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# Seasonal dynamics of a modern sabkha surface

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The Holocene to Recent Abu Dhabi Sabkha is located in the supratidal zone of the southern shore of the Arabian Gulf. Annual variations in temperature can be extreme; summer temperatures often exceed 50˚C yet regularly fall below 10˚C at night during the winter. Annual rainfall in this arid region is low, typically less than 4cm/yr, but may be concentrated into a few episodic torrential downpours. Humidity is extremely high during summer months. Most of the previous studies of the Abu Dhabi Sabkha were based upon field seasons of limited duration, typically undertaken during the more clement winter months. The findings of these studies typically describe the sabkha as a low-energy environment where slow sedimentary processes are rarely punctuated by episodic high energy events. We propose that this bias in fieldwork towards winter months resulted in a failure to recognise the highly dynamic nature of many of the sedimentological features of the sabkha environment.

During the present study a number of 'stations' were identified for repeated examination and description over a period of more than one year. Stations were selected at regular intervals over the sabkha surface and range in area between 1 $m^2$ to 25 $m^2$. At each station an area of the sabkha surface was defined and regularly photographed to construct a graphic record of temporal changes in surface morphology.

The results of this study clearly illustrate that the Abu Dhabi sabkha is, in fact, an extremely dynamic sedimentary environment in which many of the characteristic sedimentary features at the sabkha surface are transient and in a constant state of flux. Meter-scale halite polygons are a typical and often cited feature of the sabkha surface. During the spring the evaporation of surface and near-surface pore waters results in the precipitation of salts that displace laterally with resultant uplift of polygon margins as tepee structures. Once uplifted, the polygon margins are susceptible to abrasion by aeolian processes and dissolution as a result of high humidity during the summer

months. Conversely, episodic rainfall during the winter results in water ponding on the upturned dish-like polygon centers and consequent dissolution of salts to leave a residual rim tepee structure. During more extended periods of rainfall, greater than two days, total dissolution of halite polygons may occur.