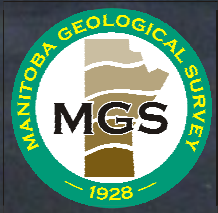
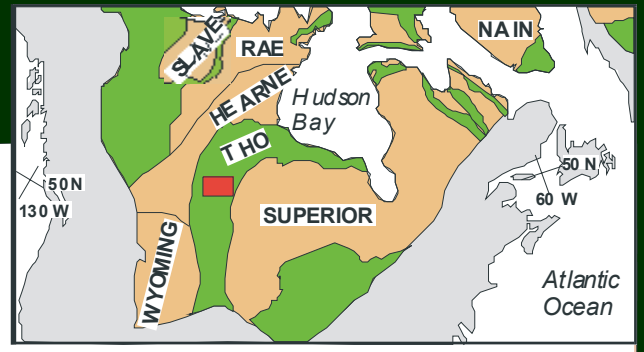
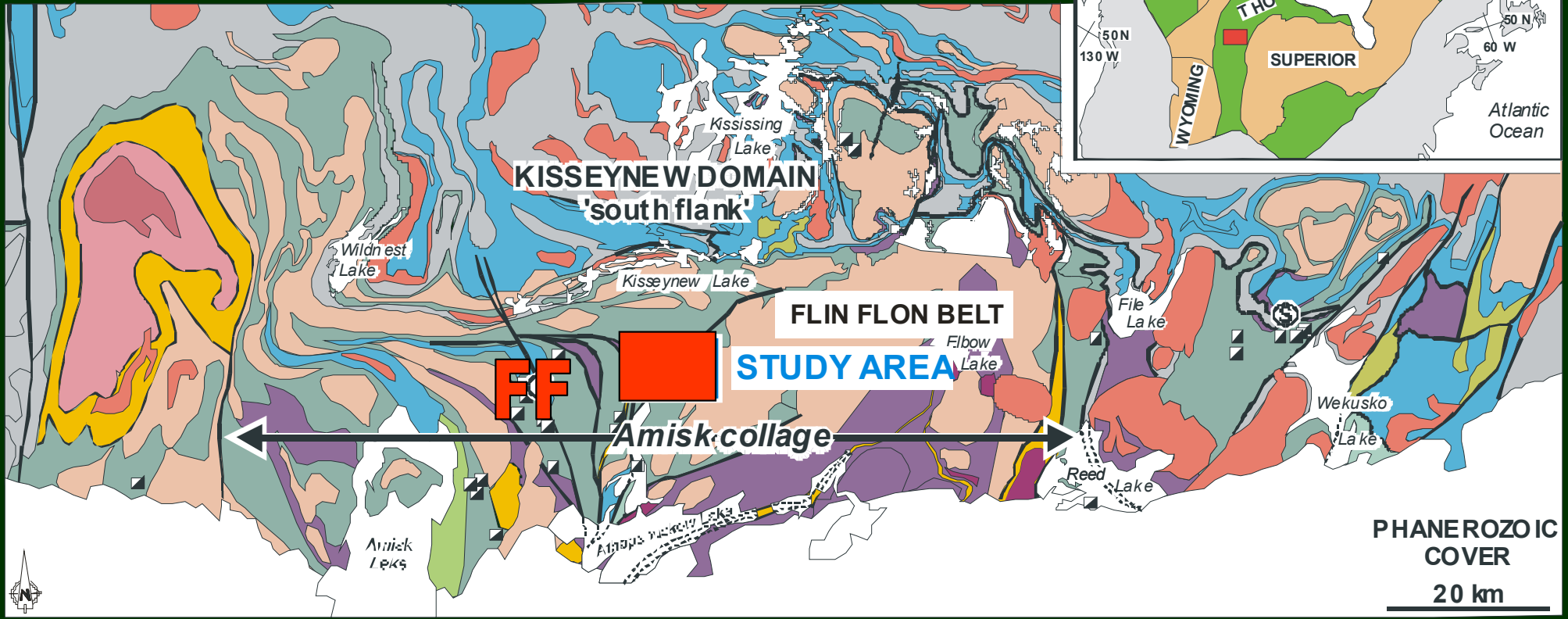


# Geochemistry and economic potential of tectonic terranes at the north flank of the Flin Flon Belt.

by  
Paul Gilbert













35 D

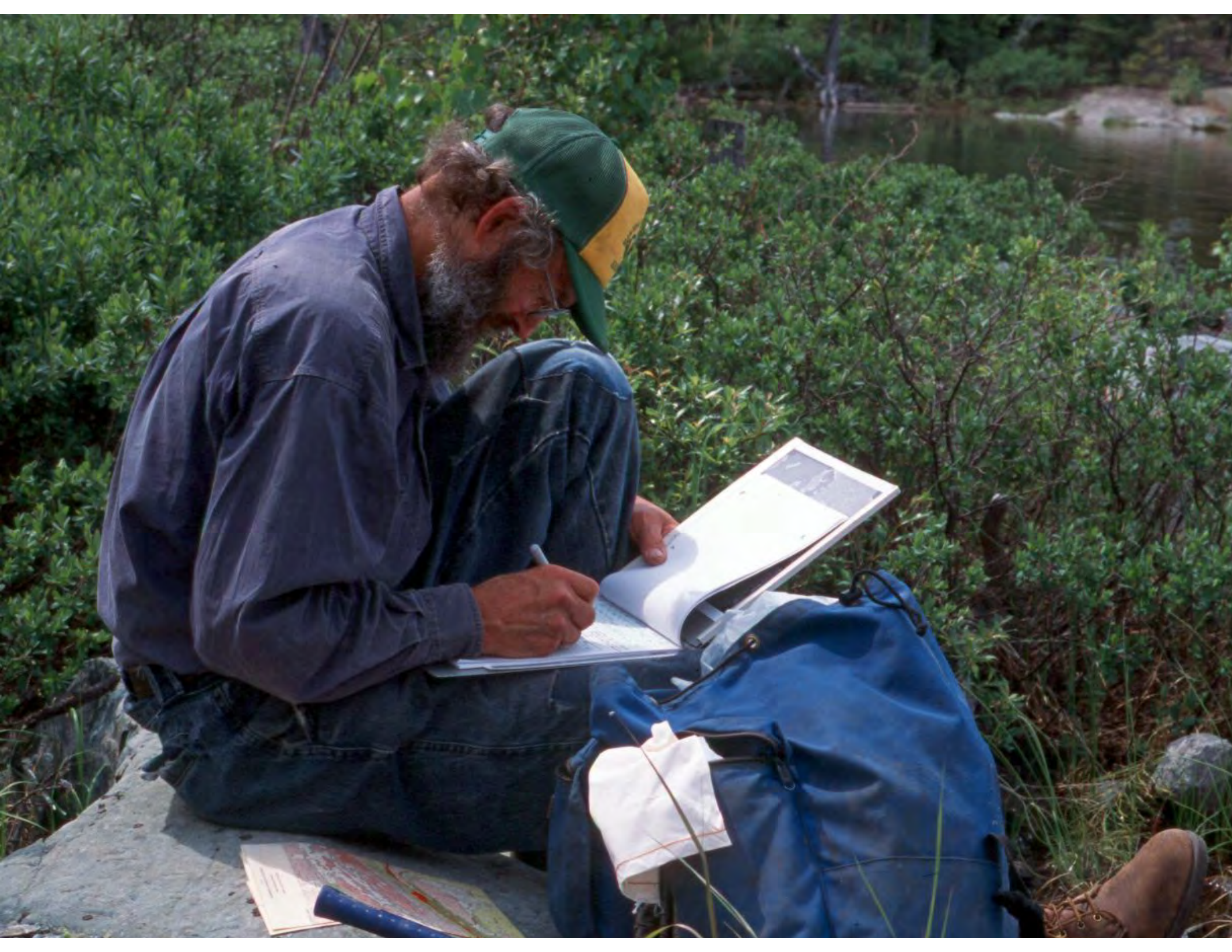
ATTENTION  
BLASTING  
IN CRUSHER  
WHEN WHISTLE  
IS BLOWING

136



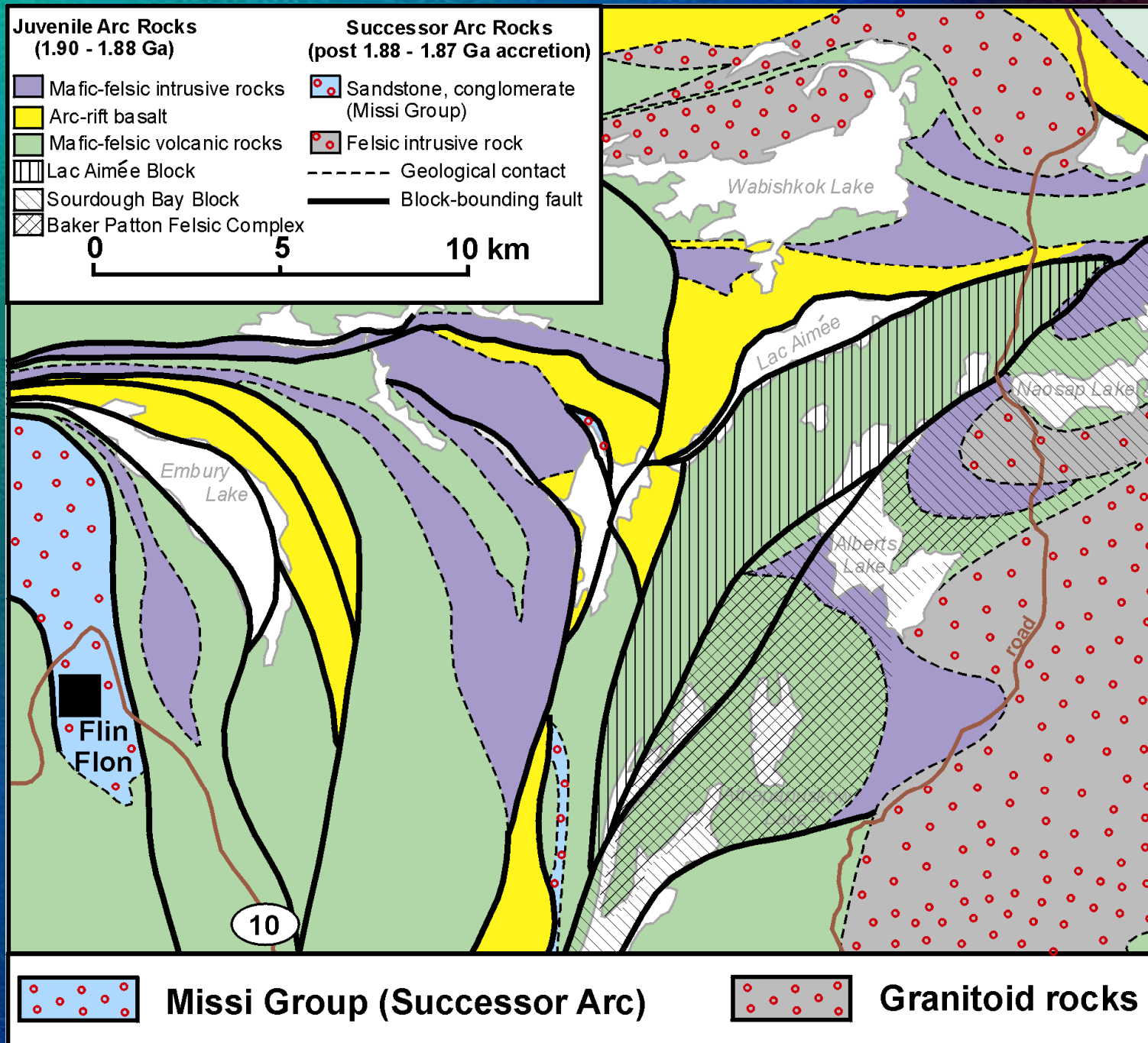








# Northern FF Belt: Geochemical Assemblages



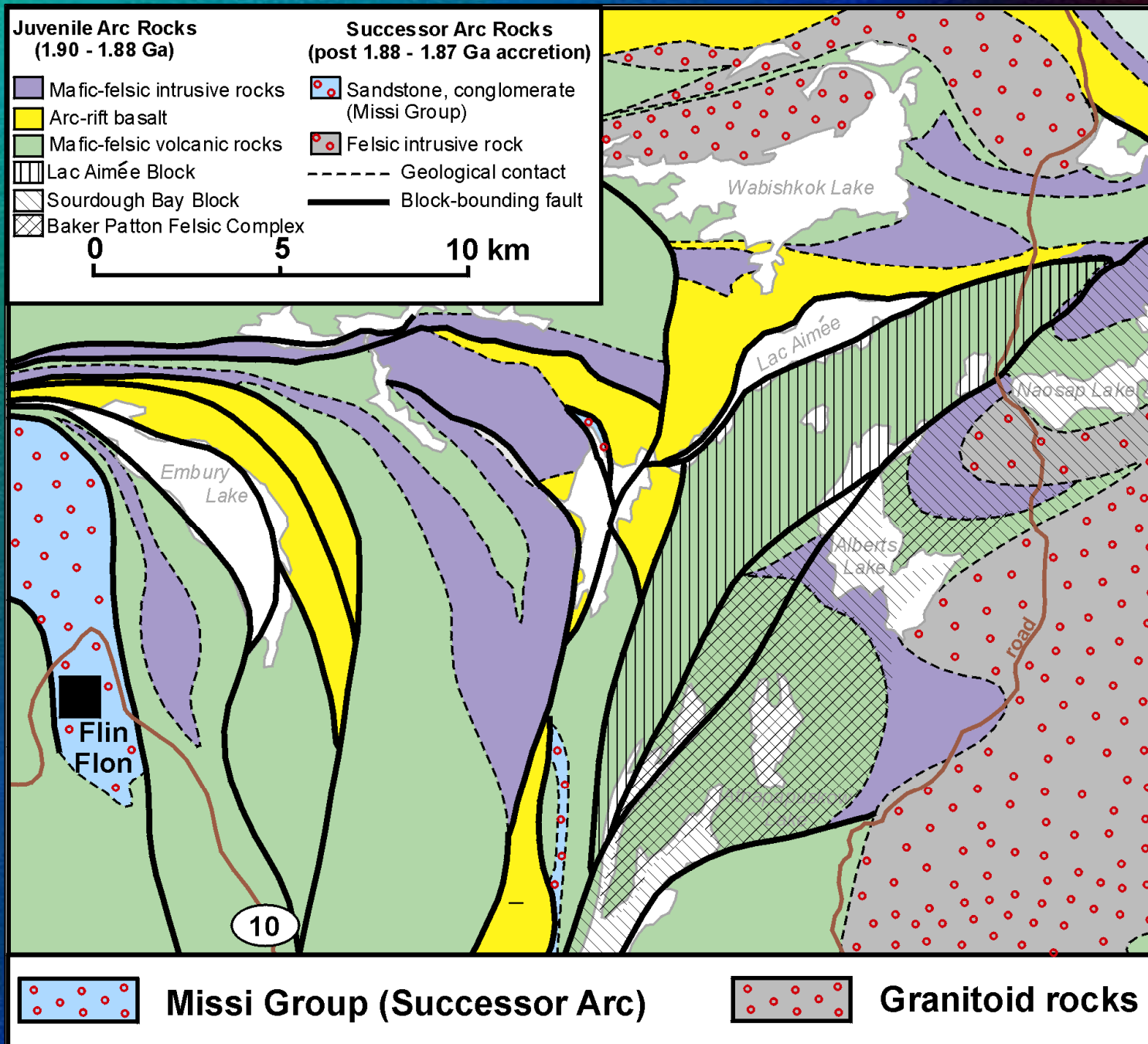


## Simplified tectonic history of the Flin Flon Belt

Pre-accretion period (1.906 – 1.881 Ga) - 'Juvenile arc'	
1.9 – 1.88	Juvenile arc and BABB volcanism, and turbidite sedimentation - <b>Flin Flon arc assemblage</b> <b>Elbow-Athapapuskow ocean-floor assemblage</b>
Tectonic accretion - 1.88 to 1.87	<b>Amisk collage</b>
Post-accretion period (1.876 – 1.838 Ga) - 'Successor arc'	Juvenile calc-alkaline plutons
1.87 – 1.847	Marine to subaerial sedimentation
1.84 – 1.81	Peak orogeny, continental collision

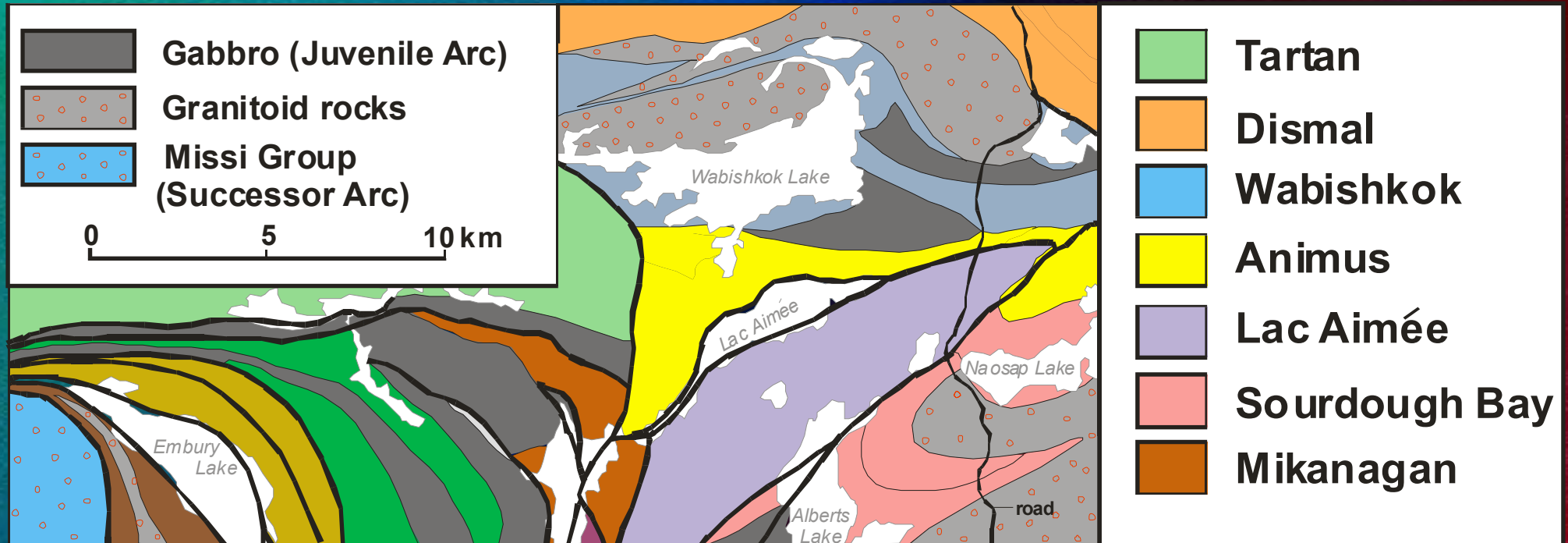


# Northern FF Belt: Geochemical Assemblages



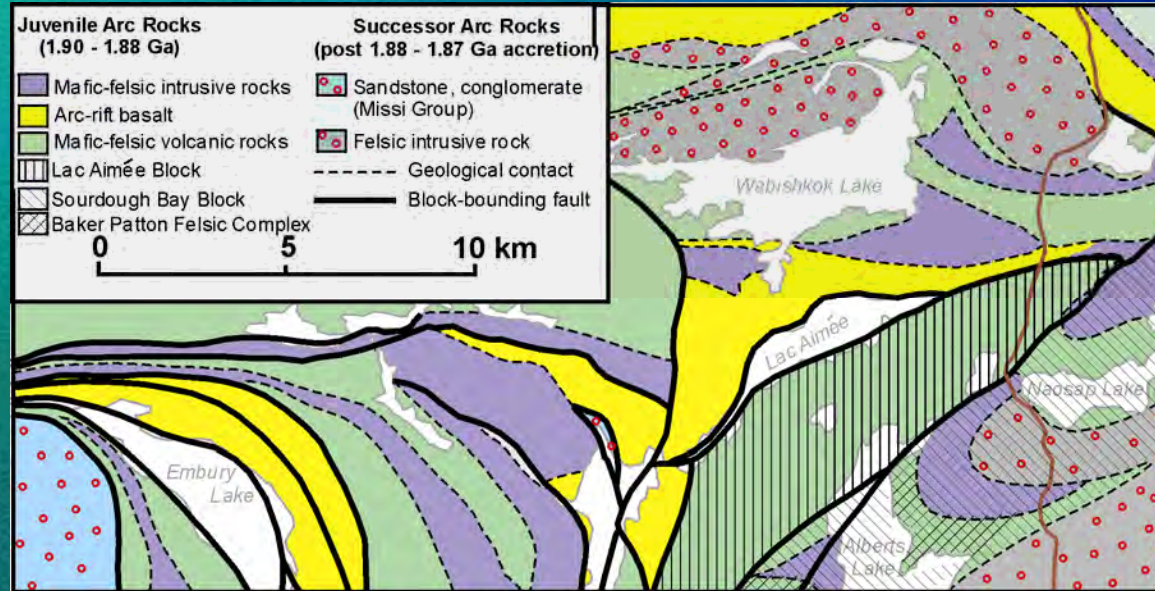


# Northern FF Belt: Fault Blocks

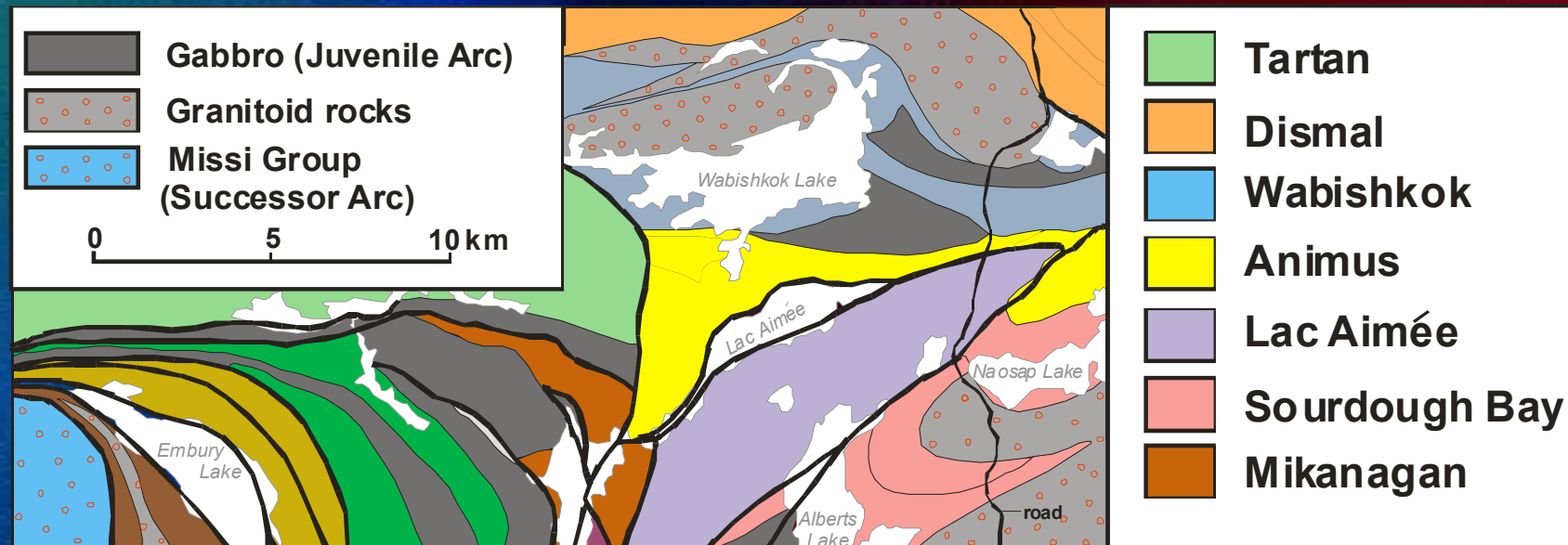




# Northern FF Belt: Geochemical Assemblages



## Northern FF Belt: Fault Blocks



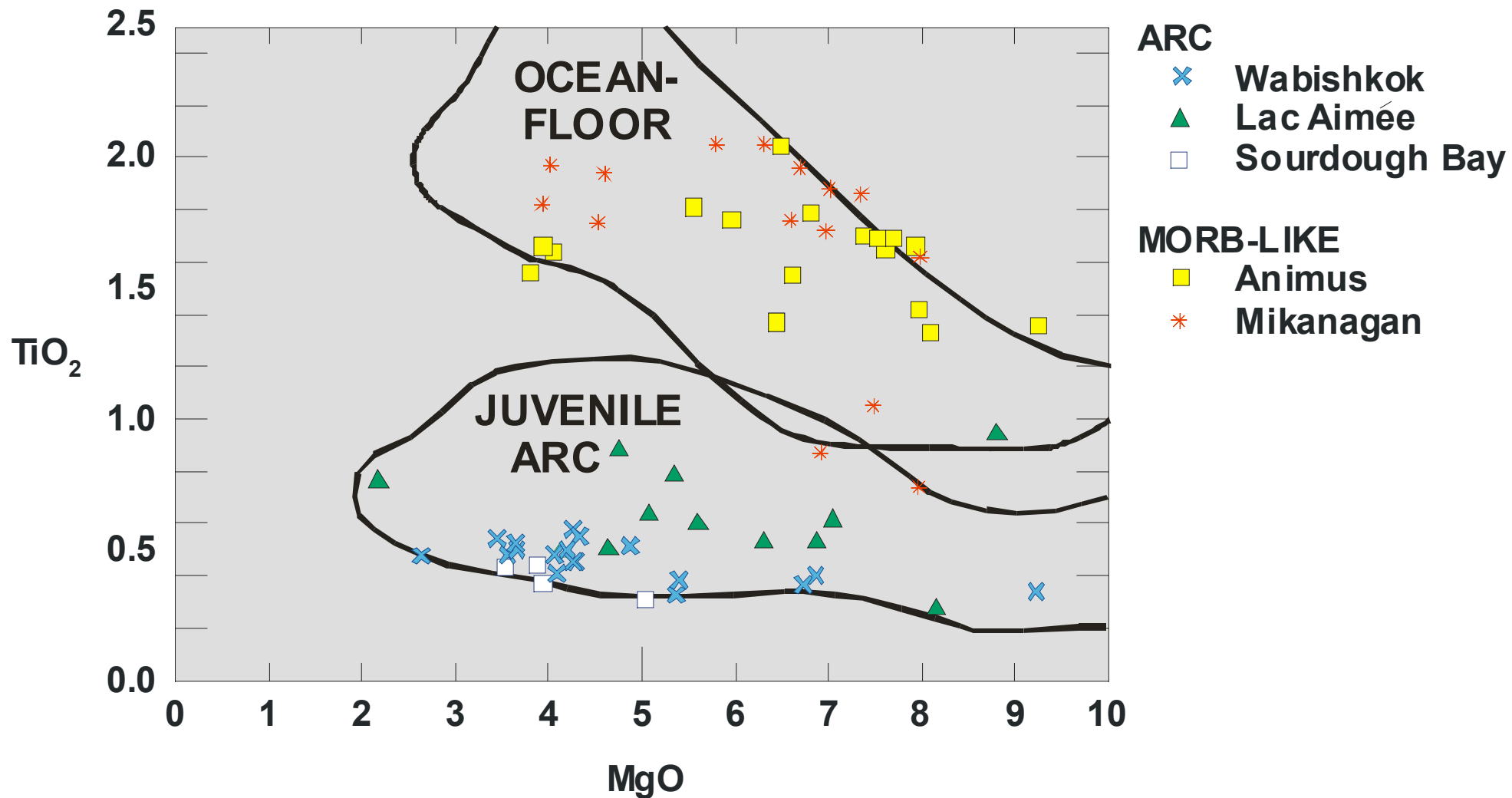




# Selected Element Averages

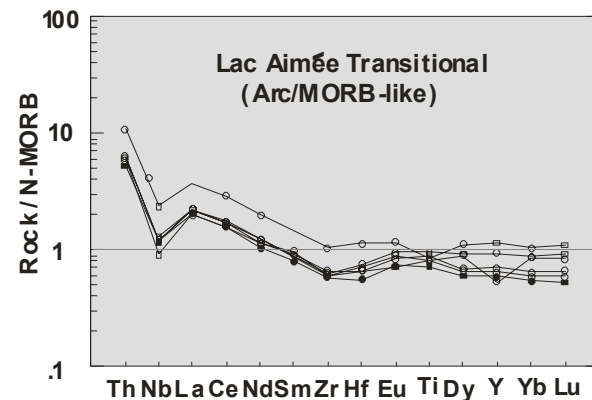
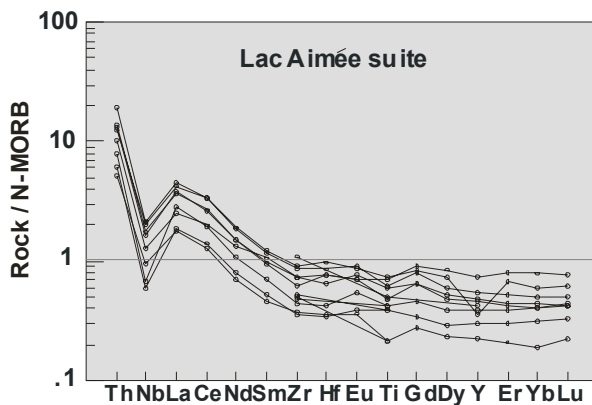
Fault Block	Tectonic type	SiO <sub>2</sub> %	TiO <sub>2</sub> %	FeO total %	Th ppm
Wabishkok Lake, Lac Aimée, Sourdough Bay	ARC	56	0.5	10.6	0.7
Animus Lake	E-MORB	50	1.6	12.6	0.5
Mikanagan Lake	E-MORB	51	1.9	13.4	0.9
Animus Lake	N-MORB	49	0.6	11.4	0.1
Lac Aimée	TRANS Arc/E-MORB	55	1.1	13.6	0.8
Dismal Lake	TRANS N-MORB/Arc	50	0.9	11.2	0.1



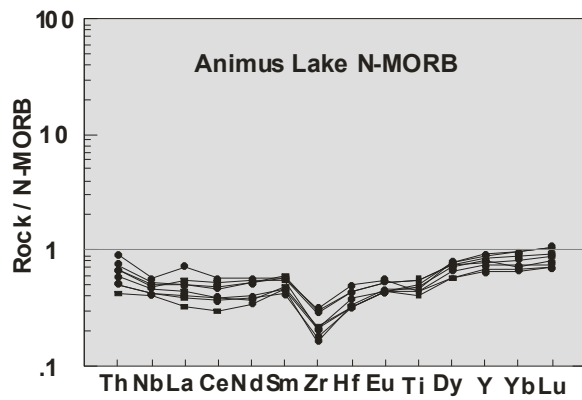
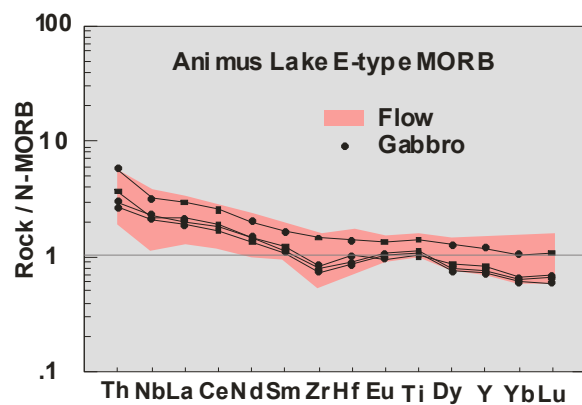




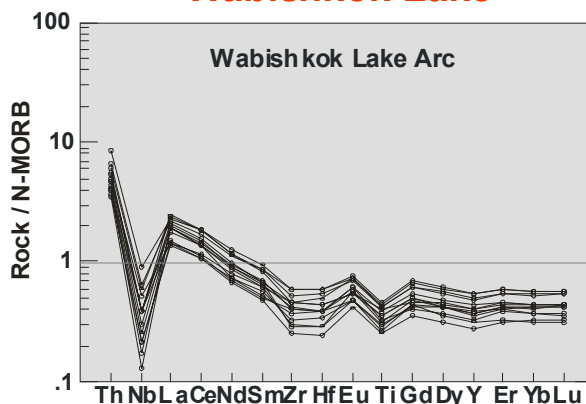
### Lac Aimée



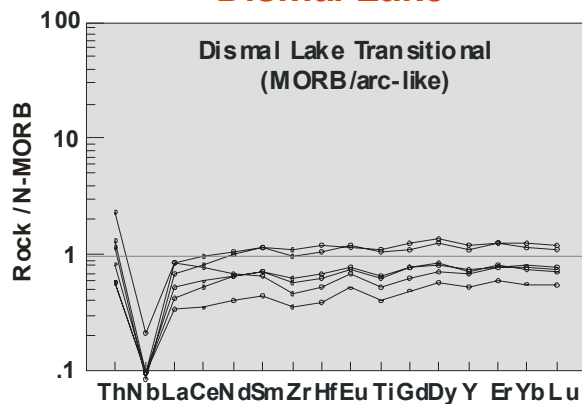
### Animus Lake



### Wabishkok Lake



### Dismal Lake







# 1 ARC BASALTS

- enrichment of LREE + Th
- Nb negative anomaly
- negative profile due to HFSE (Ti, Zr and Hf)





## 2 E-MORB BASALTS - e.g. ANIMUS LAKE BASALT

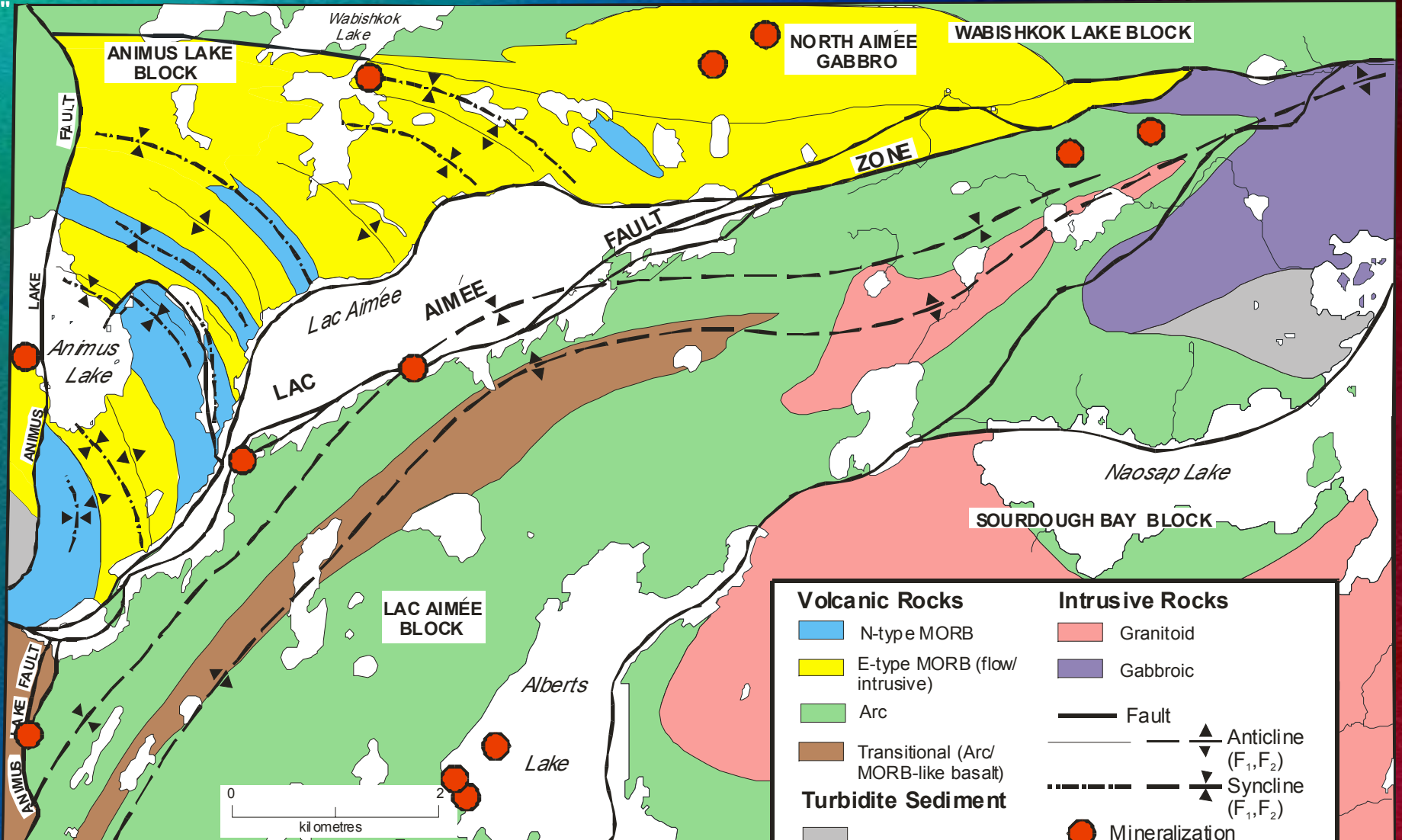
- REE contents similar to MORB, but moderately higher LREE
- No REE depletion
- No Nb spike





101°37'30"  
54°53'00"

101°25'00"  
54°53'00"



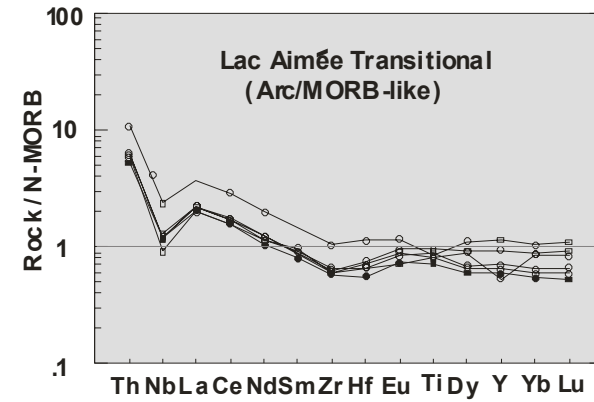
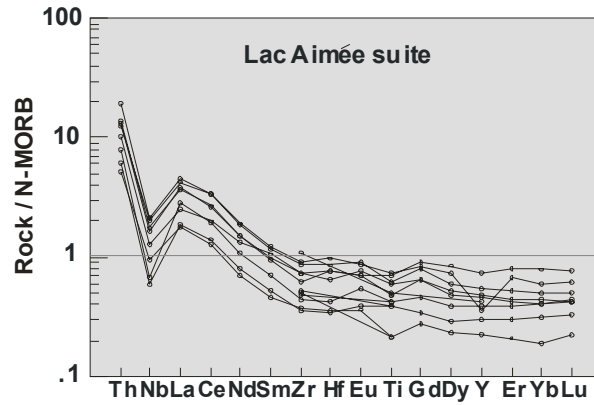
54°48'40"  
101°37'30"

54°48'40"  
101°25'00"

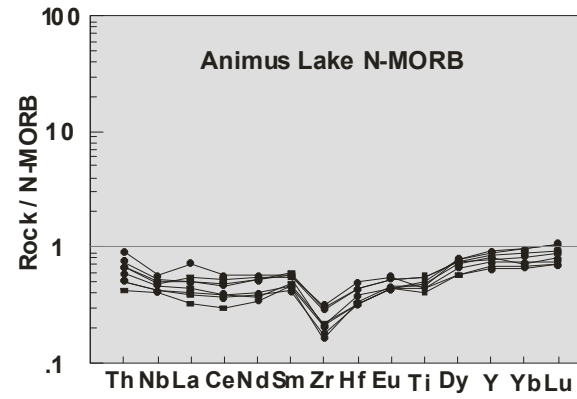
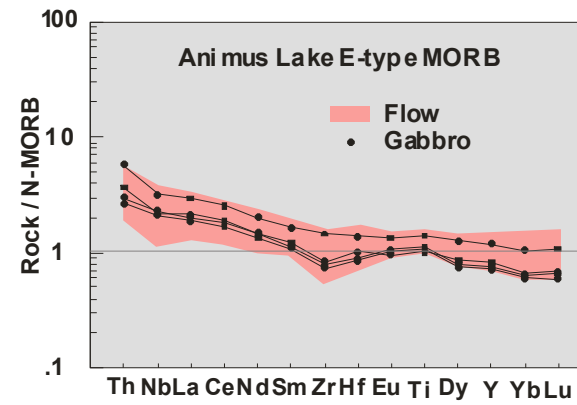
Volcanic Rocks		Intrusive Rocks	
	N-type MORB		Granitoid
	E-type MORB (flow/intrusive)		Gabbroic
	Arc		Fault
	Transitional (Arc/MORB-like basalt)		Anticline (F <sub>1</sub> , F <sub>2</sub> )
	Turbidite Sediment		Syncline (F <sub>1</sub> , F <sub>2</sub> )
			Mineralization (base metal)



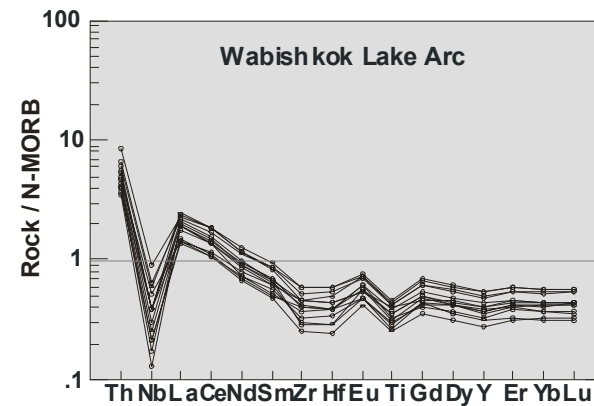
### Lac Aimée



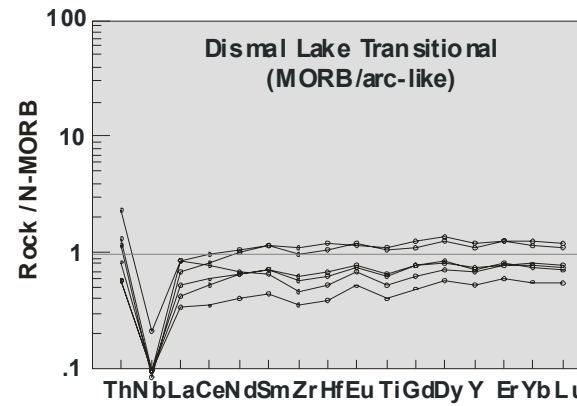
### Animus Lake



### Wabishkok Lake



### Dismal Lake



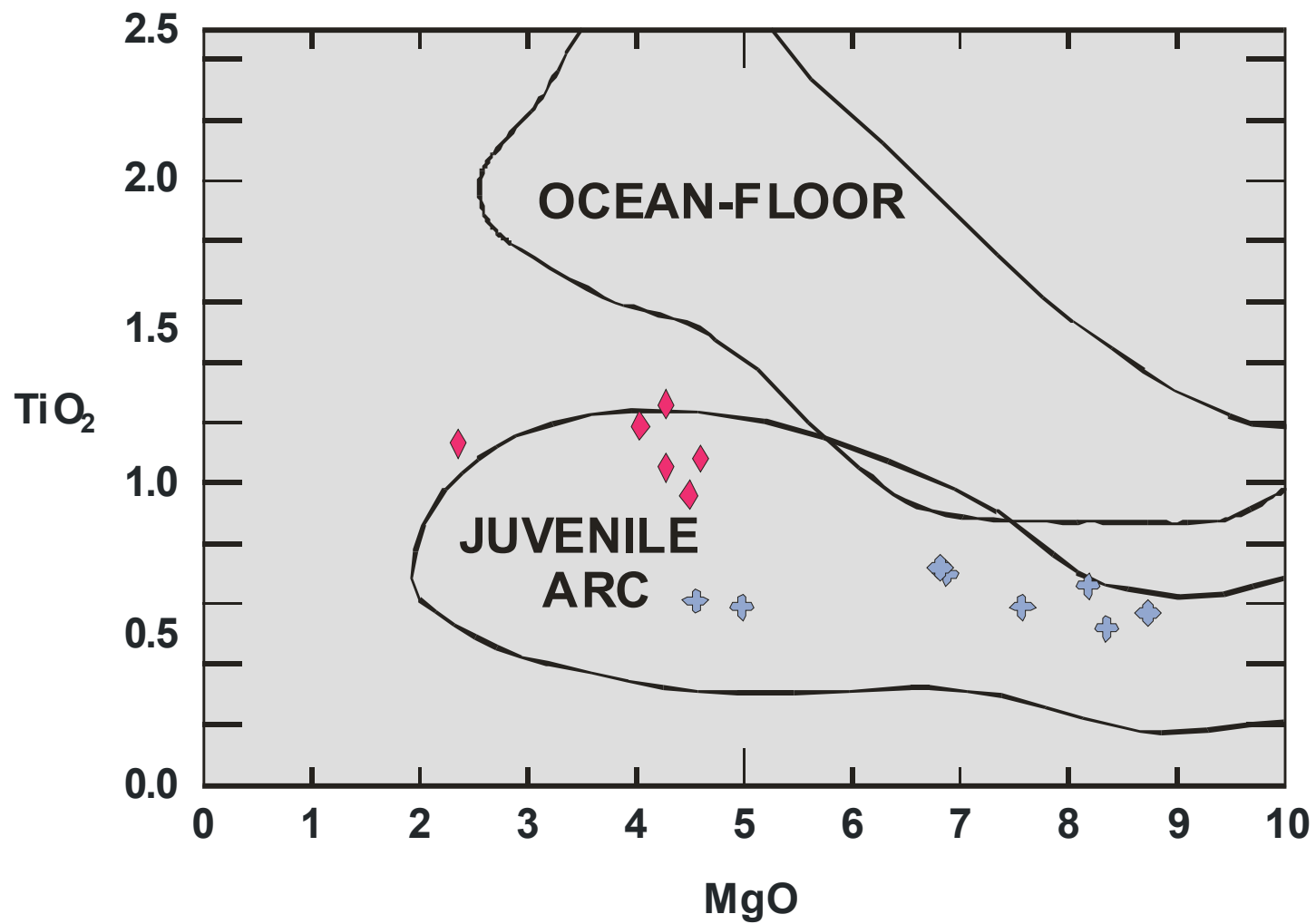




# Selected Element Averages

Fault Block	Tectonic type	SiO <sub>2</sub> %	TiO <sub>2</sub> %	FeO total %	Th ppm
Wabishkok Lake, Lac Aimée, Sourdough Bay	ARC	56	0.5	10.6	0.7
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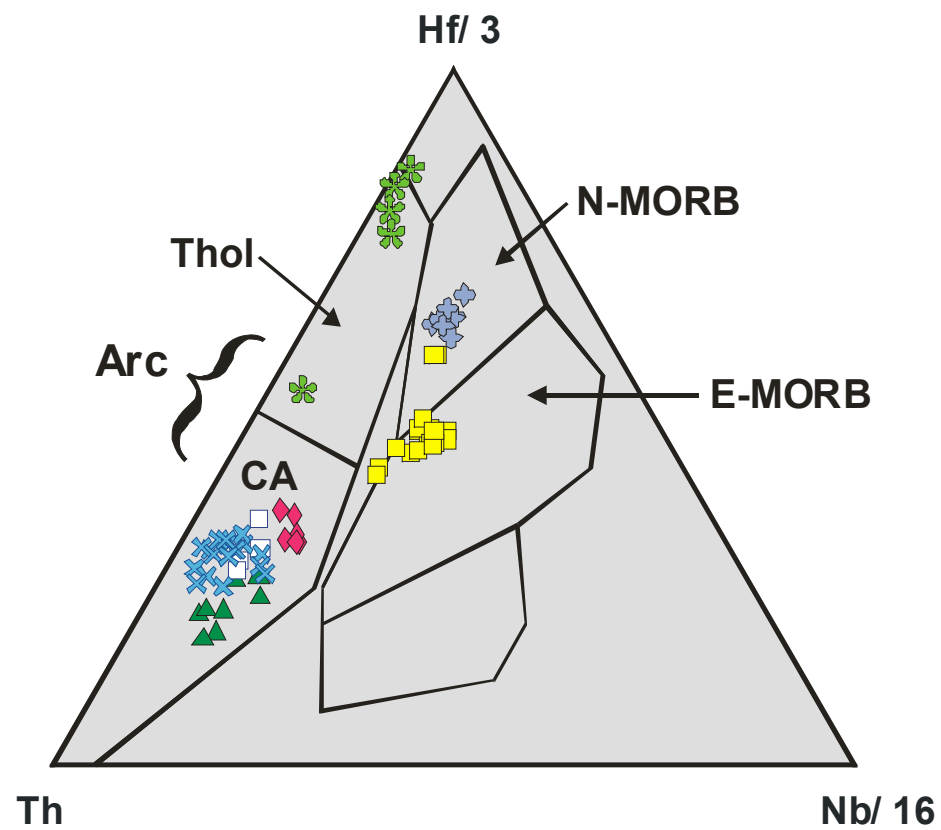




◆ Lac Aimée Transitional  
(arc / MORB-like)

⊕ Animus Lake N-MORB





- |   |               |                               |
|---|---------------|-------------------------------|
| × | Wabishkok     | } ARC                         |
| ▲ | Lac Aimée     |                               |
| □ | Sourdough Bay |                               |
| ◆ | Lac Aimée     | TRANSITIONAL<br>ARC/MORB-like |
| ■ | Animus        | E-MORB                        |
| ⊕ | Animus        | N-MORB                        |
| ✱ | Dismal        | TRANSITIONAL<br>MORB/ARC-like |





## Arc-rift terranes

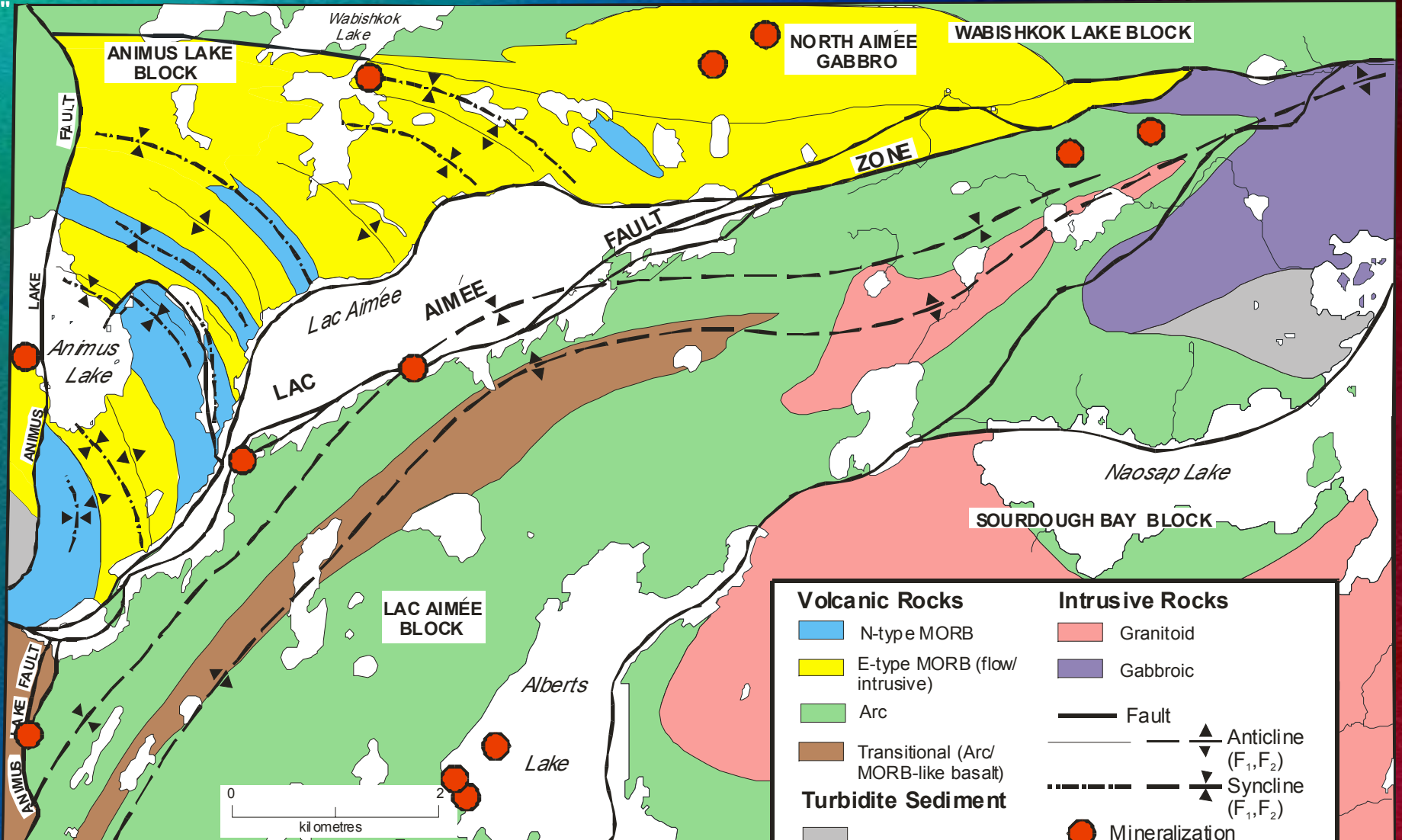
- MORB-like basalts + ferrobasalts
- Intra-arc extension-related turbidite basins





101°37'30"  
54°53'00"

101°25'00"  
54°53'00"



54°48'40"  
101°37'30"

54°48'40"  
101°25'00"

Volcanic Rocks		Intrusive Rocks	
	N-type MORB		Granitoid
	E-type MORB (flow/intrusive)		Gabbroic
	Arc		Fault
	Transitional (Arc/MORB-like basalt)		Anticline (F <sub>1</sub> , F <sub>2</sub> )
	Turbidite Sediment		Syncline (F <sub>1</sub> , F <sub>2</sub> )
			Mineralization (base metal)



- Turbidite in Lac Aimée Block  
with scour structure and graded bedding





- Rhyolite flow in Lac Aimée Block with flow banding

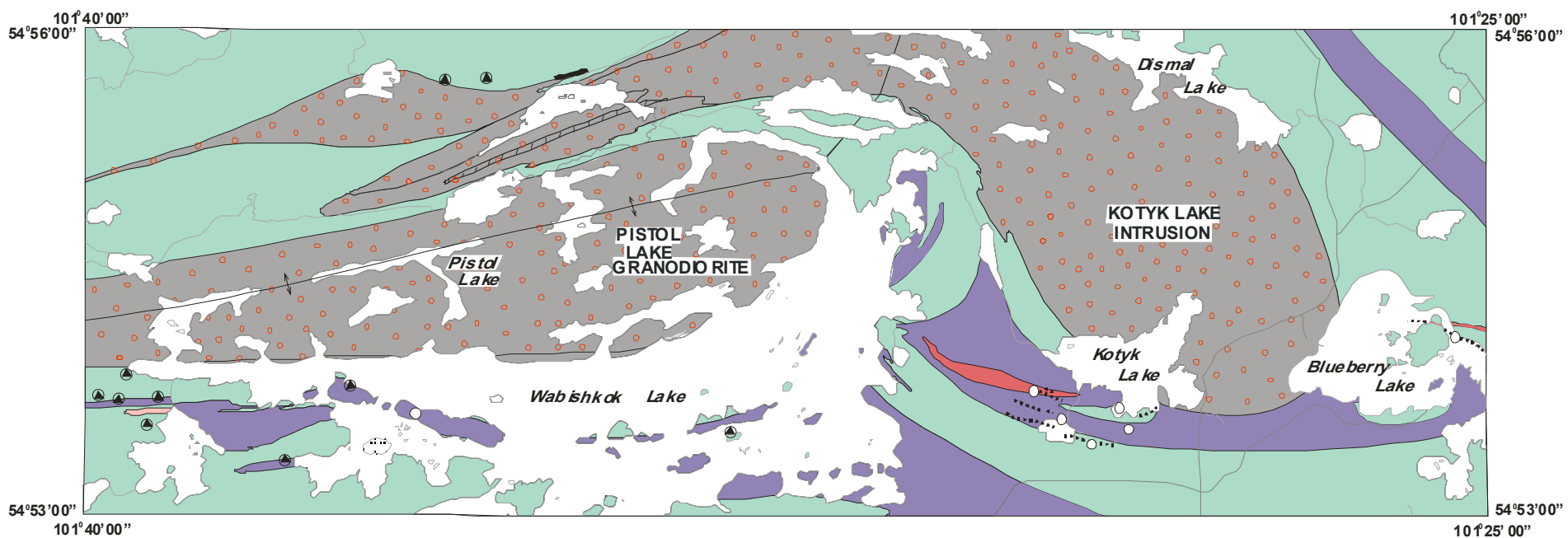






- Fragmental rhyolite flow east of Wabishkok Lake





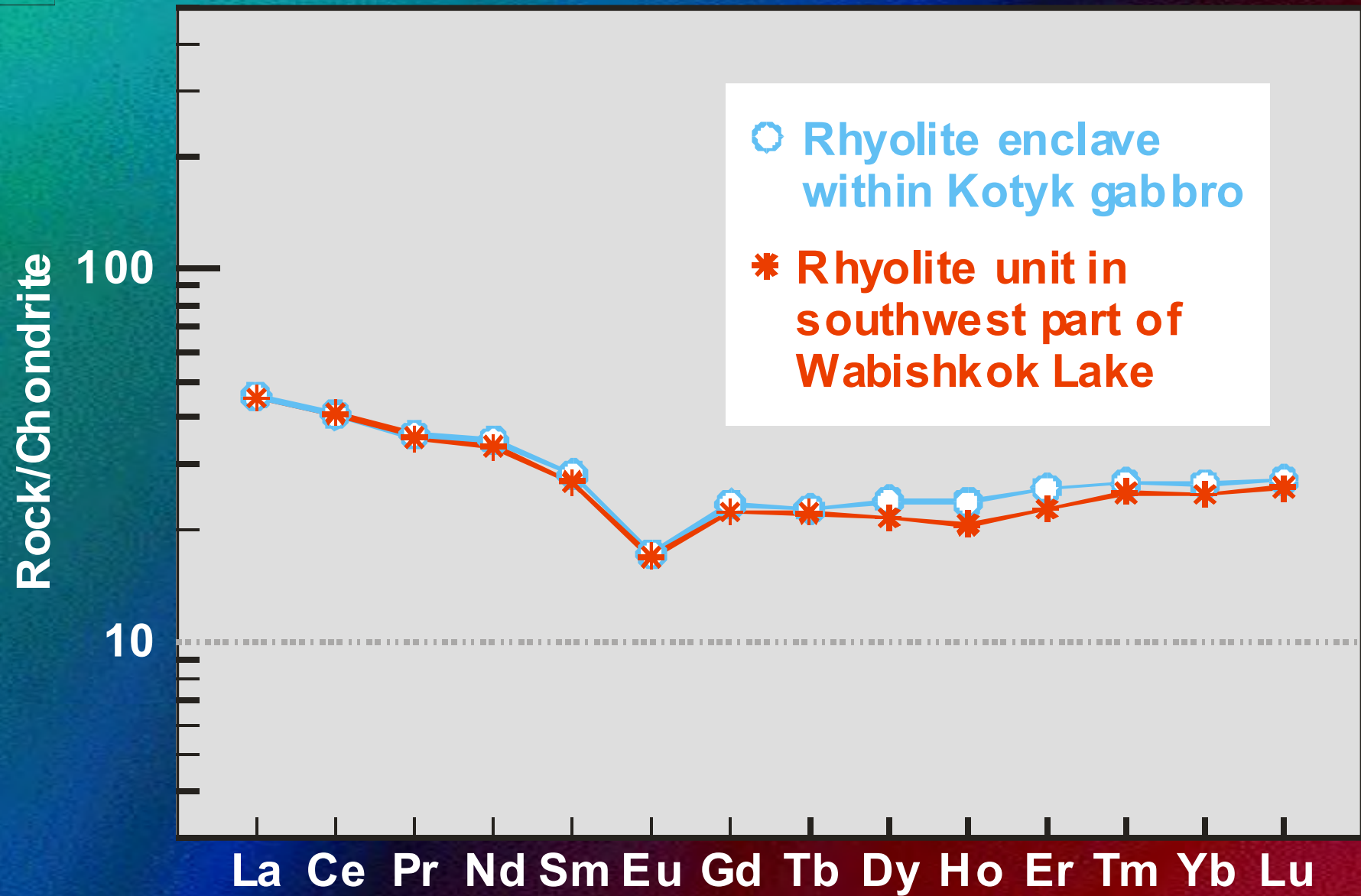
**LEGEND**

- (4a) Granodiorite, granite
- (4b) Quartz diorite, tonalite, diorite, granodiorite (/// with enclaves of unit 1)
- (3a) Gabbro, hornblendite
- (3b) Pyroxenite
- (2a) Rhyolite, massive to fragmental
- (2b) Feldspar-quartz porphyry
- (1a-h) Basalt, gabbro, amphibolite, mafic gneiss; minor volcanic breccia

**SYMBOLS**

- Geological contact (approximate)
- Wabishkok Lake antiform
- Mineralization (pyrite±pyrrhotite)
- Diamond-drill hole
- Electromagnetic conductor
- Gravel road, track

Note: Unit numbers correspond to those on Preliminary Map 2001F-3







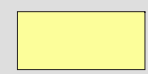
Rock/Chondrite

100

10

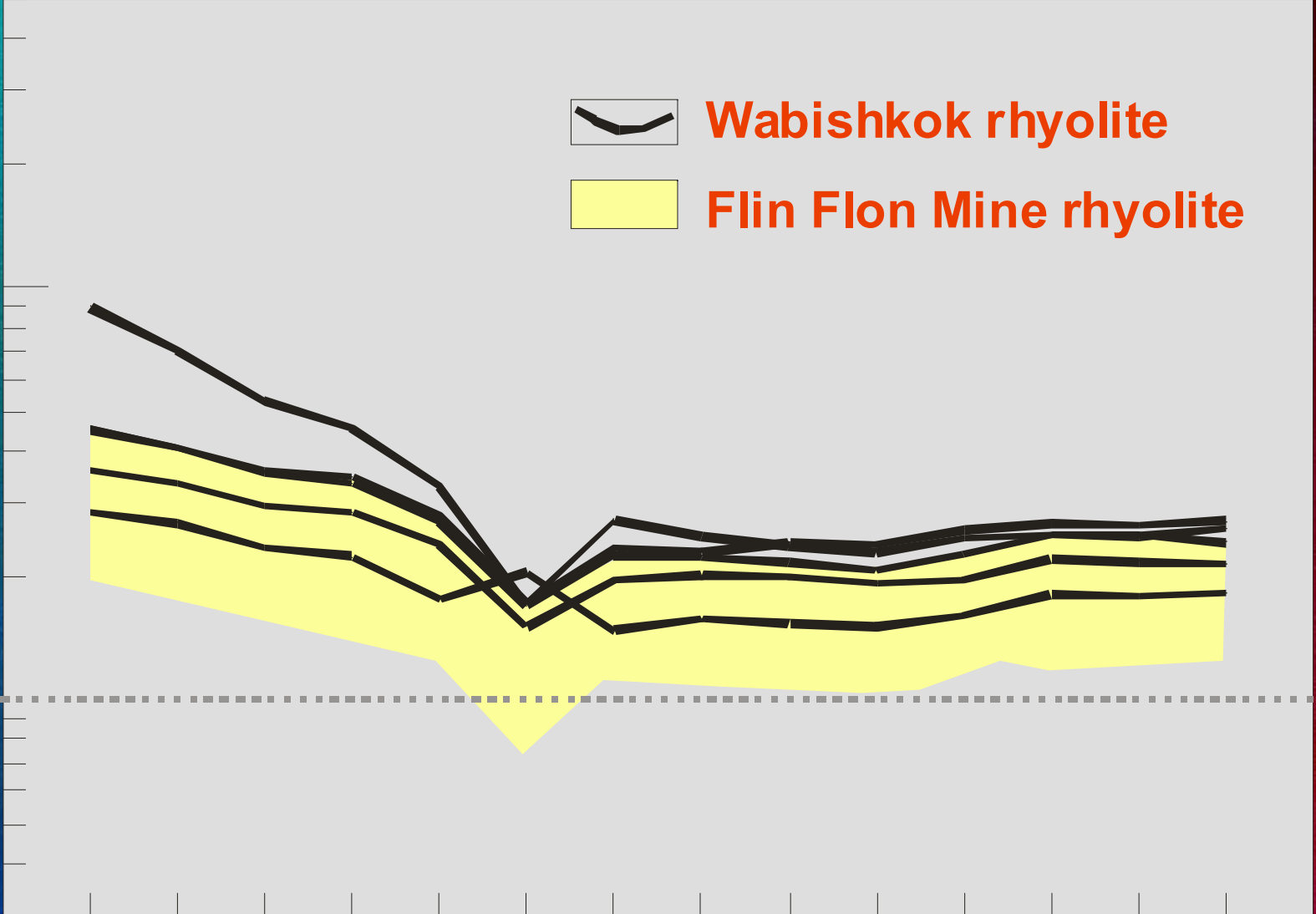


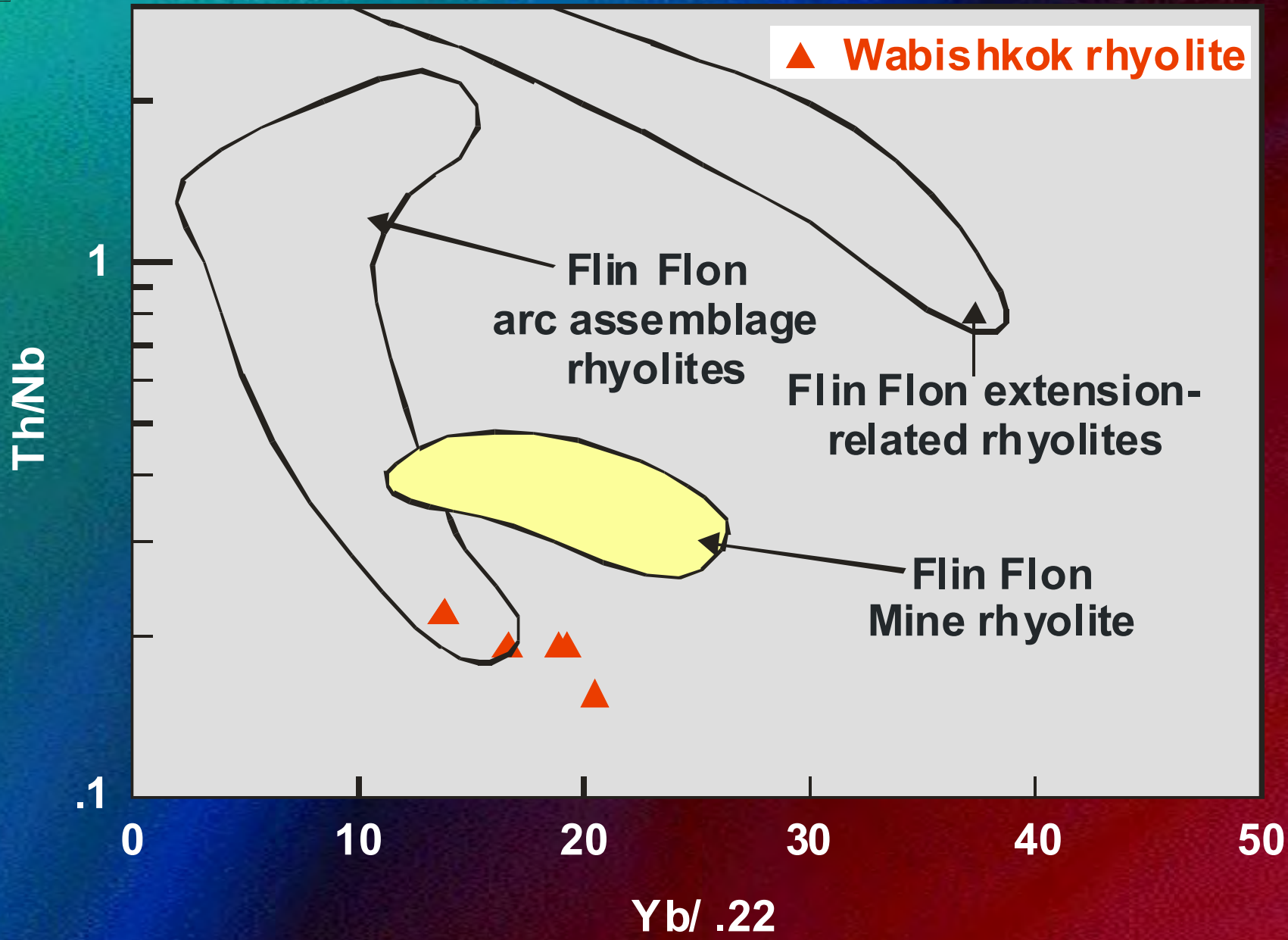
Wabishkok rhyolite



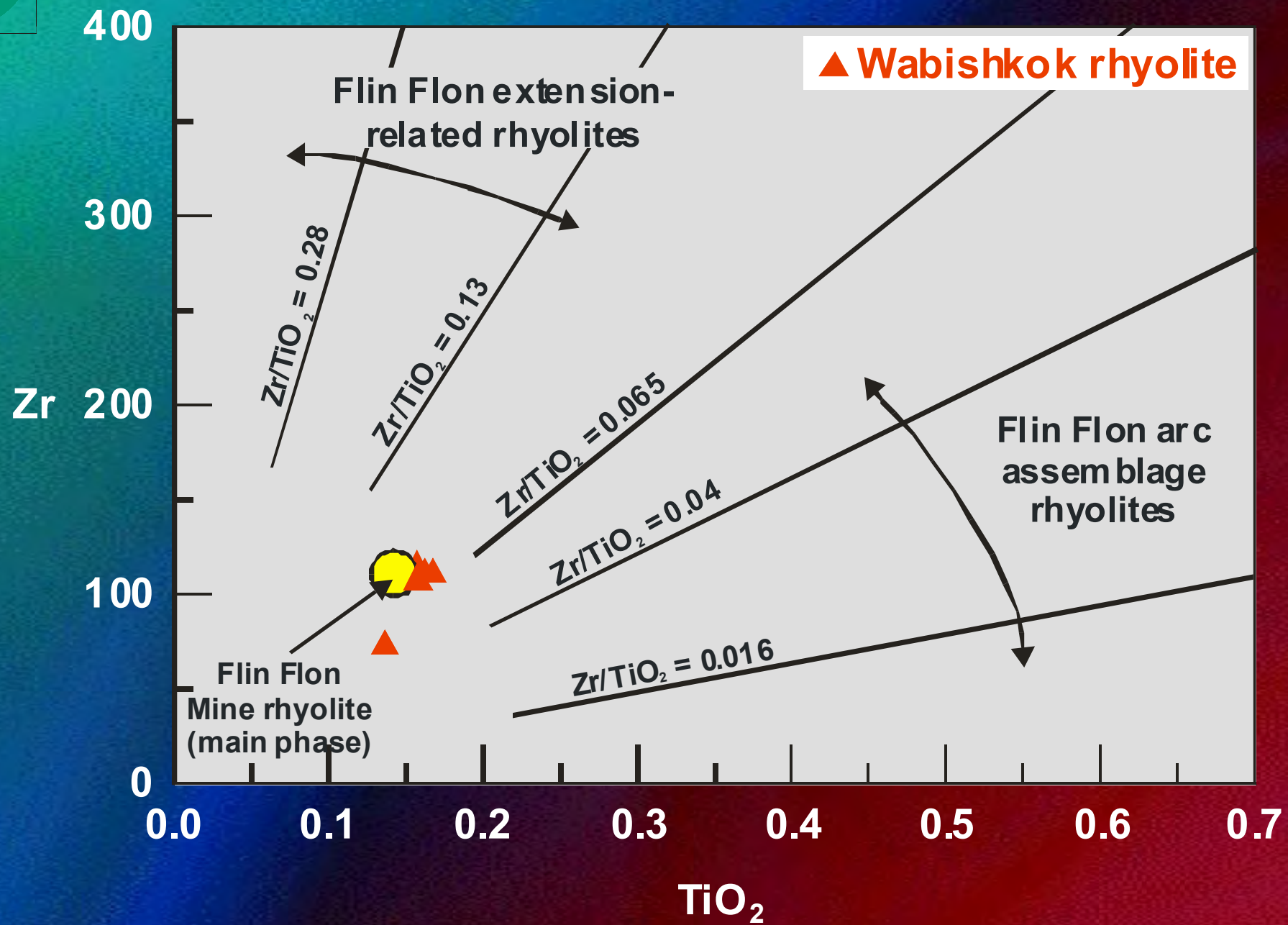
Flin Flon Mine rhyolite

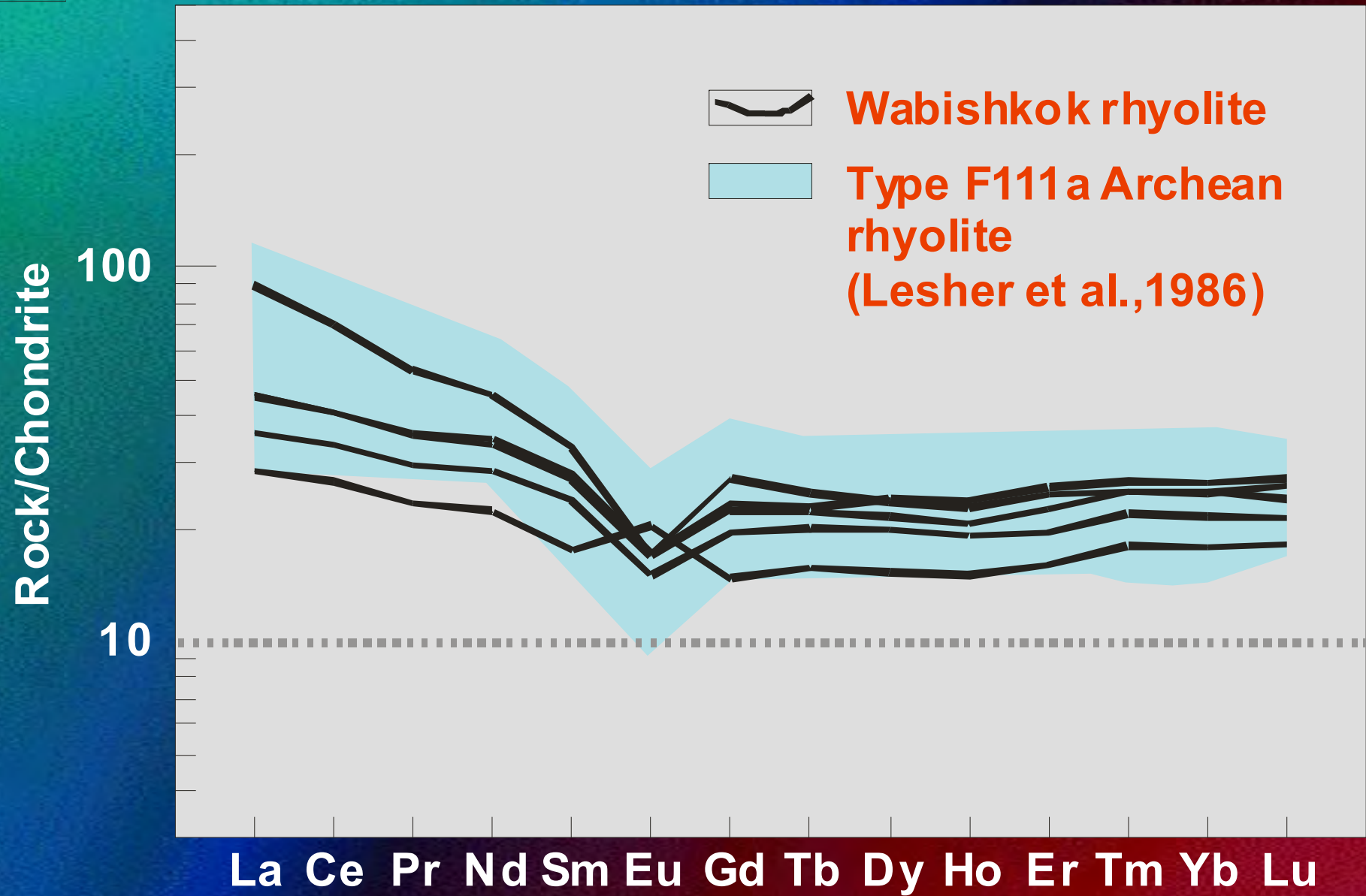
La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu











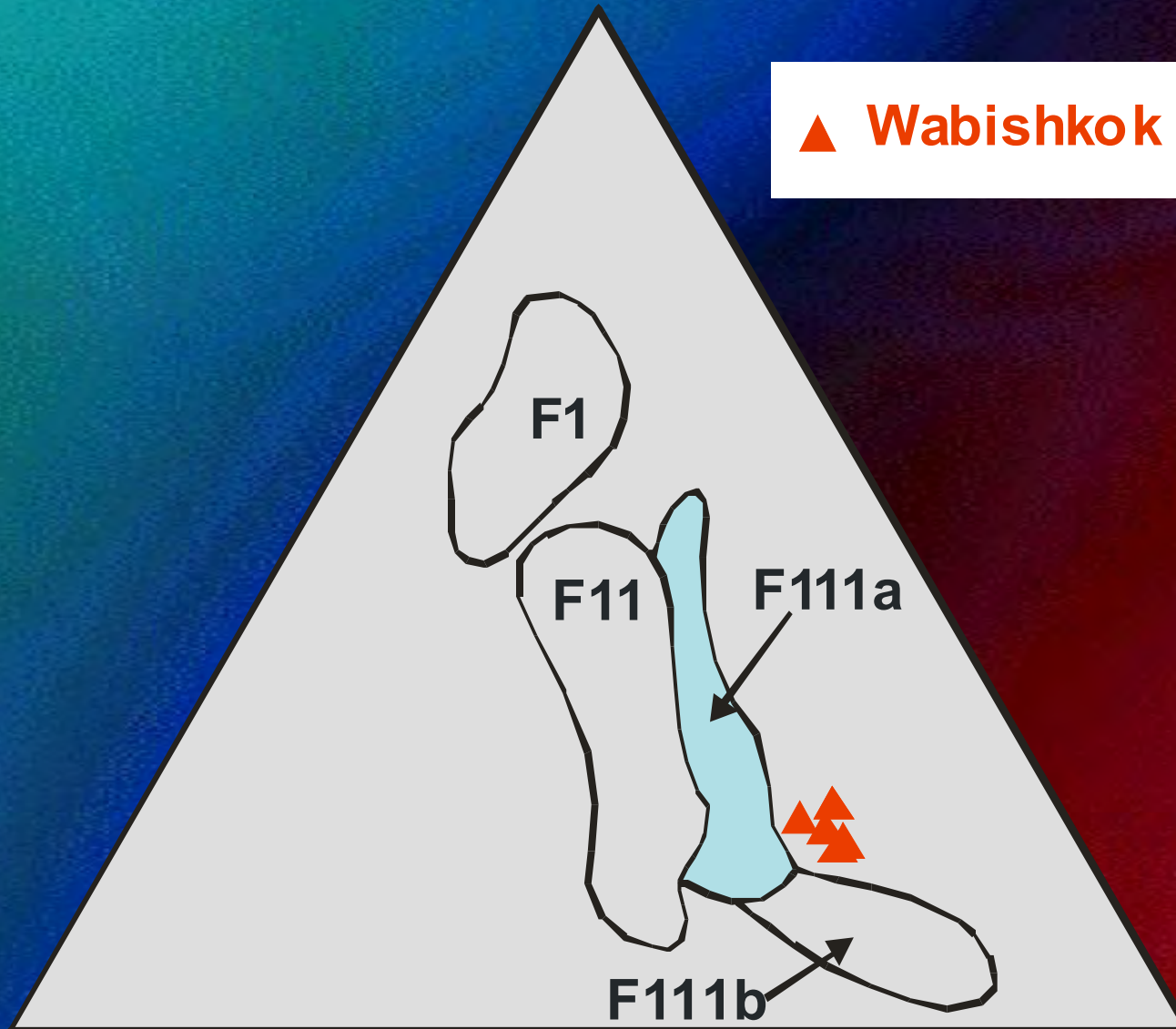


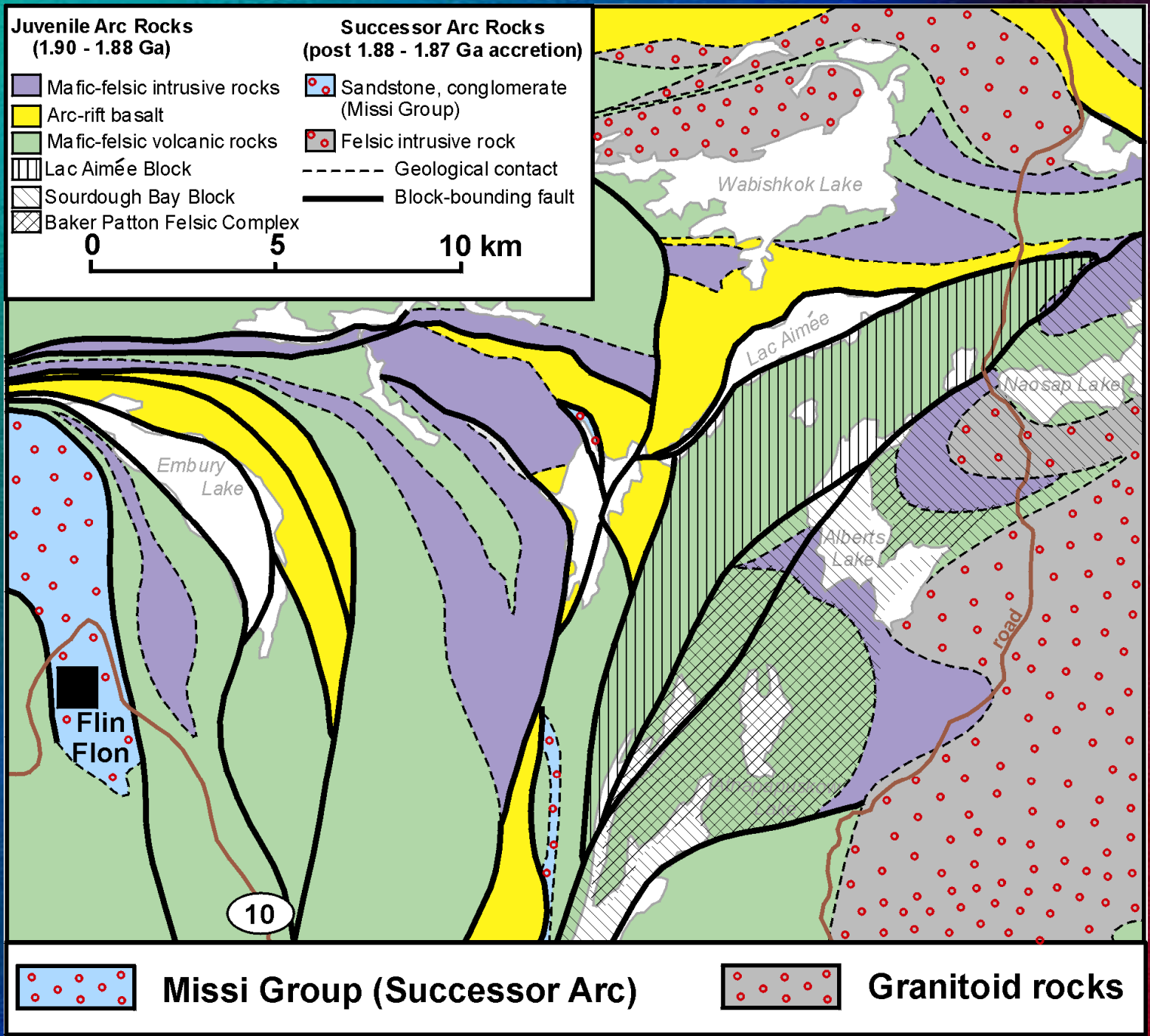
Ti/ 100

▲ Wabishkok rhyolite

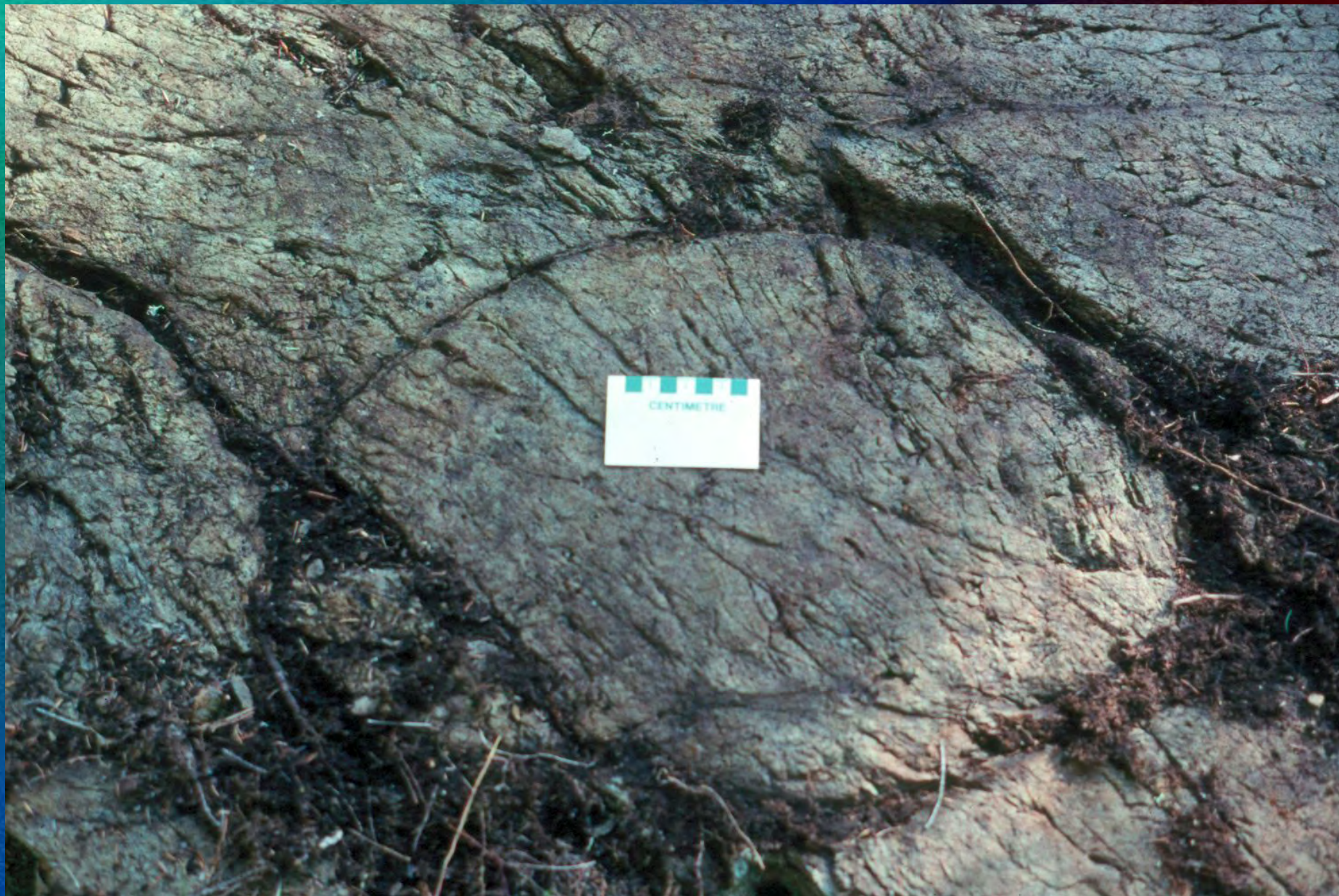
Zr/ 10

Y











# Fault Blocks Tectonic Affinity

Block	Arc	E-MORB	N-MORB	Transitional	Felsic volc	Turbidites	Rifting
Wabishko k	+				+		
Lac A imée	+			+	+	+	+
Sourdough	+				+	+	
Animus		+	+				
Mikan agan		+		+	+	+	
Dis mal				+	?	?	