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Unraveling 75 Million Years of Stratigraphic Evolution Around a Salt Wall in the Paradox Basin, Southeast Utah

Salt structures in the Paradox Foreland Basin in SE Utah, USA form a variety of structural styles ranging from deeply buried salt anticlines to complexly faulted diapirs and salt walls exposed at the surface. Based on detailed field studies, well data and 2-D seismic lines, the Pennsylvanian Honaker Trail to Triassic Chinle formations along the Moab-Spanish Valley record a complex stratigraphic history.

Salt wall growth is interpreted to be the result of mainly passive diapirism, resulting in a salt wall with a height of at least 2500m at the end of the Triassic. Growth of the salt wall began during the Pennsylvanian and is recorded by thickness and stratigraphic variations throughout the overlying Permian and Triassic strata. These variations include rapid lateral changes in facies within the dominantly continental depositional environment, and significant variations in paleocurrent directions within channelized alluvial deposits. Reconstructing the geometry of the salt wall through time indicates that a significant amount of along strike movement of salt occurred, and at times, lateral extrusion of salt at the surface occurred, followed by salt withdrawal.

The Moab-Spanish valley is a possible analog for similar salt wall structures in sub-surface salt basins, e.g., the Central Graben of the North Sea, West Africa, and the Pre-Caspian salt basin. In these basins, stratigraphic plays against the flanks of salt walls have been targeted in the past. This ongoing study indicates that the complex vertical stacking patterns, and lateral variations in stratigraphy make an understanding of the salt evolution critical to any such play concept.