Geoscientific

Model Development

Discussions

[GMDD]

Interactive
comment

Interactive comment on "Evaluation of Integrated Assessment Model hindcast experiments: A case study of the GCAM 3.0 land use module" *by* Abigail C. Snyder et al.

Anonymous Referee #2

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This paper describes an experiment in which the GCAM model is calibrated to the historical baseyear of 1990 and ran forward to the year 2010 to simulate historic changes in land use. The experiment is done under four different assumptions, including or excluding the historic trends in yields and including or excluding the US renewable fuel standards. They authors conclude that history is best explained when trends in yield and the US renewable fuel standard are included in the assumptions of the model.

The first sentence of the abstract (but also the main introduction) shows that the authors suffer from a syndrome that is all too common among IAM modelers: selective amnesia. There are several examples of hindcasting-type experiments in the (broader)

IAM community, even though they not always use the keyword 'hindcasting'. If the authors had thoroughly read the introduction of Fujimori et al. 2016, they would have found about five additional examples that would be valuable to cite in this paper.

The described experiment is fairly simple and straightforward, but immediately raises three questions that are not satisfactory dealt with in the paper: 1) Would the GCAM model reproduce historic trends better if some key parameters had other values? 2) Can we use this analysis to draw conclusions about the influence of the US renewable fuel standard on global land use? 3) What does this study imply for applications in which the GCAM model is ran forward into the future?

For the first issue, the authors could identify a few key-parameters (e.g. elasticities) and assume a range of values. By running the hindcasting experiment with these different values, they would learn something about the behavior of the GCAM model itself and whether certain parameter settings better explain the historic trends.

The second issue would make the paper a lot more relevant to a non-modeling audience. If the US renewable fuel standard considerably changed land use trends, this should have had consequences for land use emissions and indirect land use change. The difference between the FY and FYB scenarios should be the impact of the renewable fuel standard. Since several existing studies already examine the impact of the US renewable fuel standard on land use, the authors should compare the results of their experiment to these studies.

On the third question, the authors briefly discuss how future applications of GCAM could be improved by updating yield information. However, a more direct comparison between the (common) assumptions for future runs vs these historic scenarios would be valuable. What is the typical setup for a future run? The AY scenario? What does that set of assumptions imply for interpreting future results of the model? Do errors compound over time, and should users be worried about the long-term results of the model? Such questions are not discussed at the moment and would be a relevant

addition to the final sections of the paper.

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Discussion paper