

Interactive comment on “Two-signed feedback of cross-isthmus moisture transport on glacial overturning controlled by the Atlantic warm pool” by H. J. de Boer et al.

H. J. de Boer et al.

h.deboer@geo.uu.nl

Received and published: 10 February 2012

We kindly thank anonymous Ref #1 for his/her positive review and constructive comments. In the following reply we will try to clarify and address the points raised. For clarity, the specific comments of Ref #1 will be numbered and repeated before they are addressed.

1) Introduction: I found the first paragraph difficult to follow. In particular, the sentence from Line 11 to 15 (page 3861) should be simplified. I also suggest the introduction sentence of the CCLJ (line 15-20) to be brought before the sentence from lines 11-15.

We agree with Ref #1 that the first paragraph will be easier to follow when the
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Caribbean Low Level Jet (CLLJ) is introduced before its response to changes in the Atlantic Warm Pool (AWP) in the modern climate are indicated. We will rewrite the first paragraph accordingly in a revised version of the manuscript.

2) Model framework: You may try to turn the sentence page 3865, lines 11-14 more positive, e.g. by pointing out that you look at the atmospheric response to oceanic changes during the AMOC collapse

We acknowledge that this sentence may be rewritten more positively to present our model setup. We will do so in a revised manuscript.

3) Results / Figures: The meaning of Figure 5c is not clear to me, nor the sentence from page 3871, lines 20-23. Please clarify these issues.

Thank you for this suggestion. We agree that Fig. 5c should have been discussed in more detail. The goal of figure 5 was to show the annual average amount of moisture transported by the Caribbean Low Level Jet (QCLLJ) for the individual experiments as simulated by the atmospheric model and regression model, respectively. As the response of the regression model was already evaluated in Figure 5b, we propose to include averages of each experiment including error bars of both the GCM and regression model in Figure 5b. Figure 5c then becomes obsolete and may be removed in a revised version of the manuscript.

4) General comment on the positive/negative feedbacks terminology: I also recommend the authors to clarify the use of the feedback terminology. Perhaps it would be more appropriate to use the terms "amplifying feedbacks" and "attenuating/ dampening feedbacks" instead of positive / negative feedbacks. (...) As such positive / negative feedback terminology was often misleadingly used in the literature for describing amplifying and/or attenuating effects of moisture transport across central america, perhaps the authors should use the opportunity to clearly define what mechanism they interpret as being positive and/or negative retroaction loops in light of the atmospheric processes they look at, and propose several recommendations on appropriate terminology

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to be used for future studies on that topic.

We agree with Ref #1 that the feedback terminology used in the discussion paper may have been confusing. Part of the confusion could have been related to the counter-intuitive sign of the feedbacks, e.g. we interpreted a reduction in cross-isthmus moisture transport as a potential positive feedback because it may stimulate slowdown of the Atlantic Meridional Overturning Circulation (AMOC) prior to its full collapse. The suggestion to use the terminology of "amplifying" and "dampening" feedbacks is therefore well appreciated. We will include this suggestion in a revised version of the manuscript. We also propose to rewrite section 5.2, where proxy evidence for altered cross-isthmus moisture transport is discussed, using this clearer terminology.

Interactive comment on Clim. Past Discuss., 7, 3859, 2011.

CPD

7, C2606–C2608, 2012

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