

Paleoenvironmental and paleoclimatic conditions in the Tagus River Estuary during the Holocene

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Abstract: Estuaries constitute the frontier between terrestrial, fluvial and marine environments, representing areas of high biological productivity that are particularly sensitive to global, regional and local environmental and climatic changes. The lower Tagus valley experienced a transgression period from 12000 – 7000 calendar (cal) years BP (Vis *et al.*, 2008;QSR). Trying to understand the interaction between land-river and ocean, we are studying paleoenvironmental conditions of the Tagus river estuary, using a 52,76 m long core drilled near Vila Franca de Xira (38°56'24''N; 8°56'19''W, 2 meters elevation). The age model of this core is based on 6 AMS ¹⁴C dates. Marine/estuarine productivity and river input have been reconstructed for the last 14 000 calendar years BP, using a high resolution, multi-proxy study of diatoms, C₃₇ alkenones, higher plant C₂₃ – C₃₃ n-alkanes and C₂₀ – C₃₀ n-alkan-1-ols, Fe and Ca content derived from XRF analysis and Total Organic Carbon (TOC). Our data shows that major river input events (as revealed by higher concentrations of terrestrial lipid biomarkers and phytoliths) control the primary productivity at this site because increased productivity – maxima in diatoms, C₃₇ alkenones and TOC – are synchronous. Marine and brackish diatom genera and C₃₇ alkenones occur between ca. 11500- 4500 cal years BP indicating a marine to brackish environment, probably in a shallow marine pro-delta. After 4500 cal years sea level had risen so much that the marine influence was reduced (low abundance of marine diatoms) and the environment was similar to the modern, i.e., a brackish tidal flat. Further work is needed to improve the understanding of this estuarine record.