# *An example of alternative correlation techniques in a low-accommodation setting, nonmarine hydrocarbon system: The (Lower Cretaceous) Mannville Basal Quartz succession of southern Alberta*

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## ABSTRACT

Chemostratigraphy and heavy-mineral techniques have been applied to the Lower Cretaceous Basal Quartz in the Western Canada sedimentary basin. The aim of the study is to demonstrate that these two techniques can be used to help understand the complex stratigraphy of reservoirs deposited in low-accommodation fluvial settings. The Basal Quartz is an ideal unit to demonstrate their applicability in stratigraphic studies of hydrocarbon reservoirs because extensive mapping and petrographic studies have enabled the establishment of a rigorous stratigraphic framework despite its complexity resulting from deposition in a low-accommodation fluvial setting.

The three component units analyzed in the Basal Quartz (Horsefly unit, Bantry–Alderson–Taber [BAT] unit, and Ellerslie unit) each have unique geochemical and heavy-mineral characteristics. Chemostratigraphic analysis shows that silty claystones from the Horsefly, BAT, and Ellerslie units have distinctly different geochemistry from one another, with the variations being caused by changes in clay mineralogy and other components, such as feldspar, apatite, and zircon. The geochemistry also suggests periodic volcanogenic input influenced the silty claystones of the Basal Quartz. Heavy-mineral analysis shows that sandstones from the three units can be distinguished on the basis of ratio parameters, such as apatite/tourmaline, rutile/zircon, and zircon/tourmaline, which are controlled by differences in provenance and intensity of weathering during transport.



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