

Coastal evolution and facies successions in a subtropical arid carbonate environment – Initial results from the sabkha of Al-Zareq, Gulf of Salwa (Qatar)

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The Arabian Gulf is a semi-enclosed, relatively shallow sea with an average depth of 35 m. Initial marine incursions into the Gulf date some 12,500 years before present. Current relative sea level was first reached c. 7000 to 6500 years ago, and a relative sea-level highstand of c. 2–4 m was reached around 6000–5500 years ago. Supratidal coastal sabkhas (former lagoons), stranded beach ridges and foredune sequences as well as abandoned tidal channels along the coasts of Qatar and the UAE provide evidence for this mid-Holocene peak in sea level. Regression since then induced shoreline migration of up to several kilometers along the low-lying coasts of southern Qatar, for which, however, detailed spatio-temporal reconstructions are scarce.

The study presented here aims at deciphering facies changes and coastal evolution of the coastal area of Al Zareq in the inner Gulf of Salwa (Qatar) as these sedimentary environments have important implications for a better understanding of reservoirs that formed under arid climatic conditions. Ten vibracores (up to 8 m), two deep drillings (up to 20.5 m) and two trenches covering the entire transgression-regression cycle are currently being investigated. In order to characterize and interpret facies types at Al-Zareq as well as to reconstruct sabkha formation in space and time, grain size and shape distribution (laser diffraction, camsizer), XRD, micro- and macrofossil contents and thin sections are analysed by applying qualitative interpretation, descriptive and multivariate statistics (PCA, MDA, end-member modelling), and RIR (XRD). Thirty-seven samples were radiocarbon dated and four samples were dated by optically stimulated luminescence (OSL). Depositional environments include the following types: eolian dune and interdune (in-situ or reworked), coastal sabkha (diagenetic), saline lake (salina), protected lagoon (sand- or carbonate-dominated), beach and beach spit, tidal channel and tidal bar, as well as open lagoon (low-energy, shallow-subtidal lagoon and low-energy deeper-subtidal). This facies classification should be considered as preliminary; it might be subject to modifications during ongoing research.