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Holocene evolution of Guadiana River estuary (South of Portugal) based on benthic foraminiferal assemblages

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The analysis of variation in benthonic foraminifera content throughout five boreholes drilled in Guadiana River Estuary enabled the identification of five paleoenvironments that occurred during the Holocene, each one with a different Marine Influence Degree (MID). The MID 1 was determined by samples without forams, which could indicate a terrestrial environment with no marine influence or a depositional environment not ideal to the tests *post-mortem* preservation. The environment exposed to a MID 2 was delineated as high intertidal and is exclusively colonized by agglutinated forms (*Trochammina macrescens*, *Trochammina inflata*, *Trochammina* spp., *Ammobaculites* sp.) and inner linings, indicating high exposure times that can be found in high to middle marsh zones. The environment exposed to a MID 3 was characterized as middle intertidal by being predominantly colonized by agglutinated forms and/or inner linings and, carbonate tests showing high dissolution, characterizing confinement typical of middle to low marsh zones. The environment exposed to a MID 4 was characterized as low intertidal and is dominated (more than 65% of the individuals) by the estuarine species association of *Ammonia beccarii* and *Haynesina germanica* associated with *Elphidium* spp. and to the miliolids, characterizing a moderate confined environment, that includes the low marsh and all the mud flats zones. The environment exposed to a MID 5 is suggested to be open intertidal and is defined by the estuarine species *A. beccarii* and *H. germanica* associated with forms preferring greater marine influence, namely, the species *Cibicides lobatulus*, *Planorbulina mediterraneensis*, *Asterigerinata mamilla*, *Brizalina* sp. and *Discorbis* sp., occurring as well an increase in diversity index and in the number of small and indeterminate tests.

According to the paleoenvironmental sequences in all boreholes except CM2 it was possible to identify a transitional fluvio-marine phase immediately before a transgressive episode. The perseverance of middle intertidal environment in the CM2 sequence may be explained by its inward localization which affords it protection against the major changes felt in the Guadiana main channel. In the most complete borehole (CM5) with 82 samples which reach

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the 51 meters of depth, it was possible to identify a pre-marine invasion paleoenvironmental sequence accompanied by a dominance substitution of marsh species to low marsh and estuary species between a pre-Holocene episode and the transgression maximum.

In all boreholes it was determined that there was a reduction of marine influence immediately after the transgressive maximum. The marsh environment occurrence in CM3 and CM5 boreholes in surficial bio-horizons suggests a recent equilibrium between the accretion rates and the current rising rates of Mean Sea Level.