Sample 2: 99-PCM-02, 203.0–214.2m

Feldspar-quartz porphyry, Canamax Zone (Figure 4-4)
*(*see also *Chapter 2 "Canamax Zone, Section 4700E";* see also *Figure 1-16)*

This sample was collected over a depth interval of 203.0–214.2m in drill hole 99-PCM-02, a north-trending hole collared in Porcupine greywackes and intersecting FQ porphyry before finishing in ultramafic volcanic rocks. Canamax interpreted the porphyry to occur within the Pipestone fault system.

Sample 99-PCM-02, 203–214.2m yielded a small amount of variably altered, cloudy and (hematite?) stained fine, acicular zircon euhedra, and lesser flat, 2:1 euhedral crystals (Figure 4-3). Rare, clear grains are present. Many crystals contain fluid inclusions as well as inclusions of other mineral phases (likely feldspar, apatite, mica and quartz), although these have not been studied in detail. Most zircons are small, <200 μm in length and frequently 25 to 30 μm or less, in width. Upon annealing and leaching, many of the remaining zircons were mere shells of former crystals, the strongly altered domains having been preferentially dissolved and removed over lower-uranium domains with less radiation damage.

Several single-grain fractions of strongly chemically abraded zircon were analyzed (Z1 to Z6, *see* Figure 4-3). Uranium concentrations range from approximately 50 to 160 ppm, and Th/U ratios are uniformly low (0.06 to 0.14). All zircon fractions in this sample have low $^{207}Pb/^{206}Pb$ ages, ranging from 2645.2 Ma to 2664.6 Ma, and are discordant between 1.4 and 5.7% (*see* Table 4-1). With the exception of one fraction (Z3), however, all analyses are collinear. Linear regression of fractions Z1, Z2, Z4, Z5 and Z6 yields an upper intercept age of 2671.0±6.2 Ma with a high probability of fit (85%; Figure 4-4). Zircon fraction Z3 lies to the left of this regression and shows slightly more complex secondary Pb-loss effects; consequently, this fraction has been excluded from the age regression. The lower intercept of the regression of the remaining 5 fractions is less well constrained at 757±170 Ma, but suggests that these altered zircons were susceptible to a lead-loss event during the Neoproterozoic. The cause of this is unclear. The strongly collinear nature of the data from this sample suggests, however, that the upper intercept age of 2671±6 Ma represents an accurate estimate of the primary crystallization age of the Canamax FQ porphyry.

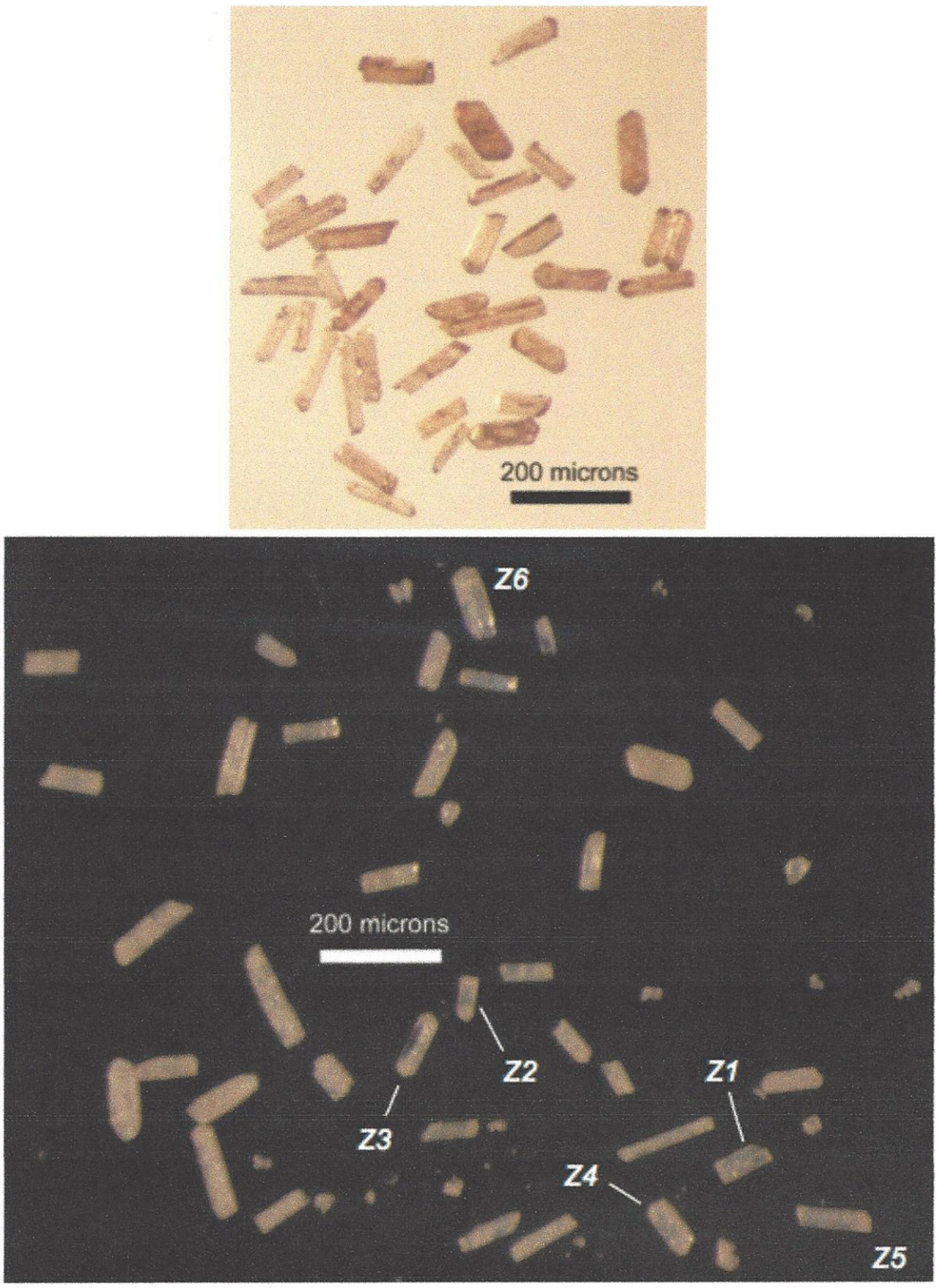


Figure 4-3. Canamax Zone feldspar-quartz (FQ) porphyry sample 99-PCM-02, 203.0–214.2m. Representative transmitted light photomicrographs of zircons selected for analysis, before annealing (left) and following chemical abrasion (right).

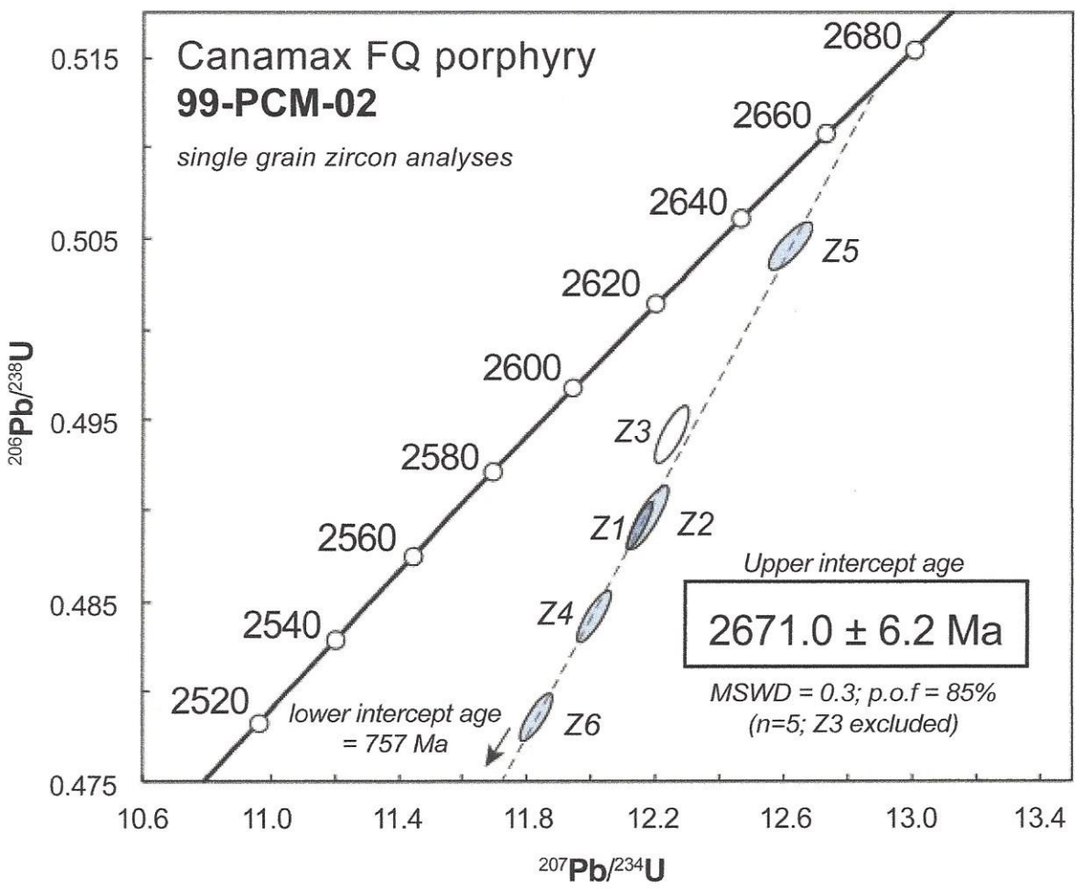


Figure 4-4. Concordia diagram for Canamax Zone feldspar-quartz (FQ) porphyry sample 99-PCM-02, 203.0–214.2m. Shaded ellipses represent zircon fractions included in regression. Zircon fraction Z3 (unshaded) shows more complex lead loss, and is excluded from the regression.

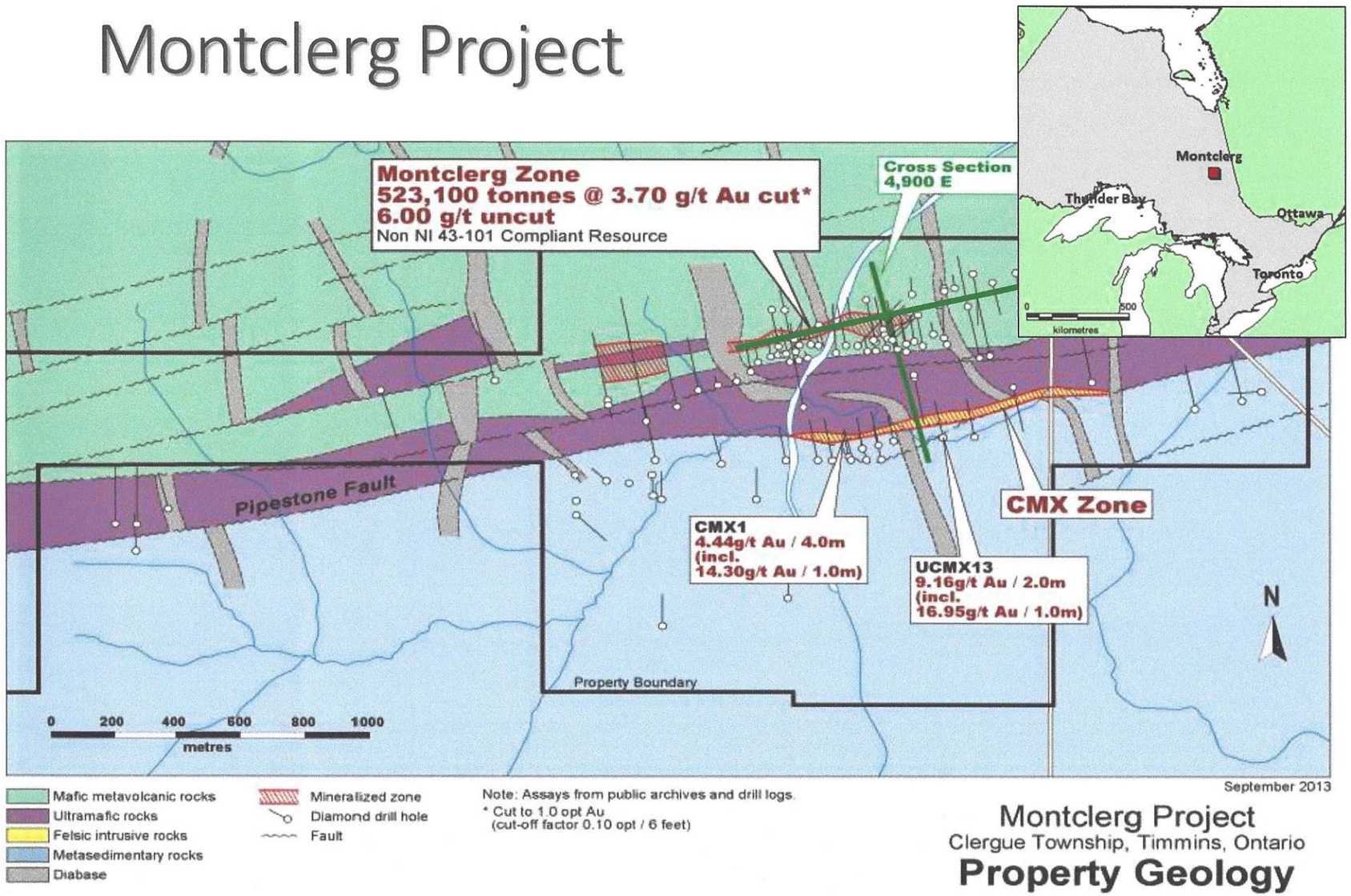
DISCUSSION

The age of 2710.4±1.3 Ma for the Montclerg QF porphyry, sampled in drill hole 07-MON-01, is in accord with the observation that it is intrusive into its adjacent rhyolite, which was sampled 350 m to the east and for which an age of 2714.3±0.8 Ma was obtained (drill hole 06-MAT-07; sample 06JAA-010B, 201–204m depth; Berger et al. 2007; Berger 2011). The ages from both units suggests that felsic volcanism with tholeiitic magmatic character spanned at least 4 million years in this part of the Kidd–Munro assemblage. Felsic tuffs of this age are also known from the Kidd–Munro assemblage, approximately 8 to 9 km east-northeast of the Montclerg prospect, in western Wilkie Township. Here, ages for the Wilkie rhyolitic tuff were obtained in 2 instances: one age over a broad sampling interval (220–260m) in Falconbridge (now Xstrata) drill hole WI21-06, by C.T. Barrie (1999 collection; sample 97TB091), and a second age over a more focussed interval (221.5–224.3m) in the same drill hole, by B.R. Berger (2007 collection; sample 07-BRB-102). Both age determinations yielded overlapping, statistically identical results: 2710.1±2.5 Ma (Barrie 1999) and 2710.4±4.1 Ma (Berger 2011 and unpublished data). The similarity of these ages with the Montclerg QF porphyry suggests that the latter could represent a subvolcanic equivalent of the rhyolitic tuffs in Wilkie Township. Of regional (and perhaps economic) interest, Bleeker, Parrish and Sager-Kinsman (1999) described a quartz-feldspar porphyritic flow from southern Prosser Township, several kilometres northeast of the Kidd Creek Mine, which has yielded a similar age, at 2710.1±4.4 Ma. This indicates that coeval (if volumetrically limited) felsic volcanism occurred in widely separated regions within the Kidd–Munro assemblage.

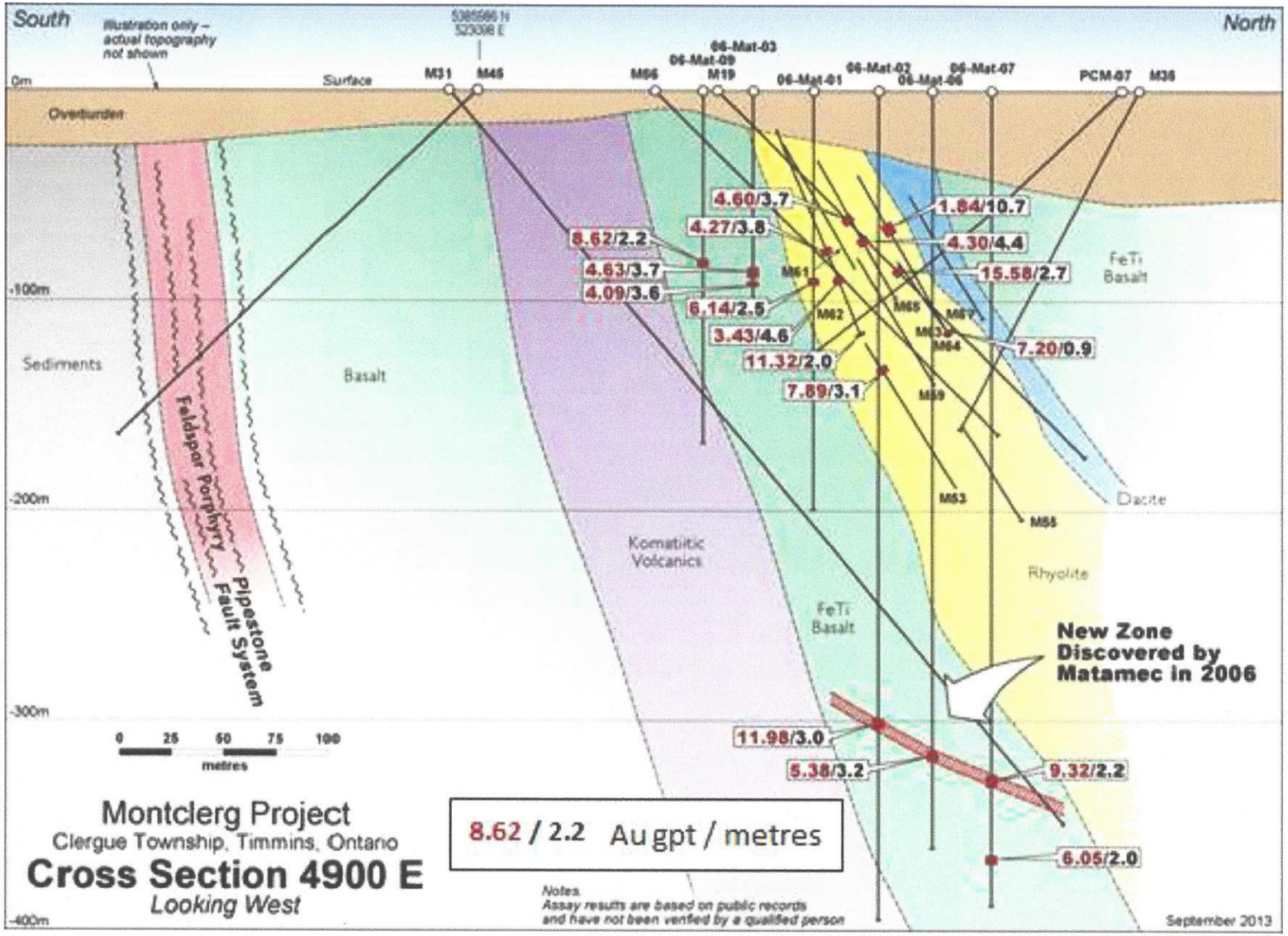
The age for the Canamax FQ porphyry, at 2671±6 Ma, is in good agreement with the range of established ages for alkaline felsic porphyries from the Kirkland Lake camp, which are dominantly 2680 to 2670 Ma, as are many of the Timiskaming assemblage alkaline volcanic rocks and conglomerates. For example, Ayer et al. (2005) reported an age of 2669.6±1.4 Ma for a feldspar-phyric trachytic lava in the volcanic-dominated Timiskaming assemblage sequence in Gauthier Township, in accord with the maximum age constraints for Timiskaming assemblage sandstone and conglomerate deposition in the Three Nations formation. The age of 2671 Ma for the Canamax FQ porphyry is also within error of 2 albitite dikes in the Timmins region: one of these intrudes Tisdale assemblage ultramafic volcanic rocks and has an age of 2676.5±1.7 Ma (04JAA-0010, Whitney Township); the other intrudes Tisdale assemblage tholeiitic basalts and the Pearl Lake granitic porphyry (2689 Ma) at the McIntyre Mine and has an age of 2672.8±1.1 Ma (SM85-60, Tisdale Township: *see* Ayer et al. 2005). It is also noted that the quartz-feldspar-phyric Pamour porphyry (Pamour Mine, Whitney Township), which carries little fabric and, at 2677.5±2.0 Ma, appears to be younger than many other porphyry intrusions in the Timmins area (Ayer et al. 2005), would overlap slightly in age with the upper error limit of 2677 Ma for the Canamax FQ porphyry.

The low Th/U ratios recorded in zircons from the Canamax FQ porphyry sample are unusual for igneous zircons in general, but not for those present in some alkaline and peralkaline granitoids. Late co-crystallization of thorium-rich phases such as monazite, thorite or xenotime could also exert a strong control on the thorium content of precipitating zircon in these environments.

Montclerg Project



See Note on last page concerning Historical and Non-Compliant Resources


South
North
Illustration only – actual topography not shown
5385586 N
523098 E
0m
Surface
Overburden
-100m
-200m
-300m
-400m
M31
M45
M56
M19
06-Mat-03
06-Mat-09
06-Mat-01
06-Mat-02
06-Mat-06
06-Mat-07
PCM-07
M36
M61
M62
M65
M67
M63
M64
M59
M53
M55
4.60/3.7
4.27/3.8
8.62/2.2
4.63/3.7
4.09/3.6
6.14/2.5
3.43/4.6
11.32/2.0
7.89/3.1
1.84/10.7
4.30/4.4
15.58/2.7
7.20/0.9
11.98/3.0
5.38/3.2
9.32/2.2
6.05/2.0
Sediments
Basalt
Feldspar Porphyry
Pipestone Fault System
Komatiitic Volcanics
FeTi Basalt
FeTi Basalt
Dacite
Rhyolite
New Zone Discovered by Matamec in 2006
0 25 50 75 100
metres
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Clergue Township, Timmins, Ontario
Cross Section 4900 E
Looking West
8.62 / 2.2 Au gpt / metres
Notes
Assay results are based on public records and have not been verified by a qualified person
September 2013