



Physical environmental data of the mixed carbonate-evaporite depositional system of the Abu Dhabi shoreline

T. Steuber, S. Lokier

Petroleum Geosciences Engineering, The Petroleum Institute, PO Box 2533, Abu Dhabi, UAE
(tsteuber@pi.ac.ae)

Despite its importance as a unique modern analogue for ancient carbonate-evaporite sedimentary systems, available physical data of the modern depositional system are scarce. We have surveyed the seasonal variation of air, surface and subsurface temperatures, humidity, salinity, and isotopic composition of marine and continental waters for a period of c. 2 years. Data were obtained along a 3.5 km long transect from the sabkha across the intertidal. A large temperature gradient exists, with highest summer temperatures recorded in the upper intertidal zone of anhydrite formation. Here, surface temperatures reach 60°C and subsurface temperatures stabilize at 32°C, which is considered to be the annual mean. At selected locations, air, water, and subsurface temperatures were recorded in 10-minute-intervals. In the lower intertidal zone, air temperature reach 50°C from May to September, and annual variation in water temperature is from 46 - 10°C, with a variable daily pattern depending on the tidal cycle. Salinity and oxygen isotopic compositions of subsurface waters are remarkably constant throughout the year, and even the rare episodes of substantial rainfall alter this distribution only in well defined zones of the studied transect. In the intertidal zone, salinity of ponding seawater has been found to increase from 70 to 90 per mil during a tidal cycle and $\delta^{18}\text{O}$ values up to +7.5 per mil SMOW have been recorded. These waters still support relatively diverse marine biota. In addition to the importance as basic physical data for the evaluation of the biology and mineralogy of the modern environment, our data are also important for the interpretation of geochemical proxy data from mixed carbonate-evaporate systems of the sedimentary record.