DEPOSITIONAL FACIES AND GEOMETRY OF AN EXPOSED MEGAFLAP: PENNSYLVANIAN HONAKER TRAIL FORMATION, GYPSUM VALLEY SALT WALL, PARADOX BASIN, COLORADO

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Megaflaps are geometrically defined as steep to overturned, relatively conformable deep minibasin strata that extend long distances (several kilometers) up the margins of salt diapirs. The younger minibasin fill successively onlaps the megaflap, forming large scale growth strata. Megaflaps have been penetrated during drilling in petroleum bearing salt basins (Gulf of Mexico, South Atlantic margins) due to the misinterpretation of seismic along the poorly imaged salt-sediment interface. Pre-drill identification of megaflaps reduces the drilling hazards associated with encountering older, steeply dipping strata and impacts how trap, reservoir, and seal are risked. Therefore the application of outcrop analogs that document the depositional facies, stratal geometries, and structural deformation of megaflaps is critical for successful pre-drill prediction and characterization of salt-flank traps.

On the southwestern flank of the Gypsum Valley salt wall, Paradox Basin, Colorado, outcrop exposures of the Pennsylvanian Honaker Trail Formation provide a 2 km strike-oriented view of a megaflap. The near vertical panel comprises a thin black shale interval of the upper Paradox Formation and a 200 m section of cyclic shallow marine carbonates and siliciclastics of the Honaker Trail Fm. Stratigraphic analysis of the lower Honaker Trail Fm. documents conglomerates with shallow marine carbonates above abrupt depositional contacts. Near-vertical upper Paradox and Honaker Trail strata are onlapped by a 200 m thick transitional wedge of steeply dipping (70°) Permian lower Cutler Formation siliciclastics. This panel is onlapped by progressively lower-dip strata of the Jurassic Entrada Formation to form a large-scale onlap wedge. The megaflap and onlap wedge were subsequently beveled at an angular unconformity overlain by the Jurassic Summerville and Morrison formations, which form the overlap wedge. Laterally, the megaflap gradually shallows to 50-60° to the southeast before being abruptly terminated by a large down-dropped block, whereas younger minibasin fill progressively buries the megaflap to the northwest.