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Modern Deltas as a Model for Study of Ancient "Terminal" Distributary Channels in Fluvial-Dominated Delta Front Deposits, Cretaceous Panther Tongue Sandstone, Utah

Two distinct types of modern fluvial-influenced deltas can be distinguished, "Mississippi type", deltas with a few large and deep distributary channels debouching into deep water, and "Atchafalaya type" deltas with multiple small and shallow distributary channels, termed "terminal" distributary channels, debouching into shallow water. "Mississippi type" distributary channels are commonly recognized and described in ancient deposits but "Atchafalaya type" deltas are rarely described. As an analog of "Atchafalaya type" deltas, we document the 3-D facies architecture of "terminal" distributary channel deposits within the fluvial-dominated Cretaceous Panther Tongue in central Utah. We studied cliff exposures oriented at high angles to the paleoflow direction on both sides of Spring Canyon and on cliff faces oriented at low angles in Sowbelly Gulch area. 2-D ground-penetrating radar (GPR) lines, made at the top of cliffs, correlated with 3-D bedding diagram of the outcrops show channels stacked within delta front deposits. Facies analysis shows that channel deposits 2 to 6 meters thick and tens of meters wide are interbedded with sheet-like mouth bar deposits. 3-D reconstruction shows that channels are interconnected with planar beds formed in distal mouth bars. Over application of "Mississippi type" models to many ancient deltas suggests that the fine scale heterogeneity described here may have been overlooked. "Atchafalaya type" fluvial-influenced deltas were not described in ancient deposits, because it is difficult to distinguish small-scale "terminal" distributary channel within sandy delta front deposits, especially in subsurface data where only well log or seismic data may be available.