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The Mahdia Bay shoreface (Tunisia): assessment of coastal sensitivity by textural and morphodynamical studies

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The understanding of the barred sandy coastlines functioning leads to improve the knowledge of the world beach. The present study was undertaken in the sedimentary unit of the bay of Mahdia characterized by activate and moderate tectonics.

The preliminary survey described the morphology and the sedimentology of the included nearshore between the Africa capes and Dimas in border of the coastline of the bay of Mahdia, a linear of about 15 km constituted by a sandy beach and an irregular foredunes.

The morphology showed a disposition characterized by a sandy sedimentary prism formed by three units, spaced out from south to the north. In the two extremities, the prism is poor in sediment, in border of the salient of the capes. In the central part, on about 7 to 8 km, it is more regular, forming a slope of the order of 1.4%, succeeding little toward -10 to -12 m to a tray tilted, marked by a reliefs line that underline the general curve of the bay. This sedimentary slope is limited suddenly at the north by an alignment of relief situated in the extension of Moknine fault of which they constitute the trace.

In the middle part, the prism is marked by the existence of two bars of which the internal one reveals an instability under the forcing of the hydrodynamic regime. A bathymetric survey done on August 2006, showed a carving that doesn't correspond to the state presented after the comparison of the two series of air photo. This segmen-

tation seemed to be under the dependence of the frequent sea storm of the summery regime. Their origins, from the N to E quadrant, corroborate the distribution of the different segment orientations observed, as shown by a simulation of the field of orthogonal refracted by the morphology of the bay. The rupture and the reorientation of the internal bar sections under a middle energy storm effects, mark a symptomatic instability of a sandy volume to displace and which could only be modest.

The textural analysis and the nature of the sediments confirm this diagnosis. The answer of the sediments to the processes of sorting showed that the granulometric assembly is under the dependence of a limited number sedimentary type mixture, characteristics of the reduction of the sedimentary sources numbers. The most important, has for reservoir, the material of the beach and the foredune, that is affected by processes of reduction having required operations of defence against the erosion. Of the coarser populations, essentially bioclastic, have been incorporated to the finer sand material of which they modify the distribution. The change is however discreet, affecting the asymmetry and rarely bordering to a bimodality. In the bay of Mahdia, the sedimentary sources were therefore exclusively locales, few and little abundant.