

Review: Land-Atmosphere interactions in the tropics, by Gentine et al.

As a review paper, there are not really any new findings here, but rather a summary of previous work. The paper does a fine job of this, and I believe it will be a valuable resource for others. I recommend acceptance with minor revisions. That being said, I do have some comments.

Lines 202-203: When I looked at the WECANN papers I did not see proof that seasonal cycles were reproduced. I see r-squared values in the tables, but not evidence showing seasonal cycles (also: I think the sentence should have 'variability' added at the end). I'm not sure I'm convinced that WECANN is better than other models in the tropics (really, Brazil. Do we have enough tower data in Africa or the Maritime Continent to really make an assessment?). Is there a way to establish this?

This brings up something else: By using the words 'wet tropics', the implication is that tropical forests do not experience any water stress. I don't agree with this. There are a couple of papers [da Rocha et al., 2009, Costa et al., 2010] that discuss the variation in 'environmental control' (light limitation) and 'biotic control' (water limitation across precipitation and vegetation gradients in Brazil. Yes, the cerrado (savanna) is generally water-limited, and the wettest forest is light-limited, but the transition is not binary, nor is it limited to the cerradao (transition forest). I think a discussion of light- and water-limitation across gradients, and our uncertainty about the relative importance of each is an important part of tropical land-atmosphere interaction that is missing from this manuscript. George Vourlitis and coauthors have done some good work in the cerradao that should be described (I'm not going to list them all here). Baker et al. (2013) put forth a conceptual description of this gradient in a modeling study. Whether describing Brazil, the forest-to-desert transitions in Africa (both north and south), or the ecotone in Australia, there is important ecophysiological information in these transitions (and their response to changing climate) that is ignored here.

On a potentially related note, I'm curious if the European Centre Amazon conversion papers need to be mentioned (Cox, Huntingford, Jones, et al.). I understand a review paper is not the same thing as a history paper, but these HADGCM papers got a lot of attention, and actually initiated quite a bit of investigation. The fact that there has been somewhat of a retreat from the initial findings means that these papers are no longer the 'state of the science', but they were seminal, along with the Saleska 2003 paper (in my opinion) in the initiation of some pretty important lines of investigation.

Figures:

The figures don't flow smoothly with the text, in that the sequence of figures doesn't match when they are referenced. I was jumping back and forth in the figures as they

were mentioned in the text, and I think a little rearranging would make the readability better.

Labels are too small in Figure 3, and are very difficult to read.

Figures 5-10. The deformation of continents makes these plots hard to interpret. I would prefer to see the horizontal scale of the 4 seasonal plots stretched to match the longitude panel on the bottom of the plot. It would make the plots a little bigger, but readability would be improved. Also, the reader would be able to look directly up from the bottom panel and see the spatial variability in the latitudinal averages.

Figure 16 seems to be thrown in, without much explanation in the text. I'm not sure I understand what is going on here, please clarify.

Miscellaneous comments:

Lines 74-75: Could include Friedlingstein (2006) and ?? here as citations.

Lines 84-85: is it worth mentioning previous land-atm coupling papers, like Koster et al. (2004), or Dirmeyer (2011)?

Lines 130-133: Cumbersome sentence, maybe some typos. Please reword.

Line 169: If you say 15 S, you probably don't need the minus sign.

Line 277: Looks like a LaTeX citation typo.

Line 287: Grabowski (1999) could be cited too.

Line 289: 'models'

Line 324: I think the citation '[Anber et al., 2015a]' should be 'Anber et al. [2015a]', since the author name is part of the sentence. This looks like a place where \citep is used instead of \citet in the creation of the manuscript. There are a lot of instances of this in the manuscript, especially from line 587 on.

Lines 398-400: 'Tropically-averaged EF does not evolve much...' With time? With space?

Lines 400-402: incomplete sentence.

Line 406: 'through' not 'though'

Line 428: The text is talking about vertical gradients of light and water availability, yet refers to figure 3, which shows temperature response to ENSO. This recalls the earlier comment about figures and how they are referred to in the text.

Line 430: delete 'because'

Line 476: knownknows

Line 539: delete 'though,'

Lines 549-550: I'm not sure I agree. Mesoscale-Induced clouds may be *initiated* preferentially in clearings and deforested regions, but they don't necessarily *stay* there. When I look at the GOES-16 images over Amazonia, I see clouds moving, not standing still. Do you have evidence that demonstrates that, integrated over time, the cleared/deforested regions are effected by clouds more than non-deforested regions? This may require some clarification.

Lines 567-569: confusing sentence, please reword.

Lines 574-577: You might want to cite Fu and Li (2006) here as well.

Line 585: 'increased'

Line 625: 'lightning'

Lines 617-620: cumbersome sentences, some rewording would be helpful.

Line 703: inconsistent reference style.

Line 790: 'dry-to-wet'

Lines 815, 832: inconsistent reference style.

Line 893: 'through'

References

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