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Comparing the last two declaciations and interglacials in the North Atlantic region

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Marine sediment cores from the Alboran basin (southern Iberian margin) are reviewed here, demonstrating their utility as tools to verify the robustness and reproducibility of palæoclimate estimates. Sea surface temperatures (SSTs) recorded by alkenones at an unprecedented fine time resolution are used to describe and compare the present interglacial (PIG, initiated at 11.7 ka BP) and the last interglacial (LIG, onset approximately at 129 ka), together with their respective deglaciations (d1 and d2). Oxygen isotope values measured in the same strata allow direct comparison with other palæoarchives such as stalagmites and ice cores.
The amplitude of variation during the PIG is found to be no more than 2ºC (from 20ºC to 18ºC). SST progression during the LIG is steeper, up to 5ºC change from the early interglacial (23ºC) to immediately before the glacial inception (18ºC). The structure of the events observed allows identification of equivalences between the PIG and d1 versus the LIG and d2. Both deglaciations display complexity in structure that is directly related to their cooling reversals embedded in them. Characteristic events are observed during d1 at 17 ka, 14.8 ka and 11.7 ka. Equivalent events during d2 probably occurred at 136 ka, 132 ka and 129 ka. A SST maximum and the subsequent cold period that ensues, at 8.2 ka for the PIG and around 125 ka for the LIG, plausibly mark a “dividing line” indicating that deglaciations have come to an end. Full interglacial conditions in the Alboran basin show a recognisable long term trend towards colder SSTs, interrupted by brief warm stable periods. During the PIG, one such interval began after the 8.2 cold event and ended about 5.3 ka ago. An equivalent period within the LIG is tentatively recognized in this study between 125 ka and 121 ka ago. After this temperate phase, climatic deterioration appears to accelerate and instability to increase remarkably. A harsh cold spell at about 2.8 ka over the PIG, and possibly mimicked at 118 ka during the LIG, suddenly terminated the rapid cooling trend and stabilisation of interglacial SST at around 18ºC. A conspicuous feature of both interglacial periods is the subtle oscillations preceding the final glacial inceptions. The inception within the LIG was barely evident at the beginning, approximately 115 ka. However, it culminated dramatically 109 ka with a final change of great magnitude in just a few centuries. In this respect, the Little Ice Age which ended two centuries ago could be an example of how a final inception following an interglacial might appear. This brings us to what make the PIG unique: it has not yet ended and anthropogenic activities may influence its ultimate climatic development, all of which makes it more difficult to predict its close.