

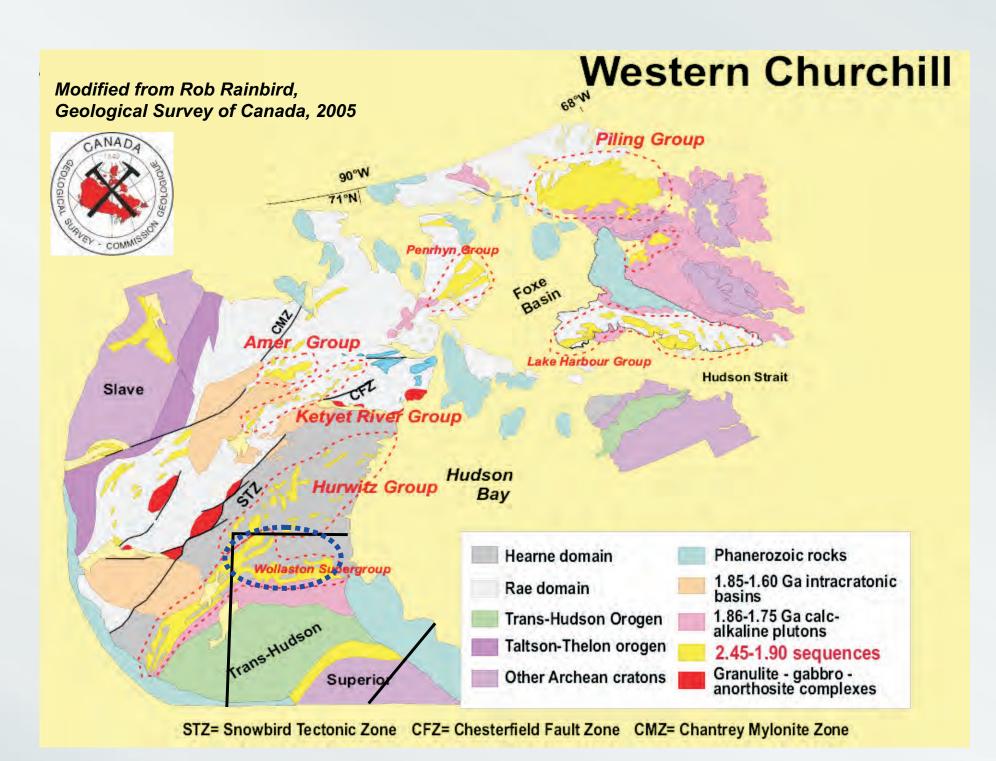
The Hearne craton cover sequence in Manitoba: where the Hurwitz meets the Wollaston Christian O. Böhm (Christian.Bohm@gov.mb.ca) and Scott D. Anderson (Scott.Anderson@gov.mb.ca)

Exposures of the Paleoproterozoic cover sequence to the Archean Hearne craton in Manitoba bridge the areas where similar sequences have been defined separately: the Hurwitz Group of the central Hearne craton in Nunavut and the Wollaston Supergroup of the south Hearne craton in northeast Saskatchewan. These sequences record rifting, basin opening and basin closure during the breakup of 'Kenorland' and the assembly of Laurentia.

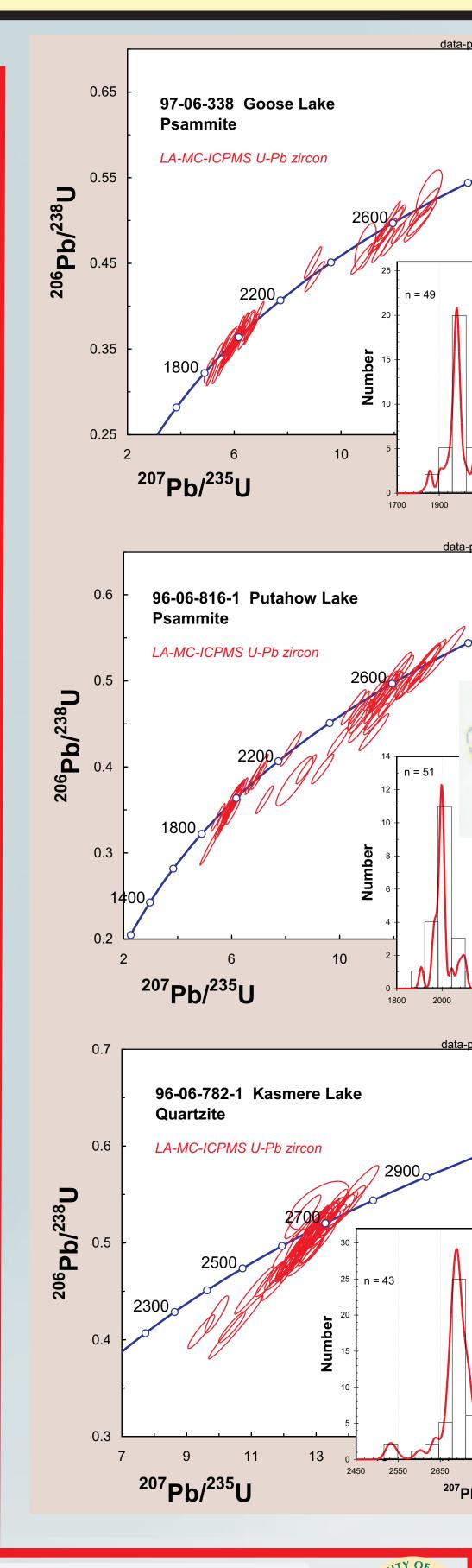
In Manitoba, the cover sequence consists of a thick succession of quartzite, arkose, calc-silicate, psammite, semipelite and pelite (from base to top), which is intruded by younger, Paleoproterozoic, granitoid plutons, and was deposited as a passive-margin sequence along the rifted southeast margin of the Hearne craton, and/or within restricted extensional subbasins inboard from the craton margin. U-Pb detrital zircon age data presented here are comparable to similar rocks from both the Hurwitz Group in Nunavut and the Wollaston Supergroup in Saskatchewan.

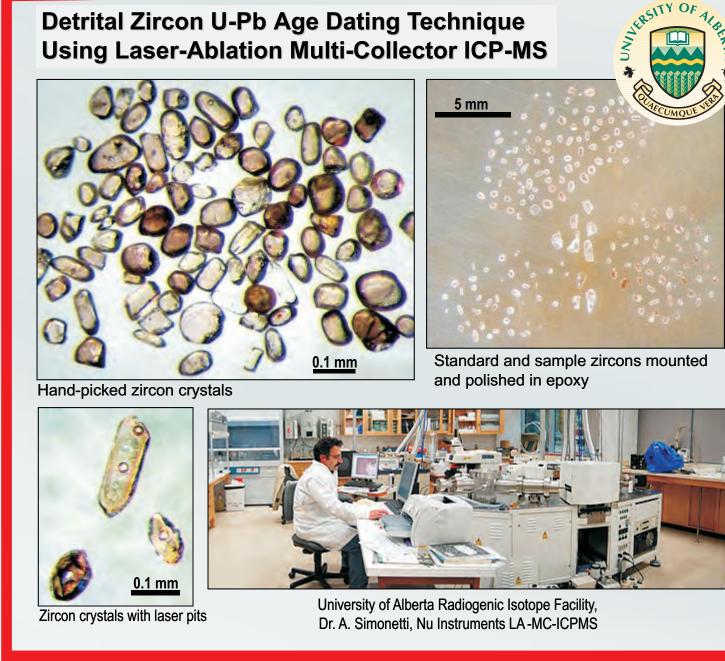
For example, quartzite samples from exposures in the Nejanilini and Kasmere lakes areas of Manitoba are characterized by predominantly ca. 2.7 Ga zircons, with fewer zircons as young as ca. 2.5 Ga, which is comparable to quartzite in the Lower *Hurwitz Group and/or the lower-most Wollaston Supergroup.* Variable amounts of Mesoarchean zircon detritus in the quartzites reflects the presence and degree of recycling of Hearne proto-crust that is largely preserved in the Nejanilini Granulite Domain. Psammite samples from Manitoba's far north, in comparison, have abundant ca. 1.9-2.1 Ga, minor 2.3-2.4 and variable 2.6 and 2.7 Ga detrital zircons like those from the upper Hurwitz Group in the central Hearne craton of Nunavut.

This data is also similar to the Wollaston Supergroup sediments in northeast Saskatchewan, which, in addition, have abundant 1.90-1.88 Ga detrital and younger (metamorphic) zircons. Based on similarities in lithologies, provenance and depositional age constraints, the new data from Manitoba suggest that at least portions of the Hurwitz and Wollaston sequences are likely equivalent, and that these ca. 2.45-1.90 Ga cover sequences have formed contemporaneously and in a similar or related tectonic setting over hundreds of kilometres including northern Manitoba.



Lithotectonic elements of the Trans-Hudson Orogen-Hearne craton region Hearne craton 🔽 Ennadai Block **Magmatic Arc** Trans-Hudson Orogen Archean, altered, abundant Great Island Groι Hurwitz Group younger intrusions supracrustal rocks Wollaston Group Paragneiss, uncertain age Granitoid intrusions Pre-Great Island Group Juvenile Paleo-proterozoic rocks Archean, undivided ____ quartz diorite ------ Shear zone



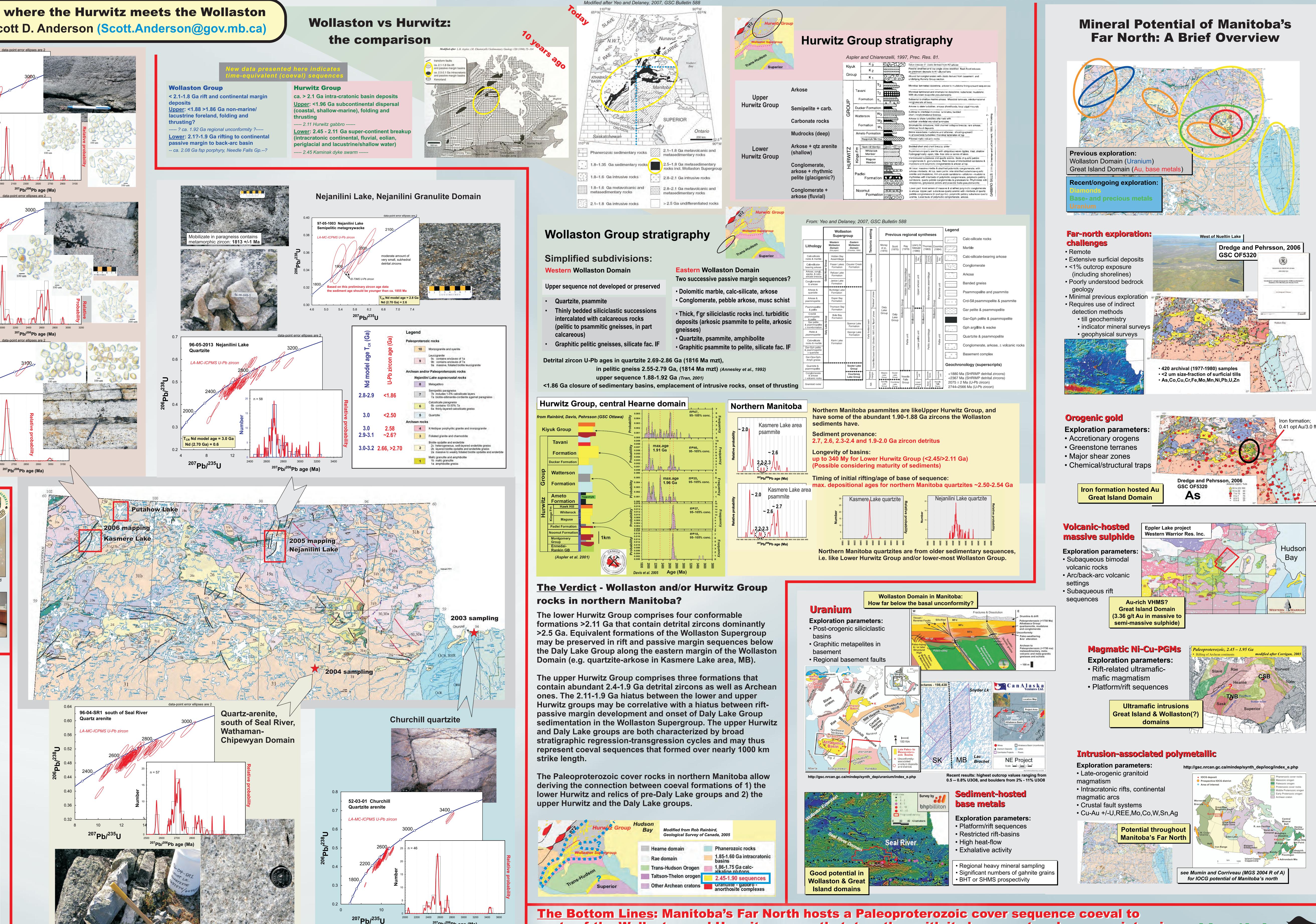


Regional Geology

The southeast margin of the Hearne craton has been regionally subdivided into six geological domains: the Mudjatik, Peter Lake (present only in Saskatchewan), Wollaston, Seal River, Great Island and Nejanilini domains. The domains are distinguished by their cover rocks, the proportion or absence of basement rocks, and their dominant structural trends. The Nejanilini Domain is presently thought to consist largely of Archean continental crust of the Hearne craton, which consists mainly of granitoid gneiss of amphibolite and granulite metamorphic grade. The orthogneiss contains enclaves of migmatized supracrustal rocks and is intruded by younger, presumably Paleoproterozoic plutons. Orthogneiss of possible Archean age is typically composed of hypersthenebearing granodiorite to monzogranite (opdalite to monzocharnockite), which shows varying degrees of alkali metasomatism and contains widely scattered, discontinuous inclusions of hypersthene-bearing, intermediate to mafic gneiss.







²⁰⁷Pb/²⁰⁶Pb age (Ma)

<u>The Bottom Lines: Manitoba's Far North hosts a Paleoproterozoic cover sequence coeval to</u> parts of the Wollaston and Hurwitz groups that, together with its basement and younger intrusions, Manitoba is underexplored but has excellent potential for U, Au, IOCG, base metal and diamond deposits.