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Topographically Controlled, Mixed-Influence Top-Truncated Deltas: Turonian Wall Creek Member, Frontier Formation, Powder River Basin, Wyoming, U.S.A

We evaluate a newly developed asymmetric wave-influenced delta model, which has not been tested on ancient deltaic systems. Detailed stratigraphic and sedimentological analysis suggests that the Turonian Wall Creek Member of the Frontier Formation is a topographically controlled top-truncated mixed-influence delta. The Wall Creek was deposited into a tectonically-active foreland basin along the western flanks of the Cretaceous epicontinental seaway.

98 measured sections were collected and correlated over an 1800 km² area on the western flank of the Powder River Basin. Five offlapping parasequences have been identified and correlated, although not all are present locally. Paleocurrent data and variations of sediment body thicknesses indicate sediment retreat from and around paleo-topographic highs. Ichnofacies and varying degrees of bioturbation indicate delta front deposition into both upper- and lower-shoreface environments. Beds within parasequences dip southeastward, the same as paleocurrents, suggesting they are delta front clinofolds. The 5 parasequences show distinctly different elongate to lobate geometries, some of which are bound above by marine erosional surfaces with associated local pebble lags and/or a *Glossifungites* ichnofacies. Locally, several parasequences are sharp-based and floored by pebble lags indicating underlying marine erosional surfaces, possibly associated with a forced regression, which could reflect tectonic uplift of the seafloor.

These sandstones are interpreted as different delta lobes. The internal sedimentological facies shows that these sandstone bodies record progradation of several variably proportioned tide-, river-, and wave-influence lobes that built around and over topographic highs, likely of tectonic origin.