

## ***Interactive comment on “Nitrogen deposition: how important is it for global terrestrial carbon uptake?” by G. Bala et al.***

**Anonymous Referee #2**

Received and published: 3 September 2013

Bala et al. report on the results of a global simulation study with an off-line land ecosystem model which tries to disentangle the sensitivities of terrestrial ecosystem carbon (TEC) to changes in nitrogen deposition, rising atmospheric CO<sub>2</sub> concentration and temperature. Their main finding is that since the pre-industrial period nitrogen deposition had a positive effect that was counteracted by warming and that increases in TEC were due to rising CO<sub>2</sub>. The paper is highly relevant as it provides, within the limits of the chosen approach, first data on the relative importance of these three drivers. The topic of the paper fully fits with the objectives of BG and the paper is mostly well written and the presentation is excellent. I thus recommend the paper for publication once the following minor issues have been tackled.

Minor comments: (1) p. 11079, l. 20: the CO<sub>2</sub> fertilization effect may be "well docu-

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mented" in the (global) modeling world, however among experimentalists the degree to which elevated CO<sub>2</sub> causes increases in plant carbon uptake is much more controversial, with some authors suggesting that mature ecosystems with carbon and nutrient cycling in equilibrium should and are not sensitive to elevated CO<sub>2</sub> (see Körner 2006 *New Phytologist* 172, 393- for an excellent review). Please modify the text to reflect this discrepancy between modeling and experimental world. (2) p. 11083, l. 25: section 4 is actually more a combined "Results and Discussion" section and should be name accordingly, while section 5 should be name "Conclusions". (3) p. 11084, l. 11-13: in my view this demonstrates in the first place the assumptions underlying the model (4) p. 11089, l. 6: here and already before in the discussion of the sensitivity parameters I was wondering whether an ANOVA on the model results would not be a suitable tool to tease apart main effects and interaction terms; see Galbraith et al. (2010; *New Phytologist* 187, 647-) for a nice example

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Interactive comment on Biogeosciences Discuss., 10, 11077, 2013.

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