

Casas, E., and Lowenstein, T.K. 1989. Diagenesis of Saline Pan Halite: Comparison of Petrographic Features of Modern, Quaternary and Permian Halites. *Journal of Sedimentary Petrology*, Vol. 59.

ABSTRACT, p 724;

" Petrographic studies of modern saline pan halites (Saline Valley, CA; Salina Omotepec, Baja California, Mexico) and Quaternary shallow-buried (0-200 m) halites (Saline Valley, CA; Bristol Dry Lake, CA; Searles Lake, CA; Qarhan saline pan, Qaidam Basin, China; Lake Uyuni, Bolivia) show that the diagenetic modification of halite begins contemporaneously with deposition, is most intense within the upper few meters of burial, and is essentially complete within the first 45 m of burial. Halite crusts from modern saline pans that have undergone repeated episodes of flooding, evaporative concentration, and desiccation contain abundant syndepositional diagenetic features. These 'mature' modern halites are dominated by dissolution textures and fabrics (formed during flood stages) and cementation textures (formed during desiccation stages). Interlayered mud beds contain varying amounts of displacive halite crystals.

At shallow burial depths, halites retain many textural features of 'mature' modern saline pan halite. Halites below the first few meters are no longer susceptible to dissolution from floodwaters but continue to be cemented by clear halite. Within the first 10 m of burial, cementation reduces the porosity of halite crusts to less than 10%. The remaining pore spaces are completely filled by burial depths of approximately 45 m. Displacive growth of halite in muds continues at shallow-burial depths and is probably limited to the first few tens of meters of burial depth. The mechanisms for cementation and displacive growth of halite at shallow-burial depths probably include (1) evaporative concentration of groundwater brines and (2) cooling of surface brines when they sink below the sediment surface.

Undeformed halites from the Permian Salado and Rustler Formations of New Mexico contain delicate syndepositional textures and abundant clear halite cements that are comparable to those observed in modern saline pan halites and shallow-buried halites. The Permian halites are interpreted to have undergone a depositional and early diagenetic history similar to the modern and Quaternary analogs.

Complete cementation of saline pan halites at shallow burial depths has important implications for the origin of saline formation waters in sedimentary basins. Parent evaporite brines may not be stored in the pores of halite rocks and later expelled during burial compaction if the rocks are cemented early, and tightly crystallized halite rocks may also impede the downward migration of dense syndepositional brines."

