Upper Montney Geochemistry: Insights into Sedimentary Provenance

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Abstract

This study uses tectonic discriminant diagrams, REE (Rare Earth Elements) and multielement plots, to determine the magmatic affinities of sediments in the upper Montney Formation in the Groundbirch region, NE BC. Whole rock geochemistry, specifically REE and immobile elements, are particularly useful for classifying a rock's tectonic origin. Tectonic discriminant diagrams illustrate that the upper Montney Formation has granitic/andesiticrhyodacitic geochemical affinities; and multi-element and REE plots, display that the upper Montney Formation has negative Ce and Eu anomalies, when standardized to chondrite and primitive mantle. Previous work suggests the Montney was deposited on a west-facing marine ramp/shelf setting, during the Triassic where the western margin of the Laurentian continent was a passive margin, and sediments from the east were being deposited from the craton and into the Western Canada Sedimentary Basin (WCSB). Alternatively, to the west during this time, it is thought volcanic arcs existed, staging a back-arc-basin depositional type environment, where these Triassic sediments were accumulating. Utilizing immobile element geochemistry, this study elaborates on these two directionally opposing tectonic sources.

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