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Marginal Notes

nis geological compilation of the Shaw Dome area, located ~30 km southeast of mmins, follows the bedrock mapping, at a scale of 1:20 000 in Ogden, Deloro, Shaw, Carman, Adams, Eldorado and Langmuir townships, conducted by the Precambrian Geoscience Section of the Ontario Geological Survey (OGS) in the Fimmins mining camp since 2000. The mapping area south of the Porcupine— Destor deformation zone is the main focus for this project. This compilation project was completed by the Ontario Geological Survey as part of its commitment of in-kind support to the Discover Abitibi Initiative. The Discover Abitibi Initiative is a regional, cluster economic development project based on geoscientific investigations of the western Abitibi greenstone belt.

FedNor, Northern Ontario Heritage Fund Corporation, municipalities and private

Data from the airborne geophysical survey of the Bartlett Dome area (OGS-GSC 2007) from the Abitibi Project of the federally funded Targeted Geoscience Initiative – Phase 3 (TGI-3) have been added to Figures 1 and 2. The Targeted Geoscience Initiative – Phase 3 is a geoscience-based collaboration between the Geological Survey of Canada, Géologie-Québec and the Ontario Geological Survey to help sustain reserves of base metals in the Abitibi greenstone belt.

GENERAL GEOLOGY AND STRATIGRAPHY With the exception of a few dike swarms (Matachewan and Abitibi) and minor

sector investors provided the funding for the initiative.

Proterozoic sedimentary rocks in the southeast part of the map area, all the bedrock is Archean in age (Table 1). The dominant metamorphic zone in the Shaw Dome area is lower greenschist facies with lesser higher metamorphic zones along intrusions, faults or folds hinges (Figure 3). The volcano-sedimentary succession in the Shaw Dome area south of the Porcupine–Destor deformation one (PDDZ) is characterized, from oldest to youngest, by the Deloro assemblage, e Tisdale assemblage, ultramafic to mafic intrusions, the Porcupine assemblage the Timiskaming assemblage, and lastly younger intrusions (including dike swarms). The Deloro assemblage consists of intermediate volcanic flows and several iron formation units overlain in Deloro Township by felsic fragmental

subordinate feldspar and quartz porphyry, and ultramafic to mafic intrusions. southeast-trending anticline with a shallow southeast plunge centred in Shaw Township is the main structural feature in the Shaw Dome. The volcanolimb. A significant fold system occurs in the northwestern segment of the Shaw a series of tight east-west folds. Minor east-northeast-trending folds appear to

or green mica fragments and rare quartz eyes. The lower Tisdale assemblage in

ownship and is interpreted as the locus of PDDZ. Here, the stratigraphy is highly precipitation, thus, the presence of gold mineralization associated with iron omplicated by the presence of a number of facing reversals related to this Montreal River fault system, traverse the map area. South-dipping normal faults submarine unconformity between the Deloro and Tisdale assemblages. also occur in the southeast part of the Shaw Dome (Figures 4, 5 and 6). This structure was affected by the main folding event in the Shaw Dome supporting its early nature and has resulted in tectonic superposition of Deloro assemblage strata over the younger Tisdale assemblage in the southern margin of the Dome.

Various types of mineral deposits and occurrences are present in the Shaw Dome (indicated by abbreviation "mgs"). area including Ni, Au, Cu, silica, magnesite, barite and platinum group elements metavolcanic rocks, with abundant lapilli size fragments, including some "fuchsitic" the attention of mineral explorationists to the Shaw Dome over the past 80 years.

this area consists of felsic volcaniclastic rocks intercalated with komatiitic volcanic recognized at least 25 years ago. This potential is exemplified by the close spatial rocks and, less extensively, iron formation units. The upper part of the Tisdale relationships between extrusive and intrusive ultramafic rocks, sulphide- and/or assemblage consists of intercalated tholeiitic mafic and komatiitic ultramafic oxide-bearing iron formations and sulphidic graphitic argillite that occur extensively volcanic rocks. The volcano-sedimentary succession north of the PDDZ is around the outer margin of the Shaw Dome. The interaction of komatiitic magma characterized by a series of intercalation of tholeiitic mafic volcanic rocks and with an external sulphide source (the sulphide-bearing iron formation or sulphidic komatiites of the Tisdale assemblage overlain by the felsic volcaniclastic and graphitic argillite) is critical for komatiitic Ni-Cu-(PGE) mineralization. Abundant sedimentary rocks of the Porcupine assemblage. Lenses of Timiskaming olivine cumulate indicates a high volume of magma, potentially sufficient to dissolve assemblage rocks also occur along the PDDZ in the northern part of Deloro sulphur and precipitate sulphide minerals that carry the Ni, Cu and PGE. The ownship. Intrusions within the supracrustal rocks are dominantly felsic with combination of abundant olivine cumulate (i.e., high magma flux) and its proximity to a sulphur source results in high exploration potential for komatiite-associated Ni-Cu-(PGE) deposits not only in the middle part of the Shaw Dome, but also stratigraphically higher, where the komatiitic units are interleaved with tholeiitic

The presence of numerous gold occurrences south of the PDDZ in the Shaw sedimentary strata young outward from the centre of this structure with a moderate Dome area indicates good gold potential for this area even if all major gold deposits 48°27′00″ rtheast dip on the northeast limb and a steep northwest dip on the northwest in the Timmins mining camp found to date occur north of the PDDZ. The style of gold mineralization south of the PDDZ is distinct from that north of the PDDZ. Dome. It is most probably related to overprinting by the PDDZ, which resulted in Whereas the major gold deposits north of the PDDZ are lode gold deposits (quartzcarbonate veins) associated with mafic volcanic and clastic metasedimentary rocks, south of the PDDZ, the gold mineralization occurs mainly associated with quartz veins within or near iron formations. Although not common in the Abitibi greenstone A highly strained deformation zone, ~100 m wide, is located in northern Deloro belt, sulphidation of iron formation is recognized as a critical mechanism for gold formation in the area suggests some potential for this style of mineralization. It may ormation zone. Numerous north-northwest-trending faults, which are part of the also be significant that almost all gold occurrences in this area occur near a

The nickel potential associated with komatiites of the Shaw Dome area was

Locally, intensive carbonate replacement (e.g., magnesite) occurred within large komatiitic units resulting in the development of magnesite in the Shaw Dome area. The main occurrences of magnesite are defined in a general corridor trending eastnortheast and include the Canadian Magnesite deposit in south-central Deloro Township (#20 on map), a property in northeastern Adams Township (#102 on map) and another area of intense magnesite alteration in west-central Carman Township

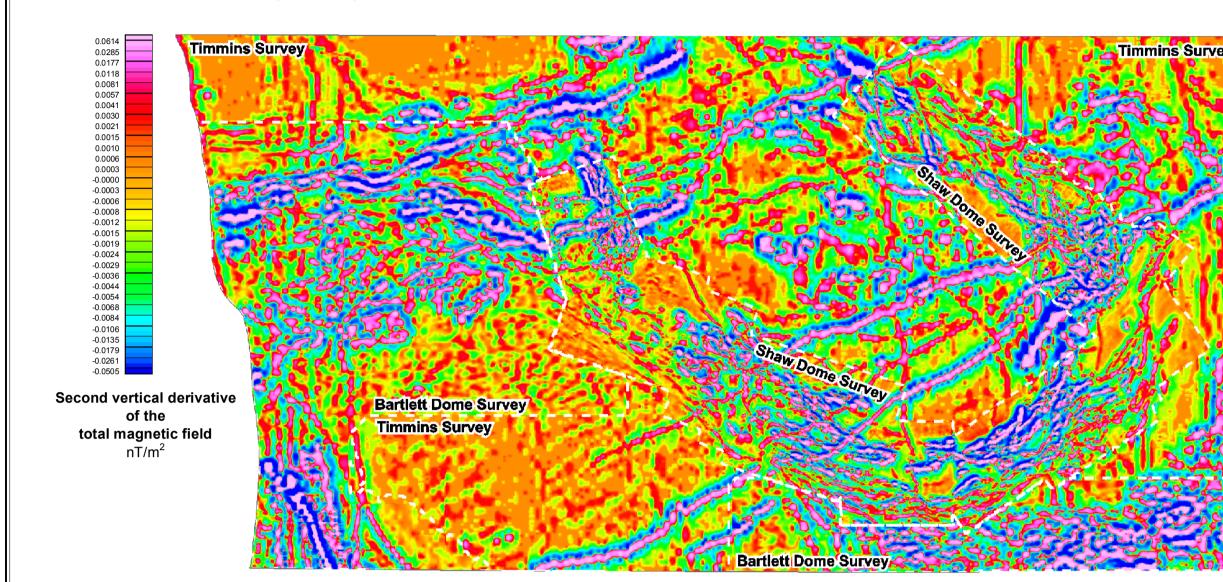


Figure 1. An image of the second vertical derivative of the total magnetic field data merged from several airborne geophysical surveys covering the Shaw Dome area. Sources: 1) Timmins survey (OGS 2003: Geophysical Data Set (GDS) 1004): magnetic-GeoTEM I time-domain electromagnetic (TDEM) surveys, 200 m line spacing, flown in 1987; 2) Shaw Dome survey (OGS 2004: GDS 1046): magnetic-Aerodat frequency-domain electromagnetic (FDEM) surveys, 50 m line spacing, flown in 1996; and 3) Bartlett Dome survey (OGS–GSC 2007: GDS 1057): 5953 line-kilometres airborne magnetic-MegaTEM® II TDEM surveys, 200 m line spacing, flown in 2006. Data from the airborne geophysical survey of the Shaw Dome area were

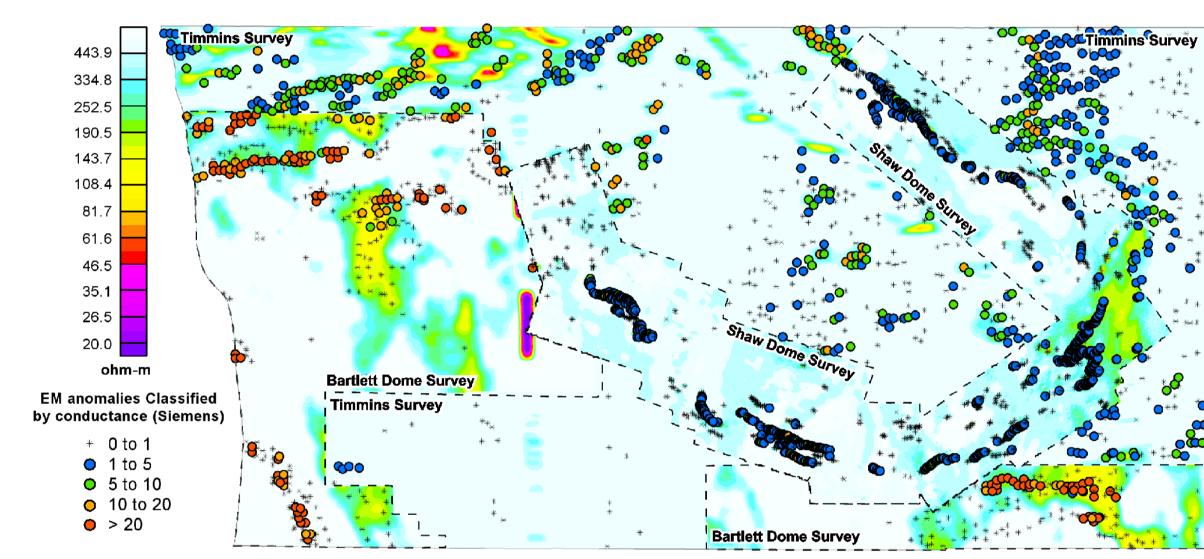


Figure 2. An image of the electromagnetic (EM) and the resistivity field data merged from several airborne geophysical surveys covering the Shaw Dome area. Sources: 1) Timmins survey (OGS 2003: GDS 1004): magnetic-GeoTEM I TDEM surveys, 200 m line spacing, flown in 1987; 2) Shaw Dome survey (OGS 2004: GDS 1046): magnetic-Aerodat FDEM surveys, 50 m line spacing, flown in 1996; and 3) Bartlett Dome survey (OGS–GSC 2007: GDS 1057): 5953 line-kilometres airborne magnetic-MegaTEM® II TDEM surveys, 200 m line spacing, flown in 2006. Data from the airborne geophysical survey of the Shaw Dome area were donated by Outokumpu Mines Ltd. to Discover Abitibi Initiative (Phase 3) (OGS 2004). Data from the airborne geophysical survey of the Bartlett Dome area are from the Abitibi Project of the federally funded Targeted Geoscience Initiative – Phase 3 (TGI-3) (OGS–GSC 2007).

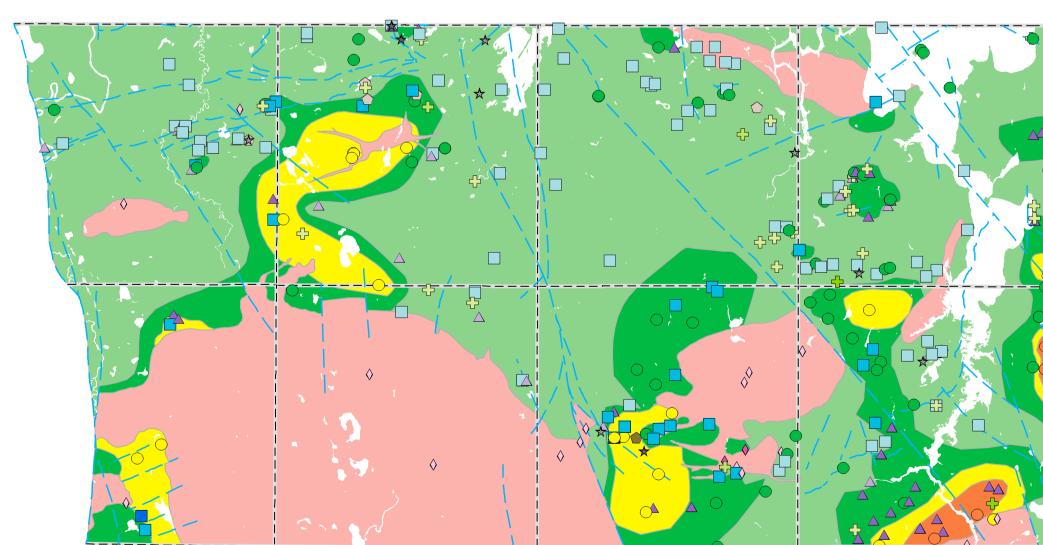
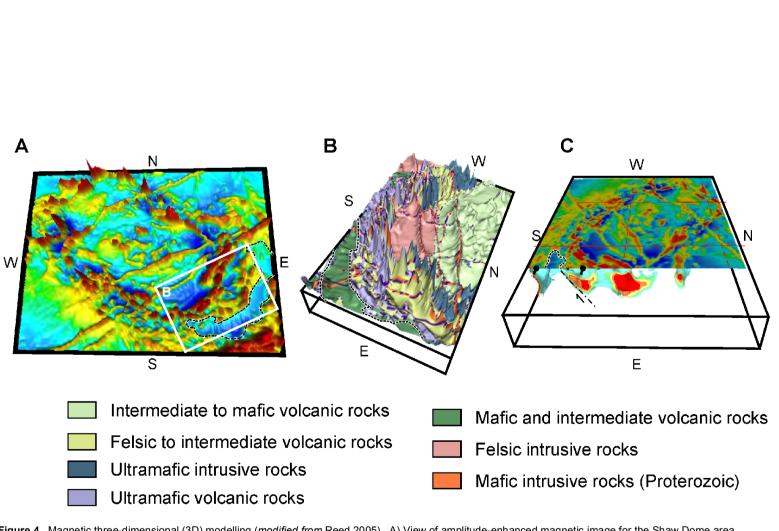


Figure 3. Metamorphic map of the Shaw Dome area, western Abitibi enstone belt (modified from Thompson 2005); colours used in figure ow those shown in accompanying chart. Lower greenschist zone i the dominant metamorphic zone in the Shaw Dome area. However, significant higher metamorphic zones are also present in the area. Those zones are generally associated with intrusions, faults, fold hinges or a combination of these events. Diagnostic mineral assemblages (point data) are the basis for the definition of metamorphic grade in each metamorphic zone. Metamorphic zones on this figure are derived from the grade in one or more rock associations. The relative positions of the boundaries in rock associations 2 to 7 that correspond approximately to the lower/upper greenschist zone boundary on the map are inferred. The precise positions of these boundaries relative to each other have yet to be calibrated. Mineral name abbreviations: ab - albite, act actinolite, am - amphibole undifferentiated, and - andalusite, bt - biotite, cb - carbonate (ankerite, calcite, dolomite, magnesite, siderite), cht chlorite, crd - cordierite, ctd - chloritoid, cum - cummingtonite, diop diopside, epg - epidote group, fp - feldspar, grt - garnet, gru - grünerite, hn - hornblende, kf - potassium-feldspar, qtz - quartz, mt - magnetite, oam - orthoamphibole, plg - plagioclase, prn - prehnite, pu - pumpellyite, se - serpentine, sil - sillimanite, st - staurolite, tlc - talc, trm - tremolite, wm - white mica (muscovite, paragonite, talc).

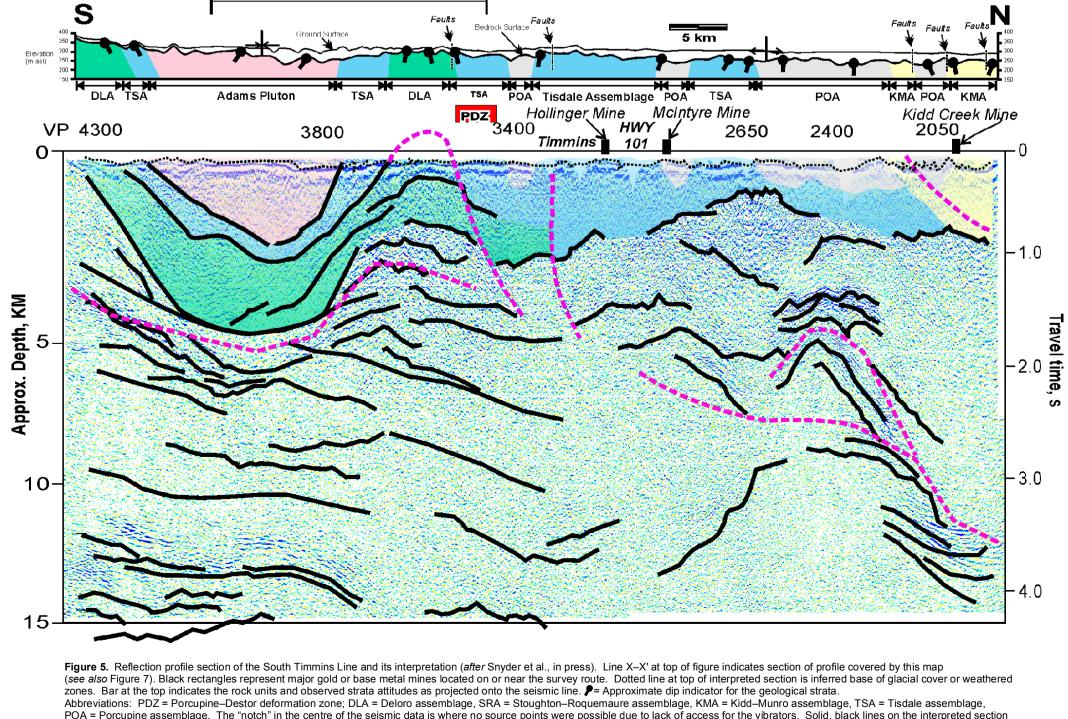
Archean Metamorphic Grade on Figure	Subgreenschist Zone	Lower Greenschist Zone	Upper Greenschist Zone	Transition Zone	Amphibolite Zone	
Rock Association/f	Metamorphic Gra	ade of Samples				
Metabasites: metabasalt/gabbro/andesite, greenstone, amphibolite	pu-prn	act-cht-epg-ab		act-hn	hn-calcic plg	
Metaquartzofeldspathic Rocks: metarhyolite/dacite, qtz-fp metaporphyry, felsic metavolcanoclastite, metasandstone, psammite	pu-prn	cht-wm/kf	biotite	l t	ot-hn	
Metaultramafites: metaperidotite/dunite, metakomatiite		cht-tlc-se-cb	clinoamphibole			
Metamorphosed Aluminum-rich Rocks: metamudstone/siltstone, meta-hydrothermal alteration		cht/ctd-wm	bt-cht, bt-grt-c	cht st-an	crd-and/sil-bt d/sil-bt, crd-oam	
5) Metamorphosed Chemical Sedimentary Rocks: meta-iron formation, chert		qtz-cht cb-cht mt-qtz	clinoamphibole-grt two amphiboles			
Metamorphosed Granitoid: metagranite to metatonalite	pu-prn	cht-wm/kf	biotite bt-epg	g am(act/c	crossite)	
7) Metamorphosed Carbonate-rich Rocks: carbonate metasediments, metamorphosed interpillow rock/ breccia/hydrothermal alteration, synmetamorphic cb alteration		cht-cb-qtz	bt-cht epg-act-cb-	•	-am-grt hn-bt	
8) Unmetamorphosed Granitoids: granite to tonalite	metamorphosed Granitoids: granite to tonalite no metamorphic minerals					
Metamorphic Facies	Subgreenschist	Greenschist			Amphibolite	



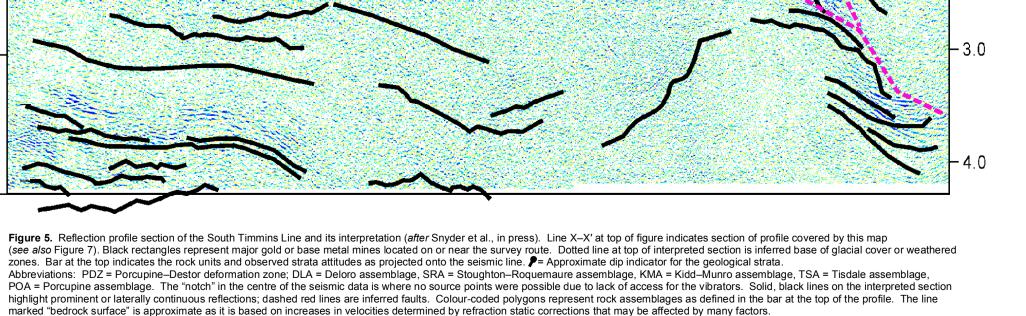
Oktamano voloamo rosko
Figure 4. Magnetic three-dimensional (3D) modelling (<i>modified from</i> Reed 2005). A) View of amplitude-enhanced magnetic image for the Shaw Dome area. B) Image showing the geology of Langmuir Township draped on amplitude-enhanced magnetic data (rotated ~120°). C) North to south slice through the inversion isosurfaces under the flat magnetic data. Dashed line = low magnetic signature within the southeastern corner of the Shaw Dome area. Dash-dot line = north-dipping fault; p = approximate dip indicator for the geological strata.
B) Image showing the geology of Langmuir Township draped on amplitude-enhanced magnetic data (rotated ~120°). C) North to south slice through the inversion isosurfaces under the flat magnetic data. Dashed line = low magnetic signature within the southeastern corner of the Shaw Dome area.

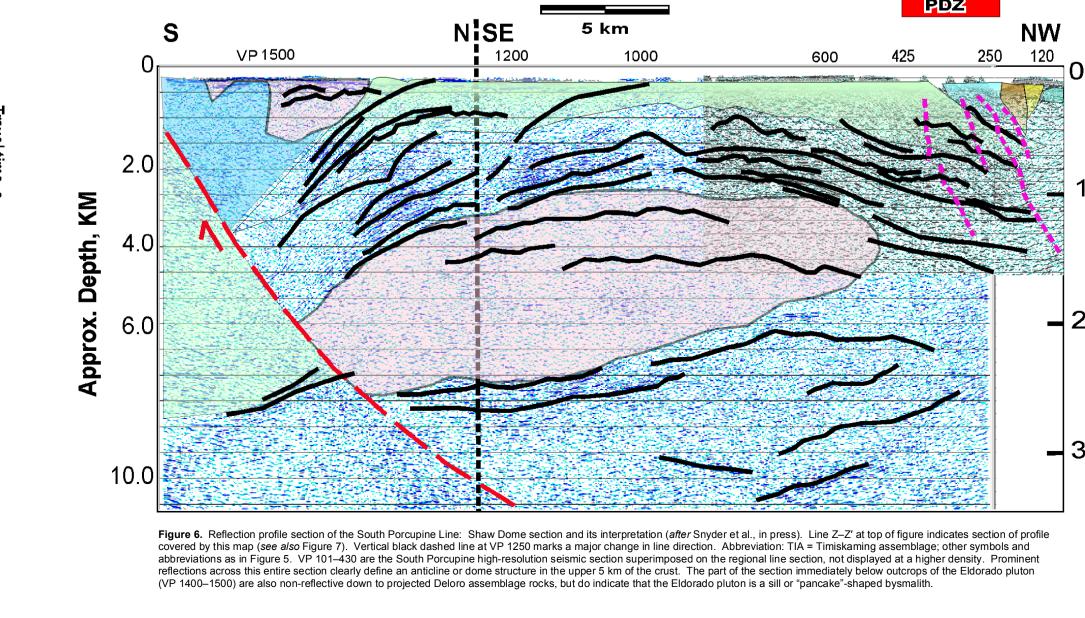
o	Sample Number	UTM Co- Easting (m)	-ordinates Rock Type		Primary Age (Ma)	Inheritance or Provenance Age(s) (Ma)	Assemblage/Intrusion	Method	Source
		(111)	(m)			Age(s) (Wa)			
	DD, N77-21	480005	5361948	Gabbro	2707±3		Mafic to ultramafic intrusion (Tisdale)	TIMS	1
	96TB0079	499802	5354448	Felsic volcaniclastic	2708±2		Tisdale	TIMS	2
	96TB0079	499802	5354448	Felsic volcaniclastic	2703.5±14	2767 to 2725	Tisdale	SHRIMP	5
	96TB0099	499632	5352373	Felsic volcaniclastic	2724.4±1.5		Deloro	TIMS	2
	96TB0099	499633	5352374	Felsic volcaniclastic	2723.1±1.3	2725.8±0.8	Deloro	TIMS	5
	99JAA-0061	476307	5366168	Felsic tuff	2687.5±1.3		Porcupine (Krist formation)	TIMS	3
	BNB-01-T-02	480377	5365098	Conglomerate	< 2669±7	2682	Timiskaming	TIMS	4
	02JAA-009	472346	5362046	Quartz-felspar sericite schist	2685.1±1.3		Porphyry	TIMS	4,5
	02JAA-010	474733	5363546	Sediment	< 2673	2689 to 2722	Timiskaming	TIMS	4
	03-LAH-0627	492156	5365021	Quartz porphyry	2689.0±1.4	2692.3±1.7	Mt Logano	TIMS	5
	03-LAH-0161	493476	5362615	Felsic flow	2727±12		Deloro	TIMS	5
	04-PCT-0062	478510	5364034	Felsic lapilli tuff	2724.1±3.7		Deloro	TIMS	5
	04-MGH-0283	487699	5351167	Quartz-felspar porphyry	2686.2±1.1		Porphyry dike	TIMS	5
	02-LAH-0048	477999	5361677	Quartz-felspar porphyry	2685.1±1.1	2700 to 2730	Porphyry dike	TIMS	6
	04-MGH-0523	498804	5352384	Felsic epiclastic	Absence of minerals suitable for analysis.				

Abbreviations: SHRIMP = sensitive high-resolution ion microprobe; TIMS = thermal ionization mass spectromet Sources: 1 = Corfu et al. (1989); 2 = Barrie and Corfu (1999); 3 = Ayer et al. (2002); 4 = Ayer et al. (2003); 5 = Ayer et al. (2005); 6 = J.A. Ayer, unpublished data, 2005. The reader is strongly referred to Ayer et al. (2005) concerning the SHRIMP data obtained on the sample 96TB-0079. The "primary age" in the table is the minimum age obtained in that sample with Pacaud- and Deloro-age zircon xenocrysts. All UTM co-ordinates are provided in NAD83, Zone 17.



ADAMS TP

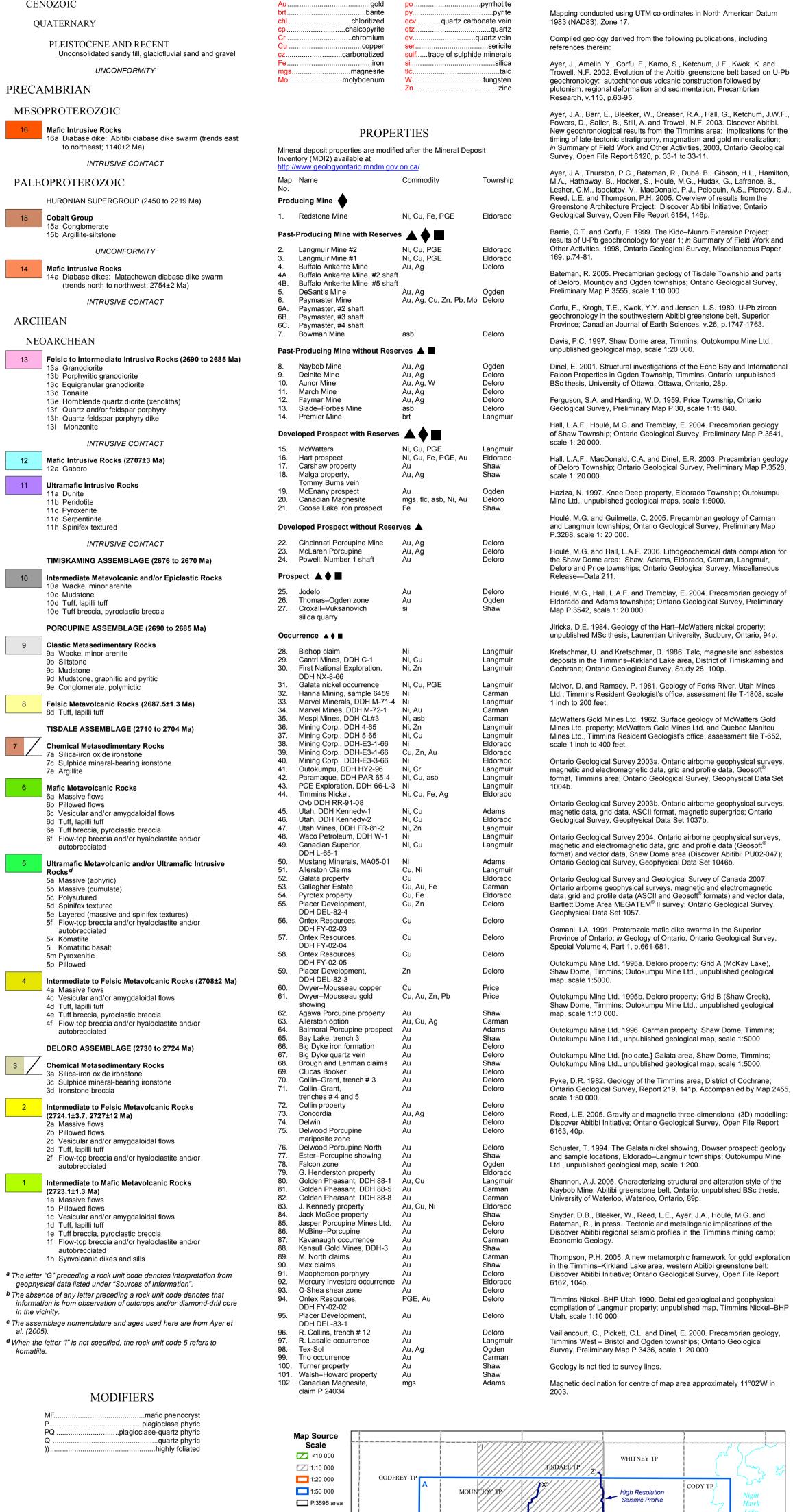




Deloro Assemblage

Assemblage (TSA) Pluton

Deloro Assemblage



ABBREVIATIONS

E.....platinum-group elements

.....asbestos

PHANEROZOIC

CENOZOIC

PRECAMBRIAN

QUATERNARY

MESOPROTEROZOIC

PALEOPROTEROZOIC

15b Argillite-siltstone

Mafic Intrusive Rocks

13b Porphyritic granodiorite

12 Mafic Intrusive Rocks (2707±3 Ma)

1 Ultramafic Intrusive Rocks

11h Spinifex textured

10a Wacke, minor arenite

10e Tuff breccia, pyroclastic breccia

9d Mudstone, graphitic and pyritic

✓ Chemical Metasedimentary Rocks

7a Silica-iron oxide ironstone

Mafic Metavolcanic Rocks

5b Massive (cumulate)

5d Spinifex textured

5l Komatiitic basalt

4a Massive flows

6d Tuff, lapilli tuff

Felsic Metavolcanic Rocks (2687.5±1.3 Ma)

7c Sulphide mineral-bearing ironstone

6c Vesicular and/or amygdaloidal flows

6f Flow-top breccia and/or hyaloclastite and/or

e Layered (massive and spinifex textures)

4c Vesicular and/or amygdaloidal flows

4f Flow-top breccia and/or hyaloclastite and/or

DELORO ASSEMBLAGE (2730 to 2724 Ma)

4e Tuff breccia, pyroclastic breccia

Chemical Metasedimentary Rocks

3c Sulphide mineral-bearing ironstone

Intermediate to Felsic Metavolcanic Rocks

c Vesicular and/or amygdaloidal flows

2f Flow-top breccia and/or hyaloclastite and/or

1f Flow-top breccia and/or hyaloclastite and/or

MODIFIERS

plagioclase phyric

.....quartz phyric

B - Houlé and Guilmette (2005)

- Davis (1997)

Bateman (2005)

M - Shannon (2005)

N - Haziza (1997)

C - Houlé, Hall and Tremblay (2004)

D - Hall, Houlé and Tremblay (2004)

- Hall, McDonald and Dinel (2003)

I - Ferguson and Harding (1959)

Timmins Nickel-BHP Utah (1990)

K - Outokumpu Mine Ltd. (1995b)

O - Outokumpu Mine Ltd. (1996)

- Outokumpu Mine Ltd. (1995a)

- Outokumpu Mines Ltd. (no date)

S - Kretschmar and Kretschmar (1986)

U - McWatters Gold Mines Ltd. (1962)

are shown in greater detail in Figures 5 and 6, respectively.

McIvor and Ramsey (1981)

McKEOWN TP

FRIPP TP

Figure 7. Lithological reliability diagram. This diagram also shows the transects for the regional seismic profile (X–X') and the high-resolution seismic profile (Z–Z'), aspects of which

MCARTHUR TP

Vaillancourt, Pickett and Dinel (2002)

...plagioclase-quartz phyric

Intermediate to Mafic Metavolcanic Rocks

1c Vesicular and/or amygdaloidal flows

1e Tuff breccia, pyroclastic breccia

1h Synvolcanic dikes and sills

geophysical data listed under "Sources of Information".

3a Silica-iron oxide ironstone

(2724.1±3.7, 2727±12 Ma)

3d Ironstone breccia

2b Pillowed flows

autobrecciated

1b Pillowed flows

1d Tuff, lapilli tuff

f Flow-top breccia and/or hyaloclastite and/o

6e Tuff breccia, pyroclastic breccia

TISDALE ASSEMBLAGE (2710 to 2704 Ma)

9e Conglomerate, polymictic

10d Tuff, lapilli tuff

9 Clastic Metasedimentary Rocks

9a Wacke, minor arenite

8d Tuff, lapilli tuff

11a Dunite

11b Peridotite

13I Monzonite

3c Equigranular granodiorite

13e Hornblende quartz diorite (xenoliths)

INTRUSIVE CONTACT

INTRUSIVE CONTACT

TIMISKAMING ASSEMBLAGE (2676 to 2670 Ma)

PORCUPINE ASSEMBLAGE (2690 to 2685 Ma)

3f Quartz and/or feldspar porphyry

13h Quartz-feldspar porphyry dike

NEOARCHEAN

6 Mafic Intrusive Rocks

PLEISTOCENE AND RECENT

to northeast; 1140±2 Ma)

INTRUSIVE CONTACT

HURONIAN SUPERGROUP (2450 to 2219 Ma)

UNCONFORMITY

(trends north to northwest; 2754±2 Ma)

INTRUSIVE CONTACT

SOURCES OF INFORMATION

Base map information derived from Ontario Land Information Warehouse,

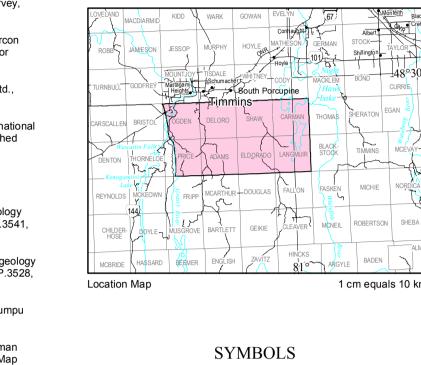
Land Information Ontario, Ontario Ministry of Natural Resources, scale

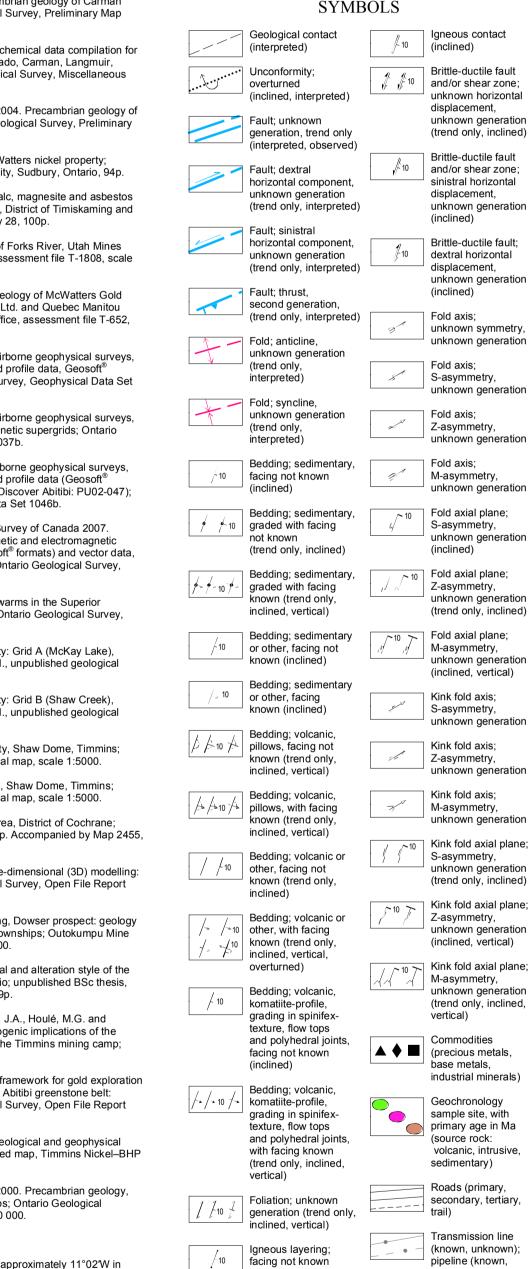
PRECAMBRIAN GEOLOGY GEOLOGICAL COMPILATION OF THE SHAW DOME AREA NORTHEASTERN ONTARIO Scale 1:50 000 1000 m 0 1 2 km

Ontario Geological Survey

NTS Reference: 42 A/5

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