

Geosci. Model Dev. Discuss., referee comment RC2
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Comment on gmd-2021-76

Walter Rossi Cervi (Referee)

Referee comment on "Estimating global land system impacts of timber plantations using MAGPIE 4.3.5" by Abhijeet Mishra et al., Geosci. Model Dev. Discuss.,
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The manuscript presents the first results on land use after the implementation of a dynamic forestry component in MAGPIE (which is an economic rooted land use model). Prior to this, MAGPIE basically covered the agricultural and the bioenergy sector in the model. Undoubtedly, this new forestry component represent a relevant improvement in the model, increasing the coherence and the completeness of its land use simulations. Given that, I accept the publication of the manuscript, but it is important that minor (perhaps "moderate") revisions/suggestions should be considered in a revised version or in a rebuttal document.

General comments.

I understood the principle of rotation lengths derived from the relation between interest rate and IGR. This generates information on rotation lengths and it is important for calculating timber production costs. I was wondering whether some reference data could be added to validate the rotation length map. I`m not a forest specialist, but in principle Latin America and Australia should have the similar spatial pattern, given that that both regions are important eucalyptus producers. Instead, the map shows different spatial patterns. I believe that an analysis on the main species (and they respective rotation period) per region could be used to calibrate the rotation length map.

It is clear that the study was focused on creating a proof of concept that enables a forestry module in MAGPIE. However, I missed a bit the discussion on how realistic are the figures presented.

For example, in section 3.1, it is mentioned a large increase in cropland at expense of primary forest areas (where exactly?). Are protected areas included in the analysis? What about agro-forestry (also included)?

Perhaps some discussions around the current and future spatial uncertainties would be relevant as well.

Productivity is an important component for calculating global costs of demand driven land uses. I`m not fully aware of

LPJML, but doing a quick research, I found that LPJML might include the productivity of natural vegetation and planted forests. These were surely incorporated in MAGPIE (right?). But yet it is not clear to me how the productivity of secondary forest came about?

Specific comments.

Line 175. If a fraction of forestry residues is recovered during the harvesting period, it is likely that there will be a potential decay in productivity in the forthcoming period in comparison with a plantation system that does not recover any fraction of residues. It was not clear for me if that was included in the model, but it is something to be considered.

Typo.

Line 119. "optimal"