Earth Syst. Dynam. Discuss., 1, C34–C37, 2010
www.earth-syst-dynam-discuss.net/1/C34/2010/

Earth System Dynamics Discussions

Interactive comment on "Climatic and ecological future of the Amazon: likelihood and causes of change" *by* B. Cook et al.

Anonymous Referee #2

Received and published: 16 June 2010

Review of the manuscript "Climatic and ecological future of the Amazon: likelihood and causes of change" from B. Cook, N. Zeng, and J.-H. Yoon submitted to Earth System Dynamics

General comments:

The authors evaluate the climate scenarios provided by the IPCC-AR4 and the output of a vegetation model to explore the causes of change in precipitation patterns and vegetation cover in different regions of Amazonia. The study is generally interesting, but several findings from this study are already published in other studies. See specific comments.

Generally, the authors should be aware that "Amazon" refers to river only, not to the

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

basin - for the basin, “Amazonia” or “Amazon basin” should be used. In my opinion the title is not appropriate, because the authors do not really calculate a likelihood.

Specific comments:

p. 64, l. 2: “Some recent climate modeling results suggested a possible dieback. . .”. The dieback was only found by the Hadley model and this was coupled to a dynamic vegetation model. Please reformulate.

p. 64, l. 5 and p. 68, l. 10: The IPCC-AR4 provides 24 climate model projections. Why did you use only 15? According to which criteria were these 15 models selected? How would the model median change if you would use the 24 models instead of 15.

p. 65, l. 4: The Amazon forest was replaced by C4-grasses in the study of Cox et al.

p. 65, l. 14-15: The studies presented by Cowling and Shin (2006) and Schaphoff (2006) are not really similar to the Cox-study. They didn’t use a coupled climate-vegetation model. Please reformulate.

p. 66, l. 4: The “Amazon” is defined as the Amazon river. I think the authors are correct that it is important to account for regional precipitation patterns and that these patterns vary strongly within the Amazon basin. But the definition of what the Amazon basin is, is rather not a factor that complicates the issue about Amazon forest dieback. Please reformulate.

p. 66, l. 5: Sentence not clear, please correct.

p. 68, l. 1ff: Did you use daily data for the analysis?

p. 69, l. 18: The information about the VEGAS model should be given here and not in the Appendix.

p. 70, l. 1ff: Wouldn’t it make more sense to analyze the change in days with a precipitation lower than 1 mm per day instead of the precipitation during May-September? Then you would also account for shifts in the dry/wet season under future conditions

ESDD

1, C34–C37, 2010

instead of analyzing the precipitation only for these particular three month.

p. 70, l. 22 and Figure 6: This finding is not clear from Fig.6. Additionally, Fig. 6 has a very bad quality, the legend and the y-axis label are missing.

p. 71, l. 21 and p. 77, l. 24/25: This is not clear. Shouldn't it be wet season precipitation that recharges soil moisture? How do you support this finding?

p. 74, l. 17: If this is a robust signal in the IPCC-AR4 models, why do they then differ so widely in their projections of rainfall in the Amazon region?

p. 74, l. 21-24: This paragraph is not clear. Please reformulate. Please explain the symbols or remove.

p. 77, l. 2: The fact that CO2-fertilization is not included in the model should already be mentioned in the model description!

p. 77, l. 28: Also Phillips et al. 2009 (Science) show very interesting results for the 2005 drought.

Appendix A: The Appendix is not really necessary. The paragraphs of the Appendix should be moved to the according Methods section. Some details of the VEGAS model are not clear:

- p. 79, l. 15: Is photosynthesis simulated explicitely? Please describe PS in more detail. The authors mention that the model does not account for CO2-effects, please state here and explain.

- How does the precipitation change during the dry season affect vegetation in the model?

- Is the model run in a daily or monthly mode?

- Please describe the fire simulation in more detail.

- p. 79, l. 25 "contribution to interannual CO2 variability" . Not clear what is meant by

ESDD

1, C34–C37, 2010

this, please reformulate.

- p. 79, l. 29: “coupled”? From the model description I understand that it is an uncoupled vegetation model. Please clarify.

- p. 80, l. 7: “. . .has been validated. . .” Were the results of the validation good?

Table 1: If you calculate these kind of probabilities, it would be really important to use the whole model ensemble consisting of 24 models.

Figure 1: It would be good to have the abbreviations for the regions in the figure. The x- and y-axis labels are missing.

Figure 9: a) and b) How can fire flux and LAI be negative? Figure legend is hard to read. Figure 8: Here you show the median annual rainfall which is increasing. Why don’t you show the wet and dry season rainfall?

Interactive comment on Earth Syst. Dynam. Discuss., 1, 63, 2010.