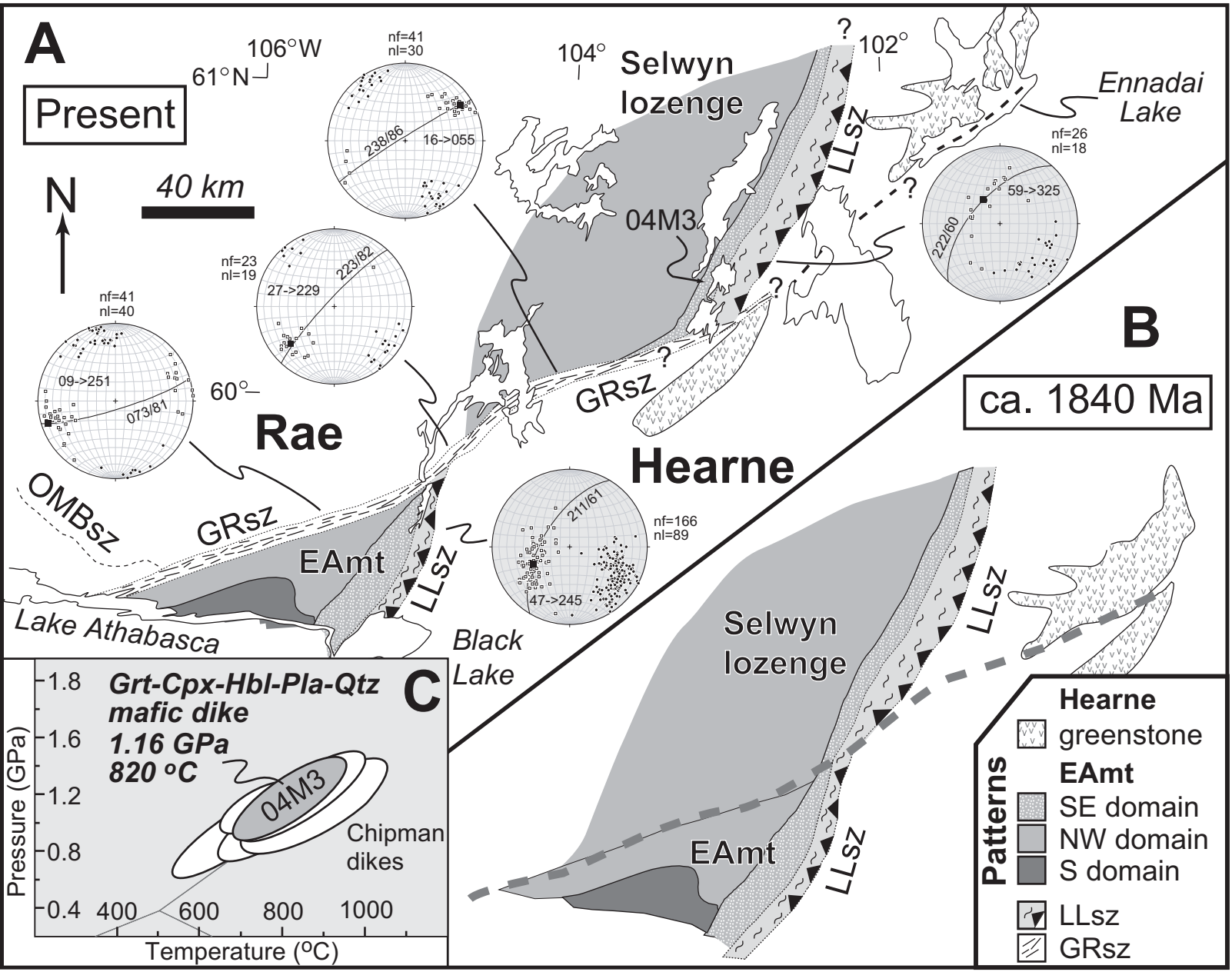

Figure DR1. A: Map present-day east Lake Athabasca area, showing our revised interpretation of East Athabasca mylonite triangle (EAmt) and Selwyn lozenge relationship. All structure data are plotted on stereonets (nf=# foliation data, nl=# lineation data). Filled circles-poles to foliation. Great circle-mean shear zone foliation. Open squares-extension lineation. Large filled box-mean extension lineation. LLsz - Legs Lake shear zone. GRsz-Grease River shear zone. B: Simplified ca. 1840 Ma reconstruction showing realigned lithologic units and LLsz. C: P-T plot for mafic dike 04M3 (location in A).

Analytical methods

Wavelength dispersive spectrometric X-ray maps were made and silicate compositions analyzed using a Cameca SX-50 electron microprobe at the University of Massachusetts-Amherst. X-ray maps were made using an accelerating voltage of 15 kV, beam current of 200 nA, and pixel count times of 70-80 ms. Quantitative analyses were made using an accelerating voltage of 15 kV, beam current of 15 nA, and peak count times of 20 ms (background 10 ms). Common silicate standards were used.

Sample description and silicate compositions

Sample 04M003 has the peak assemblage Grt-Cpx-Hbl-Pla-Qtz. The sample has a uniform fine-grain size (~100-200 μm) and is strongly foliated (upper left to lower right in x-ray maps), but individual crystals have a strain-free, annealed appearance. Garnet is generally unzoned except for a marked decrease in Mg toward margins (typical core Mg-ratio $[X_{Mg}/(X_{Mg} + X_{Fe})] = 0.23$), which is interpreted as the result of late Fe-Mg exchange reactions with other ferromagnesian phases during cooling. Some garnet crystals have slightly higher Ca ($X_{Gr} = 0.23$) in their cores, interpreted as early growth zoning, but more typical compositions are ~$X_{Gr} = 0.20$. Clinopyroxene and hornblende are typically unzoned except for a narrow increase in Mg at the margins interpreted as due to late Fe-Mg exchange with garnet. The dominant plagioclase composition is ~An_{24}-An_{26}, but plagioclase grains have narrow margins with markedly higher Ca compositions (up to An_{37}), which could be due to retrograde garnet-consuming net-transfer reactions.

Table A1. Silicate compositions-sample 04M003[1]

	Grt core	Pla core	Cpx	Hbl
Pt	pt 15	pt 5	pt 5	pt 7
FeO	27.82	0.12	12.16	17.89
MgO	4.68	-	11.64	8.91
MnO	0.71	-	0.12	0.05
CaO	6.83	5.17	20.09	11.43
Na2O	-	8.46	0.98	1.54
K2O	-	0.30	-	1.32
TiO2	0.02	-	0.22	2.09
Al2O3	21.48	23.78	2.90	11.90
SiO2	37.60	62.34	51.63	41.84
Cr2O3	0.00	-	0.01	0.08
Total	99.13	100.17	99.75	97.03

[1]Compositions for Chipman dikes in the East Athabasca mylonite triangle are published in Williams et al. (1995).

Thermobarometry

Calculations were made using the programs AX (for activity calculations) and the AveP-T method in Thermocalc 3.1 (Powell and Holland, 1988, 1994) with the internally consistent thermodynamic dataset of Holland and Powell (1998). The best fit results for peak metamorphic conditions, shown in Fig. 2C, were produced when H_2O and cats (Cpx-Tschermaks) are excluded phases.

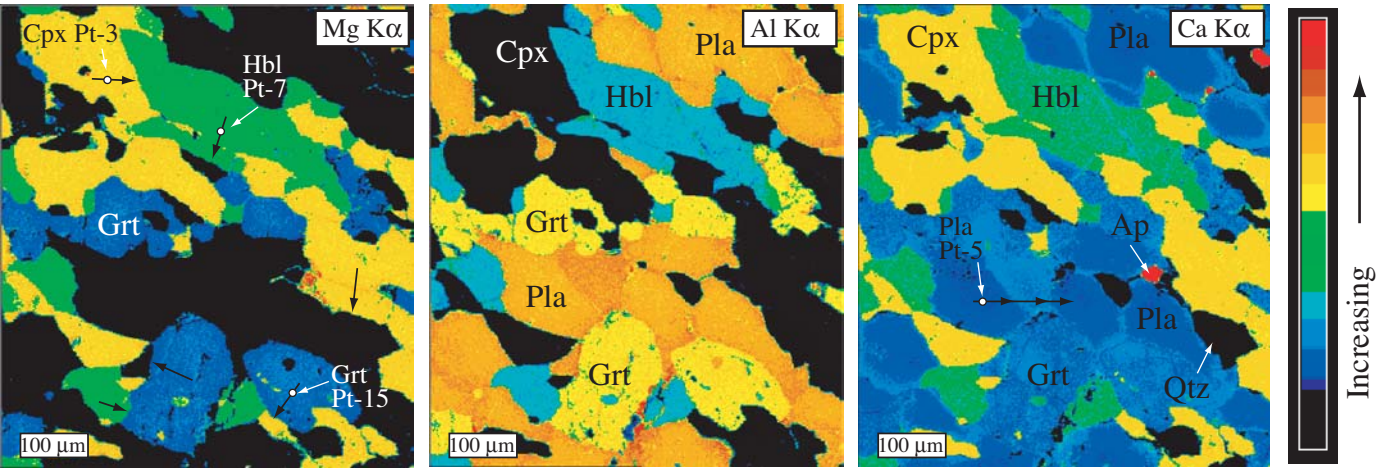

Figure DR2. X-ray composition maps for analyzed area in mafic dike sample 04M003. Black arrows represent multipoint traverses. Indicated points are those used for peak calculation.

References

Powell, R., and Holland, T.J.B., 1988, An internally consistent thermodynamic dataset with uncertainties and correlations: 3. Applications to geobarometry, worked examples and a computer program: Journal of Metamorphic Geology, v. 6, p. 173-204.

Powell, R., and Holland, T.J.B., 1994, Optimal geothermometry and geobarometry: American Mineralogist, v. 79, p. 120-133.

Holland, T.J.B., and Powell, R.,, 1998, An internally consistent thermodynamic dataset for phases of petrological interest: Journal of Metamorphic Geology, v. 16, p. 309-344.

Appendix DR3

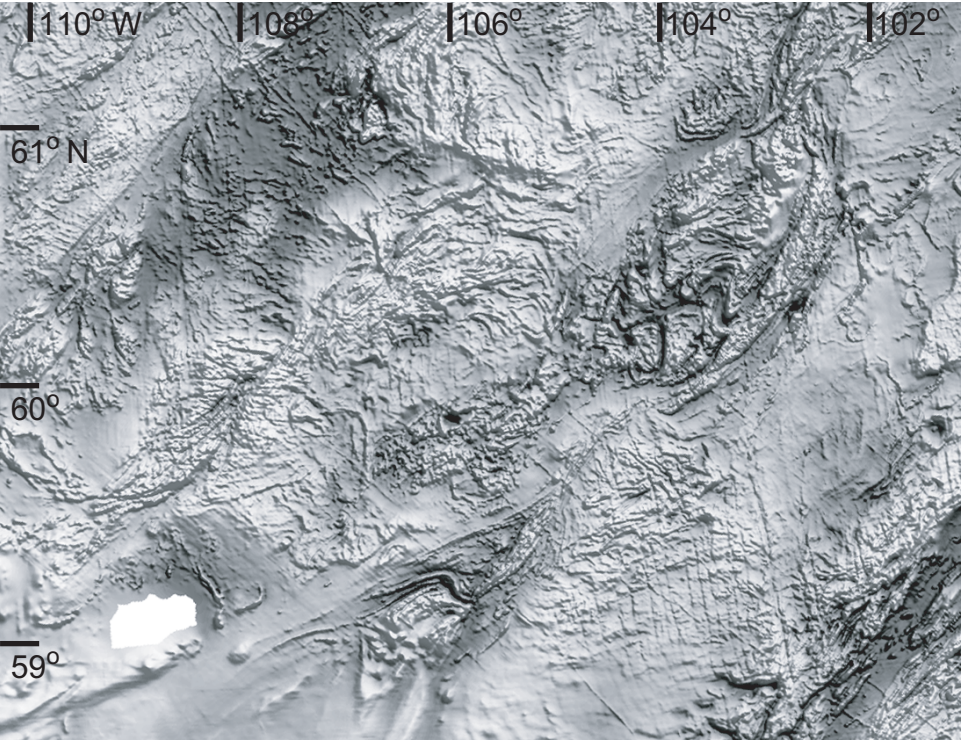

Figure DR3. This image was prepared by Paul and Doug Oneschuk (Geological Survey of Canada) with data from GSC's National Geophysical Data Center.