

Palaeoproductivity changes and upwelling dynamics in the Iberian margin driven by abrupt deglacial climate variability

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Variations in primary productivity (PP) and the upwelling system dynamics on the SW Iberian margin for the last 28 kyr were assessed by combining nannofossil, X-ray fluorescence, ice-rafted debris, and stable carbon and oxygen isotope record data from a very well-dated sediment core. Centennial variations in upwelling and the related productivity were proven to be controlled primarily by hydrographic and environmental conditions that were the result of abrupt deglacial climatic events.

Overall, a good correlation among higher PP, shallower nutricline and upwelling reinforcement was observed for the Last Glacial Maximum, Bølling-Allerød and Late Holocene. Conversely, lower PP, deeper nutricline and upwelling weakening/absence were observed during the cold Heinrich Stadials 2 and 1 and the Younger Dryas, and the warmer Early and mid-Holocene.

The highly-detailed records presented here allowed documentation of palaeoproductivity changes and upper water-column dynamics never observed before. For instance, this is the first time, to our knowledge, that the impact of the internal complexity of Heinrich events has been found in palaeoproductivity proxies. Further work at higher resolution (i.e. a multi-decadal timescale) will help unambiguously unravel the sequential order of events that impacted surface hydrography and productivity during these periods.