



An Early Pleistocene 190 kyr pollen record from the ODP Site 976, Western Mediterranean region

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The Mid-Pleistocene Transition (1.200 to 0.500 Ma) corresponded to a period of increased cooling and the shift from “41 kyr world” to “100 kyr world”. Climate cycles were 41 kyr long as a response of the climate system to the obliquity orbital parameter forcing, then the climate system responded to a combination of eccentricity and precession resulting in 100 kyr long cycles.

The Mediterranean region offers the opportunity to study climate response to orbital forcing at this particular period. It is usually done on marine proxies that are preserved in continuous sediments with good age attributions but may be affected by calorific inertia of marine environments.

We investigate continental palaeoenvironment changes inferred from pollen analyses through time on a short interval of the ODP Site 976 (259.50 to 230.42 mcd). In order to search for short climate oscillations, the chronology has been refined according to the comparison between the pollen ratio “mesothermic vs. Caryophyllaceae, Amaranthaceae–Chenopodiaceae and steppe elements” curve and Mediterranean and LR04 oxygen isotope curves. The time slice runs from ~1.090 Ma (MIS 31) to ~0.900 Ma (MIS 23). Pollen analyses provide a new record of the south western Mediterranean vegetation and climate changes at the beginning of the Mid-Pleistocene Transition. Vegetation successions are evidenced in pollen diagram with replacement of mesothermic elements by mid- and high-altitude trees, ended by strengthening of Caryophyllaceae, Amaranthaceae–Chenopodiaceae, and steppe vegetation. These vegetation successions reveal two overlapping rhythms that may be related to climate responses to both obliquity and precession orbital parameters, while wavelet analyses on pollen ratio only indicate the shift from precession to obliquity dominance. The comparison of these two approaches raised the question of their own limit.