Mapping of the recent sediment and relict features in the area between Jizan and Farasan Islands and Jizan in the Saudi Arabian sector of the Red Sea, Saudi Arabia

N. Rasul1, G. Bailey2, A. Qutub2, S. AlNoman1, N. Widiny1, M. Khorsheed1, A. Jarees1, A. Thrawi1, T. Bakrman1, A. Osemi1, M. Devés1, R. Inglis3, M. Meredith-Williams4, G. Monber2, D. Sakellariou4, G. Rousakis2, A. Alshariekh5

2. Department of Archaeology, University of York, the King’s Manor, Exhibition Square, York, Y01 7EP, UK
3. Institut de Physique du Globe de Paris, 1 rue Jussieu, 75238 Paris, Cedex 05, France

Project

The project is a joint venture between various international and national organizations. The first stage of research is currently under way in the vicinity of the Farasan Islands and Jizan in the Saudi Arabian sector of the Red Sea, by the Saudi Geological Survey and by a joint UK geo-archaeological project forming part of the ERC-funded DISPERSE project (Dynamic Landscapes, Coastal Environments and Human Settlements) (Bailey et al., 2012).

In February and June 2014 the RV COASTAL SURVEYOR II of the Saudi Geological Survey conducted two cruises to understand the sedimentary characteristics of the basin from an environmental perspective, the influence of the waters draining into the basin, and the role of islands and shoals controlling sediment dispersal.

In May–June 2013, the RV AEGAEO of the Hellenic Centre for Marine Research conducted a survey (Bailey et al., 2013; Sakellariou et al., 2013) to explore systematically the submerged landscapes down to 120 m revealed by late Paleocene-early Neogene deposits.

Study Area

The study area is the southeastern Red Sea (Figure 1a) including Farasan Islands and Jizan, which is part of the vast Arabian subregion of the Red Sea bays. The islands are formed by the continental shelf of the Arabian Peninsula and are triangular in shape. They are elongated parallel to the coast.

Jizan lies at the northern end of the Red Sea and is 90 km inland from the coast. The coast is essentially straight, with a partially protected bay in the north (Jizan) and is open to the south. The coastline is arid and mainly dominated by savannas and scrub.

Jizan coastal belt rapid development along with natural factors has caused shoreline erosion and loss of pristine environment people used to enjoy (Figure 1b).

Jizan, which could be due to bottom trawling.

Data Acquisition and Processing

The RV COASTAL SURVEYOR II, and the RV AEGAEO gravity box and core samples (up to 5 m) and geophysical equipment – dual frequency echo-sounding, multi-beam side-scan, bathymetry (20 kHz and 180 kHz), argon/water profiler (10 cubic bins), high resolution sub-bottom profiler (2.5 kHz profiler), deep-towed (110/410 kHz) side-scan sonar, and an ROV (Max Rover).

The RV COASTAL SURVEYOR II focused on the processes responsible for sediment transport and possible contamination and degradation of the marine environment, incorporating a wide-range of sediment, water quality, bathymetric survey, circulation pattern and properties of the water, producing 118 surficial sediment samples and data on various physical and chemical parameters from an area of 11 428 km2.

R/V COASTAL SURVEYOR II concentrated on two areas (FARASAN 1 and FARASAN 2) and two sub-bottom transects (TRANSECT 1 and TRANSECT 2), and mapped ~500 km2 with resolution sub-bottom profiler (3.6 kHz pinger), deep-towed (110/410 kHz) side-scan sonar, and an ROV (Max Rover).

Methodology

Present-day sediment deposits result from the interaction of various processes acting on the coastal environment. The deposits are classified as: terrigenous (arroyo and fluvial), detrital (reef and coralline), and biogenic (calcium carbonate). In the Jizan coastal belt regions, terrigenous and detrital materials are mostly biogenic (Figure 2).

Rapid evolution of the prehistoric landscapes of the Arabian subregion of the Red Sea, Saudi Arabia. GeonoArch project of the European 7th Framework Programmes. The area includes: Farasan Islands, Jizan, Al-Shuqaiq region from wadis (seasonal streams) and are transported to the shoreline erosion and loss of pristine environment people used to enjoy (Figure 1b).

In the coastal belt, shoreline evolution is mainly controlled by tectonic activity, which has resulted in the formation of the Red Sea and the Arabian Gulf. The area is characterized by a high rate of tectonic activity, with the Red Sea spreading at a rate of about 2-3 cm/year.

The study area is located in the central part of the Red Sea, between 15°E and 18°E and 19°N and 21°N. The coast is formed by a series of parallel ridges and troughs that are separated by deep basins.

The area is characterized by a high rate of tectonic activity, with the Red Sea spreading at a rate of about 2-3 cm/year.

The study area is located in the central part of the Red Sea, between 15°E and 18°E and 19°N and 21°N. The coast is formed by a series of parallel ridges and troughs that are separated by deep basins.

The area is characterized by a high rate of tectonic activity, with the Red Sea spreading at a rate of about 2-3 cm/year.

The area is characterized by a high rate of tectonic activity, with the Red Sea spreading at a rate of about 2-3 cm/year.