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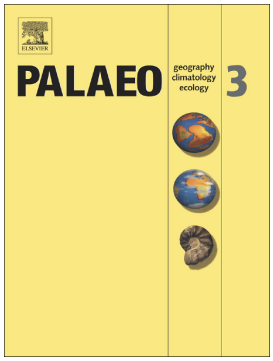

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Late Pleistocene to Holocene evolution of the Emba Delta, Kazakhstan, and coastline of the north-eastern Caspian Sea: sediment, ostracods, pollen and dinoflagellate cyst records

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Abstract

Six cores, each approximately 10 m long, of late Pleistocene to Holocene age were studied from the Emba Delta region in the north-eastern Caspian Sea. Radiocarbon dates provide ages within the range of 47,820 to 12,020 cal BP for the middle sections, and for post-1950 close to surface. The ages fall within Marine Isotope Stage (MIS) 3, MIS 2 and MIS 1 (with MIS 4 also inferred). Four lithological units are present, each separated by an erosional contact. Unit 4 is equated with MIS 4 and consists of over-consolidated, east-west trending aeolian sands deposited during the late Pleistocene Atelian lowstand. Unit 3 is equated with MIS 3 and is a low-energy, shallow open water or lagoonal deposit based on ostracod faunas. Pollen from mesophilic trees is common, confirming warm climatic conditions. Floristic elements such as *Engelhardia* and *Carya* were shared with East Asia. Frequent Taxodiaceae pollen occurs, derived from *Glyptostrobus pensilis*, a seasonal freshwater swamp tree, now found naturally only in isolated relict stands in East Asia. This suggests that the north-eastern Caspian region

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