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Late Pleistocene palaeoproductivity patterns during the last climatic cycle in the Guyana Basin as revealed by calcareous nannoplankton

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Abstract. Variations in the assemblage and abundance of coccolith changes in oceanic and atmospheric dynamics in the Guyana Basin during the last climatic cycle, mainly linked to latitudinal variations in the ITCZ (Intertropical Convergence Zone). Records of the N ratio (a palaeoproductivity index of coccolithophores) allowed us to monitor thermocline fluctuations. Nannofossil accumulation rates (NAR) varied with the N ratio, indicating a strong correlation between these two palaeoproductivity proxies. Decreases in the N ratio and NAR values suggest lower palaeoproductivity during glacial substages, indicating a deep nutri-thermocline (deep stratification of the mixed layer) as a consequence of the piling up of warm water dragged by the NEC. This setting was favoured by the southern shift of the ITCZ and Trade winds which blew perpendicular to the Guyana coast. By contrast, increases in the N ratio and NAR values revealed higher palaeoproductivity during interglacial substages, suggesting a shoaling of the nutri-thermocline scenario is favoured by a northward displacement of the ITCZ with southeast Trade winds blowing alongshore. Additionally, palaeoproductivity changes during substages of Marine Isotope Stage (MIS) 6-5 are of much higher amplitude than those recorded in substage MIS 4-2 and the early Holocene. Similarities between the palaeoproductivity and the 65° N summer insolation records, suggest a link between the depth of nutri-thermocline, the latitudinal migration of the ITCZ and ice-sheet changes in the Northern Hemisphere.

[Final Revised Paper](#) (PDF, 1220 KB) [Discussion Paper](#) (eED)

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