Clim. Past Discuss.,
doi:10.5194/cp-2016-59-RC1, 2016

Climate of the Past Discussions

Interactive comment on "Glacial δ^{13}C decreases in the western South Atlantic forced by millennial changes in Southern Ocean ventilation" *by* Marília C. Campos et al.

Anonymous Referee #1

Received and published: 24 July 2016

This is an interesting manuscript presenting two high-resolution planktic d13C records from the Brazilean coast covering HS3 and HS2. It is worth publishing in Climate of the Past if the "Discussion" section is completely rewritten and therefore the interpretation of the results re-assessed.

The authors have not shown that the planktic d13C decrease measured in their core was due to stronger Southern Ocean upwelling. This is just an hypothesis. Planktic d13C is influenced by several factors such as changes in oceanic circulation, mixing, SST, export production... (see Charles et al. 1993, Lynch-Stieglitz et al. 1995, Menviel et al. 2015...). An AMOC decrease will lead to significant surface ocean d13C changes. Changes in Southern Ocean upwelling are not the only solution. In addi-

tion, it has been shown that during calcification temperature and carbonate ion content could have an impact on calcite d13C in planktic species (see Spero et al. 1997, Bemis et al. 2000...). Moreover, the authors suggest that increased runoff from the Plata river drainage basin led to increased sediment rate. It is an interesting result, which nicely fits with a southward shift of the ITCZ during that time, however river runoff might potentially have a fairly low d13C signature, thus potentially also influencing surface d13C at the core location?

Please note that: 1) the ice core data (Ahn and Brook 2014) do not support any atmospheric CO2 increase during HS2 and HS3. 2) D13CO2 can't really be used due to poor resolution and most likely issues with age model. 3) The link between changes in southern hemispheric westerlies and AMOC changes is still poorly documented. 4) the opal flux in the Southern Ocean (Anderson et al. 2009) does not increase during HS2 and HS3. As such the whole discussion section, as well as conclusion and abstract need to be rewritten.

Interactive comment on Clim. Past Discuss., doi:10.5194/cp-2016-59, 2016.