

## Sea-level variation during MIS 11 constrained by stepwise Osaka Bay extensions and its relation with climatic evolution

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Marine oxygen isotope stage (MIS) 11 has been described as a super-interglacial because of its long duration, more than 30ka, but this view is often refuted by the observation that the peak sea-level and maximum temperature did not surpass other interglacials, including the last interglacial. We address this problem using data from coastal sediments; we conducted diatom and sulfur analyses on two cores of high accumulation rate (0.52 m/ka) sediments from Osaka Bay, Japan. A linear age model applied to the diatom data shows that sea-level variations with precession cycles are correlated with oxygen isotopic events 11.3, 11.24, 11.23, 11.22, 11.1. Diatom abundances reveal sea-level increases and falls because of environmental changes caused by stepwise extension of the bay. This extension can be verified and mapped using data from 15 other drill cores. Sea-level was above the sill for Osaka Bay (about -60 m to -50 m) during the marine interval in Osaka Bay, spanning 60 ka. It was above the sill for Kawachi Bay (0 m to +2 m) during the marine interval in Kawachi Plain for a duration of 44 ka, including events 11.3 and 11.23. There was a period of extremely high sea-level, exceeding the sill for Kyoto Bay (about +10 m) during an interval of 16 ka centered at event 11.3. Palynological data from the same core show that the MIS 11 climate around Osaka Bay was divided into early warm-temperate and late cool-temperate times, with a boundary between events 11.3 and 11.24. During the marine interval in Kyoto, the climate was an extremely warm hypsithermal, almost coincided with the warmest interval in Antarctica where temperatures are > 0 deg. C. The extremely high sea-levels globally observed during MIS 11 (e.g. +13 m, +21 m) probably occurred during this interval.

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