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Morphological evolution (1985-2021) and sedimentological study of the Essaouira bay and the mouth of Oued Ksob (Morocco)

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Abstract

The coastline of Essaouira is located on the Atlantic coast of Morocco. The bay of this city is a large sandy system strongly marked by coastal and fluvial dynamics which makes it a perfect example to understand the process of sedimentology in a bay area.

The use of satellite imagery allows us to determine the morphological evolution of the bay of Essaouira and the mouth of Oued Ksob. The results of our study show the evolution of the coastline of the bay of Essaouira with areas in erosion and others in accumulation. The analysis of satellite images allows us to distinguish three very different sectors: the first which is north of the estuary of Wadi Ksob because of its closed nature (bay), this area receives most of the flood contributions of Wadi Ksob, which helps to maintain its morpho-sedimentary balance. The second sector, which is composed of the estuary and the mouth of the Wadi Ksob, is characterized by a hydrodynamic both fluvial and maritime. The third sector is located south of the estuary of Wadi Ksob, this sector is an open beach that is not affected by the presence of an obstacle which is the island of Mogador.

The sedimentological study is carried out on four different areas which are: the dunes, the mouth of Wadi Ksob, the area south of the estuary and the area north of the mouth. Several analyses were carried out namely: granulometry, morphoscopy, calcimetry and X-ray diffraction.

The granulometric, morphoscopic, calcimetric analyses and the results obtained by X-ray diffraction as well as the presence of certain minerals confirm that the origin of the sediments studied is both continental and marine. In addition to the natural factors that condition the morphological evolution of the whole coastline of Essaouira, the island of Mogador presents an obstacle and plays an important role on the morphogenesis as well as the sedimentation along the coastline

Keywords: coastline, coastal dynamic, fluvial dynamic, bay, satellite images, oued Ksob, mouth, sedimentologicalstudy, granulometry, morphoscopy, calcimetry, X-ray diffraction