

Salt Deposits in Desert Basins of the Western United States

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ABSTRACT

The salt pans and brines in desert basins of the Western States have yielded, in addition to common salt, noteworthy quantities of other saline minerals. Examples from the Great Basin are borates from several localities in western Nevada and southeastern California, sodium sulfate from Rhodes Marsh, sodium carbonate from Big Soda Lake, calcium chloride from Bristol Lake, and potash, borax, and other products from Searles Lake. To explain satisfactorily the differences in composition, it is necessary to consider sources of saline components, processes of mineral formation in an arid basin, and the consequences of local and regional geologic events, particularly climatic changes.

Among sources of saline components, the most important are the rocks exposed to weathering and leaching. Some material is brought up from deeper sources by spring waters, and some is blown in from the adjacent regions or from the sea. Volcanic rocks, older evaporites, and thermal springs are potent sources of soluble components. Of processes that from saline minerals, the most important are desiccation and subsequent recrystallization. Major components such as calcium and sodium carbonates, sulfates, and chlorides tend to form minerals in gradational lateral zones and vertical layers; minor components such as potassium tend to be concentrated in residual, interstitial brines. The chemical system, which is partly biochemical, is affected by overflows, new inflow, and temperature changes.

Of geologic events, the most important were the Pleistocene pluvial periods, when the Great Basin lakes expanded, and intervening dry periods when they contracted.