

## ***Interactive comment on “Understanding the mechanisms behind high glacial productivity in the southern Brazilian margin” by Rodrigo da C. Portilho-Ramos et al.***

### **Anonymous Referee #2**

Received and published: 12 January 2019

This paper presents a new record of foraminiferal species abundances, which are used to reconstruct temperature and productivity changes off the Brazilian Margin over the last 70 kyr. In general, I enjoyed reading this paper, which is clearly written and with apparently sound methods (note that the use of MAT isn't my area of expertise) and mostly good interpretations. I have a suggestion for a moderate revision to the manuscript before publication in *Climates of the Past*, and some minor corrections/suggestions for the correct use of English.

My main comment surrounds the interpretation of the silicic acid leakage hypothesis (SALH). The authors use as evidence for silicon leakage the opal records from sedi-

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ment cores RC13-254 and 259. Whilst these do show a change in opal burial from the glacial into the Holocene, this change in burial is most likely a result in the shift of location of opal production (due to movement of frontal zones), rather than an overall net change in opal accumulation in the Atlantic Sector and leakage of DSi (see papers by Kumar et al., 1995 and Frank et al., 2000). [In contrast to the Atlantic, the Pacific Sector may have experienced not only a shift in opal burial location, but also a net decline across the glacial termination (Chase et al., 2003)]. Although there is some evidence that there was a net decrease in opal burial in the Equatorial Atlantic over this time period (Bradtmiller et al., 2007), opal records from the Atlantic Ocean north of the APF are variable and paint an inconsistent story. There are also AAIW DSi reconstructions available for the Western Atlantic available for comparison, including from GeoB2107-3 (Hendry et al., 2012; Griffiths et al., 2013). In summary, I think the authors should make a more nuanced discussion of the evidence for Atlantic DSi leakage changes on glacial-interglacial timescales taking all of the evidence into account.

Minor suggestions/corrections:

Line 18: The first sentence of the abstract would read better if merged with the second sentence: “This study explores the mechanisms behind the high glacial productivity in the southern Brazilian margin during the last 70 kyr, using planktonic foraminifera. . .”

Line 49: Avoid phrases such as “On the other hand” e.g. use “Opposing this drawdown, the upwelling. . .”

Line 79: Change “mechanisms” to “mechanism”

Line 94: What is meant by “besides other oceanographic processes”? Perhaps just remove this phrase as I don’t think it adds anything

Line 101: Change “vicinities” to “vicinity”

Line 110: Change “vicinities” to “vicinity”

Line 120: Change “limestone” to “sediments”

Line 153: Change “where” to “were”

Line 157: Change “decide” to “decided”

Line 180: Change “by” to “of”

Line 204: Change “has” to “have”

Line 214: Change “like” to “such as”

Line 237: I find the references to *G. bulloides* vs. dinocyst deposition showing different seasonal changes rather repetitive as it appears a number of times throughout the text. As a suggestion, perhaps remove reference to it at this point, leaving the explanation of the interpretation to the next section.

Line 248: Remove “On the other hand”

Line 256: Change “to” to “with”

Line 259 (and elsewhere): I find the use of the phrase “eutrophic environmental dinocysts” a little unclear. As a suggestion, perhaps replace with “dinocysts characteristic of eutrophic conditions”, and then subsequently just refer to “dinocysts”?

Line 286: Change “do” to “does”

Line 288: This sentence could do with restructuring. Perhaps “dinocyst record from core GeoB2107-3 matches austral winter (June) insolation at 65oS very well over the past. . .”

Line 301: This sentence could do with restructuring. Perhaps “We suggest that, rather than being driven by changes in upwelling intensity. . . , the increased productivity may have been a result of increased silicic acid content. . .” (this sentence appears in a similar form in the conclusions, and so should also be rephrased)

Line 324: Change “benefited the” to “benefited from the”

Line 337: Change “decrease” to “decreased”

Line 338: Change “Oligotrophic conditions is” to (e.g.) “The presence of oligotrophic conditions is”

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Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2018-98>, 2018.

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