# Geochemistry and petrogenesis of Late Cretaceous bentonites from the Kanguk Formation, Axel Heiberg and Ellesmere islands, Canadian High Arctic

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Late Cretaceous explosive volcanism in the Canadian High Arctic deposited blankets of volcanic ash over much of the eastern Sverdrup Basin region. These ash layers have been altered to bentonitic clays, that are interbedded with organic-rich mudstones of the Kanguk Formation on Axel Heiberg and Ellesmere islands. Initial fieldwork in 1990 revealed ten individual bentonites on the Kanguk Peninsula, western Axel Heiberg Island. A more comprehensive sampling was undertaken during the 1992 field season and documented 27 individual bentonites with a cumulative thickness of over 9 m on the Fosheim Peninsula, western Ellesmere Island. Remnant volcanic minerals, including sanidine, quartz, ilmenite, and zircon, have been separated for radiometric dating and geochemical work. Preliminary $^{40}Ar/^{39}Ar$ dating of sanidine crystals, combined with micropaleontology of the intercalated sediments (undertaken at the University of Calgary), yield a late Turonian to early Campanian age for this formation. Detailed major and trace element geochemistry on both volcanic minerals and bulk bentonites, in conjunction with discriminant diagrams, reveals a within-plate tectonic setting for the parent volcanism, and a dominance of peralkaline rhyolite compositions. Microprobe analyses of unaltered glass inclusions in quartz phenocrysts provide confirmation of such parent melt compositions. Analysis of element mobility during bentonite formation will help to determine the possibility of geochemical correlation between individual units or groups of units. The Kanguk bentonites may represent late-stage magmatic activity along the Sverdrup Rim, or they may be the products of extra-basinal volcanism. Late Cretaceous to Tertiary peralkaline volcanism has been documented along the north coast of Ellesmere Island and northwestern Greenland; however, no exact match to the age and composition of the bentonites has been found to date.