



Holocene climatic changes on the western coast of Italy (Arno coastal plain, Tuscany)

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A 51 m-thick Holocene succession was identified in a core from the Tyrrhenian coast of Tuscany and investigated by means of combined pollen and micropaleontological (foraminifers and ostracods) analyses, integrated with AMS radiocarbon ages. The stratigraphic succession includes an incised valley fill (IVF), formed under rising sea-level conditions, overlain by prograding deltaic deposits formed during the following sea-level highstand. This multidisciplinary study documents the strict relationship between Holocene paleoenvironmental evolution, relative sea-level changes and climate fluctuations.

Estuarine deposits, showing the establishment of a brackish-water environment at the onset of the Holocene, are recorded in the lower part of the IVF, at about 10,000 years BP. The abrupt change from fluvial to estuarine sedimentation is paralleled by the expansion of forest vegetation. Between about 10,000 and 8,000 years BP the transgression proceeded stepwise, as documented by subtle changes in foraminifer and ostracod associations, recording temporary breaks in sea-level rise. Pollen data point to parallel changes in forest composition and vegetation coverage, suggesting a key role of short-term climatic fluctuations in controlling small-scale, relative sea-level changes. Above thin transgressive barrier deposits, maximum marine ingression is recorded within inner shelf deposits shortly after 7,800 years BP. This phase is characterized by maximum expansion of termophilous forests. Vertical changes in foraminifer and ostracod associations within the overlying highstand, prodelta deposits are interpreted as evidence of salinity fluctuations, possibly related to changes in fluvial regime. These changes could be the result of variations of climate factors, such as the humidity ratio, documented by the peculiar vegetation dynamics.