

Deposition of the Peavine Sandstone on the Peace River Arch and its Relationship to Transgressive-Regressive Cycles within the Beaverhill Lake Group, North-central Alberta

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Abstract

Strata of the Beaverhill Lake Group in north-central Alberta were mapped using wireline logs and core. Primary lithostratigraphic mapping was supplemented with sequence stratigraphic methods to relate the timing of events between distinct depositional realms within the Beaverhill Lake Group across the province. Transgressive-regressive (T-R) cycles within the Waterways Formation in the east were correlated westward across the province to the southern flank of the Peace River Arch and northern Swan Hills area. Here, T-R cycles downlap or onlap Slave Point or Swan Hills carbonate complexes. Younger T-R cycles interfinger with siliciclastics shed from the Arch. During a period of relative sea-level fall, one such T-R cycle merges with a marked regressive sandstone package, known in industry reports as the Peavine sandstone (also the Beaverhill Lake sandstone). This particular T-R cycle is significant because its upper contact displays evidence for subaerial exposure on the Eastern Platform and has been correlated to similar exposures within the carbonate complexes of the Swan Hills area. On the Eastern Platform, evidence for subaerial exposure occurs at the top of a T-R cycle within the Moberly Member carbonates of the Waterways Formation. In the study area, this event is recognized as one of a few times during which sea level fell low enough to subaerially expose Frasnian-aged Beaverhill Lake Group carbonates. Evidence for lowering of relative sea level is further supported by linking this event with the Peavine sandstone regressive pulse on the Peace River Arch.