

DEPOSITIONAL PATTERNS AND STRIKE VARIABILITY OF FLUVIO-LACUSTRINE SYSTEMS: EVIDENCE FROM EOCENE LAKE UINTA AND MODERN ANALOGS

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ABSTRACT

We present the largest known outcrop-based cross-section of Nine Mile Canyon, Utah to date. The depositional-strike-oriented transect demonstrates the high-degree of facies variability of the fluvio-lacustrine deposits in the Sunnyside Interval Mbr. of the Middle Green River Fm., one of the best-studied lacustrine outcrops in the world. Using data from 8 new and 20 published sedimentary logs as well as large-scale drone-based orthophotomosaics, we constructed a 30km wide cross section of three depositional sequences (S1, S2, & S3) which are further sub-divided into 7 deposodes. We find 5 facies associations: channel sandstones (FA1), well-drained floodplain (FA2), subaqueous clastic deposits (FA3), littoral & sublittoral carbonates (FA4), and profundal carbonates (FA5). Additionally, we assign bedding geometry styles to every FA1 unit (channelized, shingled, tabular amalgamated, and tabular). Channel sandstones are distributed randomly throughout each sequence, while FA2 increases in abundance from E-to-W and FA4 increases in abundance from W-to-E. Results show 2-3 lobes of fluvial deposition throughout each deposode. We find no statistical differences in bed thickness or net-to-gross % between identified lobes, indicating gentle, broad depositional slopes. Previously proposed modern analogs for the Sunnyside Interval were re-analyzed. We submit the best modern analog proposed for the three sequences investigated in the Sunnyside Interval System is the Neales River Delta (described as a terminal splay) in Lake Eyre, Australia due to its morphological and stratigraphic similarities. Finally, we characterize the Sunnyside Interval System as a “Splay-Delta” which switches between well-known morphological elements of a terminal splay and a fluvially dominated delta. The changes between fluvial splay and delta are caused by the accommodation regime linked with river water discharge and lake water level controlled by the Eocene climate over the Lake Uinta drainage.



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