



# Salt-Sediment Interaction in Lower Triassic Moenkopi Formation Near the Castle Valley Salt Wall, Paradox Basin, Utah

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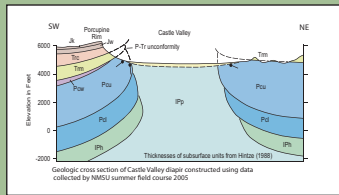


## Abstract

Stratigraphic, sedimentologic and compositional data from the Moenkopi Formation near Moab, Utah, indicate that the Castle Valley salt anticline of the Paradox basin was a diapiric salt wall with well developed topography and exposed salt during the early Triassic. Strata within the salt anticline region have long been known to thin adjacent to salt anticlines and thicken away from them, indicating control of sedimentation by salt generated topography. Sedimentology and compositional aspects of the Moenkopi Formation adjacent to the Castle Valley salt wall further supports this assertion. The world's oldest gypsum paleosols are found in overbank strata interbedded with high width/depth ratio sandstone bodies deposited by ephemeral rivers. In combination, these features indicate an arid, wadi depositional environment. Paleocurrents in sandstone units are generally parallel to the long axis of the salt wall, suggesting that large drainage systems were controlled by syndinal topography. Local gypsum sheet sandstones and thin debris-flow beds containing clasts of gypsum and dolomite derived from the diapiric Paradox Formation of Pennsylvanian age provide evidence for significant topography and exposed evaporite during Moenkopi deposition. The salt diapir itself is therefore interpreted to have provided the sulfate source for both gypsic paleosols and gypsum sandstone sheets in the Moenkopi. These observations demonstrate strong control of Moenkopi deposystems by salt-generated topography adjacent to an exposed salt wall. Recognition of similar sedimentologic and pedogenic phenomena in salt basins elsewhere may serve as important indicators of diapir activity and proximity in petroleum exploration.

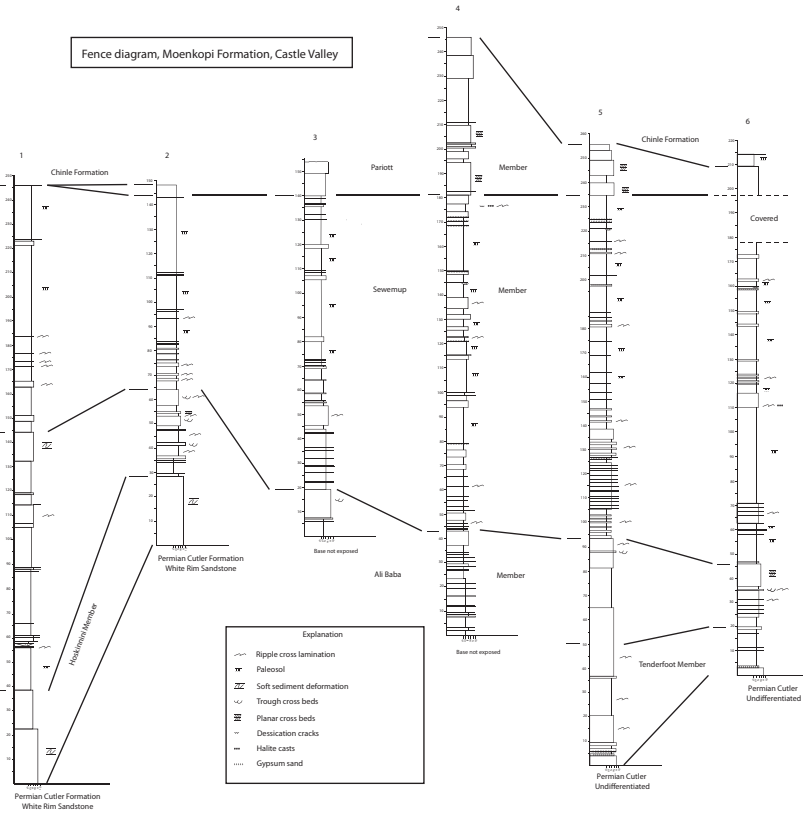


Location of measured sections and cross section in Castle Valley



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Fence diagram, Moenkopi Formation, Castle Valley



Trough cross beds in All Baba Member, NE side of Castle Valley. Ron Foster photo



Photo panorama of growth strata in All Baba (Tms) and Sewewup (Tms) Members in Red Hills, NW end of Castle Valley. Ron Foster photo



Diapor-derived clasts of gypsum and dolomite within a conglomerate bed in the All Baba Member. Ron Foster photo



Photo panorama of Castle Valley looking N-NE. Ron Foster photo



Salt sediment deformation, Sewewup Member. Ron Foster photo



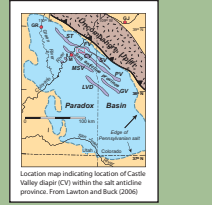
Interpreted photo panorama  
 Tms- Triassic Moenkopi Formation, Pariaot Member  
 Tms- Triassic Moenkopi Formation, All Baba Member  
 Tms- Triassic Moenkopi Formation, Tenderfoot Member  
 Pms- Permian Cutler Formation, White Rim Sandstone  
 • Indicates jump in perspective



Gypsic paleosol, Sewewup Member. Ron Foster photo



View of Castle Rock from SE side. Gypsum sand sheets in Tenderfoot Member is visible in approx. middle of photo.



Location map indicating location of Castle Valley diapir (CV) within the salt anticline province. From Lawton and Buck (2006)

## References

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