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## Montney Formation multi-core chemostratigraphy and regional cross-sections across Alberta

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### Abstract

The Lower Triassic Montney Formation in Alberta ranges from nearshore fossiliferous coquina limestones to offshore sand and siltstones. Some of the lowermost deposits have also been termed classic turbidite sequences sourced from the N-American craton that resulted in finely laminated siltstones. Although the turbidite model resulting in finely laminated offshore siltstones has been in dispute for years by the authors, evidence to prove otherwise has been difficult to obtain.

In this study, 23 cores (>1100 m) have been analyzed across the Alberta Montney Formation using high-resolution (10-30 cm interval) XRF geochemistry which provides empirical data to define new stratigraphic correlations based on major and trace elemental ratios and associated parameters. Geochemical fingerprinting allows basin-wide correlations of units that are difficult to identify on a regional scale using visual sedimentological analysis.

Three distinct chemostratigraphic units with several sub-units can be identified in Alberta, some of which identify distinct sequence boundaries within the Montney. In addition to the powerful geochemical dataset of the 23 analyzed cores, we also illustrate and document relationships between elements on a local and regional scale and what implications the data has on interpretation of sourcing and sediment composition (i.e. feldspars) and influx. In particular, relationships between Al, Ti, K, and Si and Na, as well as Ca and Mg, will be illustrated with interpretations for sediment sourcing put forward.

As a conclusion, new depositional models are proposed for both the Lower/Middle and Upper Montney Formation in Alberta. These models are based on geochemical and mineralogical findings and compliment sedimentary textures but illustrate shallow shelf conditions across most of the Alberta Montney depositional environment with a complex tectonic and oceanographic framework.