

Huntite, Dolomite, Magnesite, and Polyhalite of Holocene Age From Tuz Gölü (Salt Lake), Turkey

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ABSTRACT

Playa muds from the hypersaline environment of the Tuz Gölü, a seasonal salt lake in central Anatolia, Turkey, contain large quantities of huntite, $\text{CaMg}_3(\text{CO}_3)_4$, (proto dolomite and magnesite. In the southern part of the lake calcite and aragonite were found in addition. Dolomite from the uppermost sediment cover revealed a ^{14}C -age of 6000 ± 140 years. Large authigenic gypsum crystals occur together with the carbonates.

Fine-grained polyhalite, $\text{K}_2\text{MgCa}_2(\text{SO}_4)_4 \cdot 2\text{H}_2\text{O}$ was found to be the main constituent of a 15 cm mud layer in several cores in a depth of about 60 cm below the salt cover. No gypsum is present in the polyhalite horizon.

The Mg/Ca atomic ratio of the overlying salt brine in contact with the sediments was measured to be 149. In the pore fluids, taken in a sediment core to 10 cm intervals, this ratio varied within narrow limits (85-98) and did not show any relation to the distance from the sediment/water interface.

These extremely high Mg/Ca-ratios of the salt brines and pore fluids seem to be responsible for the formation of huntite, dolomite, magnesite, and polyhalite. The equilibrium conditions for the different carbonate minerals and their genesis—direct precipitation or early diagenesis from already existing minerals—are discussed. Polyhalite seems to have formed diagenetically by the transformation of gypsum.