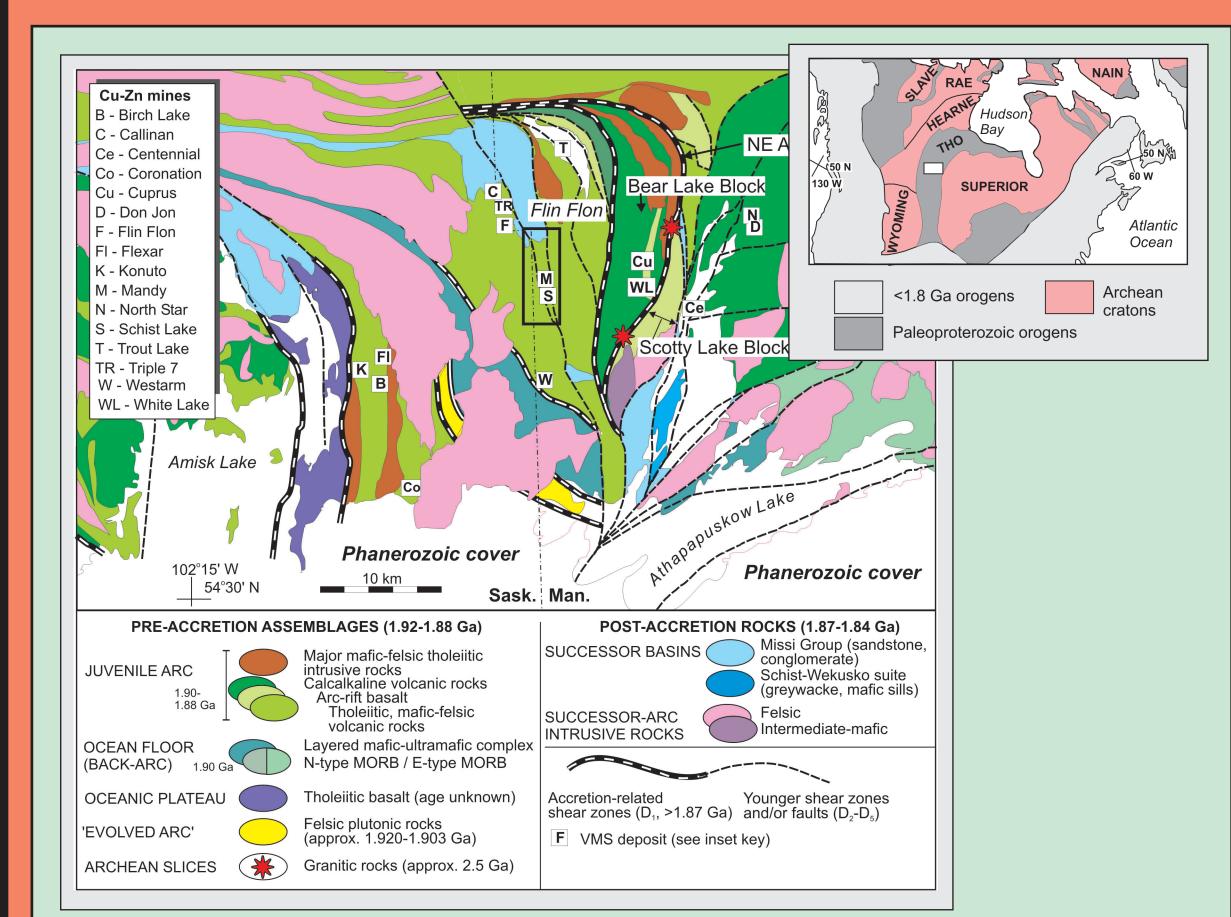
A new 1:10 000 scale bedrock map for the Flin Flon area

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Flin Flon Regional Geology

The Paleoproterozoic Flin Flon belt is part of the Reindeer Zone of the Trans Hudson Orogen. The Flin Flon belt consists of a series of tectonostratigraphic assemblages (juvenile arc, juvenile ocean-floor back arc, ocean plateau, ocean-island basalt and evolved plutonic arc) that range in age from 1.92 to 1.87 Ga. All of the VMS deposits mined to date in the Flin Flon area are associated with the juvenile Flin Flon arc assemblage (Syme et al., 1999).

The volcanic rocks of the Flin Flon area are part of the 1.9 Ga juvenile Flin Flon arc assemblage, which consists mainly of tholeitic subaqueous pillowed basalt and basaltic andesite, with lesser amounts of heterolithic mafic breccia and mafic and felsic volcaniclastic rocks, and minor dacite to rhyolite flows (Bailes and Syme, 1989). The VMS deposits in the area occur in association with the felsic volcanic units in synvolcanic collapse structures and calderas, within the main mafic volcanic complex (Bailes and Syme, 1989; Syme and Bailes, 1993).

Recent detailed geological mapping and stratigraphic analysis of volcanic rocks of the Flin Flon mines area (Devine, 2003; Tardif, 2003; DeWolfe and Gibson, 2006; Gibson, unpublished data 2000-2006), have allowed the establishment of an informal stratigraphic subdivision of rocks hosting and occurring within the footwall and hangingwall to the Flin Flon-Callinan-Triple 7 massive sulphide deposits (Devine, 2003; DeWolfe and Gibson, 2006).

Rocks equivalent to the Flin Flon-Callinan-Triple 7 hangingwall strata have been recognized in the Schist Lake-Mandy mines area. They occur west of the Mandy Road Fault, around Carlisle Lake, and east of the Burley Lake Fault. More work is required before rocks east of the Mandy Road Fault and west of the Burley Lake Fault can be associated with any of the known stratigraphic units in the Flin Flon area.

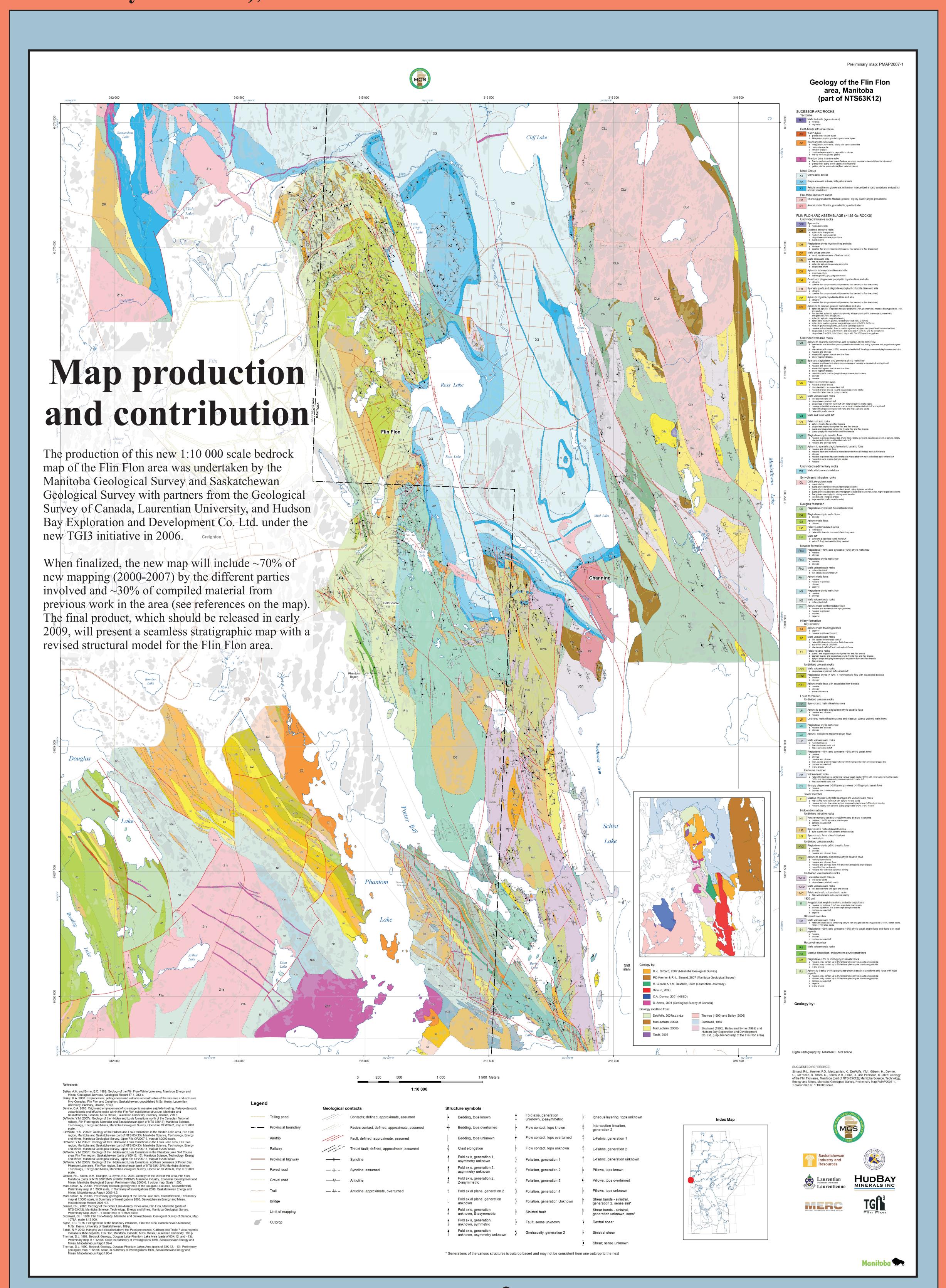
TGI3 project

The Flin Flon area of the Paleoproterozoic Flin Flon belt is well known for its volcanogenic massive sulphide (VMS) deposits. Three active (Callinan, Triple 7 and Trout Lake) and three past-producing (Flin Flon, Mandy, and Schist Lake) VMS mines occur in the immediate vicinity of the town of Flin Flon, which makes this area one of the most productive base-metal regions in Canada. Despite its productive past, however, Flin Flon area's reserves are being rapidly depleted and new reserves/deposits are needed to maintain the economic viability of the Hudson Bay Mining and Smelting Co. Ltd. smelter at Flin Flon.

With the intent of stimulating private-sector resource exploration in areas of high base-metal potential in established mining communities, the Government of Canada launched a new five-year Targeted Geoscience Initiative (TGI-3) in 2005. As part of this initiative, the Manitoba Geological Survey, in collaboration with the Saskatchewan Geological Survey, the Geological Survey of Canada, and researchers from Laurentian University, is participating in production of a new 1:10 000 scale 'cross-border' geological map of the



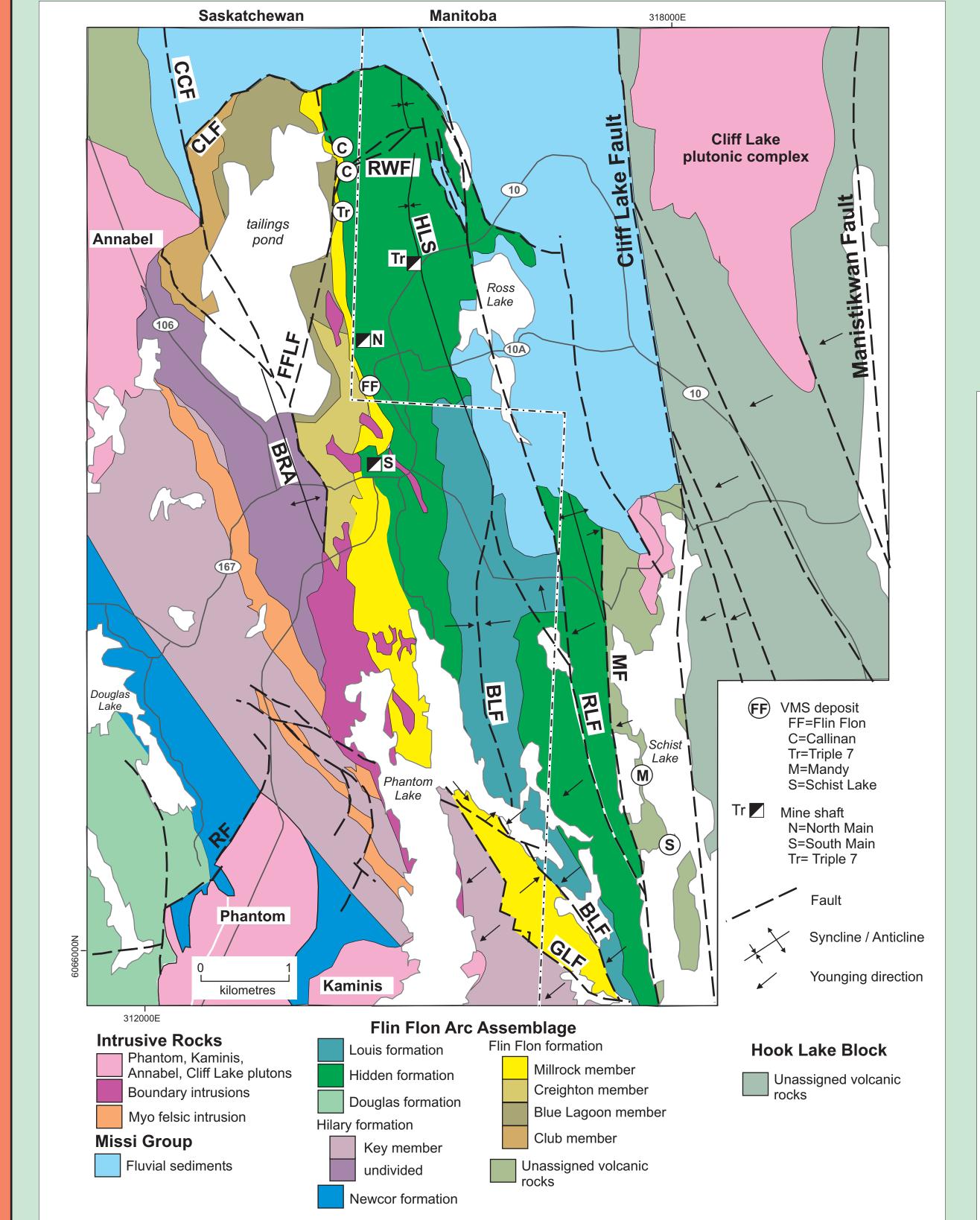
Michelle DeWolfe, Jamie Bewcyk, James Croft, Karren Wassell and Lance Thompson.



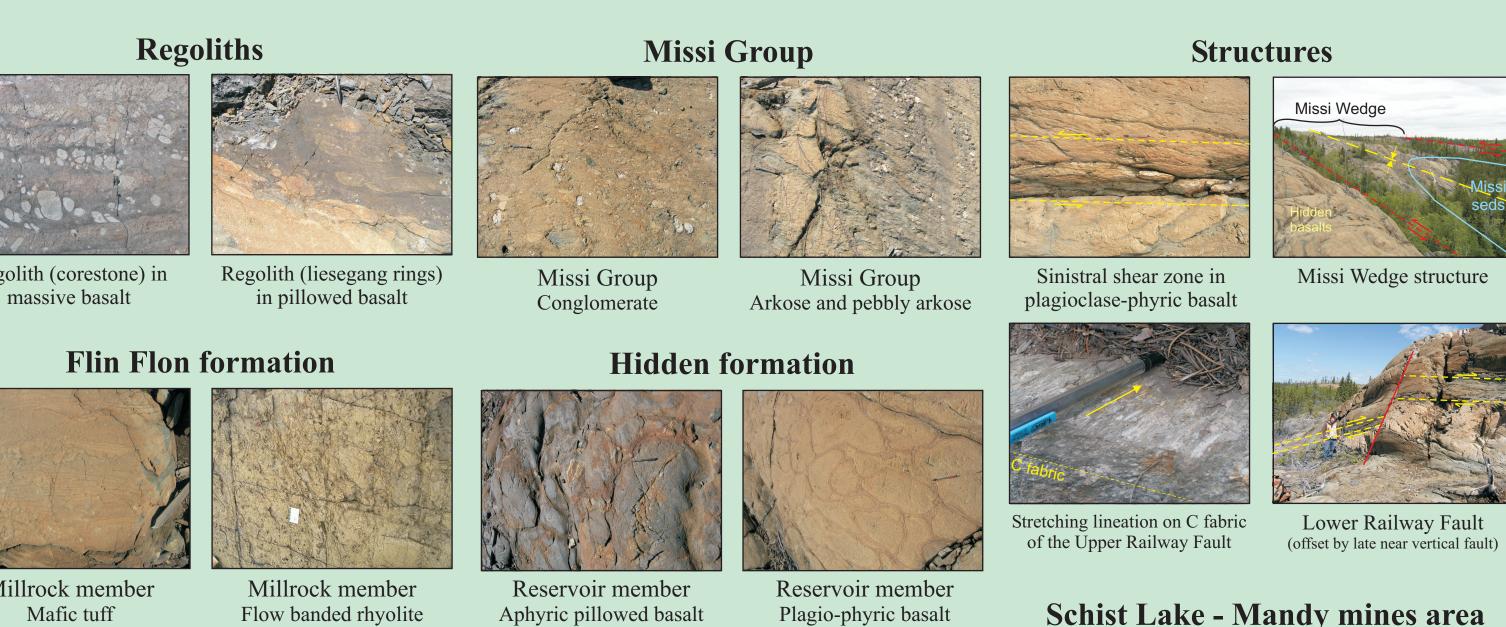
Proximal volcanic arc environments, such as those in which Flin Flon rocks were formed, display highly variable stratigraphy due to multiple volcanic centres, local subsidence structures and the sporadic nature of volcanic activity. These features make confident extrapolation of stratigraphy between areas difficult, even when these areas are as close to one another as the Flin Flon-Callinan-Triple 7 and Schist Lake-Mandy mines areas.

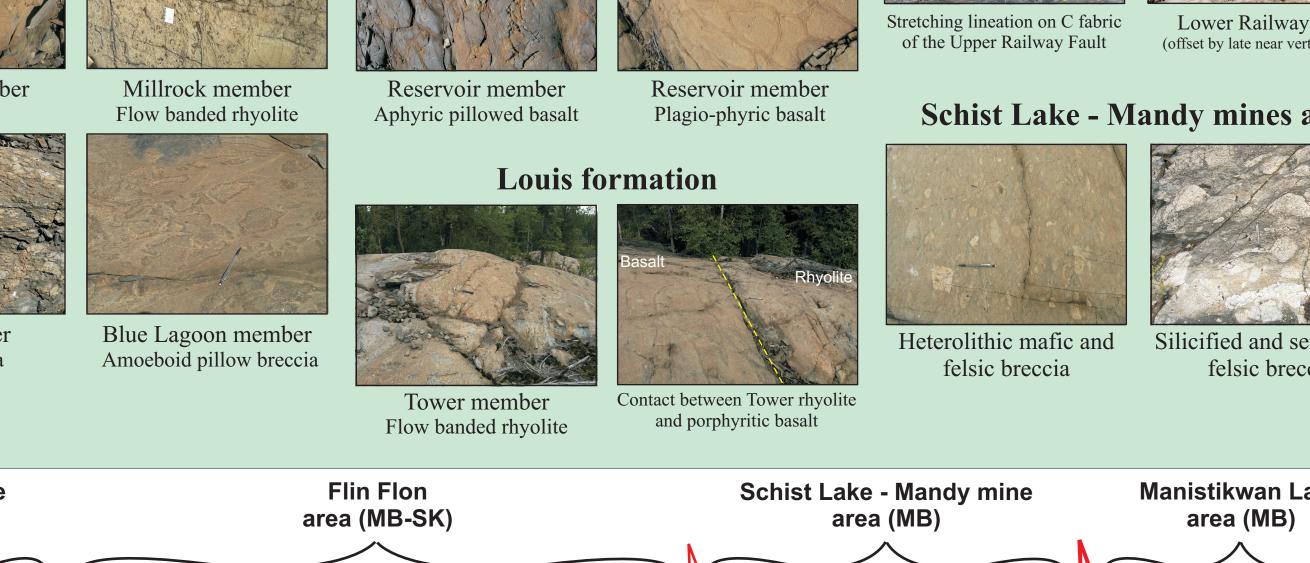
The Flin Flon mine stratigraphy is composed of the Flin Flon formation (host of the deposits) conformably overlain by the Hidden and Louis formation. A similar stratigraphy can be found across the Beaver Road Anticline in the Douglas Lake area with the Hilary formation conformably overlain by the Newcor and Douglas formations.

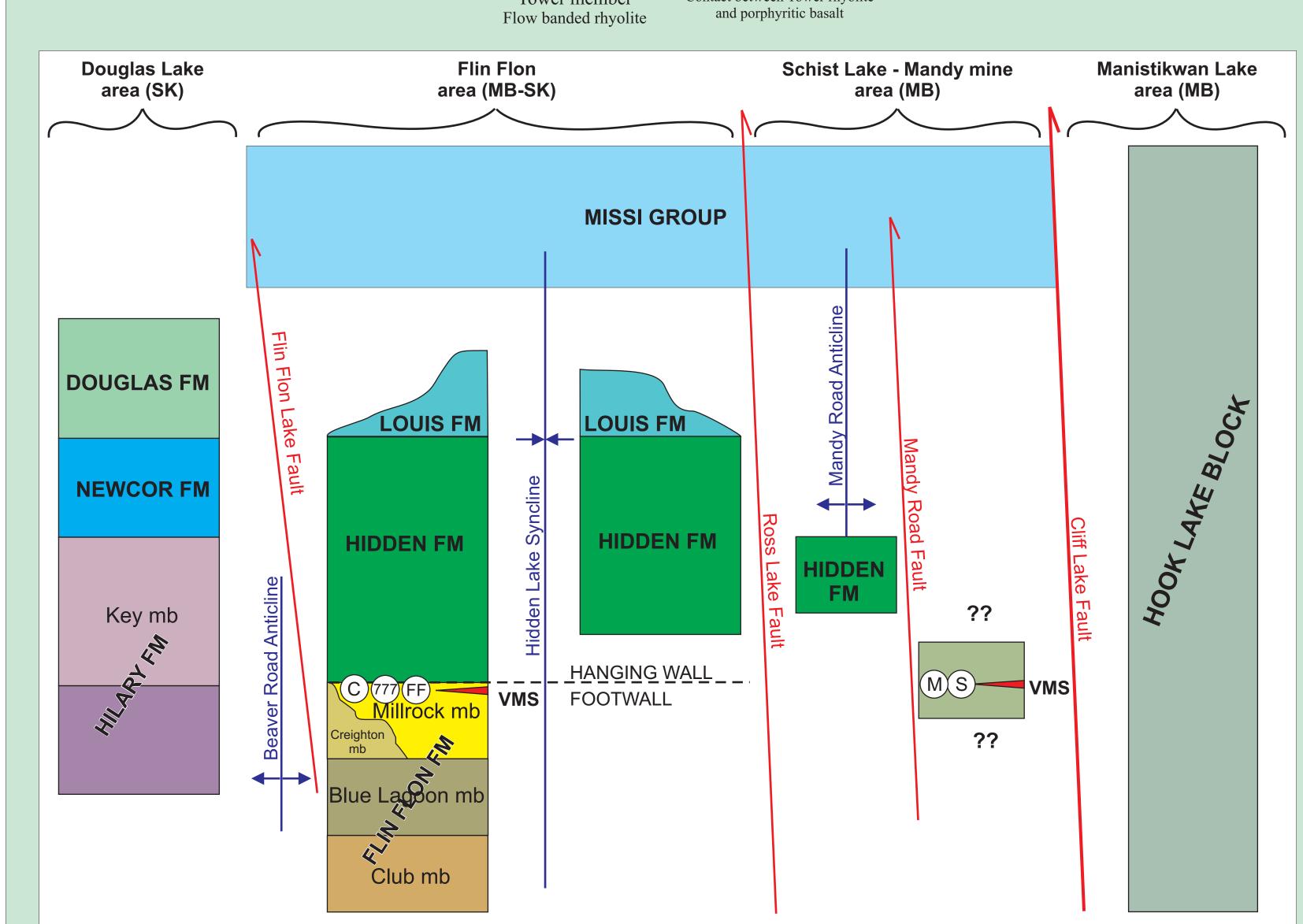
On the other hand, the host rocks of the Schist Lake-Mandy deposits and of the Hook Lake Block to the east look different from the Flin Flon deposits based on field observations and preliminary geochemistry. However, the rocks hosting the Schist Lake-Mandy deposits are very similar to those of the Hook Lake Block, which could suggest that they were related at some point before being offset by the Cliff Lake Fault.



Stratigraphy & Structure





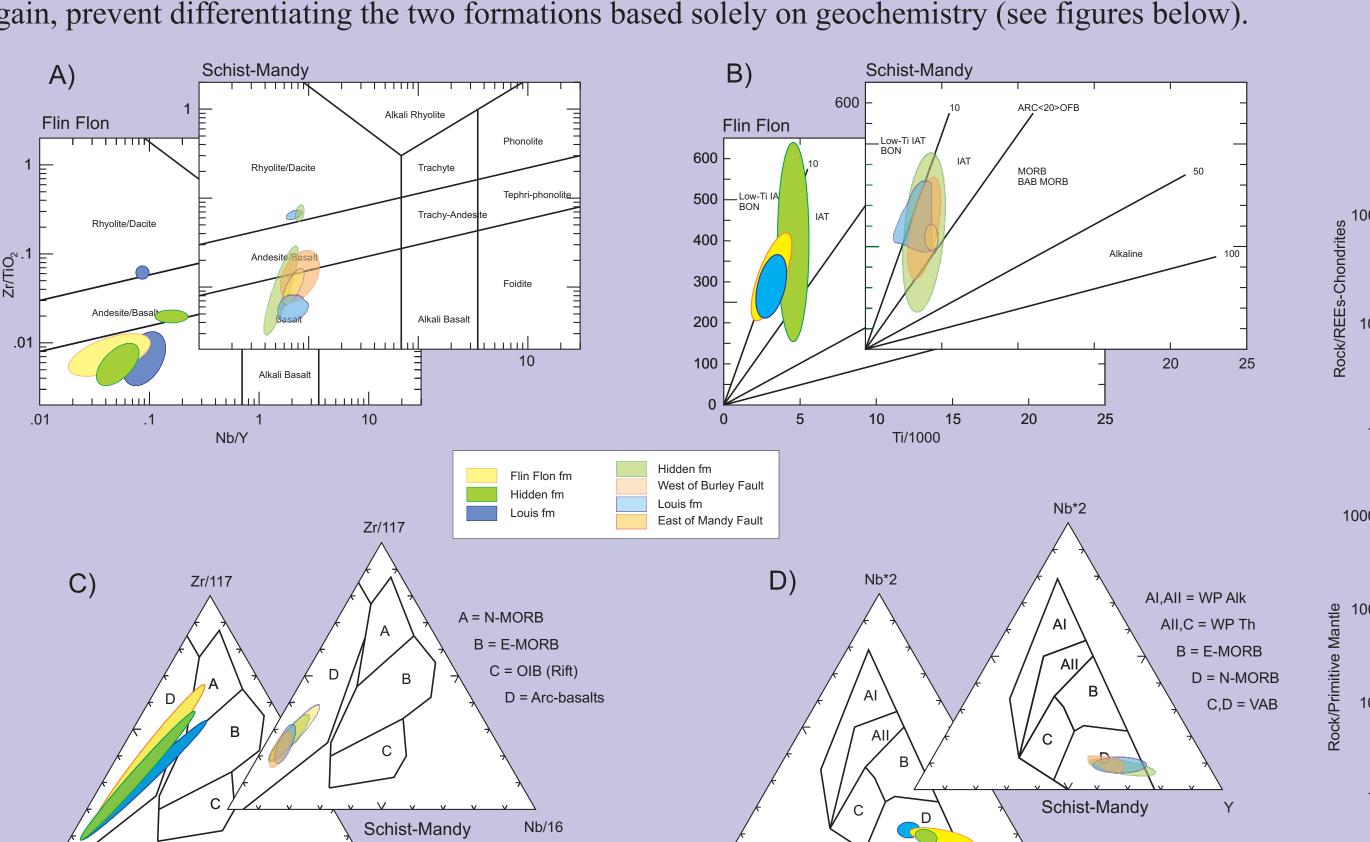


Geochemistry

Footwall versus Hangingwall

Although volcanic rock geochemistry is a powerful tool to characterize volcanic packages, it has limitations. Rocks of the Flin Flon-Callinan-777 mine stratigraphy display very similar whole rock and isotopic geochemical signatures with only subtle variations, if any, between the footwall (Flin Flon formation) and hangingwall (Hidden formation) packages (see figure below; DeWolfe, pers. comm., 2007; Gibson, unpublished data, 2000-2007). The Flin Flon-Callinan-777 footwall and hangingwall volcanic rocks are both the result of tholeiitic arc volcanism (Syme et al., 1999) with relatively juvenile isotopic signatures (i.e., positive Nd values of +2 to +5; Stern et al., 1995a, 1995b).

Within the hangingwall stratigraphy, small geochemical differences do exist between rocks of the Hidden and Louis formations, but there is also considerable overlap in their geochemical signatures that, once again, prevent differentiating the two formations based solely on geochemistry (see figures below).



Flin Flon

Flin Flon versus Schist Lake - Mandy mines areas

If we compare the rocks of the Schist Lake - Mandy mines area to those of the Flin Flon-Callinan-777 mine stratigraphy, they clearly show geochemical similarities (see figures below). The aphyric basaltic flows west of the Mandy Fault and the pyroxene-plagioclase phyric basaltic flows on the peninsula in Phantom Lake how the same geochemical characteristics as the typical Hidden and Louis formations of the Flin Flon mines area (see figure below; DeWolfe, pers. comm., 2007). All the analyzed felsic volcanic rocks in the area, the Hidden and Louis formation flows/lobes and dikes alike display a very similar geochemical signature when compared to the Flin Flon mine rhyolite.

The scarcity of analyses for rocks east of the Mandy Road Fault combined with their considerable variability currently prevents any conclusive comparison to the Flin Flon-Callinan-777 mine package based on geochemistry.

