

## Intravalley Cut-and-Fill Structures in Lower Cretaceous Fluvial Strata of Colorado and Kansas—a Cause for Compartmentalization in Fluvial Reservoirs

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The upper Muddy Sandstone in southeastern Colorado and the Terra Cotta Member of the Dakota Sandstone in central Kansas both represent mid-Cretaceous (Albian/Cenomanian) fluvial deposition in the U.S. Western Interior between marine deposition of the Kiowa–Skull Creek and Greenhorn cycles.

These units also are characterized by intravalley cut-and-fill structures. These structures are composed of amalgamated channel-fill, lateral accretion, and overbank-fine elements; and are channel shaped with width/depth ratios near 14:1, and thicknesses near 7–12 m. At least in the situation of the Muddy Sandstone examples, these structures are bound by larger scale channel-shaped surfaces that represent cut-and-fill of large-scale valleys. These intravalley cut-and-fills thus exist on a scale larger than channel scours and smaller than fluvial valley scours, and seem to result from primarily tectonic and climatic stimuli that result in temporary episodes of incision of channels into their own alluvium and subsequent filling.

Because these cut-and-fill structures may be filled with a wide variety of lithofacies, the potential to generate permeability contrasts across structure boundaries is high (as is exemplified in the Terra Cotta Member). Because of their linear nature, such structures may serve as narrow conduits for petroleum migration as well. As the processes that form these structures are widespread in most modern fluvial systems, these structures should be universal to fluvial deposits. They, however, are rarely reported from ancient strata.