

1 **Precipitation in the Amazon and its relationship with moisture transport and tropical Pacific**
2 **and Atlantic SST from the CMIP5 simulation**

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4 **Suggestions of reviewers**

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6 **3. Reviewer 3: H.M.J. Barbosa**

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8 It seems that the paper title, which immediately caught my attention, does not correspond to what
9 was done in the manuscript. This was a bit of a downside to me, as I read it with great interest
10 hopping to learn about new dynamical mechanisms that could justify the general inability of models
11 to produce tropical precipitation. Here I will limit myself to suggest three points where authors
12 could significantly improve their manuscript.

13
14 The introductory and discussion sections, for instance, explained well how different dynamic
15 mechanisms could be responsible for or linked to tropical south american precipitation, nonetheless,
16 the authors did not explore the already identified mechanisms as possible explanations for the
17 model's biases. Since the authors have the data, can you please show how do CMIP 5 models
18 represent Hadley and Walker circulations?

19
20 It is also not clear to me why the authors have moisture transport in the title, but did not mention it
21 at all in the introduction section nor reviewed/cited the recent literature, for instance: Drumon et al.
22 JGR-Atmos (2008), Arraut et al J. Clim. (2012), Zemp et al (2014), Drumond et al, HESS (2014),
23 Boers et al GRL (2014). The analysis shown in figure 10 is not explained enough and it is hard to
24 get conclusions from it. Since the authors have the data, can you please show how do CMIP 5
25 models represent moisture transport over the continent? I mean, show the actual vector field, and its
26 bias.

27
28 I do not think ERA interim moisture convergence can be used as observation. This has lots of error
29 and actually is as bad as the precipitation field from ERA-interim itself. For more details on why
30 one can trust the humidity field (and thus the moisture content and transport) but not the divergence
31 of a reanalysis product see, for instante Arraut et al, J. Clim. (2012). I suggest removing this
32 analysis and using the extra space to further discuss the points above.

33
34 I hope to see and improved version of this analysis as it is potentially very interesting.
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Modifications suggested by the reviewers

3. Reviewer 3: H.M.J. Barbosa

Lines 8-12: It seems that the paper title, which immediately caught my attention, does not correspond to what was done in the manuscript. This was a bit of a downside to me, as I read it with great interest hoping to learn about new dynamical mechanisms that could justify the general inability of models to produce tropical precipitation.

Authors: We apologize for this confusion. We tuned down the statements on SST in the abstract and focus this discussion now in the final parts, where it is used to provide a context for the results we obtained.

Lines 14-18: The introductory and discussion sections, for instance, explained well how different dynamic mechanisms could be responsible for or linked to tropical south american precipitation, nonetheless, the authors did not explore the already identified mechanisms as possible explanations for the model's biases. Since the authors have the data, can you please show how do CMIP 5 models represent Hadley and Walker circulations?

Authors: The pictures about the pattern of meridional and zonal circulation and vertically integrated moisture transport were made and were included in the supplementary material.

Lines 20-23: It is also not clear to me why the authors have moisture transport in the title, but did not mention it at all in the introduction section nor reviewed/cited the recent literature, for instance: Drumon et al. JGR-Atmos (2008), Arraut et al J. Clim. (2012), Zemp et al (2014), Drumond et al, HESS (2014), Boers et al GRL (2014).

Authors: We insert in introducing some of the studies suggested by the reviewers.

Lines 23-26: The analysis shown in figure 10 is not explained enough and it is hard to get conclusions from it. Since the authors have the data, can you please show how do CMIP 5 models represent moisture transport over the continent? I mean, show the actual vector field, and its bias.

Authors: We rewrote the discussion and conclusions so that this is more clear now. The purpose of the figure is to verify how the models simulate the flows entering each edge of the examined area. This is important because the moisture entering the Amazon is the northern and eastern borders, and how the models have difficulty in properly simulate these fluxes, we made this picture.

Lines 28-32: I do not think ERA interim moisture convergence can be used as observation. This has lots of error and actually is as bad as the precipitation field from ERA-interim itself. For more details on why one can trust the humidity field (and thus the moisture content and transport) but not the divergence of a reanalysis product see, for instance Arraut et al, J. Clim. (2012). I suggest removing this analysis and using the extra space to further discuss the points above.

Authors: The ERAI reanalysis data are used for various analyzes and has proven to be a best reanalysis on Amazon when compared for example, as the Modern-Era Retrospective Analysis for Research and Applications [MERRA, NASA] and Climate Forecast System Reanalysis [CFSR, NCEP]). We stressed in the text that they are reanalysis and not data *sensu stricto*.

Reference: LORENZ, C.; KUNSTMANN, H. The hydrological cycle in three state-of-the-art reanalyses: Intercomparison and performance analysis. Journal of Hydrometeorology, v. 13, n. 5, p. 1397–1420, 2012.