Productivity response to the SST and hydrography change in the Tagus prodelta during the Younger Dryas and the Holocene

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A sediment core recovered from the Tagus prodelta (90 m water depth) in the Portuguese Margin has been analysed for the coccolithophore assemblage, planktonic and benthic foraminifera oxygen isotopes and the biomarkers, for reconstructing the primary productivity variations during the Holocene. The chronology, based on 10 AMS ^{14}C dates, suggests that the sediment sequence extends up to the last 13.5 cal yr BP.

The alkenone-based SST, and the $\delta^{18}O$ of *G. bulloides,* suggest cooler surface water (~8˚C) conditions during the Younger Dryas (YD). This period was also characterised by low primary productivity as indicated by the *G. muellerae* abundance and low coccolithophore accumulation rates. However, the $\delta^{18}O$ of benthic foraminifera species *A. beccari* shows that the bottom water conditions were different from surface conditions.

Termination 1B is associated with 1 ‰ *G. bulloides* $\delta^{18}O$ and 10˚C SST shifts. The primary productivity increases with rising temperature. The dominance of the coccolithophore species *Gephyrocapsa oceanica* and small *Gephyrocapsa* is recorded for this period and also the Holocene. The Holocene, particularly the last 8 cal kyr BP, witnesses a decrease in SST from 19˚C to 15˚C. A gradual increase in coccolithophore accumulation rate indicates that, in spite of decreasing SST, primary productivity increased. The fresh water influx from the Tagus River could have changed the surface water hydrography and triggered higher primary production because the river water discharges important amounts of nutrients to the prodelta.

The sudden shift in $\delta^{18}O$ of *G. bulloides* around 10, 8.2 and 5.6 cal kyr BP, could correspond to the abrupt cooling events recorded in different parts of the Atlantic Ocean. This suggests that the study area is influenced not only by the river estuarine condition but also by the Atlantic Ocean circulation.