

Interactive comment on “South Atlantic island record reveals a South Atlantic response to the 8.2 kyr event” by K. Ljung et al.

K. Ljung et al.

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Response to EC S473 : ‘Recommendation’ , Hugues Goosse

Dear authors, The reviewers have considered that your paper presents several interesting results. I thus encourage you to submit a revised version for publication in Climate of the Past. In this revised version, you should take into account the main issues raised in the reviews and comments. In particular, you should modify the manuscript in order

1/ to discuss your hypothesis that the main event analysed in the manuscript is related to the 8.2 kyr event but mention the alternative hypothesis that the events observed in the Southern Hemisphere are not connected to the northern hemisphere. This alternative hypothesis could not be discarded on the basis on the information provided, in particular because some smaller events observed in the South Atlantic does not seem

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to have a counter-part in the North Atlantic.

We agree that we cannot completely discard the alternative hypothesis that the events observed in our core are regional events or Southern Hemispheric events, i.e. that they are not connected to the Northern Hemisphere. As suggested, we have now briefly discussed this alternative hypothesis in the revised manuscript. However, we have two strong arguments in favour of the link with the North Atlantic via the THC. First, the timing of other similar Holocene events registered in the core is similar to the timing of published phases of weakened THC, e.g., the event at 7500-7300 cal yrs BP. This has been discussed in detail in a separate paper that provides an overview of the entire Holocene record (Ljung and Björck, QSR in press). Second, the response in our records is consistent with the South Atlantic response in climate model experiments in which the THC is perturbed by the release of a realistic freshwater pulse in the North Atlantic Ocean (as shown in Figure 6). In our view, these two arguments make a strong case for the N-S connection.

2/ to analyse more precisely the mechanism responsible for the north-south connection, to prove that the anomaly in the South Atlantic is indeed related to the North Atlantic perturbation and to show how large the anomaly in the South Atlantic is compared to noise (natural variability).

Unfortunately we cannot prove that the anomaly is related to a North Atlantic perturbation, as temporal correlations of events observed in other records provide no proof, they only provide an argument for a connection. What we can do, however, is to analyse the system's response and the proposed mechanism in detail in a numerical model experiment. We argue that the similarity in the response between our record and the model output makes it very likely that the mechanism in the model was actually operational in reality. We have provided a clarification of this mechanism in the revised manuscript (including the signal to noise ratio) as requested by the editor.

3/ to answer the questions raised about the interpretation and the chronology of the

core.

We have answered the reviewer comments on the interpretation and chronology, and improved and clarified this in the manuscript.

Interactive comment on Clim. Past Discuss., 3, 729, 2007.

CPD

3, S716–S718, 2007

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