

## **A tale of two volcanic provinces: geochemistry of bentonites in the Late Cretaceous Kanguk Formation, Sverdrup Basin**

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The mudstone-dominated Late Cretaceous Kanguk Formation of the Sverdrup Basin, Canadian Arctic, contains numerous diagenetically altered volcanic ash layers (bentonites) that provide a record of Late Cretaceous volcanism within the High Arctic. Using whole-rock geochemical analyses, two distinct types of bentonite are identified from an outcrop section in the Sawtooth Range, Ellesmere Island. Decimetre-thick peralkaline rhyolitic to trachytic bentonites were erupted in an intra-plate tectonic setting. These occur throughout the late Turonian to early Campanian (c. 92–82 Ma) outcrop section and were likely associated with the alkaline phase of the High Arctic Large Igneous Province (HALIP). Two thinner, centimetre-thick, sub-alkaline dacitic to rhyolitic bentonites of late Turonian to early Coniacian age (c. 90–88 Ma) were also identified. The geochemistry of these bentonites is consistent with derivation from volcanoes within an active continental margin tectonic setting. The lack of nearby potential sources of sub-alkaline magmatism, together with the thinner bed thickness of the sub-alkaline bentonites and small size of euhedral zircons, are consistent with a more distal source area. The age and geochemistry of these two sub-alkaline bentonites correlate with an interval of intense volcanism in the Okhotsk-Chukotka Volcanic Belt (OCVB), Russia. Consequently, during the late Turonian to early Coniacian intense volcanism within the OCVB may have resulted in widespread volcanic ash dispersal across Arctic Alaska and Canada, reaching as far as the Sverdrup Basin.