Geoscientific
Model Development
Discussions

Interactive comment on "The Land Use Model Intercomparison Project (LUMIP): Rationale and experimental design" *by* David M. Lawrence et al.

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General comments:

Realizing this is primarily a "documentation" paper and not a "results" paper, my comments are mainly regarding clarity and completeness of description.

The NCAR Last Millennium Ensemble (LME) is not mentioned anywhere in this manuscript, but it is a natural antecedent to much of what is described here and it seems to me it would be handy to reference (e.g., ca. line 122; Otto-Bliesner et al. 2016).

Specific comments:

L3: "...large to..." - It appears one or more words are missing.

L19: "...respect to-." - Likewise, seems words are missing.

L41-43: Clarify: effect on global MEAN air temperature is small.

L98-102: Expand acronyms.

L200: Good to cite previous recent works regarding climate impacts of global deforestation (e.g., Davin and Noblet-Ducoudré 2010) and remote climate impacts of tropical deforestation (e.g., Snyder 2010, Badger and Dirmeyer 2016).

L228: Apparently more missing words, "...level if."

L263: I well understand and appreciate the issues of providing guidance to the execution of model runs in MIPs, but wouldn't it be good to declare an avenue for consultation - a wiki or something - to assist the groups "to make their own decisions..."?

L314: "Figure X" needs a number.

L321: Also cite Badger and Dirmeyer (2015) in this regard.

L409: Change "i.e.," to "e.g.,"

L476: Should cite the most recent effort at land model benchmarking - PLUMBER (Best et al. 2015).

L544-46: There have been investigations of the effect of land-atmosphere coupling on land use change responses. In particular, Kumar et al. (2013) developed a clever method to extract the land use change impact in CMIP5 simulations where multiple climate change factors were convolved in each RCP.

Sec 4.2: The existence variable output lists is mentioned then glossed over - please give a direct link to a list of variables (what is the "LUMIP CMIP6 variable request"?) or list them in supplemental tables in this paper. This is an important detail.

Figure 9 is not cited in text.

References:

Badger, A. M., and P. A. Dirmeyer, 2015: Climate response to Amazon forest replacement by heterogeneous crop cover. Hydrol. Earth Sys. Sci., 19, 4547-4557, doi: 10.5194/hess-19-4547-2015.

Badger, A. M., and P. A. Dirmeyer, 2016: Remote tropical and sub-tropical responses to Amazon deforestation. Climate Dyn. 46, 3057-3066, doi: 10.1007/s00382-015-2752-5.

Best, M. J., and co-authors, 2015: The plumbing of land surface models: benchmarking model performance. J. Hydrometeor., 16, 1425-1442, doi: 10.1175/JHM-D-14-0158.1.

Davin, E. L., and N. de Noblet-Ducoudré, 2010: Climatic impact of global-scale deforestation: Radiative versus nonradiative processes. J. Climate, 23, 97–112, doi: 10.1175/2009JCLI3102.1.

Kumar, S., P. A. Dirmeyer, V. Merwade, T. DelSole, J. M. Adams, and D. Niyogi, 2013: Land use/cover change impacts in CMIP5 climate simulations: A new methodology and 21st century challenges. J. Geophys. Res., 118, 6337–6353, doi: 10.1002/jgrd.50463.

Otto-Bliesner, B. L., E. C. Brady, J. Fasullo, A. Jahn, L. Landrum, S. Stevenson, N. Rosenbloom, A. Mai, and G. Strand, 2016: Climate variability and change since 850 C.E.: An ensemble approach with the Community Earth System Model (CESM), Bull. Amer. Meteor. Soc. (in press).

Snyder, P. K., 2010: The influence of tropical deforestation on the Northern Hemisphere climate by atmospheric teleconnections, Earth Interact., 14, 1–34, doi:10.1175/2010EI280.1.