

Architecture of Fluvial-Dominated Distributary Channel Deposits: an Example from the Upper Cretaceous Ferron Sandstone, Utah, United States

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A well-exposed outcrop in the uppermost portion of the Turonian-Coniacian Ferron Sandstone in Emery County, Utah, exhibits complex fluvial architecture of cross-cutting mud- and sand-dominated channelized successions. These channelized deposits are interpreted to be mainly fluvial-dominated distributary channel deposits. The ichnofossils present indicate brackish through to fully marine conditions, and potentially play an important role in determining the proximity of the channel deposits to the paleoshoreline.

The outcrop studied contains a large, sand-dominated channel fill system that is incised into mud-dominated channel deposits. It contains stacked, sand-dominated channel bodies, which are capped by a channel with high mud content. The dominant facies is fine- to medium-grained, inclined-tangential, tabular cross-laminated to cross-bedded sandstone with organic-draped foresets. Paleocurrent measurements show an overall northeasterly to easterly trend, consistent with the progradational direction of delta deposits in this area. Bioturbation is sparse, but *Teredolites* burrows occur in xylic clasts. *Thalassinoides* burrows are common along coal beds at the base of the channel fills, denoting *Glossifungites*-demarcated surfaces. One such surface occurs in the inclined, mud-dominated deposits and indicates their erosional edge. Plant debris and mud and organic rip-up clasts are commonly observed above erosional surfaces. Occurrence of *Ophiomorpha* burrows on the edge of the channel deposits indicates burrowing activity in shifting sediments, pointing to the erosional remnants of possible shoreface or tidal shoal deposits.

One of the observed coal beds is interpreted to be deposited along the top of a point bar rather than in a paleotopographic low, due to its offlapping geometry. Dominated by fine-grained, laminated facies with sparse bioturbation, the succession also contains thin, low-angle rippled sand units, commonly as laminae within mud beds.

The scoop-like basal bounding surfaces with overlying clasts, inclined strata, unidirectional bedforms, limited evidence for tide- or wave-influence, and the low diversity and abundance of ichnofossils lead to an interpretation of the fluvial-dominated character of the deposits. Sand-dominated successions, capped by mud-dominated ones, represent abandonment or progradation, indicated by a pinching out of the sandstone bodies, and by soft-sediment deformation underlying the erosional surfaces, respectively. The abandonment and progradation, along with the complex architecture, are indicative of channel switching and deposition in low-gradient, marginal marine settings, interpreted as fluvial-dominated distributary channels.