



Temporal evolution of Recent shallow-marine sedimentary facies belts, offshore Abu Dhabi, United Arab Emirates

Stephen Lokier, Flavia Fiorini, and Yunlong Zhao

Petroleum Geosciences Program, The Petroleum Institute, Abu Dhabi, United Arab Emirates (slokier@pi.ac.ae)

This paper presents the results of the first study to assess the temporal changes in Recent sedimentary facies distribution along the coastline of Abu Dhabi, United Arab Emirates (UAE). The northern coastline of the UAE is undergoing massive infrastructure development with coastal engineering taking place at an unprecedented scale. Anthropogenic activities are drastically modifying the morphology of the coastline at an ever-increasing pace with consequent changes to hydrodynamic regimes and coastal sedimentary systems.

During the early 1960's, prior to any major construction activities, a number of studies examined the distribution of shallow-marine facies and biotic communities in the shallow off-shore coastal zone of Abu Dhabi. While each of these earlier projects focused on specific aspects of the shallow-marine coastal system, together they provide a good overall assessment of the distribution of sedimentary facies and index biota distribution prior to the onset of significant anthropogenic activities. We have adopted the data from these earlier studies as a 'pre-anthropogenic base-line' which can be used to assess the modifications in the distribution of benthic environments and consequent changes in sedimentary facies.

The present study identified and, where possible, revisited the sampling sites used in the studies conducted in the middle of last century. In total 150 sea-floor sediment samples were collected, these represent a wide-range of shallow-marine sedimentary environments (including nearshore shelf, beach front, channels, oolitic shoals and lagoonal settings) proximal to the coastline of Abu Dhabi Island. Samples were characterised in terms of grain-size, composition, sedimentary facies and biotic content.

Particular attention was given to foraminiferal assemblages. These are dominated (70-100% of the dead assemblage) by species with a porcellaneous test belonging to the genera *Quinqueloculina*, *Triloculina*, *Sigmoilina* and *Peneroplis*. Hyaline foraminifera (mostly belonging to the genera *Rosalina*, *Ammonia*, *Eponides* and *Elphidium*) and agglutinated foraminifera (*Clavulina*) are present at lower percentages.

While the shallow-water settings of the Abu Dhabi coastline continue to be areas of active carbonate sedimentation there have been distinct, and sometimes profound, changes in facies distributions. Some settings have been totally lost, with sites formerly in lagoons now being under buildings, whilst other areas show surprising resilience to anthropogenic activities with little, if any discernable change in sedimentary facies distributions. The detailed analysis of these changes in sedimentary facies and biotic distribution allows us to further our understanding of the effects of anthropogenic activities on shallow-marine environments. By so doing, we are better able to distinguish between those changes that result from anthropogenic activities and those that are a result of naturally-occurring environmental perturbations.