



Mangroves and Sediments – It’s not all about mud!

Stephen Lokier, Andreas Paul, and Flavia Fiorini

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

Mangals occur both as natural mangals and as plantations along the Arabian Gulf coastline of the United Arab Emirates (UAE). Over recent years there has been a significant campaign to extend the area of the mangrove forests, a project that has resulted in significant dredging activity in tandem with the planting of mangrove samplings. The philosophy for this operation has been in order to increase coastal protection from erosion and as a bid to somewhat offset the UAE’s carbon footprint. This project, along with significant coastal infrastructure development, has, regrettably, reduced the number of mangal settings that may be considered as pristine. With this in mind, we have undertaken an extensive sampling campaign in order to fully characterise the sediments associated within the depositional sub-environments of mangal systems.

Satellite imagery and ground-based reconnaissance were employed to identify a natural mangal area to the East of Abu Dhabi Island. Within this area, a transect was established across a naturally-occurring mangal channel system. Along-transect sampling stations were selected in order to reflect the range of environmental conditions, both in terms of energy and in relation to the degree of tidal exposure. At each station an array of environmental parameters were monitored. These included, but were not limited to, temperature, salinity, current velocity and turbidity. The surface sediment at each sample station was regularly sampled and returned to the laboratory where it was subjected to a range of analysis including grain size and modal analysis, identification of biota and measurement of total organic content.

The results of this study allow us to develop a mangal sediment facies map that accurately establishes the relationships between sediments, depositional setting and environmental parameters. These results can be employed to inform the interpretation of ancient successions deposited under similar conditions. Further, the findings of this study will aid in the development of accurate petroleum reservoir models that are constrained by a quantitative data set. Lastly, a comparison between the environmental and sediment characteristics of natural and artificial mangals will aid our understanding of the effects of these new systems on the sedimentary dynamics of the UAE’s coastline.