(≃10 m) lithologic units of the upper Mannville in the Wainwright area indicate that these beds were deposited in a marine depositional environment. The same interval in a nearby well (11-21-47-2W4) has been confirmed as marine (contains dinoflagellates) and also contains dicotyledonous tricolpate pollen grains. The presence of this type of pollen grain means that, at least locally, the disconformity that is supposed to occur at the base of the overlying Joli Fou Formation occurs instead within the sandstones at the top of the Mannville, as suggested by Stelck.

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Correlation of Lower Ordovician Rocks to Their Geophysical Log Signature

To create meaningful structural maps related to geologic processes from well log data, one must consistently select the boundaries of the formations in question. Different workers use a variety of names and markers for the Lower Ordovician strata in Ohio, causing confusion and discrepancies in correlation and interpretation. So, it is apparent that some standard must be established.

The currently accepted nomenclature, in ascending order, is the Knox Dolomite (upper region), Glenwood or Wells Creek Formation, Black River Limestone, and Trenton Limestone. The Ohio Geological Survey has generated a sample log for these formations based on data from several wells in Licking County of central Ohio. One cannot use this as a type log for the entire state, particularly when choosing the top of the Black River Limestone. Previously, a very thorough chemical description and correlation was made and several bentonite beds were used to define the Black River. Still, this description is not easily distinguished on the geophysical logs. However, assuming the postulate that the Trenton and Black River were deposited contemporaneously and those names have no time significance, only three formations need be considered and can be consistently recognized on any log in the state.

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Transition from Slope to Fan Facies, Lower Cretaceous Sediments, Andean Foothills, Southern Chile

In southern South America, mid-Cretaceous compressional deformation transformed an Early Cretaceous back-arc basin-slope-platform setting into a protocordillera-foreland basin. The Lower Cretaceous sedimentary rocks exposed in the Andean foreland fold and thrust belt at lat. 51°S record an abrupt transition from back-arc basin-slope facies to foreland-basin submarine-fan facies.

The Zapata Formation of Portlandian to Albian age represents deposition on the slope of a coeval back-arc basin which formed to the west. The 600-m section consists predominantly of rhythmically interbedded and extensively bioturbated mudstone and siltstone. The siltstone beds are laterally continuous and contain sedimentary structures suggesting deposition by turbidity currents. Sporadic turbidite sandstones occur as shallow channel-fill sequences or as thin, laterally persistent graded beds rich in coarse detrital mica. Slumped intervals are common, and show a northwest-southeast trend of slump fold axes, which parallels the axis of the back-arc basin to the west.

The overlying Punta Barrosa Formation of Albian to Cenomanian age was deposited contemporaneously with deformation in the cordillera to the west. It represents a rapid change in depositional regime, signaled by an abrupt increase in sandstone beds. The thick sandstone beds are lenticular, commonly amalgamated, and show thickening/coarsening-upward and thinning/fining-upward cycles indicative of deposition in a submarine-fan environment. NNW to SSE paleocurrent trends indicate a longitudinal basin-fill pattern; this persists through the Upper Cretaceous flysch sequence. The Punta Barrosa Formation thus represents the establishment of submarine-fan deposition associated with the initiation of a foreland basin on the site of the preexisting back-arc basin slope.

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Fluvial Model for Lower Cretaceous Lignite, Northern Ontario

The Mattagami Formation is an erosional remnant of unconsolidated sand, clays (commonly kaolinitic), lignite, and rare conglomerate, extending 180 km east-west and 70 km north-south. The maximum known thickness is 130 m and the formation thins to the north. Outcrops are rare and drill-hole data are limited regionally. Devonian carbonates and shales and Jurassic shales underlie the Mattagami Formation and thick Pleistocene tills and clays overlie it.

An east-west-trending post-Mesozoic fault forms the south boundary of the Mattagami with Archean gneisses. Small isolated Mesozoic outliers occur farther south. The Grand Rapids arch trends northwest from the southeast corner, which is defined by Precambrian inliers and outcrops of Middle Devonian carbonates.

Across 50 km west of the arch, the Mattagami Formation contains many clean quartz cross-bedded sands, which lack correlative beds between drill holes. On Adam Creek, sand cross-cutting dark-gray shales suggests laterally migrating streams eroding flood-plain deposits. Lignite beds are thin and discontinuous.

East of the arch, the Mattagami is mainly clay with minimal sand, and total thickness is much less than in the west. Two lignite beds comprise the Onakawana deposit (185 million tons proved, approximately 5,000 BTU dry basis) with a total thickness of 16 m and known lateral continuity of 12 km. These are flood-plain and associated swamp deposits.

The paleogeomorphic Grand Rapids high was a barrier for the great northwest-trending river system meandering across 50 km, and preventing the river's incursion in the flood-plain and swamp environment to the east. North of the Onakawana lignite deposits and parallel with them, the interpreted trend of the river system is a prime target for exploration drilling.

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Depositional-Tectonic Setting of Clastic-Hosted Lead-Zinc Sulfide Deposits

Clastic-hosted, stratiform lead-zinc sulfide deposits (MacArthur River H.Y.C., Mt. Isa, Broken Hill, Australia; Sullivan, Howard's Pass, Anvil Range, Jason-Tom, Canada) precipitated from exhaled, hydrothermal fluids in similar depositional and tectonic settings. Host rocks suggest sedimentation in anoxic water below storm waves in areas devoid of active bottom currents. Depths were at least 150 to 200 m as inferred from the absence of storm-influenced deposits. Such numbers are suggested by calculations involving fetch distances of the ancient basins and by