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Interactive comment on "Persistent millennial-scale link between Greenland climate and northern Pacific Oxygen Minimum Zone under interglacial conditions" *by* O. Cartapanis et al.

L. Pichevin (Referee)

laetitia.pichevin@ed.ac.uk

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The authors present high resolution productivity and redox metal data in a core from Baja California during the last 120 ka. The data reveal a close relationship between paleoproduction, bottom water oxygenation in the ETNP (Eastern Tropical North Pacific) and Greenland Climate. Although such a close relationship at orbital and millennial timescales has been extensively described during the last glacial period (including stage 3 and 4) in previous works, this is the first time it is shown in interglacial sediments in the area. This suggests a strong, persistent coupling mechanism between Greenland climate and biological productivity/oxygenation in the ETNP. In the discus-

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sion, the authors speculate on the nature (atmospheric or oceanic) of the coupling.

The high resolution data are quite compelling and show very strong correspondence between Greenland oxygen isotope and the Baja California elemental data. However, the data are all percentages of the bulk sediment. Hence, it cannot be excluded that to a certain extent the variations in opal content for instance are due to dilution by other constituents and do not reflect paleoproductivity variations per se. The presence of diatom mats during stage 5 (interstadials) does tend to show that large blooms occurs during these intervals, nevertheless this is not a proof that productivity changes faithfully matched millennial climate changes in Greenland. This should be mentioned when presenting the data.

In the discussion the authors debate whether the coupling between Greenland and the ETNP occurs via an oceanic or an atmospheric pathway. Although modelling works support an oceanic link between Greenland warming and nutrient & oxygen delivery to the ETNP (Schmittner et al. 2007), to me, the data points clearly to an atmospheric coupling via changes in the upwelling strength. While most of the features in the records presented here could be caused by either mechanism (changes in NPIW or Wind field), there is one argument clearly in favour of the atmopspheric link : as stated by the author the dramatic change in the opal % and Si:Corg ratio at millennial time scales during stage 5 points to the occurrence of transient limitation in conditions of intense upwelling and high biological demand. (Numerous proxy data- based studies in the equatorial ocean also clearly point to variations in the position of the ITCZ which would have an impact on the wind field in the ETNP – Koutavas, 2002).

Minor comments:

3922 line 26: replace “by now” with “so far”

Fig 5 : I would not describe the Si:Corg ratio as “silicification” as it is a preserved ratio and the word silicification refers to the relative proportion of C and Si incorporated in the diatom during growth.

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Koutavas, A., Lynch-Stieglitz, J., Marchitto, T. M. & Sachs, J. P. El Nino-like pattern in ice age tropical Pacific sea surface temperature. Science 297, 226-230 (2002).

Schmittner, A., Galbraith, E. D., Hostetler, S. W., Pedersen, T. F. & Zhang, R. Large fluctuations of dissolved oxygen in the Indian and Pacific oceans during Dansgaard-Oeschger oscillations caused by variations of North Atlantic Deep Water subduction. Paleoceanography 22 (2007).

Interactive comment on Clim. Past Discuss., 9, 3919, 2013.