

Interactive comment on “Implications of incorporating N cycling and N limitations on primary production in an individual-based dynamic vegetation model” by B. Smith et al.

Anonymous Referee #3

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Smith et al. describe their modeling work with a N-enabled version of LPJ-Guess and compare results with a former version that did not include a nitrogen cycle. The topic is highly relevant as it has become clear that accounting for nutrient (not only nitrogen) cycling is necessary to accurately present the response of ecosystems to rising CO₂.

The paper is well written and structured, figures and tables are generally informative and the discussion is appropriate. I have few comments to make - actually I am impressed by many sources of data (experimental and modeling) for comparison the authors explore to reach their conclusions. Similar to reviewer #1 I too have problems with the algorithm employed for the biological nitrogen fixation, but I also think that the authors reasonably discuss these limitations - this clearly is an issue to work on for

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future versions of the model. Below some minor comments that the authors should consider:

p. 18617, l. 12: the distinction between a plant canopy and ground-layer vegetation will only hold for forest ecosystems – maybe find a more general formulation? p. 18626, l. 17-22: it is not clear to me – is the Cleveland et al. or the LPJ-Guess ET off compared to observational studies? Might be worth adding ET to Table 1? l. 18627, l. 11: a more quantitative statement would be warranted here Fig. 4: is unfortunate in my view as much of the information is hidden – I suggest to redraw in a more conservative fashion without the 3D effect

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