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Iberian margin sequence of events within the ocean-atmosphere-sea-ice system

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A specific core not only becomes referential when its radiometric chronostratigraphy is sufficiently robust; it proves even more useful for palaeoclimate assessment, when multiproxy studies are performed on its strata. A multiproxy approach definitely enriches the description of events and is crucial before making any comparison with other palaeoarchives close to the areas studied, or before establishing any long distance connection.

This study presents an intra- and inter-event stratigraphy. The sequence of events is defined by means of the $U^{k'}_{37}$- sea surface temperature (SST) reconstruction in Iberian margin cores, while relying on as many variables as possible, e.g. uncalibrated AMS-^{14}C dates, $\delta^{18}O_{calcite}$ measurements of planktonic and benthic microscopic fauna; abundances of species of foraminifera, continental or coccolithophora flora, fossil organic compounds, total organic carbon, magnetic susceptibility, detrital lithics, etcetera. From this analysis, the events observed became known as Iberian margin interstadials (IMI) and stadials (IMS) [Martrat et al., 2007, SCIENCE, 317: 502], given that the Iberian margin sites were doubtlessly concordant. At the same time, some interesting internal differences arise between sites and events, providing clues about palaeoclimate mechanisms as yet to be explored. For example, a breakdown of the events reveals that ice volume accumulated in terrestrial environments might still be low at the time temperatures dropped and tree populations, having exceeded their tolerance limit, crashed; this situation could also be the reverse, i.e. during intervals of ice growth, forest conditions might persist in appropriate refugia and even expand at the time surface temperatures –oceanic and atmospheric– were recovering. These events are understood only if the role of internal stochastic mechanisms, thresholds (e.g. freshwater forcing, length of the dry season...) and the partially chaotic component of the climate system are taken into consideration. The oscillations defined are not expected to be exactly the same as events described by other proxies in distant or relatively closer regions, either in intensity or rates of change.