PALEOCHANNEL SEDIMENTOLOGY IN THE UPPER JUDITH RIVER FORMATION (CAMPANIAN); DINOSAUR PROVINCIAL PARK, SOUTHEASTERN ALBERTA

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Dinosaur Provincial Park, located in the Red Deer River valley 180 km ESE of Calgary, exposes the upper 60-90 m of the Judith River Formation - the penultimate wedge of foreland molasse. Within the Plains, this unit is the youngest hydrocarbon producer and contains significant subbituminous coal reserves. Twelve km of continuous N-S outcrop profiling across the western tract of badlands have revealed two distinct paleochannel types; each contains abundant vertebrate fossils.

The more common paleochannel type contains clear evidence of fining-upward lateral accretion outlined by alternating beds of slightly bentonitic sandstone, carbonaceous mud/siltstones and less commonly, extensive thin ironstones. Their meanders, 2-16 m thick, expanded preferentially to the NNE and SSE before abandonment. A tidal origin is suggested by the complete coverage of mud-silt drapes on point bar surfaces and scarce evidence for high-energy events in overbank areas, although channel geometry closely resembles modern high-sinuosity rivers. Micropaleontological analyses are underway to help elucidate their origin.

In contrast, the other paleochannel type comprises virtually mud-free, well-sorted sandstones that aggraded vertically in ribbon form. Up to 13 m thick, these channel sequences comprise co-sets of trough cross-beds up to 19.5 m wide representing lunate bar-forms and dune-size planar cross-beds; both structures generate SE sector means. These channels are envisaged as the hinterland drainage system, although a supplementary ebb-tidal influence cannot be ruled out.

Both channel types display distinct vertical trends in their geometry and/or directional properties. Such trends, which are the focal point of ongoing regional subsurface studies, are predictive aids in locating fossil fuels.

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