



Highly variable surface-water conditions off southern Portugal during mid-Pleistocene Marine Isotope Stages 20 to 26 (790 – 970 ky)

Aline Mega (1), Antje Voelker (1,2), Emilia Salgueiro (1,2)

(1) Instituto Português do Mar e da Atmosfera, Geologia e Georecursos Marinhos, Lisboa, Portugal

(alinemega20@gmail.com), (2) Centre of Marine Sciences (CCMAR), University of the Algarve, Faro, Portugal

The Mid Pleistocene Transition (MPT) was a global climatic event that occurred between 1250 and 700 thousand years (ky) ago. This period was characterized by a drastic change in the deep thermohaline circulation during the glacial periods that resulted in more intense and longer lasting glacial periods (changing from 40ky to 100ky cycles) and cooler sea-surface temperatures (SST). It is believed that the MPT may have been influenced by ocean-atmosphere system changes directly linked to an increased ice volume. A consensus point is that there was a $p\text{CO}_2$ reduction which in turn reduced the atmosphere's temperature, causing the expansion of continental ice sheets. In the North Atlantic, high-resolution records documenting the MPT's impact are still limited. The present study's objective is therefore to characterize surface-water variations at the mid-latitude southern Portuguese margin during the MPT. We are generating planktonic foraminifera faunal and related SST data for Integrated Ocean Drilling Program (IODP) Site U1387, retrieved from the Faro Drift in the Gulf of Cadiz, for the MPT interval from Marine Isotope Stage (MIS) 20 to MIS 26 at a temporal resolution of about 500 y. Nowadays, this site is dominantly influenced by subtropical surface waters. First results for the interval from MIS 20 to MIS 23 indicate highly variable SSTs off southern Portugal. Warmest summer SST between 23-25°C are recorded during interglacial MIS 21 when the fauna is dominated by tropical-subtropical species. During interglacial MIS 23, SST reached only 21°C with warm periods being interrupted by abrupt cooling events with minimum SST of 10°C. Glacial MIS 22 has three phases starting and ending with extreme cold events separated by an interstadial period of 14ky duration, during which SST increased up to 21°C. During the first extreme cold event SST stayed below 10°C for nearly 5ky. The impact of the second cold event was more extreme with SST dropping below 5°C for 4ky. The transition from this cold event to MIS 21 interglacial conditions occurred within 1ky. Contrary to MIS 22, MIS 20 was a relative warm glacial period with SST dropping down to 9°C only during the terminal event at the MIS 20/19 transition. So, the Site U1387 SST record reveals dominantly subtropical gyre influence interrupted by incursions of subpolar waters when the North Atlantic's subarctic front moved to southernmost position during the MPT.