

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

### **Anonymous Referee #2**

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General comments : This paper presents interesting new results of multiproxy analyses from a continental sediment core located on the South Atlantic Ocean, in the Tristan da Cunha islands. These data are interpreted in terms of paleoclimatic changes and compared with the results of coupled intermediate complexity model experiments. The aim of the authors is to demonstrate the widely distribution of the effect of the so-called 8,2 kyr event and to analyse the climatic mechanisms in the South Atlantic. The paper is interesting but lacks of precisions for several aspects and needs to be more precisely focused in the general discussion.

Technical comments : - chronology of the core. The  $^{14}\text{C}$  measurements show several age reversals, and more strangely, the three data points dated both with bulk sediment and terrestrial macrofossils show systematically a bulk sediment older than the terres-

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trial macrorests. Even if the difference between the two ages is within the error bar, can the bulk sediment ages be contaminated with “ dead ” carbon which would explain this systematicity ? The cal ages are provided in table 1 with one digit which is not significant (7074,5 years : 7074 or even 7070 is well enough). The data should be presented in a more simple way.

When reporting the depth interval of the silty gyttja identified as the 8,2 kyr event on a depth-age graph, the duration of the event is from 8050 to 8450 calendar years, with an age plateau during the interval. The duration is not 250 years as stated in the text (p740 - line 23). Moreover, the duration of 250 years is not very different of the GRIP duration of 160-180 years, within error bars. What can be the cause of the age plateau recorded during the 8050-8450 year interval ? Is this a big increase in the sedimentation rate or a level of sediment deposited by a catastrophic surge (that can be linked to an increase of precipitation) ? I would favour the increase in the sedimentation rate because of the decrease of the C and N contents seen in figure 3. Indeed, this decrease is not what is expected from the increase of the tree taxa (that will favour the increase of C content). - the explanation p739 lines 11 to 22 is not clear. What can be the causes of TS changes, except sea salt aerosols ? I would expect that, in a continental environment, the changes in organic matter content will have an impact on TS content and I am not convinced by the explanation given to show that the lower TS is linked to lower (or at least not increased) sea salt input to the area. If the silty gyttja interval is linked to a sediment surge as suggested by the 14C dates, the dilution will decrease the C, S and N contents without any other significations.

- in figure 3, the S content records a big variation around 9100 years, while the C does not show any change and the C/S is also flat. What can be the explanation is such record ?

- p741, the authors describe extensively the other anomalies of their record and particularly the one at 7500-7300 years. In the 13C record of Oppo et al, 2003 (proxy of the deep water ventilation), this time period does not show any particular anomaly.

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Moreover, in the paper of Hall et al, the 7500-7300 time interval seems to be marked by a faster deep water mass (as seen by the sortable silt index). This last part of the paper is really not convincing and should be clarified and rewritten.

- what is the variability of the model during the 550 years of the experiment before the fresh water forcing ? It is difficult to see if the 0,3°C increase after the fw pulse is significantly different of the variability of the Early Holocene experiment.

Technical correction: - one typo in the Alley et al reference in Geology (1997 and not 2007)

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

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