Seidell, B. C. 1984. The Anatomy of a Modern Marine Siliciclastic Sabkha in a Rift Valley Setting: Northwest Gulf of California Tidal Flats, Baja California, Mexico (Evaporites, Sedimentology, Holocene). Ph.D. dissertation. Baltimore, Maryland. Johns Hopkins University. 405 pp.

An extensive sabkha, roughly 100 kilometers by 20 kilometers, caps the Holocene siliciclastic tidal flats along the coast of Baja California, Mexico, in the northwest Gulf of California structural trough. An extensive alluvial fan system, built from sediment shed from the 3000 meter mountain chain that forms the backbone of the penninsula of Baja California, flanks the western border of the sabkha. To the east, an en echelon set of barrier beach ridges separates the supratidal sabkha from the Gulf of California. This sabkha is a complex of five interrelated subenvironments: the sandflat and adjacent alluvial fan toe, the saline mudflat, the gypsum pan, the halite pan, and the supratidal flats.

A system of shallow braided ephemeral streams characterize the toes of the alluvial fans. The sandflat, which is transitional between the fans and the sabkha proper, consists of horizontal, lenticular, to wavy laminated sand interbedded with centimeter-scale cross-laminated sand. This reflects depositional by extremely shallow sheetfloods, which are washed onto the flats from the adjacent fans under upper flow regime conditions. The sandflat passes into saline mudflats characterized by massive mud crowded with discoidal gypsum crystals. This gypsum has grown within the sediment both displacively and poikilitically, with precipitation driven by evaporitive pumping of brine from the shallow water table.

A gypsum pan occupies a wide, shallow depression within the saline mudflat. After storm flooding (either marine or meteoric) the pan becomes a temporary lake, with an algal mat overgrowing a detrital storm layer. Evaporation and surface drainage leads to precipitation of gypsum needles and flat plates out of the open water and growth of vertically-oriented bladed prisms on the bottom. The accumulation of this gypsum on top of the algal mat produces contorted layers that mimic the mat topography. Desiccation of the lake initiates intrasediment diagenetic growth of gypsum that deforms the layers into meter to decameter-scale polygonal dishes rimmed by pressure cracks. Evaporative pumping of subsurface brine through these cracks promotes the growth of a diapir-like ridge of euhedral hemipyradimal gypsum crystals, and blocky, twinned prisms at the upturned polygon edges. Drying out of the lake completely leads to the precipitation of a surface halite layer in the center of the pan. . . . (Author's abstract exceeds stipulated maximum length. Discontinued here with permisson of author). UMI