

desert plants and there is an increase of anthropic species, suggesting a cooling and dry episode. However these dry conditions have been gradually replaced by wet conditions at the end of this period. Finally, the last 150 years shows the increase of anthropic activities as revealed by the expansion of *pine* and anthropic associations.

Palavras chave: paleoclimatologia, Holocénico médio e recente, SW margem Ibérica, palinologia marinha, vegetação.

Keywords: *paleoclimatology, mid-late Holocene, southwestern Iberian shelf, marine palynology, vegetation, Holocene.*

New insights into the last deglaciation in the south-western iberia: vegetation cover and climate variability

Novos indícios sobre a última glaciação no SW da Ibéria: vegetação e variabilidade climática

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Direct correlation between terrestrial (pollen) and marine climatic indicators (sea surface temperatures-SST) from a core DI3882 (south-western Iberian margin) allows the detection of millennial scale climate variability for the last deglaciation in the mid-latitudes of the eastern North Atlantic realm.

The Bölling-Alleröd (B-A) is marked by the expansion of deciduous trees reflecting warm and wet conditions. In contrast, the Younger Dryas (YD) event is characterized by the contraction of temperate trees and the expansion of semi-desert plants (*Chenopodiaceae*, *Artemisia* and *Ephedra*), suggesting a cooling and dry episode. The beginning of the Holocene is marked by the return to warm and wet conditions as revealed by the recovery of the temperate trees. All these continental climatic changes are synchronous with the sea surface temperature variability in the same region and with the atmospheric temperature oscillations recorded in the Greenland Ice cores.

The maximum expansion of the temperate trees and SST at 11700 cal yrs BP marks the beginning of the Holocene thermal maximum (HTM) in the south-western Iberia.

Palavras chave: paleoclimatologia, deglaciação, SW margem Ibérica, palinologia marinha, vegetação.

Keywords: *paleoclimatology, deglaciation, south-western Iberian margin, marine palynology, vegetation.*

Pulses of aeolian activity in Portugal driven by enhanced westerlies during the deglaciation

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The climate of the Earth Planet is regulated by the transference of energy from the Equator to the poles by the coupled ocean-atmosphere circulation system. Events of rapid climate change during the last deglaciation were characterized by a weakening of the Atlantic Meridional Overturning Circulation (AMOC). Conversely, atmospheric circulation was dramatically enhanced during rapid climate shifts suggesting a complex ocean-atmosphere coupling. Here, we investigated the aeolian record from central Portugal to reconstruct windfield regimes during the deglaciation assuming that dunes are sensitive to changes in atmospheric circulation. The analysis of the internal architecture obtained with Ground Penetrating Radar (GPR) and the ages of the identified units obtained by Optically Stimulating Luminescence (OSL) support enhanced atmospheric circulation during the Heinrich event I and the Younger Dryas inferred from the occurrence of sand drift pulses driven by intense westerly winds. On the other hand, the results suggest enhanced storminess during these cooling events, which in turn conflicts with the widely accepted idea that arid conditions dominated SW Europe during HI and YD cooling events.

Keywords: *aeolian activity, windfield, westerlies, OSL, GPR.*

Latitudinal and Longitudinal SST gradient in the Western Iberian Margin during the LGIT

Gradiente de temperatura Latitudinal e Longitudinal ao longo da Margem Ibérica durante a última transição do glacial para o Interglacial

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Sea Surface temperature records based in alkenone Uk'37 Index and planktic foraminifera along the Iberian margin reveal millennial-scale climate variability over the last deglaciation, in particular during the Last Glacial Interglacial Transition (LGIT). In the Iberian margin, Heinrich event I (HI) and the Younger Dryas (YD)

represent two extreme sea surface cold episodes separated by a marine warm phase that coincides with the Bølling-Allerød interval (B-A) in the neighboring continent. Following the YD event, an abrupt sea surface warming marks the beginning of the Holocene. The 8.2 ka event, representing the most distinct climatic instability of the present-day interglacial is also clearly recorded in this region. The results show a latitudinal and longitudinal gradient in the SST, with the SST increase to the south with highest thermal contrast between warmer and coldest periods. However, the SST recorded in the Tagus mud patch (core D13882) changed faster than that of more offshore sites from the same region. While the SST values from most deep-sea cores reflect the latitudinal gradient detected in the Iberian Peninsula during YD and the B-A, the Tagus mud patch (core D13882) experienced colder SSTs during both events. This is most certainly related to a supplementary input of cold freshwater from the continent to the Tagus mud patch, a hypothesis supported by the high contents of terrigenous biomarkers and total organic carbon as well as by the dominance of tetra-unsaturated alkenone ($C_{37:4}$).

Keywords: abrupt climate change, Iberian Margin thermal gradient, sea surface temperature, LGIT.

Physiological and behavioral responses of temperate sea horses (*Hippocampus guttulatus*) to environmental warming

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The aim of the present study was to evaluate, for the first time, the effect of environmental warming on the metabolic and behavioural ecology of temperate seahorses *Hippocampus guttulatus*. More specifically, we compared routine metabolic rates, thermal sensitivity, ventilation rates, feeding intake, and behavioural patterns at average spring temperature (18°C), average summer temperature (26°C), temperatures that they endure during summer heat wave events (28°C) and in a near-future warming scenario (+2°C; 30°C) in Sado estuary, Portugal. Both newborn juveniles and adults showed significant increases in metabolic rates with rising temperatures ($p < 0.05$). However, newborns were more impacted by future warming (30°C) via metabolic suppression. In adult stages, ventilation rates also increased significantly with environmental warming ($p < 0.05$), but unexpectedly food intake remained unchanged ($p > 0.05$). Moreover, the frequency of swimming, foraging, swinging and inactive modes did not significantly change between the different thermal scenarios ($p < 0.05$). Thus, we provide evidence that, while adult seahorses show great resilience to heat

stress and are not expected to go through any physiological impairment and behavioural change with the projected near-future warming, the early stages reveal greater thermal sensitivity and will face greater metabolic challenges with potential cascading consequences for their growth and survival.

Keywords: seahorses, global warming, metabolism, behaviour, *Hippocampus guttulatus*.

Heavy mineral assemblages in tsunami deposits and sedimentary sources. Study cases from Scotland, Portugal and Indonesia.

Associações de minerais pesados em depósitos de tsunami e fontes sedimentares. Casos de estudo da Escócia, Portugal e Indonésia.

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This work is a contribution to characterize tsunami deposits and constrain their source-materials using heavy mineral (HM) assemblages. It addresses a variety of locations (thus varied sources) and events of different chronologies that affected contrasting coastal settings with different oceanographic conditions.

HM were separated (using bromoform) from the 1-3 ϕ size-fraction of 54 sediment samples collected from present-day depositional environments (nearshore, aeolian dune, beach and alluvial) and tsunami deposits. The grains were mounted on glass slides and about 300 grains/sample were identified and counted under a petrographic microscope, and data processed using principal component analysis.

Results indicate that HM assemblages reflect local specificities in regional geology and gravity separation during transport/deposition. In the Portuguese sites ca. 90% of the HM population consists of Tourmaline (T), Andalusite (A) and Staurolite (St), whereas Amphiboles (Am) and Am+A are dominant, respectively, in 90% of the assemblages in the Shetland and Indonesia samples. In each studied site the first 2 components explain more than 2/3 of the total variance. Tsunami samples share fewer similarities with nearshore materials and more resemblances with dune and beach sediment,