

Update on geological investigation of the McLeod Road – Birch Lake Allochton, Snow Lake

S. Gagne and C. Beaumont-Smith



REE compositional range of highly siliceous samples from DDH ZN03-07-

26. All sample are from one 65 metres

thick horizon occurring between Birch

mafics below. Note that the REE profile

La Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu

REE profiles from mafic grab samples

and DDH BDY08-23. Two of the Birch

Lake basalts samples were collected

from the westernmost panel of Birch

third Birch Lake mafics sample was

Lake volcanics near Kluklatch lake. The

Lake mafics above and Three Zone

is similar to the Birch basalts.

Birch Lake basalt grab samples (n= 3)

Three zone mafics grab samples (n= 4)

Introduction

The Snow Lake region is host to significant gold deposits, including the New Britannia mine (1.4 million oz Au). Despite several recent specific metallogenic and geological studies within the immediate vicinity of the New Britannia Mine, there has been no geological studies looking at the geometry and stratigraphy of the allochthon and the gold metallogeny in a more regional context.

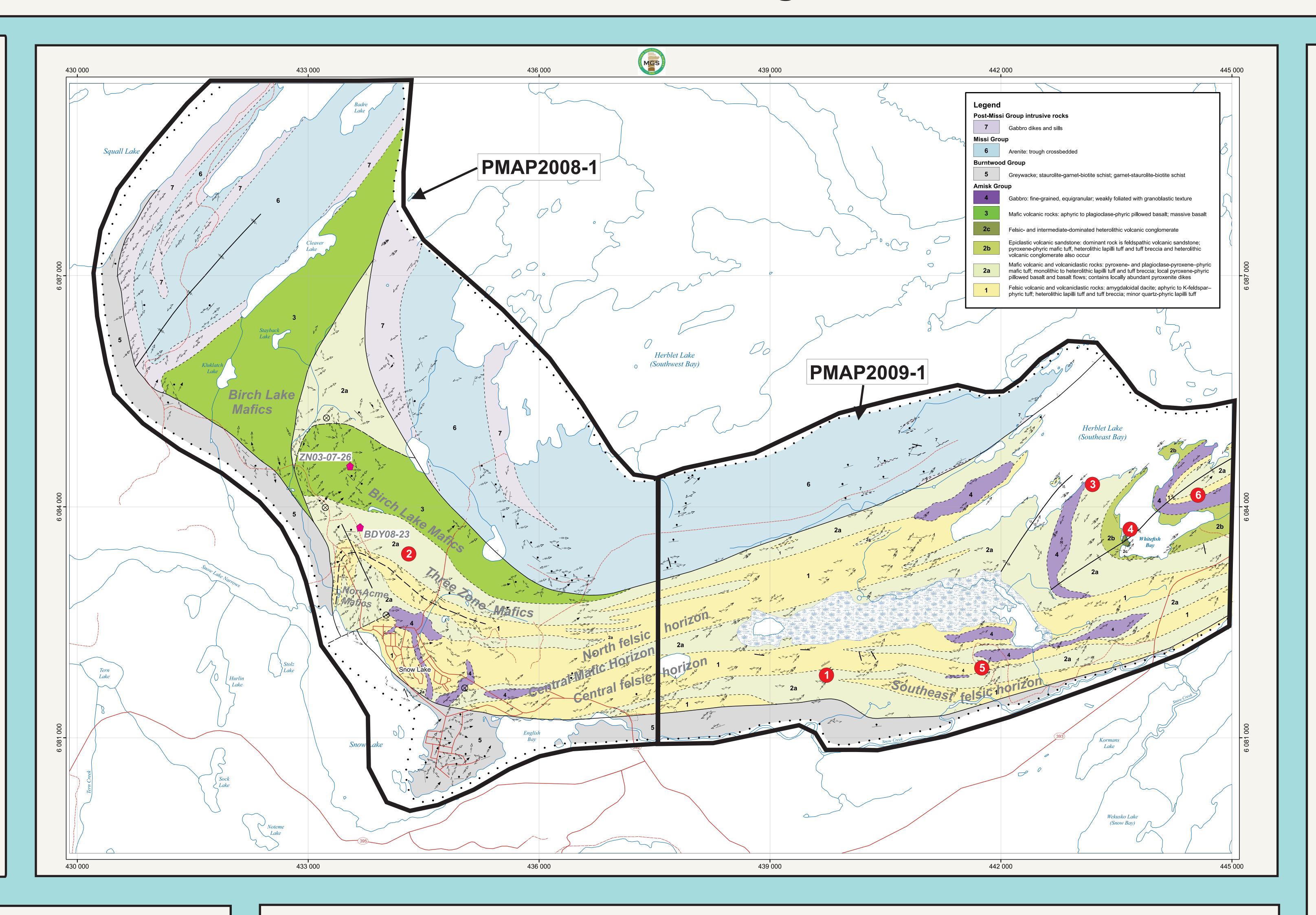
Stratigraphic and structural studies were undertaken for this purpose by Beaumont-Smith and Lavigne (2008) and a preliminary map based on geological mapping by Beaumont-Smith and Gagné (2008) was released. Fieldwork in 2009 focused on complementing the previous stratigraphic and structural studies by investigating the bimodal volcanic and volcaniclastic rocks east of the town cemetery. During the summer of 2008, geological mapping of the McLeod Road - Birch Lake allochthon, which contains the New Britannia Mine horizon, was carried on between Squall Lake and the town cemetery. Particular attention was paid to the structural elements. During the 2009 field season mapping extended east of the cemetery with the purpose to better constrain the distribution geological of units within the McLeod Road - Birch Lake

Project objectives

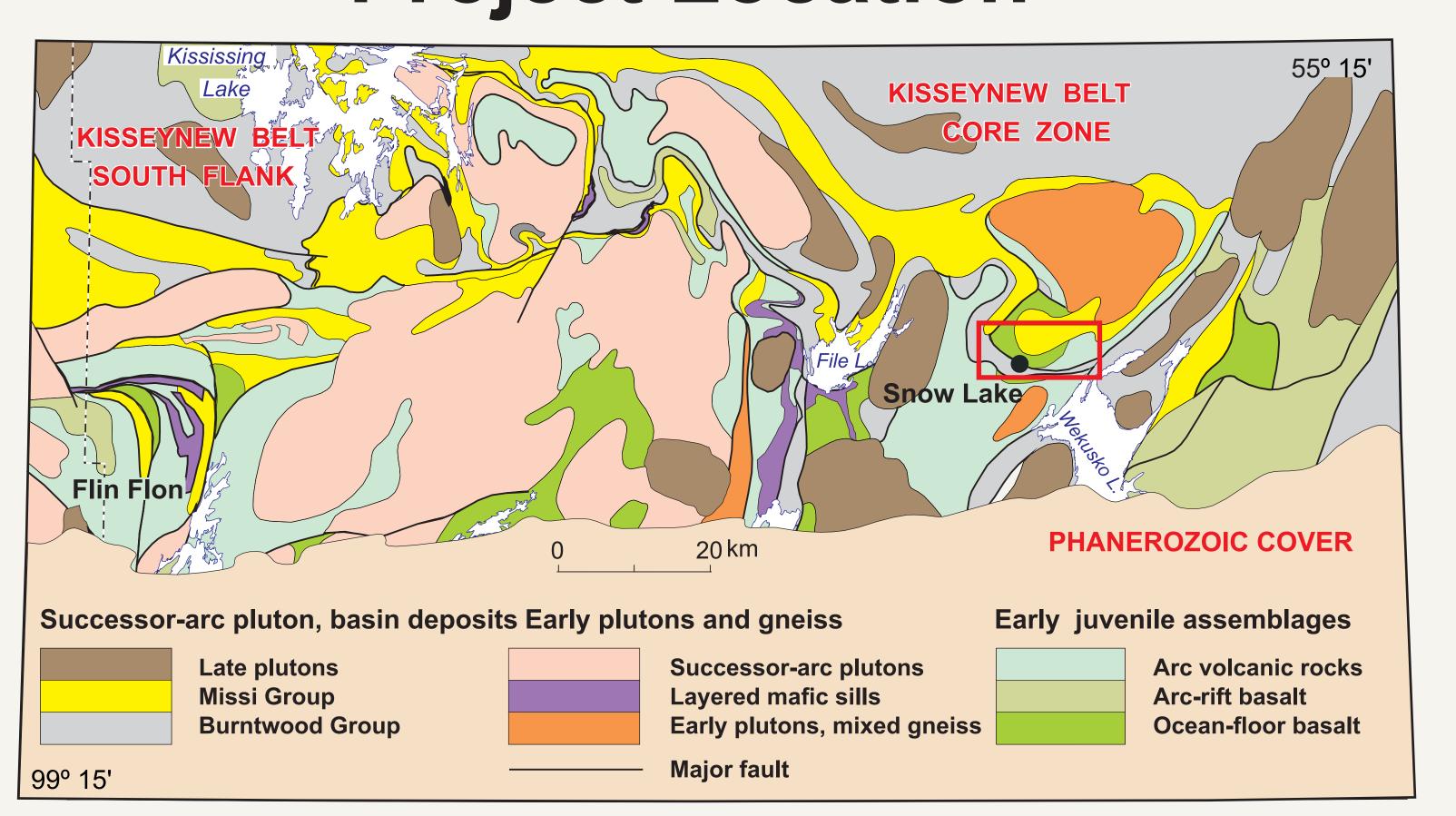
The geological investigation of the McLeod Road - Birch Lake allochthon aims to improve the current constraints on the stratigraphy of the allochthon rocks, provide better knowledge of the geometry of the various geological units, refine our understanding of the deformational. In that purpose, geological mapping was carried on during the last two summers. A final summer of field work will focus on detailed stratigraphic sections across the allochthon, detailed mapping in specific areas such as lithological contact and fold noses. Known showing and occurences will be systematically re-visited and time will be allotted for diamond drill core examination.

Concurrently to geological mapping, geochemical characterization of the different rock types is being done, over a 100 whole-rock geochemical analyses have now been obtained from the allochton, Sm/Nd analysis will also be obtained and samples were taken from felsic horizons for U-Pb age determinations.

Ultimately, results from this study will constitutes the framework of study of gold metallogeny in the Flin Flon- Snow Lake belt.



Project Location



Map showing the main geological subdivisions of the Flin Flon -Snow Lake greenstone belt. The project area is highlighted by the red box. The Snow Lake area is dominated by bimodal arc-related volcanic and volcaniclastic rocks. Younger Burntwood and Missi sediments are tectonically interleaved with the volcanics.

Stratigraphy

The McLeod Road - Birch Lake allochthon comprises a 2-3 km thick sequence of bimodal arcrelated volcanic and volcaniclastic rocks metamorphosed from lower to mid- amphibolite facies. Synvolcanic gabbro dikes and sills are common. The allochthon is flanked to the north and south by younger metasedimentary rocks. The allochthon is separated from the younger underlying Burntwood metaturbidites by the McLeoad Road thrust. The Birch Lake fault, also interpreted as a thrust fault marks the boundary between the allochthon and the the overlying younger Missi meta-arenite to the north.

The western portion of the allochthon comprises two panels of pillowed and massive mafic volcanic flows of the Birch Lake mafics. Structurally below it lie a sequence of interleaved mafic and felsic volcanic and volcaniclastic horizons. No formal stratigraphy has been established for that sequence. The current project aims to define a coherent stratigraphy for the allochthon using both field relationships, detailed section work and geochemical characterization.

Examples of the various vocanic rocks encoutered in the area are shown to the right with a brief description. Outcrop location for the photo is shown on the map above.



both felsic (20-25 %) and mafic (40%) mafic matrix. Clast up to 15 cm in size.



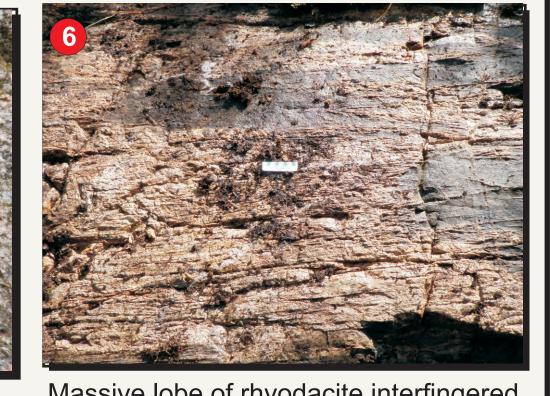
Mafic lapilli and breccia tuff with 15-25% epidote alteration patches. Matrix is finefrom aphyric to pyroxene phyric. texture, locally broken edges can be



core of the Whitefish Bay synform comprising 60–70% of mostly felsic and intermediate composition clasts; clasts



feldspar phenocrysts and 1-3mm quartz

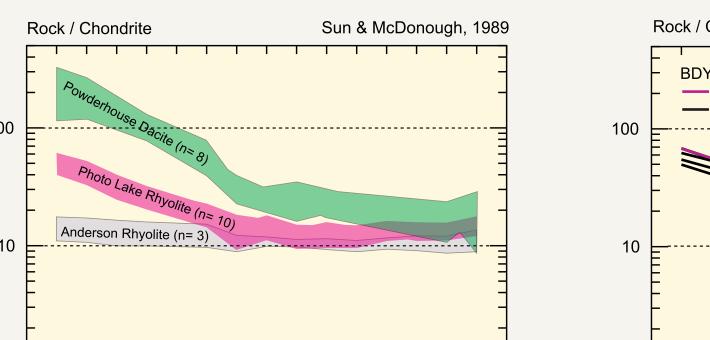


with microbreccia (some larger fragments occur in the microbreccia)

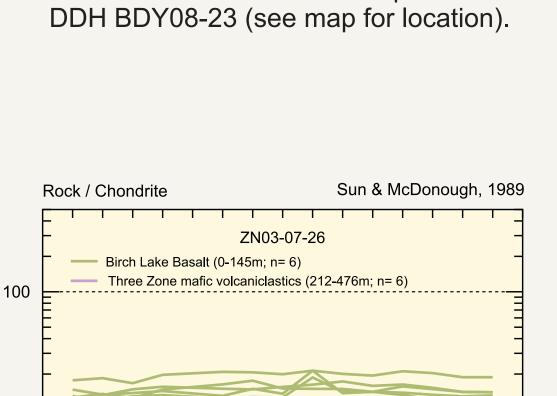
Geochemistry

During the 2008 and 2009 field seasons rock grab samples were collected from various units over the project area. Drill core samples were also collected from two drill holes BDY08-23 and ZN03-07-26.

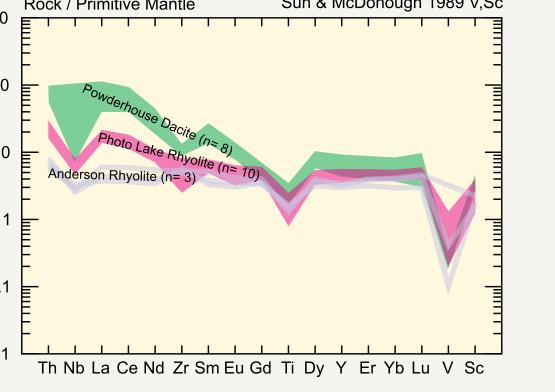
Results are presented in this section. Samples have been grouped together based on units or map horizon. Mafic and felsic rocks are treated separately. Care was given to collect best samples, however alteration is common over the area, particularly in the west part and in the drill core samples.



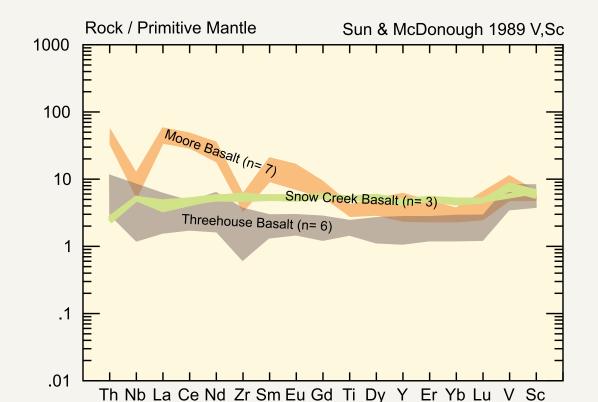
La Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu Chondrite-normalized REE plot showing the compositional range of selected samples from major felsic units of the main Snow Lake Arc Assemblage.



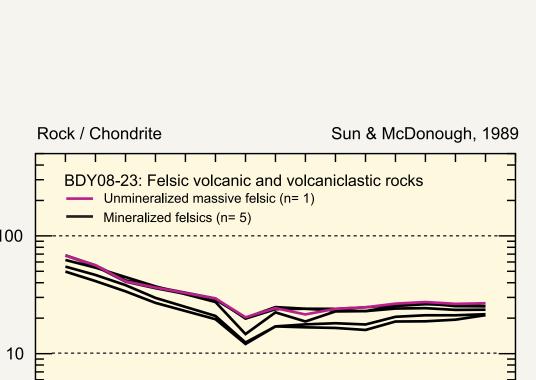
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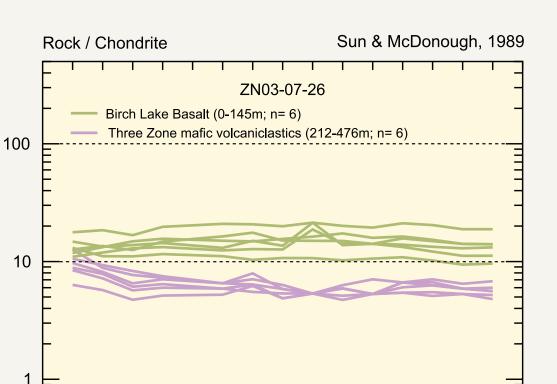


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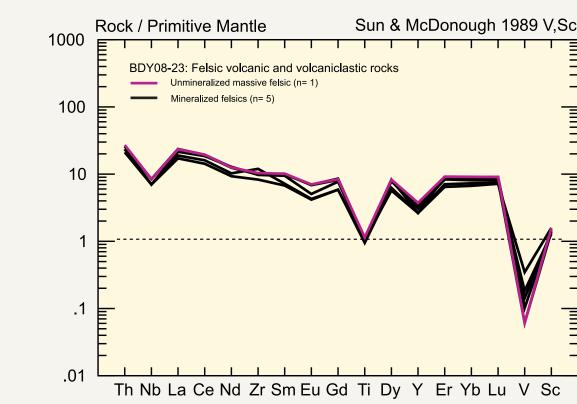


Chondrite-normalized REE plot showing the compositional range of mineralized and unmineralized felsic samples from

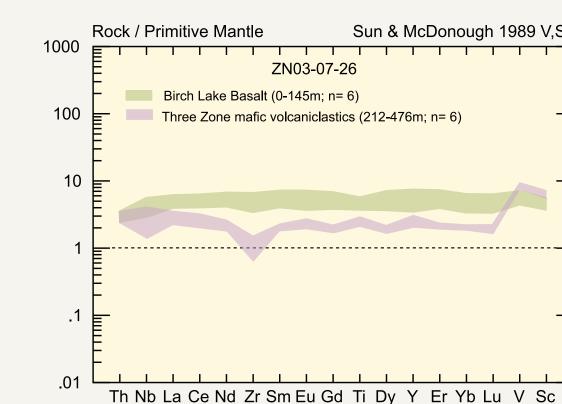
La Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu



La Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu REE profiles of mafics rocks from DDH ZN03-07-26. The upper part of the hole is a thick sequence of Birch Lake Basalt with a profile similar to the Snow Creek Basalt, a whereas the lower portion of the hole comprises mafic volcaniclastics with a distinct REE profile similar to that of the Threehouse basalt mature arc.



Chondrite-normalized REE plot showing the compositional range of mineralized and unmineralized felsic samples from DDH BDY08-23 (see map for location).



REE profiles of mafics rocks from DDH

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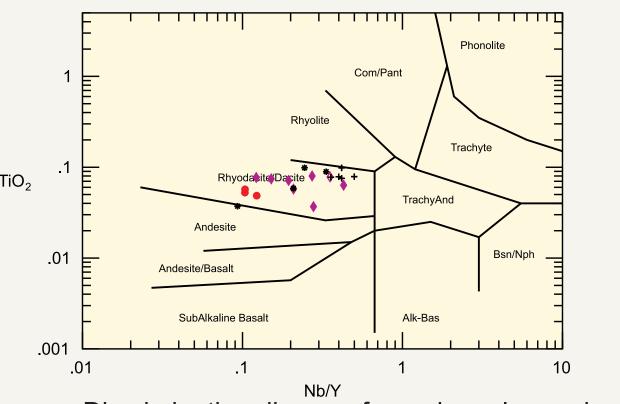
with a profile similar to the Snow Creek

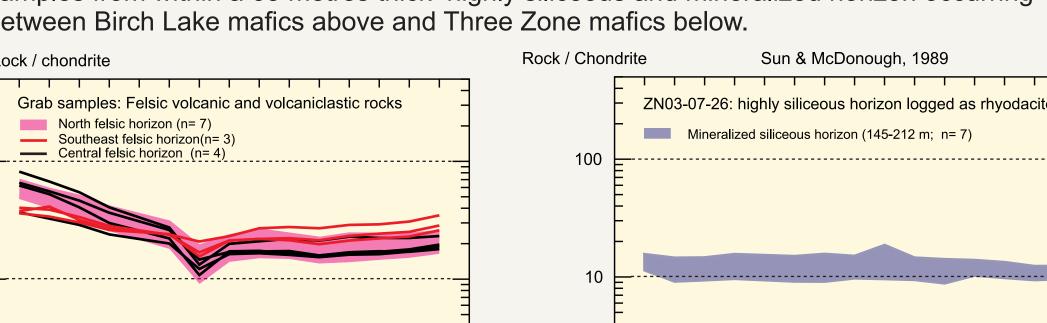
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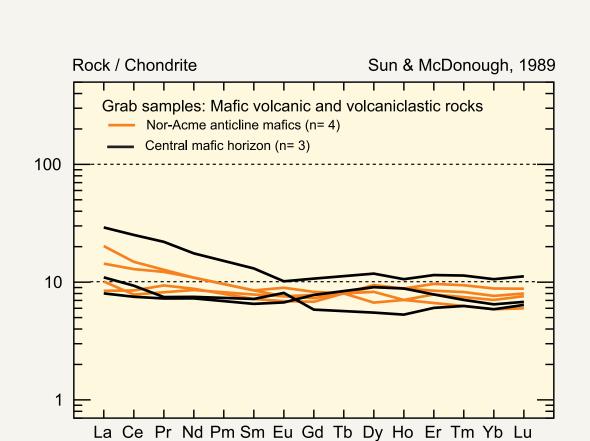
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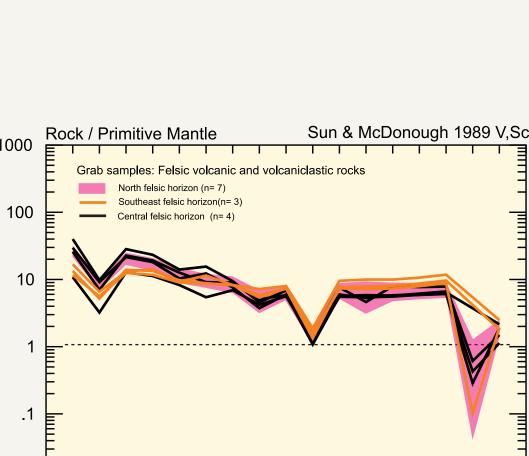




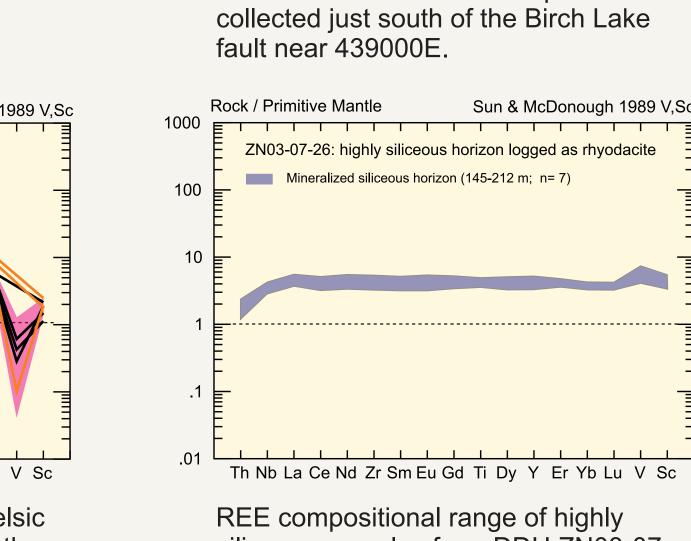
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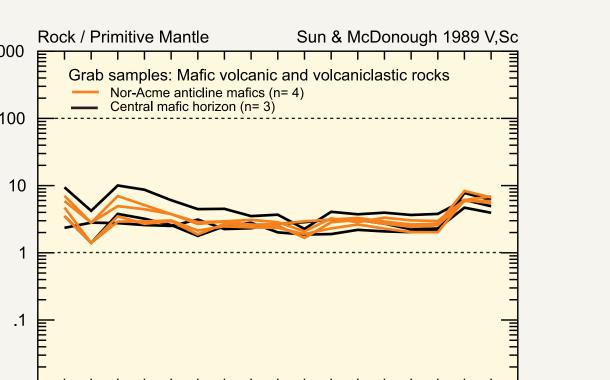
Chondrite-normalized REE plot showing the compositional range of selected mafic grab samples from the Nor-Acme antiform area and from the Central Mafic horizon (see map for location).



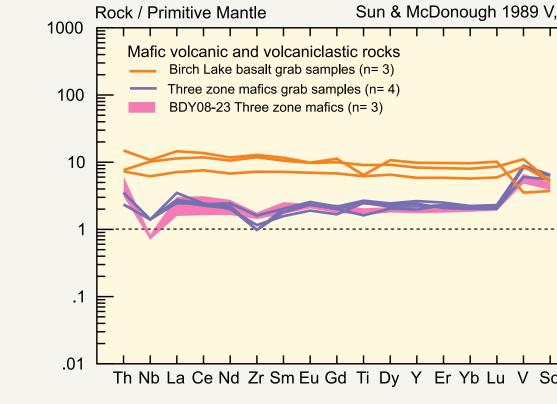
Th Nb La Ce Nd Zr Sm Eu Gd Ti Dy Y Er Yb Lu V Sc The REE compositional profile of felsic grab samples collected throughout the field area is very similar. Grab samples REE profile is also similar to that of felsic sample from DDH BDY08-23.



REE compositional range of highly siliceous samples from DDH ZN03-07-26. All samples are from one 65 metres thick horizon occurring between Birch Lake maficsabove and Three Zone mafics below. Note that the REE profile is similar to the Birch basalts.



Chondrite-normalized REE plot showing the compositional range of selected mafic grab samples from the Nor-Acme antiform area and from the Central Mafic horizon (see map for location).



REE profiles from mafic grab samples and DDH BDY08-23. Two of the Birch Lake basalts samples were collected from the westernmost panel of Birch Lake volcanics near Kluklatch lake. The third Birch Lake mafics sample was collected just south of the Birch Lake fault near 439000E.