

Geochemical Assessment of the Montney Formation: Provenance Associations Linked to Immobile Elemental Chemistry

Natasha Morris
Shell Canada Limited

Michèle Asgar-Deen
Shell Canada Limited

David Gardner
Shell Canada Limited

Chad Glemser
Formerly- Shell Canada Limited

Summary

Elemental geochemistry of the Montney Formation can lend important insights into the provenance, and magmatic origin of deposited sediments. The Montney Formation records sedimentation along the western margin of Pangea, where stratigraphic and sedimentologic studies show a predominance of sediment shed and sourced from evolved craton east to northeast of the basin (Gibson and Barclay, 1989; Gibson and Edwards, 1990; Moslow and Davies, 1992; Davies et al, 1997, Dixon, 2000). That said, to the west an island arc system is hypothesized (Coney et al 1980, Haggart et al 2006, Colpron and Nelson 2009); thus placing the Montney basin in a back-arc tectonic setting.

The immobile elemental whole rock geochemistry of the Montney Formation, associates the magmatic origin of the sediments to having granitic/andesitic-rhyodacitic geochemical affinities with prominent Cerium (Ce) and Europium (Eu) anomalies. This type of chemistry is typically affiliated with highly differentiated rocks, such as older cratons with evolved melts. In addition, igneous tectonic discriminant diagrams that utilize immobile elements illustrate that the Montney Formation has volcanic arc granite as well as syncollisional granite compositions. Although these igneous associations seem contradictory to one another, it indicates evolved magmatic origins, where partial melting of recycled

crustal materials, over lengthy periods of time also deems signatures of lower crust to mantle or mid-crustal contribution, similar to that of volcanic arcs.

The focus of this abstract is to understand the linkage between immobile elemental chemistry of the Montney Formation to provenance, and if certain data outliers and trends can be attributed to alternative sediment input sources.

*This abstract is linked to the manuscript: **Regional Geochemical Evaluation of the Montney Formation**, which will be published in the upcoming *Bulletin of Canadian Petroleum Geology: The Montney Play of Western Canada: Deposition to Development*.*

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