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Micropalaeontological record of Holocene estuarine and marine stages in the Corgo do Porto rivulet (Mira River, SW Portugal)

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Abstract

The Corgo do Porto is a small tributary of the Mira River, outleting 3.5 km upstream of its mouth. The valley is flat-floored due to terrigenous siltation and forms an alluvial plain reclaimed for agriculture/aquaculture. These conditions were quite distinct in the recent past because of extensive marine flooding of this area during the high-rate positive eustatism that followed the Last Glacial Maximum. The Holocene sedimentary column registers changes imposed by several forcing factors, mainly the climate-driven sea-level rise. As part of a multidisciplinary study, the sedimentological and micropalaeontological (benthic foraminifera and calcareous nannofossils) contents of a core taken from this infill were analyzed, and five different stages were distinguished within its environmental evolution: Stage A (prior to 10,000 cal yrs BP) consists of muddy, matrix-supported sand with abundant pebbles, barren of microfossils, and free of carbonates and organic matter that represents a fluvial environment contemporaneous of a low sea level. Between 10,000 and circa 4000 cal yrs BP the sediment is made of homogeneous mud, with bioclasts and organic matter. However, the assemblages of foraminifera and calcareous nannoplankton allowed the identification of several environmental stages, defining a cycle of increasing–decreasing marine influence inside the valley: brackish and brackish-marine sedimentation (Stage B), full-marine sedimentation (Stage C) and a return to brackish-marine sedimentation (Stage D). The final part of the core is barren of microfossils (Stage E) and it represents the modern sedimentation in the area with an accreting alluvial plain. This Holocene sedimentary sequence reflects an evolutionary succession that closely agrees with the palaeoenvironmental model previously presented by the authors elsewhere for the south-western Portuguese coast, where a change in the rate of sea-level rise has been recorded at around 5500 cal yrs BP when a very effective sandy barrier formed and isolated restricted brackish to fresh-water lagoonal environments from the open sea.

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1. Introduction

The Corgo do Porto is a small rivulet and incised tributary on the right bank of the Mira River, located 30 km south of Sines in the Alentejo coast of Portugal (Fig. 1). The maximum

width of the river is 400 m and the depth varies between 5 m and 10 m in the lower and medium zones and less than 3 m in the upper reach (Bonaventura et al., 1999). The Corgo do Porto rivulet discharges circa 3.5 km upstream of its mouth, in Vila Nova de Milfontes. Its thalweg runs close to the left and scarped embankment, and this asymmetric valley is flat-floored due to extensive siltation by terrigenous sediment, which forms an alluvial plain reclaimed for agriculture and aquaculture. However, these environmental conditions were

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