

Halokinesis Features Related to Flowage and Dissolution of Pennsylvanian Hermosa Salt in the Paradox Basin, Colorado and Utah

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Subsurface mapping has identified 41 cyclic salt intervals deposited during Late Morrowan to Early Missourian with 35 of the 36 cycles in the Atokan-Desmoinesian having an associated salt. Edges of salts are structurally defined by basin-directed thrusts of the Uncompahgre Uplift (UU) on the northeast margin and by salt welds and depositional and/or dissolution edges elsewhere. Some salts are confined to the center of the basin or known only where captured by massive salt flowage into salt walls and anticlines in the Deep Fold and Fault Belt (DFFB). Maximum thickness of the salts and interbedded strata was greatest in the DFFB next to the UU (~8000Ft, ~2400M), and minimum thickness or absence of salt in the DFFB is in the troughs and mini-basins along and between the salt structures where salt was forced out during extensive post-salt deposition.

Late Pennsylvanian and Permian cyclic progradations of thick siliciclastic wedges into the DFFB resulted in multiple salt walls, some approaching or exceeding 14,500 ft (~4400M) in height. This deposition also caused large areas of massive salt flowage which carried overlying strata toward the nearby salt walls while concurrently forming associated salt welds, normal faults, grabens, rollover anticlines, and local depocenters. Other features include: remnant salt pillows in the DFFB where overrun and isolated by progradational wedges; intact and identifiable salt intervals “inflated” to exaggerated thicknesses during massive flowage; recumbent folds of salt and interbedded strata both inside and outside the DFFB; salt glaciers where salt flowed from the core of breached diapirs; and salt collapse and extensive dissolution on salt walls and diapirs in the DFFB and on some large structural anticlines outside the DFFB. Many features can be directly related to the presence or absence of commercial hydrocarbons.