

# **Spatial and Temporal Evolution of Upper Cretaceous-Paleogene Sediment Provenance in the Alberta Basin, Canada: Insights from detrital zircon U-Pb and Hf isotopes**

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## **ABSTRACT**

The Upper Cretaceous-Paleogene stratigraphic wedge of the Alberta foreland basin records the final major contractional period of uplift and deformation in the Canadian Cordillera. In this study, we employ large-n detrital zircon geochronology to consider: (1) The relationship between Cordilleran tectonics and associated foreland strata during the final stages of Rocky Mountain development; (2) The provenance of Cretaceous-Paleogene foreland sediments; and (3) The relative timing of events in the orogen and the foreland basin. In addition, Hafnium-isotope analyses of detrital zircons is employed to further define the provenance of large populations of near syn-depositional age detrital zircons, the origin of which has been disputed. Geochronology and isotopic data are subject to statistical similarity analysis and considered with respect to detrital and isotopic signatures of potential source regions.

Statistical analysis of U-Pb geochronology data will identify trends in the detrital zircon signature of Cretaceous-Paleogene sediments which can be used to infer the spatial and temporal evolution of sediment provenance in relation to the tectonic evolution of the associated orogen. Initial results (N = 15 samples; n = 3176 dates) identify large quantities of approximately syn-depositional magmatic detrital zircons. Analysis of Hf isotopes on these young grains will address the issue of source region, as the disputed source regions (Continental Batholiths and the Coast Plutonic Complex) yield very different Hf isotopic signatures (evolved and juvenile; respectively) based on differing types of magmatism. Collectively these data will provide important insight into hinterland uplift and denudation during the final stage of Cordilleran development.