NORTH ATLANTIC SEA SURFACE TEMPERATURES AND ICE RAFTED DEBRIS PROVENANCE DURING THE LAST GLACIATION AT IBERIAN MARGIN

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ABSTRACT: This work aims to trace North Atlantic oceanic changes, since the last glaciation (≈60 Ka), at NW Iberian Margin (IM). It applies a multiproxy approach based on planktonic foraminiferal assemblages, *Globigerina bulloides* stable isotopic data ($\delta^{13}C$ and $\delta^{18}O$) and estimated SIMMAX 28 sea surface temperatures (SST), in cores PC7.1, KC24-19 and PE109-13. Sedimentological data were also analyzed: magnetic susceptibility, geochemical (elemental concentrations, Itrax XRF core-scanner, Sr and Nd isotopes) and mineralogical (XRD) data and the abundance of coarse detrital grains. The cores age models were based on 14C ages modulated with Bayesian statistics. The Sr and Nd isotope ratios measured in the detrital fraction of the sediment indicates that during the last ≈60 Ka the IM was nourished mostly by sediments from the Variscan continental crust. But allochthonous contributions, corresponding to ice rafted debris (IRDs) dropped from icebergs, were also deposited mostly during the six last Heinrich Events (H). The IRDs (non-carbonate detrital fraction) deposited during the H1, H2, and H4 present ε_{Nd} values much lower than usual, suggesting the incorporation of clasts dropped by icebergs whose sources must have been located in Archaean cratons, such as those of northeastern America and Greenland. The low ε_{Nd} values combined with dolomite peaks support the hypothesis that icebergs fed by the Laurentide ice sheet and launched through the Hudson Strait played a major role in the deposition of IRDs, especially during the middle and final parts of the H1, H2, and H4. During H3, H5, H6, and preceding the H1 (~17.5-16 ka), H2 (~26.3-25 ka) and H4 (~42-40 ka) also were deposited sediments typically from northern European sources. The Heinrich Events were marked by significant SST drop. Peaks of $\delta^{18}O$ values following some Heinrich Events indicate that the cooling of SST was also followed by the atmosphere cooling and the consequent expansion of ice sheets on land giving place to Heinrich Stadial events (HS). During the HS occurred the most extreme SST cooling at IM due to the melting of icebergs and the drift of cool and low-salinity water masses from ice sheets melting, transported from northern areas by surface oceanic currents favoured by the strengthening of northerly winds and the cyclonic Central North Atlantic Gyre. During these events and probably most part of the last glaciation, Portugal Current (PC), which is derived from the southern branch of the North Atlantic Current, also was reinforced. The PC reinforcement promoted an increase of heat transfer for the IM and smoothed the decrease of SST and atmospheric temperatures during the last glaciation, namely through the HS. In some periods of the last glaciation, the southerly winds should have been reinforced which resulted in the arrival of more water provided from the Azores Current Eastern branch (ACEb), a relatively warm water flow. The PC and ACEb strengthening prevented the formation of ice sheets, except in the higher mountains and made the climate milder in Iberian Peninsula, during the last glaciation.

KEYWORDS: PLANKTONIC FORAMINIFERA. SIMMAX28 TRANFER FUNCTION. NEODYMIUM AND STRONTIUM ISOTOPES