



Sediment Constituent Analysis; Application of a New 'Toolbox' for the Study of Iranian Coastlines

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1. Introduction

Sediment constituent analysis (SCA) is the method of assessing sediment samples under a microscope to determine the origin of constituent particles by visual inspection, and in some cases by the aid of stains. The analysis is usually performed using two basic techniques: a) by examination and identification of the origin of whole grains through a microscopic, as reported by Thorp (1936), and Perry (2000) and b) by embedding sediments for thin section preparation and microscopic examination of thin sections as reported by Illing (1954), and Lidz and Hallock (2000). Both methods use basic counting techniques through a microscope. Selection of the technique depends on resources and goals. Thin sectioning requires much more sample preparation, however most grains can be identified in details, while the first method is simpler. This type of sediment analysis is a new subject for the Iranian Coastal Engineering community, particularly as it relates to carbonate sands. Application of this method was taught to a number of Iranian experts during the second phase of Monitoring and Modeling Studies of Iranian Coastlines by training on techniques for constituent analysis for sediment samples taken particularly from Naiband Beach. This paper introduces a few case studies done in different parts of Iranian Coastlines by using this method as a general assessment toolbox.

2. Sediment sources along the Iranian Coastlines

SCA is an effective tool for identifying sediment sources. Based on several sediment samples taken from different sites all over the Iranian coastlines, we have been able to show that an important portion of sediment on the beaches in the Persian Gulf is bio-clastic; that is, biologically created from the coral environment as well as other marine habitats. Unlike mineral (clastic) sediments, carbonate sediments are born not made. Furthermore, carbonate sand constituents are generally less durable than their quartz and mineral counterparts, and break down relatively quickly. Therefore, destruction of reefs and degradation of marine habitat are certain to reduce the sand supply to the shoreline in the Persian Gulf that is necessary to maintain beaches.

Carbonate sands are also found on the coastline of the Oman Sea. One of the striking things about the sediments along the coastline of Iran is the high percentage of carbonate material. Molluscan debris is common, even ubiquitous. This reflects the populations living in the offshore waters. Some molluscs thrive in high-energy sandy environments, others like finer sediments. Some live at the surface, while some burrow down as much as a half-metre. A great deal of