Characterization and Geochemistry of Carbonate Caprock Associated with the Gypsum Valley and Castle Valley Salt Walls, Paradox Basin, CO & UT: Implications for Understanding Lateral Caprock Emplacement

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ABSTRACT

In salt tectonics, caprock refers to the rock found on the crest, and occasionally in a lateral position of a salt body, which forms as halite dissolves and the residue is chemically altered. Caprock assemblages consist of a vertically zoned sequence of anhydrite, gypsum, and carbonate rocks such as limestone and dolostone, respectively in ascending order. Lateral caprock has been identified in diapir-flanking positions hundreds of meters in the subsurface. This study will target the physical attributes and geochemical nature of carbonate lateral caprocks associated with two different salt walls in the Paradox Basin in order to test competing models of lateral caprock emplacement. We hypothesize that the lateral caprock exposed at salt walls in the Paradox Basin represents carbonate caprock that formed in a crestal position during distinct periods of time, and have been rotated into a lateral position as a result of halokinetic drape folding in a "caprock event". This study will document and compare diagnostic characteristics such as distinctive fabrics, mineralogies, thicknesses, and geochemical signatures attributed to carbonate caprocks associated with the following salt walls in the Paradox Basin to develop diagnostic characteristics attributed to certain "caprock events" of different ages. This research will provide further insight on the dynamics between diapir-proximal halokinetic deformation and marginal fluid migration as a means by which lateral caprock forms. This will either support or refute the hypothesis that halokinetic drape folding is an appropriate model for lateral caprock emplacement at analogous salt systems.

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