A survey of the thermodynamic of evaporate salts in one of the Yazd playas based on a ground sampling and remote sensing

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Abstract: This study was done in the wet marginal part of the Siahkooh playa (Kevir) in Yazd, Iran, which is located in the northwest of Ardakan. The abundance of Ca and SO₄ ions led to gypsum crystallization near the water table in the soil. From depth to the soil surface, the CaCO₃- CaSO₄·2H₂O -NaCl-H₂O-PCO₂ soil and water system change to CaSO₄, 2H₂O- Na₂SO₄-NaCl- H₂O. From water table (100cm under soil surface) to the soil surface, ionic power was decreased and activity coefficient was increased respectively. Therefore, near ground table, gypsum form and high concentration of Ca ions from gypsum lead to low amounts of exchangeable Na. This influence has been continued up to soil surface to achieve a relative balance. Replacement of Na with Ca on the exchangeable surfaces of soil and existance of SO₄ ions formed NaSO₄ inerals. The precipitation of 1800ton per hectar natrium salts(sulfatic & coloridic) was estimated with respect to the mean of annual evaporation (roughly 900mm) in the studied site. The result also showed that the seventh bands of Landsat7 are more important to differentiate between sulfate and chloride salts as well as sodium and calcium salts.

keywords: Evaporate salts - Thermodynamic - Sulfate salinity type.