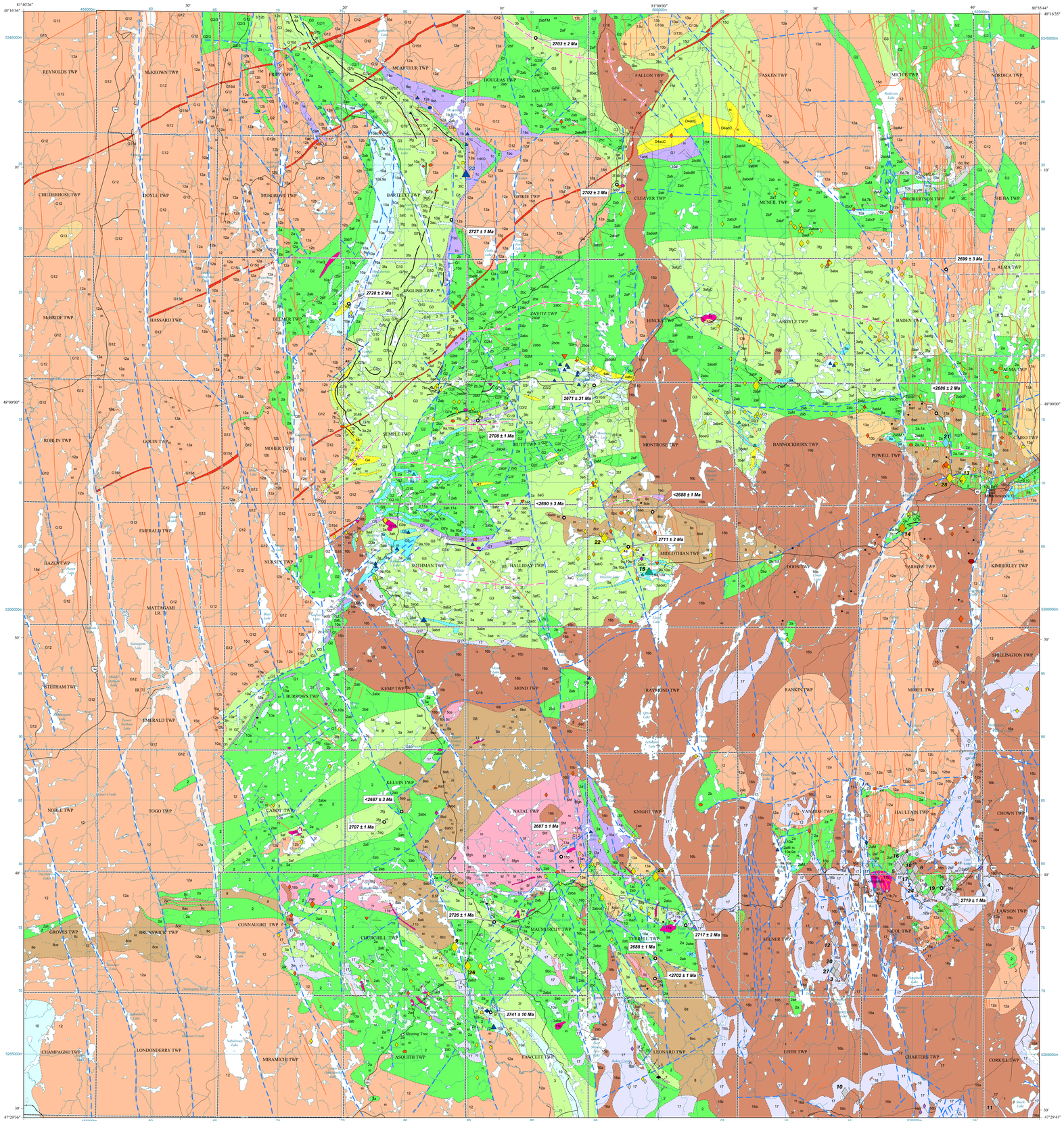


LEGEND*[abc]

PHANEROZOIC

CENOZOIC

QUATERNARY

PLEISTOCENE AND RECENT
Sand, gravel, clay and wetland deposits

UNCONFORMITY

PRECAMBRIAN

PROTEROZOIC

NIPISSING

17 — **Mafic Intrusive Rocks:** diabase, granophyre

HURONIAN SUPERGROUP

16 — **Sedimentary Rocks**
16a Lorrain Formation
16b Gowganda Formation

15, 15 — **Diabase Dikes**
15a Matachewan (2452 Ma) (NW)
15b Biscotasing (2167 Ma) (ENE)
15c Sudbury (1238 Ma) (WNW)
15d Abitibi (1140 Ma) (ENE)

INTRUSIVE CONTACT

ARCHEAN

NEOARCHEAN

13 — **Alkalic Intrusive Suite**
13a Syenite, monzonite, granite
13b Diorite, syenodiorite, monzogabbro, hornblendite
13c Schistose-textured

12 — **Felsic to Intermediate Intrusive Suite**
12a Tonalite, granodiorite, trondhjemite
12b Granite, quartz monzodiorite, quartz diorite
12c Schistose-textured

11 — **Porphyry Suite**
11a Porphyry
11b Quartz and/or feldspar porphyry
11d Tonalite, granodiorite

10 — **Mafic Intrusive Rocks**
10a Diorite, gabbro, metagabbro
10b Porphyritic
10c Anorthositic gabbro, leucogabbro
10d Granophyre

9 — **Ultramafic Intrusive Rocks**
9a Peridotite, pyroxenite
9c Schistose-textured

INTRUSIVE CONTACT

8 — **Timiskaming-Type Clastic Metasedimentary Rocks**
8a Arenite
8b Wacke
8c Conglomerate
8d Mudstone, siltstone
8e Schistose-textured

UNCONFORMITY

7, 7 — **Chemical Metasedimentary Rocks**
7a Iron formation
7b Oxide facies
7c Carbonate facies
7d Silicate facies, chert
7e Graphite facies

6 — **Clastic Metasedimentary Rocks**
6a Arenite
6b Wacke
6c Conglomerate
6d Mudstone, siltstone
6f Schistose-textured

5 — **Alkalic and Subalkalic Metavolcanic Rocks/Intrusions (Unconformable Timiskaming Type)**

Alkalic Metavolcanic Rocks/Intrusions
5a Massive flows
5b Porphyritic flows
5c Tuff
5d Breccia, pyroclastic breccia
5e Schistose-textured

Subalkalic Metavolcanic Rocks
Intermediate to Felsic Reworked Metavolcanic Rocks
5f Wacke, tuff
5g Lapilli tuff, lapillistone
5h Tuff breccia, pyroclastic breccia
Intermediate to Felsic Metavolcanic Rocks
5i Tuff, lapili tuff, lapillistone
5j Pyroclastic breccia, flows, autoclastic breccia

4 — **Felsic (to Intermediate) Metavolcanic Rocks/Intrusions**
4 Unsubdivided
4a Massive flows
4b Tuff, lapili tuff
4c Tuff breccia, pyroclastic breccia
4d Porphyritic
4e Spherulitic
4f Schistose-textured
4C Calc-alkalic
4T Tholeiite

3 — **Intermediate (to Felsic) Metavolcanic Rocks/Intrusions**
3a Massive flows
3b Pillowed flows
3c Variolitic flows
3d Hyaloclastite, flow breccia
3e Amygdaloidal flows
3f Tuff, lapilli tuff
3g Tuff breccia, pyroclastic breccia
3h Schistose-textured
3C Calc-alkalic
3T Tholeiite

2 — **Mafic (to Intermediate) Metavolcanic Rocks/Intrusions**
2a Massive flows
2b Pillowed flows
2c Variolitic flows
2d Hyaloclastite, flow breccia
2e Amygdaloidal flows
2f Tuff, lapilli tuff
2g Tuff breccia, pyroclastic breccia
2h Schistose-textured
2C Calc-alkalic
2F High-iron tholeiite
2M High-magnesium tholeite
2T Tholeite

1 — **Ultramafic (to Mafic) Metavolcanic Rocks/Intrusions**
1a Massive flows/intrusions
1b Polyaudred flows
1c Spinifex-textured flows
1d Pillowed flows
1f Schistose-textured
1R Basaltic komatiite
1K Komatiite
1O Olivine-spinifex

* This is a compilation legend.
* Units preceded by "G" are based on interpretation from aeromagnetic maps; those preceded by "D" are from drilling information; "C" denotes compiled information.
* Rocks are subdivided lithologically and the order does not imply age relationships within or among groups.

Mineral Deposit Type

- Felsic to Intermediate Intrusion-Associated Deposits
- Mafic to Ultramafic Volcanic and Intrusion-Associated Deposits
- Sediment-Associated Deposits
- Vein/Replacement Deposits
- Volcanic-Associated Deposits
- Unknown Hard Rock Deposit Type

Mineral Deposit Size

- Producing/past producing mine
- Prospect
- Occurrence

Mineral Deposit Commodity*

- Ag ± (Au, Bi, Co, Cu, Fe, Mo, Pb, Zn)
- asbe ± (Ag, Au, Cu, Ni)
- Au ± (Ag, Co, Cr, Cu, Fe, Mo, Ni, Pb, Pd, W, Zn)
- bari
- Bi ± (Mo)
- Co ± (Ag, Au, Cu, Ni)
- Cu ± (Ag, asbe, Au, Co, Fe, Mo, Ni, Pb, Zn)
- Fe ± (Ag, Au, Cu, Ni)
- grphx
- Mo ± (Au, Ag, Cu, Pb)
- Ni ± (Ag, Au, Co, Cr, Cu, Pb, Zn)
- Pb ± (Ag, Cu, Ni, Zn)
- Pt ± (Cr, Cu, Ni)
- Zn ± (Ag, Au, Cu, Fe, Ni, Pb)

***Abbreviations used for commodities:**

Ag = silver	Cr = chromium	Pb = lead
asbe = asbestos	Cu = copper	Pd = palladium
Au = gold	Fe = iron	Pt = platinum
bari = barite	grphx = hematite	minerals
Bi = bismuth	Mo = molybdenum	W = tungsten
Co = cobalt	Ni = nickel	Zn = zinc

Present Producing Mine

1. Ontario Barium

Past Producing Mines

2. Ashley
3. Bartlett
4. Bishop
5. Bonsall
6. Capitol
7. Cadillac
8. Castle-Trethewey
9. Herrick
10. Hudson Bay
11. Kell
12. Mann
13. Matachewan
14. Matamow
15. Midlothian
16. Miller Lake 1
17. Miller Lake 2
18. Millwrest
19. Morrison
20. Pamour
21. Ryan Lake
22. Stairs
23. Texmont
24. Tonopah
25. Tyrrette
26. Wasapika
27. Welch
28. Young Davidson

CREDITS

Geological compilation and interpretation by J.A. Ayer and N.F. Trowell.

Compilation of mineral deposit data by J.A. Ayer and N.F. Trowell.

Preparation of base map by S. Josey and M. Nevills.

Preparation of geophysical imagery by S. Josey and M. Nevills.

GIS compilation of data by S. Josey and M. Nevills.

To enable the rapid dissemination of information, this map has not received a technical edit. Discrepancies may occur for which the Ontario Ministry of Northern Development and Mines does not assume liability. Users should verify critical information.

Issued 2003.

Information from this publication may be quoted if credit is given. It is recommended that reference to this map be made in the following form:

Ayer, J.A., Trowell, N.F., Josey, S., Nevills, M. and Valadez, L. 2003.
Geological compilation of the Matachewan area, Abitibi greenstone belt; Ontario Geological Survey, Preliminary Map P.3527, scale 1:100 000.

Ontario

Ontario Geological Survey

MAP P.3527

PRECAMBRIAN GEOLOGY

GEOLOGICAL COMPILATION OF THE MATACHEWAN AREA, ABITIBI GREENSTONE BELT

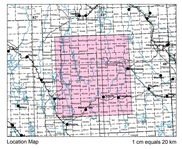
Scale 1:100 000

1000 m 0 1 2 3 4 5 km

NTS References: 41 P/6, 7, 10, 11, 14, 15; 42 A/2, 3, 6, 7

©Queen's Printer for Ontario, 2003.

This map is published with the permission of the Senior Manager, Precambrian Geoscience Section, Ontario Geological Survey.



Location Map — 1 cm equals 20 km

THE ABITIBI SUBPROVINCE

The Abitibi Subprovince is an 800 by 300 km Archean "granite-greenstone" domain situated along the southern margin of the Superior Province. It is dominated by supracrustal and granitoid rocks with a range of ages from 2.75 to 2.67 Ga (Jackson and Fyon 1991). Historically, the Abitibi greenstone belt was considered to be that portion of the Abitibi Subprovince extending to the western margin of the extensive granitoid complexes west of Timmins. However, geochronological and structural compilations (Ayer et al. 1999) shows that the bulk of greenstone belt underlying much of the Timmins-Kirkland Lake area and is now interpreted to represent a deeper erosional level of a once-continuous Abitibi greenstone belt extending to the Kapuskasing Structural Zone.

The Abitibi greenstone belt is one of the world's largest, best preserved and most economically productive greenstone belts in the world.

The Matachewan map sheet covers the area from approximately 15 km east of Gogama as far east as the western boundary of the 1:100 000 Kirkland Lake map sheet (P.3425), and from the southern margins of the 1:100 000 Timmins and Lake Abitibi map sheets (P.3379 and P.3398, respectively) to approximately 20 km south of Gowganda. Rocks are classified on the basis of their dominant lithology using textures, structures and primary mineralogy where recognizable, as well as their geochemistry. Geological information has been primarily compiled from previous mapping. New interpretations of the extent of lithological units, specifically in the areas lacking outcrop, have greatly benefited from the use of the reprocessed geophysical data for this area (Gupta 1995, 1996). As well, geochemical data have allowed for the further subdivision of the metavolcanic rocks.

A significant number of past-producing silver mines are present in the Gowganda part of the Matachewan area. Other past-producing mines have produced gold, silver, arsenic, cobalt, copper, nickel, gold, molybdenum, nickel and zinc. The industrial mineral asbestos has been produced in the past, while the Ontario Barium Mine is presently producing barite. The potential exists for structurally controlled gold mineralization in various host rocks. Copper-zinc-lead mineralization may be found in association with metavolcanic sequences. Potential exists for nickel-copper-platinum in the ultramafic/komatiitic rocks identified in the area.

SYMBOLS

- Geological contact
- Fault or deformation zone
- Sub-Huronian fault (geophysically interpreted)
- Major fold (anticline)
- Major fold (syncline)
- 50 — Bedding unsubdivided, facing unknown (trend only, inclined, vertical)
- 50 — Graded bedding, facing known (trend only, inclined)
- 50 — Graded bedding, facing known (vertical, overturned)
- 50 — Sedimentary bedding, facing known (trend only, inclined)
- 50 — Sedimentary bedding, facing known (vertical, overturned)
- 50 — Pillowed flow, facing unknown (trend only, inclined, vertical)
- 50 — Pillowed flow, facing known (trend only, inclined)
- 50 — Pillowed flow, facing known (vertical, overturned)
- Foliation, unknown generation (trend only)
- 50 — Foliation, 1st generation (inclined, vertical)
- Lineation, unknown generation
- 2702 ± 2 Ma — Geochronology date site (Ma)

SOURCES OF INFORMATION

This geological compilation of the Matachewan area is the fifth in a series of 1:100 000 maps and GIS data sets of the Abitibi Subprovince in Ontario being compiled over the next few years.

This geological map of the Matachewan area was compiled from published maps and reports of the Ontario Geological Survey and the Geological Survey of Canada. In addition, information from unpublished reports and maps on file with the Ontario Geological Survey, university theses, papers in professional journals, geophysical maps and satellite images were incorporated.

Geological interpretation was further enhanced by utilizing the Earth Resources and Land Information System (ERLIS) databases such as the Assessment File Resource Inventory (AFRI), the Drill Hole (DH) database, the Lithogeochemical (LGC) database and the Mineral Deposit Inventory (MDI) database.

Magnetic declination in 1999 through the center of the map area was 10°50' W. Mean annual change is 0.8' easterly.

REFERENCES

Ayer, J., Amelin, Y., Corfu, F., Kamo, S., Ketchum, J., Kwok, K. and Trowell, N. 2002. Evolution of the southern Abitibi greenstone belt based on U-Pb geochronology: autochthonous volcanic construction followed by plutonism, deformation and sedimentation; Precambrian Research, v.115, p.63-95.

Ayer, J.A. and Trowell, N.F. 2002. Geological compilation of the Swayze area, Abitibi greenstone belt; Ontario Geological Survey, Preliminary Map P.3511, scale 1:100 000.

Ayer, J.A., Trowell, N.F., Valade, L., Nevills, M. and Madon, Z. 2002. Geological compilation of the Swayze area, Abitibi greenstone belt; Ontario Geological Survey, Miscellaneous Release–Data 91.

Ayer, J.A. and Trowell, N.F. 2001. The Abitibi greenstone belt; a program update; in Summary of Field Work and Other Activities 2001, Ontario Geological Survey, Open File Report 6070, p.4-1 to 4-9.

Ayer, J.A. and Trowell, N.F. 2000. Geological compilation of the Kirkland Lake area, Abitibi greenstone belt; Ontario Geological Survey, Preliminary Map P.3425, scale 1:100 000.

Ayer, J.A., Trowell, N.F., Valade, L., Amyotte, E. and Madon, Z. 2000. Geological compilation of the Kirkland Lake area, Abitibi greenstone belt; Ontario Geological Survey, Miscellaneous Release–Data 58.

Ayer, J.A., Trowell, N.F., Madon, Z., Kamo, S., Kwok, Y.Y. and Amelin, Y. 1999. Compilation of the Abitibi greenstone belt in the Timmins-Kirkland Lake area: revisions to stratigraphy and new geochronologic results; in Summary of Field Work and Other Activities 1999, Ontario Geological Survey, Open File Report 6000, p. 4-1 to 4-14.

Ayer, J.A., Berger, B.R. and Trowell, N.F. 1999. Geological compilation of the Lake Abitibi area, Abitibi greenstone belt; Ontario Geological Survey, Preliminary Map P.3398, scale 1:100 000.

Ayer, J.A., Trowell, N.F., Berger, B., Madon, Z., Zalnerunas, R. and Valade, L. 1999. Geological compilation of the Lake Abitibi area, Abitibi greenstone belt; Ontario Geological Survey, Miscellaneous Release–Data 46.

Ayer, J.A., Trowell, N.F., Amelin, Y. and Corfu, F. 1999. Geological compilation of the Abitibi greenstone belt in Ontario: towards a revised stratigraphy based on compilation and new geochronology results, p. 14-24 in Summary of Field Work and Other Activities 1998, Ontario Geological Survey, Miscellaneous Paper 169.

Ayer, J., Berger, B., Johns, G., Trowell, N., Born, P. and Mueller, W. 1999. Late Archean rock types and controls on gold mineralization in the southern Abitibi greenstone belt; Geological Association of Canada–Mineralogical Association of Canada Joint Annual Meeting, Sudbury 1999, Field Trip B3 Guidebook, 73p.

Ayer, J.A. and Trowell, N.F. 1998. Geological compilation of the Timmins area, Abitibi greenstone belt; Ontario Geological Survey, Preliminary Map P.3379, scale 1:100 000.

Ayer, J.A., Trowell, N.F., Madon, Z., Wilson, A., Messier, L. and McIlraith, S.J. 1998. Geological compilation of the Timmins area, Abitibi greenstone belt; Ontario Geological Survey, Miscellaneous Release–Data 39.

Ayer, J.A., Trowell, N.F., Madon, Z. and Corfu, F. 1997. Geological compilation of the Abitibi greenstone belt in Ontario: the correlation of metallogenic potential with stratigraphy; p. 3-9 in Summary of Field Work and Other Activities 1997, Ontario Geological Survey, Miscellaneous paper 168, 149 p.

Ayer, J.A. and Trowell, N.F. 1996. Geological compilation of the Abitibi greenstone belt, Ontario; p. 19-22 in Summary of Field Work and Other Activities 1996, Ontario Geological Survey, Miscellaneous Paper 166, 198 p.

Ayer, J.A. and Trowell, N.F. 1995. Geological compilation of the Abitibi greenstone belt, Ontario; p. 5-8 in Summary of Field Work and Other Activities 1995, Ontario Geological Survey, Miscellaneous Paper 164, 305 p.

Gupta, V.K. 1996. Ontario airborne magnetic and electromagnetic surveys: Archean and Proterozoic "Greenstone" belts; in Summary of Field Work and Other Activities 1996, Ontario Geological Survey, Miscellaneous Paper 166, p.168-176.

Gupta, V.K. 1995. Processing of airborne magnetic and electromagnetic surveys; progress report; in Summary of Field Work and Other Activities 1995, Ontario Geological Survey, Miscellaneous Paper 164, p.299-300.

Heather, K.B., Shore, G.T. and van Breemen, O. 1995. The convoluted "layer-cake": an old recipe with new ingredients for the Swayze greenstone belt, Superior Province; Ontario Geological Survey in Current Research 1995-C, Geological Survey of Canada, p.1-10.

Jackson, S.L. and Fyon, J.A. 1991. The western Abitibi Subprovince in Ontario; in Geology of Ontario, Ontario Geological Survey, Special Volume 4, Part 1, p. 405-482.