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Palaeoceanographic productivity changes in the Eastern Equatorial Atlantic since the penultimate glaciation

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A 150,000 year multiproxy record from the eastern equatorial Atlantic, offshore Gabon, has been investigated in order to examine the effects of changing glacial – interglacial climate on marine productivity.

Higher δ^{13}C values of the benthic foraminifera *Planulina wuellerstorfi* are documented during the penultimate glaciation (150 -130 kyr BP) in comparison to the Last Glacial Maximum [LGM] (24.5 – 19 kyr BP). In conjunction with higher $CaCO_3$ and larger variability in the isotopic difference between surface and bottom waters during the penultimate glaciation, this suggests that the eastern equatorial Atlantic was much more productive at this time than the LGM, most likely driven by increased nutrient input through strong bottom water upwelling.

The benthic δ^{18}O and planktonic δ^{18}O record of *Globigerinoides ruber* (white) infer that both the surface and bottom waters were warmer during the penultimate glaciation than the LGM. The sea surface temperature [SST] record assimilated through Mg/Ca analysis of the *G. ruber* evidences much lower SSTs during the last deglaciation in comparison with other regional records, and with the present day SST, which together with high Fe input, we attribute this to a greatly enhanced discharge of the Ogooué River.

Bulk coccolith carbonate δ^{13}C demonstrates a shift towards lower δ^{13}C values from the penultimate glaciation towards present day which does not dovetail the other proxies. The δ^{18}O coccolith record mirrors that of *G. ruber* during the two glacial periods, but presents much higher isotopic values during the interglacials. We interpret this as a shift in seasonality in the calcification of the coccoliths between glacial and interglacial periods, which in combination with the long term decline in δ^{13}C values reflects a change in the habitat preferences of this phytoplankton over the last glacial – interglacial cycle.