Sedimentology and Ichnology of the Cretaceous Dina and Cummings Formations Near Lloydminster, Saskatchewan

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Sedimentation in the Mannville Group is the result of a number of transgressive-regressive cycles throughout geologic time. Physical sedimentary structures and trace fossils observed in core have been used to characterize the transition in depositional setting from continental (Dina) to marginal marine (Cummings) in the Lloydminster region. Lower Cretaceous deposition in Saskatchewan was strongly influenced by the irregular topography of the sub-Cretaceous unconformity. Incision into the Devonian Duperow limestone created large paleo-valleys, which were then filled during a subsequent transgression. Large fluvial systems flowed North into the Boreal Sea, filling the topographic lows on the unconformity surface. Low angle bedding and current ripples along with the lack of ichnogenera represents fluvial deposition in the 11-18-48-21W3 core. Above these deposits, the presence of brackish water ichnogenera including Gyrolithes, Teichichnus, and Cylindrichnus indicates the transition to a marginal marine environment as the Boreal Sea invaded the study area. The sequence is then capped by widespread organic-rich shale and coal, which represents the top of the Cummings Formation. Knowledge of the Dina and Cummings Formations near Lloydminster highlights the significance of trace fossil interpretation as an environmental indicator alongside the recognition of sedimentary structures.