the carbon cycle in China (1981–2000): a system-based assessment” by Z. Gao et al.

Anonymous Referee #2

Received and published: 20 September 2010

Despite previous reports on China's carbon budget, large uncertainties still remain about how the unique LULC change in China has contributed to the carbon balance. The authors intended to evaluate the influence of climate and LULC change on carbon cycle of China's ecosystems in the last two decades. The topic is interesting, but I have reservations regarding the publication of the manuscript.

The primary concern of the reviewer is whether the CEVSA model robustly simulates carbon fluxes of China's ecosystems. Model outputs are much dependent on model design and parameter choices, and thus it is essential to evaluate reliability and accuracy of model outputs. However, the authors do not establish the accuracy of their model for

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their task. Moreover, when doing the model spin-up, the authors assumed average climate condition between 1971 and 1990 as the climate condition when carbon cycle of the ecosystems reaches equilibrium. This assumption is unreliable as warming in this period has probably already driven the carbon cycle deviated from equilibrium status.

Second, the results reported by this MS are largely different from recent studies with state-of-art estimation. The annual net carbon change reported in this study is 0.017 Pg C/yr, which is one magnitude smaller than that by Piao et al. (2009) who estimated the carbon balance ranging from 0.19 Pg C/yr to 0.26 Pg C/yr using inventory and atmospheric inverse model. Such a huge difference should be noted and preferably be explained. Moreover, the authors suggested that their results were consistent with Fang et al. (2001), which is not the case. Fang et al. (2001) reported nation-wide carbon change of forest biomass (0.021 Pg C/yr), which does not include biomass C change in grassland, shrubland and soil C change under these ecosystems. Thus, the value reported by Fang et al. (2001) is only a portion of net ecosystem carbon change, but already larger than reported net ecosystem carbon change estimated by this study. Moreover, Fang et al. (2007) has improved the estimate of annual carbon sequestration rate of forest biomass to be 0.075 Pg C/yr during 1981-2000, which has a larger difference with value reported in this MS. The authors should carefully interpret previous reports and explain the differences between the estimation of this study and estimations of other previous studies.

Finally, the MS is not very well written in the sense of organization, as well as language.

Interactive comment on Biogeosciences Discuss., 7, 5517, 2010.

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