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GEOCHEMISTRY AND PETROGRAPHY OF THE LA TREVE 1 AND LA TREVE 2 PROPERTIES, CHAPAIS AREA

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Geochemistry and Petrography of the La Treve 1 and La Treve 2 Properties, Chapais Area, Quebec

a report for
Murgor Resources
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Executive Summary

The La Treve 1 and La Treve 2 properties in the Chapais area of the northern Abitibi Subprovince in Quebec are being evaluated for their platinum group element (PGE) potential. This report provides new whole rock geochemistry, petrography and interpretations for these areas, and supersedes an earlier report for Murgor (Barrie, 2000) that is based principally on reconnaissance field observations.

- At La Treve 1, the geochemistry indicates that the gabbro dike host to the PGE-Cu-Ni mineralization is compositionally very similar to the country rock pillow basalts. Both have normal, tholeiitic basaltic compositions, and they have very similar trace element and rare element abundances and ratios. This suggests that **the gabbro dike was a feeder to the sequence that includes the pillow basalts.** If this is so, then 1) the probable paleo-vertical direction of magma flow in the gabbro dike is now perpendicular to the bedding in the steeply dipping pillow basalts, i.e., at 320° and sub-horizontal; 2) **the mineralization in the gabbro dike is thus expected to plunge shallowly or moderately to the southeast**; and 3) **potential magmatic sulfide deposits in ponded gabbro/pyroxenite sills or intrusions would be up-section to the northwest,** if the host basalt sequence is monoclinal. This new geochemistry provides information that supports the contention that **one or both of the gabbro/ pyroxenite intrusions to the northwest are favorable magmatic sulfide targets.**

- The petrography at La Treve 1 reveals a magmatic sulfide mineral assemblage of pyrrhotite, chalcopyrite, pyrite and pentlandite. The sulfides have net-textured, semi-massive and minor shear-related textures with the silicate minerals and host rocks. The host rock gabbro is a slightly to moderately altered, medium-grained clinopyroxene plagioclase gabbro, derived from a high magnesium tholeiite.

- The composition of the felsic intrusive rocks with mixed magma textures with the gabbro dike host rocks at La Treve 1 is trondhjemitic, typical of late tectonic felsic intrusive rocks across the Superior Province. This suggests that the mineralization formed late in the evolution of this area, when the crust was relatively thick and favorable for producing magmatic sulfide deposits via contamination of mafic magmas by silicic material in the lower crust.

- At La Treve 2, intrusive rocks in mineralized areas are moderately altered, coarse-grained clinopyroxene plagioclase gabbro with 2% interstitial, fine-grained magmatic sulfide, and slightly to moderately altered, medium-grained clinopyroxenite with trace to 5% magmatic sulfide. One sample submitted for geochemistry from La Treve 2 is a high magnesium tholeiite, although clinopyroxene spinifex is present in this flow in the field, which would suggest that it has a higher magnesium content.

Recommendations

Based on a review of the geology and geophysics, the reconnaissance geological overview in the field in the fall of 2000, and the results from this study, the following recommendations are made.

La Treve 1

- A grid should be cut with the base line at 320°, parallel to the trend of the sulfide mineralization and host gabbro dike, and 50 meter line spacings, to cover at least a 1 km x 1 km area, centered on the main showing. The grid should be subjected to ground geophysical magnetic and EM surveys, prospecting and detailed mapping. Particular attention should be paid to trondhjemitic rocks and any other intrusive rocks within 500 meters in a SSE direction of the showing.
- A 25 m spaced grid should be cut extending from the main showing to the SSE for 300 m and surveyed with mag and EM. Geological and geochemical evidence suggests that mineralization plunges moderately to shallowly to the SSE along the trend of the gabbro dike. Any sulfide in this direction should be defined with the geophysics, and then drilled.
- The new, larger property area should be the subject of a powerful, deeply penetrating airborne mag-EM survey. All significant coincident airborne EM and mag anomalies should be followed up with ground checks.
- Prospecting and reconnaissance mapping should target. 1) the 8 km x 10 km gabbro/pyroxenite intrusion immediately to the NNW; this may represent the principal magma chamber for the mineralized gabbro feeder dike; 2) the gabbro/pyroxenite intrusion northwest of the Bercy Pluton that is highlighted by the airborne magnetic surveys; 3) dikes with mixed magma textures 1-3 km to the north along the power line outcrops that have coincident EM anomalies; and 4) gabbroic marginal rocks to the Bercy pluton with coincident airborne EM anomalies.

La Treve 2

- A grid should be established with the baseline parallel to the komatiite flows at 090°, and 100 meter line spacings over at least 1 km x 1 km, centered on the showings at the top of the hill. Standard ground magnetics and EM surveys should be conducted for a massive sulfide target, to be followed by detailed prospecting and geological mapping. The grid should be properly mapped; 2) a whole rock geochemical traverse with samples taken at 20 m intervals should be conducted to determine the most magnesian strata, which should then be prospected, mapped and sampled along strike in detail; and 3) all contacts between basalt/komatiite flows sedimentary or felsic rocks should also be prospected, mapped and sampled in detail.
- Unpublished data should be requested from Falconbridge who conducted work on the property within the last twenty years.
- Downhole pulse EM surveys will be required during drilling.

Introduction

The La Treve 1 and La Treve 2 properties in the Chapais area of the northern Abitibi Subprovince in Quebec are being evaluated for their platinum group element (PGE) potential. This report provides new whole rock geochemistry and petrography. Five samples were submitted to XRAL Laboratories in Don Mills, Ontario, for ICP and ICP-MS major and trace element geochemistry. A suite of five samples that partly overlaps with the geochemistry samples were submitted for thin sections and polished thin sections. These data have been analyzed and the interpretations are presented here The whole rock major and trace element geochemistry for the four samples from La Treve 1 is particularly revealing, and adds credence to the hypothesis that gabbro/pyroxenite intrusions to the northwest of this occurrence are favorable targets for Voisey's Bay – like (e.g., see Evans-Lamswood et al., 2000; Naldrett et al., 200; Ryan, 2000) magmatic sulfide orebodies.

La Treve 1

Review of Geology

The La Treve 1 PGE showing (Fig. 1) occurs within predominantly basaltic volcanic rocks in northern Guettard township, approximately 1 km south of a 8 km x 10 km gabbro/pyroxenite intrusion, which is, in turn, south of the Bercy pluton. The pyroxenite intrusion may prove to be a very important target for magmatic sulfide related to the La Treve 1 showing. The La Treve 1 showing is within an elongate, dike-like mafic intrusive body that has been exposed by recent stripping and trenching for 28 meters along strike and up to 6 meters in width. The intrusive rocks and the sulfides trend at 320^{o} and have moderate to steep dips. The sulfides are present at abundances from 3% to 60% over a strike length of 15 meters and up to 3.5 meters in width, and are entirely within medium- to fine-grained, equigranular to vari-textured gabbro and melagabbro. Clinopyroxene and plagioclase occur as cumulus phases, and sub-rounded gabbro, melagabbro and pyroxenite inclusions up to 20 cm are present within the sulfide matrix. Olivine has not been identified in hand specimen. The intrusive rocks cut pillow basalts that face northwest with steep dips. The host intrusive rocks exhibit magma mixing textures to the east and south of the main mass of sulfide. Gabbro is increasingly fine-grained to the south, and has quench textures in pillows and irregular, popcorn-shaped masses with glassy rims adjacent to medium-grained leuco-tonalite and biotite tonalite/granite. The tonalite/granite is generally massive but also occurs as dikelets that cut the gabbro and the adjacent basalt (locally with shallow dips), and as breccias adjacent to and within fine-grained to aphanitic gabbro/basalt. These and other textures constitute classic magma mixing textures between mafic and felsic liquids.

Whole Rock and Assay Geochemistry

Earlier samples (July 2000) of the main showing were analyzed for major and trace element geochemistry and metal assays. These results are given in the Appendix. The rocks are tholeiitic gabbros or diorites. They have relatively high Mg numbers, but cumulate rocks for mafic and ultramafic rock types have Mg numbers higher than the magma from which they were derived, and the estimated bulk liquid composition for these rocks has an Mg number of 58. This is typical for slightly primitive (e.g., higher MgO content) tholeiitic basaltic magmas. The rocks have relatively high Cr contents, which is consistent with a slightly primitive tholeiitic parental magma. Such magmas may have olivine as a liquidus phase, which is very important component as most magmatic sulfide deposit parental magmas have olivine as a liquidus phase. They have slightly elevated silica contents, and three samples have significantly elevated silica contents. This may be due to contamination by wall rock material, or to mixing with the felsic magma that has magma mixing textures with the gabbroic rocks in outcrop. Contamination by felsic material is an excellent mechanism to saturate a magma with respect to sulfide. The metal and sulfur contents of these samples have not been recalculated. These samples have average values (n=11) of: 2277 ppb Pd, 965 ppb Pt, 105 ppb Au, 0.54 wt.% Cu, 0.18 wt.% Ni and 5.0 wt.% S. The relatively high Cu/(Cu+Ni) ratio of 0.75 is consistent with a derivation from a tholeiitic basalt, and is comparable to ores in the Duluth and Noril'sk complexes.

New Geochemical Data

Four additional samples from the main showing were submitted for more detailed trace element geochemistry, and these are reported in Table 1. These samples have been recalculated from the laboratory reports with the major elements as oxides, on a volatile free basis. They include LT-13, a sample of the country rock pillow basalt (analyzed in duplicate), LT1-4, a sample of medium-grained gabbro away from sulfide mineralization and near the dike margin (see Fig. 1), LT1-5, a sample of the gabbro chill from the southern limit of the dike exposure where the gabbro dike is chilled in mixed magma textures with the felsic intrusive rocks, and LT1-6, a sample of the felsic intrusive rock that has mixed magma textures with the gabbro chill. The rare earth element concentrations are plotted on a chondrite-normalized basis in figure 2.

The pillow basalt and the gabbro samples have comparable magma element compositions, as noted in the recalculated geochemistry from the earlier sampling and given in the Appendix. These new data indicate that the trace element composition is also very similar, particularly for the rare earth elements (Fig. 2), and for Sc, Cr. Cs. Rb, Zr Y, and important trace element ratios La/Yb, Zr/Y and Nb/Zr. These data strongly suggest that the pillow basalt host rocks and the gabbro dike were derived from the same tholeiitic magma source, possibly even the same magma batch.

The similarity between the pillow basalts and the gabbro dike geochemistry is significant to the genesis of the magmatic sulfide and for the exploration for more magmatic sulfide for several reasons. 1) It suggests that the gabbro dike was a feeder dike to the basalt flows. If this is the case, then 2) the flow direction in the gabbro dike is likely to have been from southeast to northwest, perpendicular to the flow bedding and up-section. This hypothesis is consistent with the thermal aureole to the northwest of the gabbro dike, or the gabbro conduit. This side of the dike/conduit in plan view actually represents the side of the dike/conduit. As this wall of the dike/conduit is mineralized, it is predicted that 3) the mineralization plunges moderately to shallowly to the southeast along trend with the dike at 140°. (It is possible that the dike/conduit also dips steeply to the northeast as there is much more of a metasomatic effect on this side of the dike. The intensity of the metasomatic halo may reflect the upper side of the dike before regional deformation.) Another significant implication for the cogenesis of the gabbro dike and the host pillow basalts is that 4) more mineralization could be found up-section if the dike fed a gabbro sill or intrusion. Thus 5) the two gabbro/pyroxenite intrusions to the northwest (highlighted by strong airborne magnetic anomalies) along trend with the mineralized gabbro dike remain favorable targets for magmatic sulfide mineralization, as noted in the fall 2000 report (Barrie, 2000).

Sample LT-1-6 is a medium-grained trondhjemite, and is typical of some late-tectonic felsic intrusive rocks found across the Superior Province. Such rock types are only rarely found at high levels in the crust during the early stages of primitive arc development in the Late Archean. They represent partial melts of a dehydrated mafic slab in the garnet stability field, deep beneath the arc, or, in this case the continental margin represented by the older Opatica Subprovince to the north. This is significant because is suggests that the pillow basalts and the gabbro dike probably formed relatively late in the evolution of this primitive arc, and with a thick crust underneath. The thick crust provides a good source for a contaminant to help precipitate magmatic sulfides from mafic magmas.

Mineralization

The mineralization is semi-massive and locally net-textured. In hand samples, the sulfide mineralization has magnetic pyrrhotite as the principal constituent, with subordinate chalcopyrite up to 7% and pentlandite up to 4%. Photomicrographs from two thin sections taken from the main La Treve 1 magmatic sulfide occurrence are given in figure 3. These photomicrographs are of polished thin sections from samples LT1-1 and LT1-2. The magmatic sulfide minerals are chalcopyrite, pyrrhotite and pyrite; no PGE phases are noted, and pentlandite is not discernable from pyrrhotite. The magmatic sulfide minerals are interstitial to fine- to coarse-grained clinopyroxene – plagioclase gabbro, which is variably altered to tremolite-actinolite, chlorite and hornblende. Clinopyroxene has been preserved from alteration locally where it is mantled by magmatic sulfide.

La Treve 2

Review of Geology

The La Treve 2 PGE showings are located in south central Lantagnac township, approximately 60 km WNW of Chapais, Quebec. The showings are within a medium-grained to locally sub-pegmatitic gabbro and pyroxenite unit approximately 20-30 meters thick, overlain by a similar thickness of gabbro. The rocks face north and dip steeply.

Two high magnesium flows with pyroxene spinifex tops and pyroxenitic cumulate bases are present ~50 meters upsection from the blast pit surface showings. These flows are traceable at the surface for several tens of meters along strike.

One sample, LT2-1, was taken from one of the high magnesium flows and submitted for geochemistry (see Table 2; Fig. 3). This sample is a high magnesium tholeiite, with slightly elevated Cr (218 ppm) and Ni (108 ppm). Clinopyroxene spinifex is present in this flow in the field, which would suggest that at least parts of this flow have higher magnesium contents. Two samples (LT2-3 and LT2-4) were taken from the mineralized blast pits for petrography. They are very coarse-grained to pegmatitic clinopyroxene – plagioclase gabbro with 1.5% fine-grained magmatic sulfide, and fine- to medium-grained clinopyroxenite with 1% magmatic sulfide, respectively. Both exhibit minor chlorite alteration, and both have 50% of their magmatic sulfide as chalcopyrite, with the remainder as pyrite. The encouraging feature about both of these samples is the relatively high Cu content in the magmatic sulfide. Along with the PGE assays of over 1 ppm from these occurrences, this implies that if a massive magmatic sulfide is located by further work in this area it should be relatively Cu, and probably PGE-enriched, similar to the Noril'sk ores.

References

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Naldrett, A. J., Asif, M., Krstic, S., and Li, C., 2000, Composition of mineralization at the Voisey's Bay Ni-Cu sulfide deposit, with special reference to platinum-group elements: Economic Geology, v. 95, p. 845-865.

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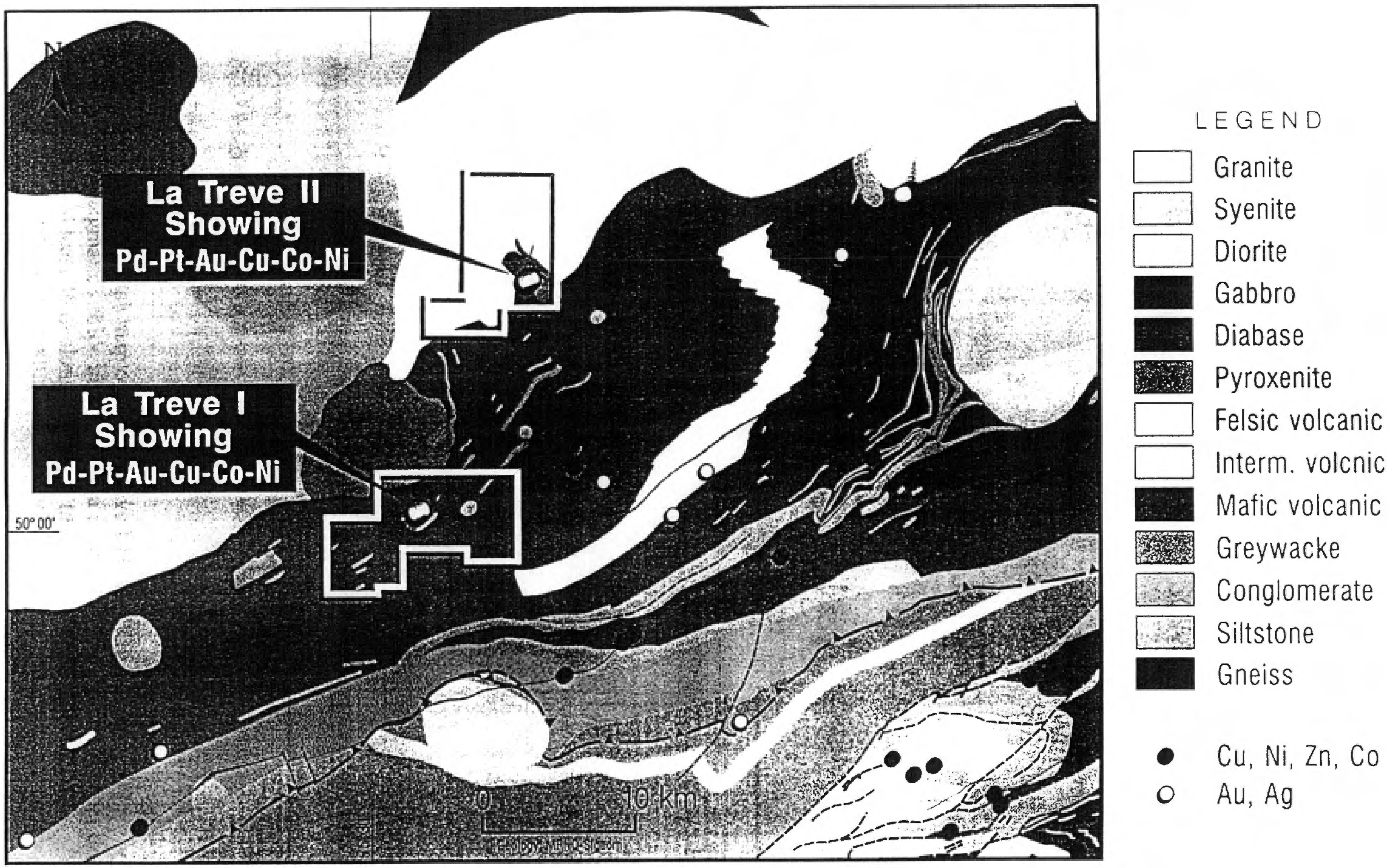
Geology of the Chibwest region, showing the La Treve 1 and La Treve 2 showings.

The La Treve 1 area is underlain by a thick sequence of massive and pillowed basalts that appear to be monoclinal, facing to the northwest. The mineralized gabbro dike at the main showing trends perpendicular to the bedding, and is believed to be a feeder dike to the upper basalts in this sequence. Farther to the northwest are two gabbro/pyroxenite intrusions, in part interpreted from airborne magnetic surveys. The outcrop patterns of these intrusions suggests that they are either sub-horizontal sills, steeply dipping lopoliths similar to Lac des Iles, or plutons similar in geometry to late tectonic diapiric plutons. These mafic/ultramafic intrusions may be part of the stratigraphic section and cogenetic to the basalts, and they represent favorable targets for magmatic sulfide mineralization.

The geology near the La Treve 2 showing is less well understood. This area has a contact between the main basaltic unit and felsic volcanic or metasedimentary rocks to the north. The mineral occurrences are associated with gabbro and pyroxenite sills intercalated with the basaltic rocks, and possibly with the felsic/metasedimentary rocks.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La Treve II
Showing
Pd-Pt-Au-Cu-Co-Ni
La Treve I
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LEGEND
Granite
Syenite
Diorite
Gabbro
Diabase
Pyroxenite
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Greywacke
Conglomerate
Siltstone
Gneiss
Cu, Ni, Zn, Co
Au, Ag

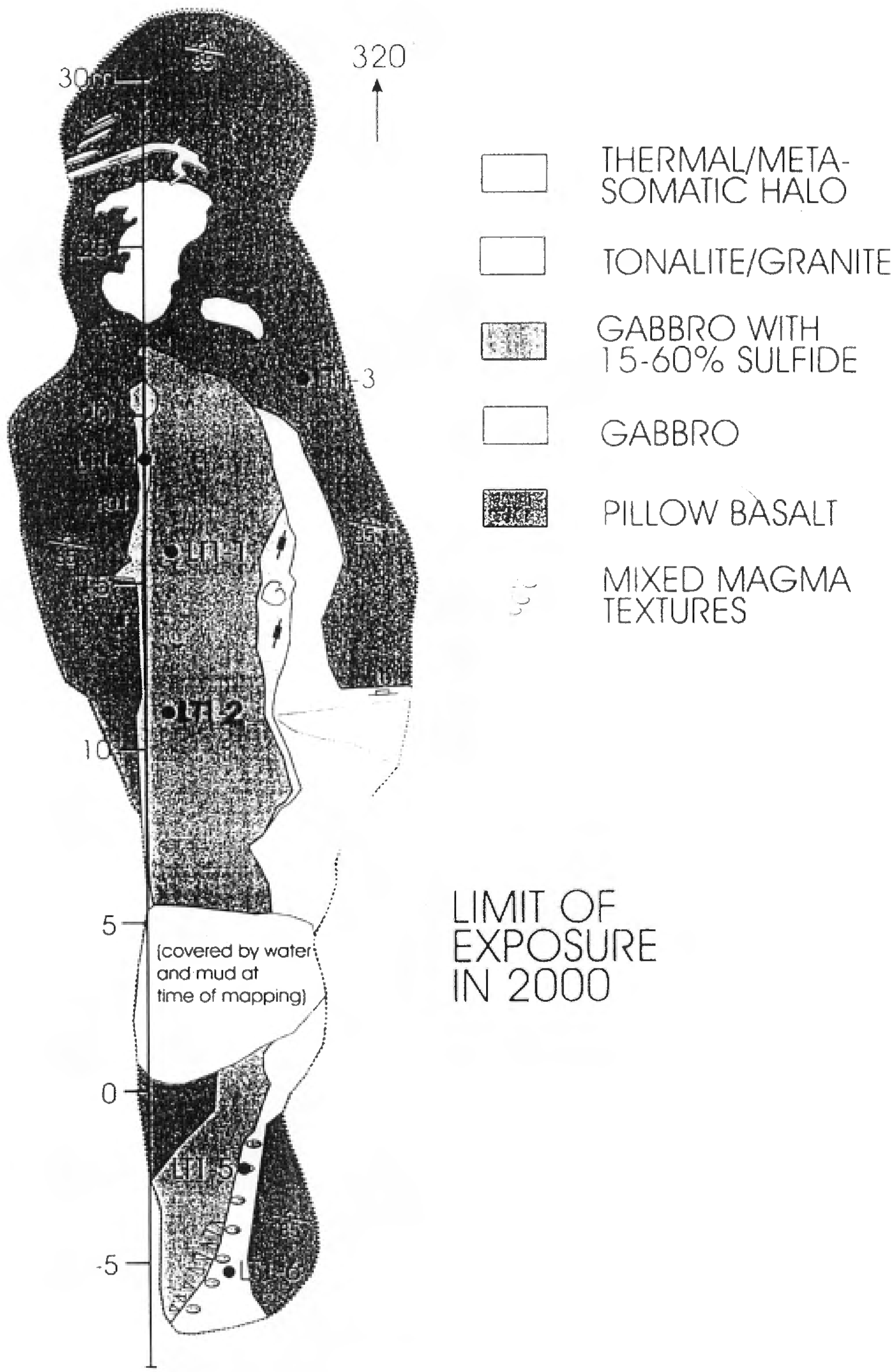

Figure 1. Detailed geological sketch map of the La Treve 1 Ni-Cu-PGE showing, with sample locations. Magmatic sulfide mineralization is confined to a gabbroic feeder dike up to 6 meters wide, and at least 30 m along strike. At the southern end, gabbroic rocks are quenched and have mixed magma textures with trondhjemitic felsic magma.

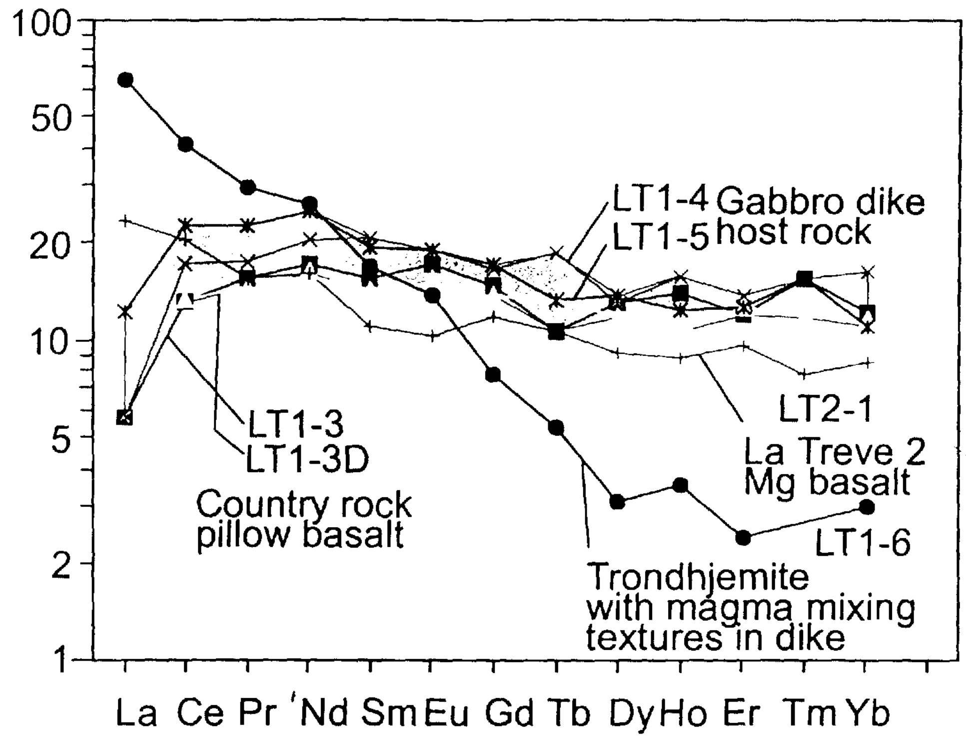

Figure 2. Chondrite-normalized rare earth element plots for La Treve 1 and La Treve 2 samples. The pillow basalt country rocks to the sulfide-bearing gabbro dike are compositionally very similar to the dike. This compositional similarity is highlighted by the gray shading that encompasses both rock types. These two rock types may be cogenetic. This would imply that: 1) the gabbro dike host rock is the same age as the basalts, i.e., Late Archean; and 2) that the gabbro dike is a feeder dike to proximal, overlying basalts and sills in the same sequence. The trondhjemite dike has a typical steep REE pattern, with very low heavy REE contents. Such felsic magmas are common late in the evolution of greenstone belts, implying that the gabbro feeder dike cut a relatively thick greenstone assemblage, a favorable condition for the formation of magmatic sulfide deposits.

The La Treve 2 area magnesian basalt sample has a distince REE profile from the mafic magmas at La Treve 1, and is likely from a diffenert suite of rocks. The sample was believed to be a pyroxenitic komatiite in the field, but it is clearly basaltic.

Figure 3. Photomicrographs of polished thin sections from the La Treve 1 gabbro-hosted magmatic sulfide. All photos 4.4 mm across.

a. Sample LT1-1, reflected light. Magmatic sulfide minerals chalcopyrite (labeled cpy), and pyrrhotite interstitial to medium-grained clinopyroxene altered to tremolite-actinolite and chlorite.

b. Same field of view as a., transmitted light cross-polars. Note that the clinopyroxene mantled by magmatic sulfide has been preserved from alteration.

c. Sample LT1-1, reflected light, with chalcopyrite, pyrrhotite (po) and pyrite (py), interstitial to medium- to coarse-grained clinopyroxene replaced by hornblende, tremolite-actinolite and chlorite.

d. Same field of view as c., transmitted light, cross polars.

e. Sample LT1-2, reflected light. Massive magmatic sulfide (minerals chalcopyrite, pyrite and pyrrhotite) interstitial to fine- to medium-grained clinopyroxene altered partly altered to tremolite-actinolite.

f. Same field of view as e., transmitted light, cross polars.

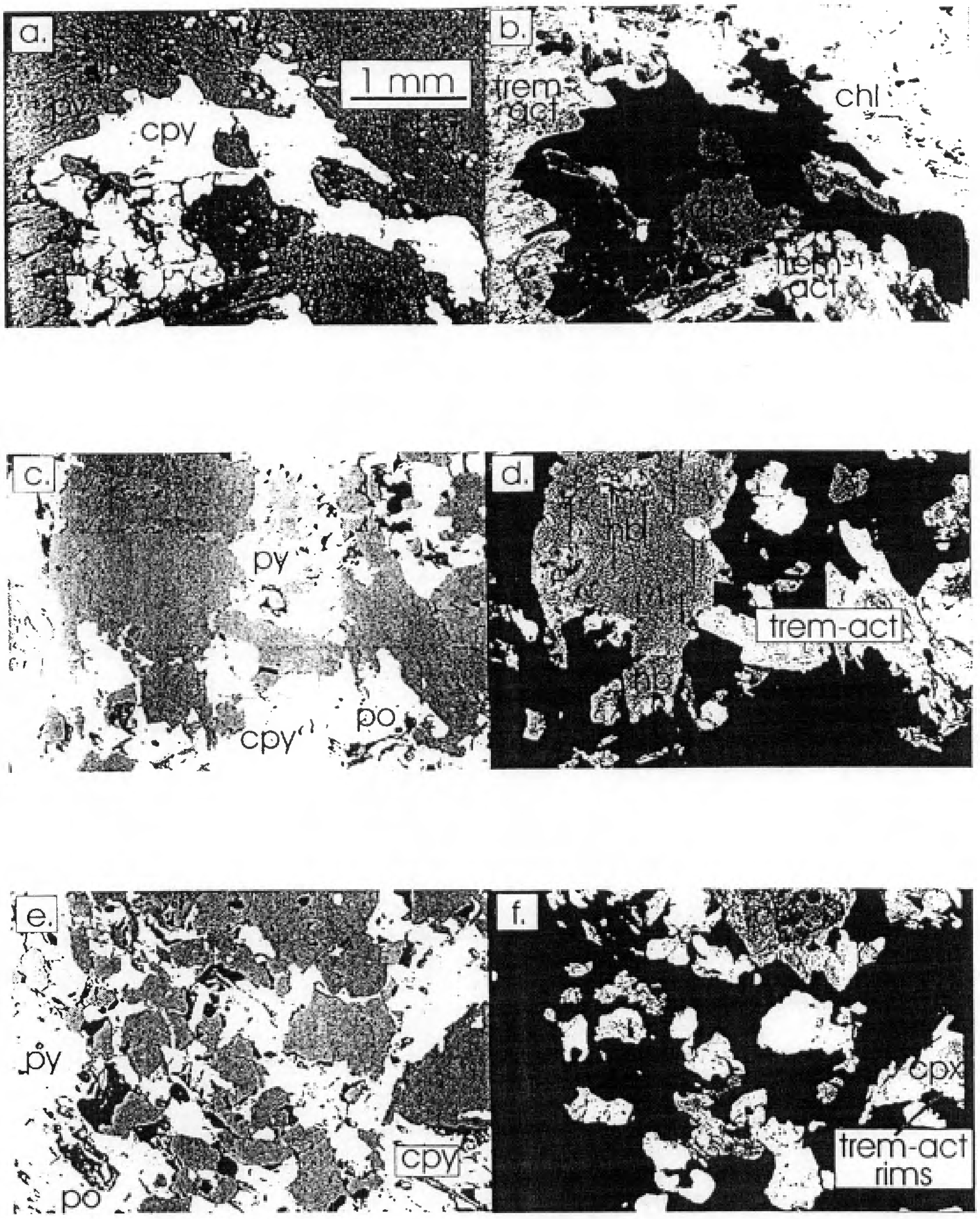
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Table 1. Geochemistry for selected samples from La Treve 1 and La Treve 2							
	La Treve 1 area					La Treve 2 area	
Rock Type	Pillow Basalt	Pillow Basalt	Gabbro Dike	Gabbro Chill	Trondh-jemite	Mg Basalt	
Sample #	LT1-3	DUP LT1 3	LT1-4	LT1-5	LT1-6	LT2-1	Analytical Technique
wt.%							
SiO2	48.35	48.35	50.07	53.06	68.04	50.71	ICP95**
TiO2	1.12	1.12	1.12	1.25	0.32	0.63	ICP95
Al2O3	13.32	13.39	13.60	15.28	18.89	14.28	ICP95
Fe2O3	10.42	10.47	9.84	9.39	2.67	10.37	ICP95
MgO	5.89	6.00	5.99	6.00	1.04	7.51	ICP95
MnO	0.19	0.19	0.18	0.15	0.03	0.21	ICP95
CaO	16.09	16.23	14.55	8.37	3.72	10.77	ICP95
Na2O	2.14	2.10	2.32	4.16	5.71	3.42	ICP95
K2O	0.23	0.24	0.28	0.87	1.94	0.31	ICP95
P2O5	0.07	0.07	0.09	0.09	0.18	0.07	ICP95
Total*	97.82	98.17	98.03	98.64	102.55	98.28	
ppm							
Cr	121	126	183	120	216	210	ICP95
Cs	0.7	0.6	0.5	0.5	1.8	1.9	MS104**
Rb	4.3	4	3.6	7.7	44.1	5.2	MS104
Ba	79	79	120	276	847	46	ICP95
Sr	136	136	148	598	1580	213	ICP95
Zr	57	55	58	67	88	48	ICP95
Y	19	18	19	17	<10	14	ICP95
Nb	29	31	30	41	18	24	ICP95
Hf	2	1	2	1	2	1	MS104
La	1.4	<.5	1.4	3.0	16.0	5.7	MS104
Ce	8.3	8.5	10.9	14.5	26.0	13.1	MS104
Pr	1.5	1.4	1.7	2.2	2.9	1.5	MS104
Nd	7.5	7.2	9.0	11.0	11.6	7.0	MS104
Sm	2.4	2.2	3.2	3.0	2.6	1.7	MS104
Eu	1.0	0.9	1.1	1.1	0.8	0.6	MS104
Gd	3.0	2.8	3.4	3.5	1.6	2.4	MS104
Tb	0.4	0.5	0.7	0.5	0.2	0.4	MS104
Dy	3.3	3.0	3.3	3.5	0.8	2.3	MS104
Ho	0.8	0.6	0.9	0.7	0.2	0.5	MS104
Er	2.0	2.1	2.3	2.1	0.4	1.6	MS104
Tm	0.4	0.3	0.4	0.4	<.1	0.2	MS104
Yb	2.0	1.9	2.7	1.8	0.5	1.4	MS104
Lu	<.1	<.1	<.1	<.1	<.1	<.1	MS104
Ag	<1	2	3	<1	<1	<1	MS104
Cd	1	<1	2	5	<1	4	MS104
Co	64.4	61.3	46.1	57	4.9	46.3	MS104
Cu	161	186	169	123	69	103	MS104
Ni	67	84	81	66	<5	108	MS104
Pb	<5	<5	<5	<5	<5	<5	MS104
Sn	12	15	15	13	20	<1	MS104
Mo	5	7	7	4	3	3	MS104
W	3	10	<1	<1	<1	<1	MS104
V	350	331	340	367	27	221	MS104
Zn	86	80	74	107	20	51	MS104
Sc	35.4	35.7	40	37.6	1.2	34.6	MS104
Ga	19	17	21	22	23	14	MS104
Tl	<.5	<.5	<.5	<.5	<.5	<.5	MS104
Ta	0.7	<.5	0.8	0.6	0.6	<.5	MS104
Th	<1	<1	<1	<1	1	1	MS104
U	<.5	<.5	<.5	<.5	0.5	<.5	MS104
* Totals without LOI							
**ICP95: ICP analysis after LiBO2 fusion; MS104: ICP-MS analysis after LiBO2 fusion; XRAL Laboratories, Don Mills, Ontario							

Appendix. Geochemistry for La Treve 1 samples, July 16, 2000; -from Barrie Oct. 13, 2000 report for Murgor

	Gabbro	Gabbro	Gabbro	Gabbro	FeOx	Gabbro	Semi-massive sulfide	Gabbro	Gabbro	Gabbro	Gabbro	
	207951	207952	207953	207954	207955	207956	207957	207958	207959	207960	207961	
SiO2	50.38	40.51	55.25	37.16	37.88	43.31	20.45	46.82	46.52	48.69	43.53	
TiO2	0.63	0.45	1.12	0.65	0.47	0.59	0.24	0.59	0.47	0.81	1.50	
Al2O3	11.90	8.11	14.91	9.01	7.63	10.79	3.58	10.66	7.35	10.43	13.07	
Fe2O3	9.91	26.82	11.61	23.28	24.20	17.46	47.97	14.76	19.02	13.66	19.77	
MnO	0.21	0.39	0.14	0.20	0.19	0.21	0.11	0.21	0.26	0.26	0.21	
MgO	11.62	6.37	2.43	7.21	8.25	8.27	4.10	9.59	8.24	8.90	6.03	
CaO	10.76	10.85	6.34	9.33	9.80	12.74	5.14	11.77	10.64	12.75	8.17	
Na2O	1.98	1.68	2.25	1.49	1.24	1.59	0.54	1.53	1.17	1.64	1.08	
K2O	0.90	0.49	0.48	0.42	0.34	0.57	0.14	0.61	0.42	0.48	0.54	
P2O5	0.13	0.11	0.14	0.20	0.24	0.16	0.21	0.13	0.19	0.12	0.14	
LOI	1.76	4.81	5.18	9.61	9.10	3.97	17.17	3.31	5.51	2.84	6.57	
Total	100.18	100.59	99.85	98.56	99.34	99.66	99.65	99.98	99.79	100.58	100.61	
Ba	312	380	137	112	274	175	13	221	105	132	251	
Cr	690	126	135	508	725	260	384	162	481	619	113	
Sr	354	189	121	179	140	233	44	255	147	165	108	
Zr	51	47	52	42	32	45	22	50	38	49	88	
Y	16	20	19	19	16	18	14	16	17	20	34	
Rb	22	3	18	1	7	16	5	16	9	12	20	**Average**
S	0.19	3.55	3.88	8.9	6.96	3.88	16.95	0.79	5.56	1.06	3.76	5.04
Au	2	18	40	347	228	55	87	52	281	35	10	105.00
Pt	13	18	531	1643	2218	556	3554	662	1083	325	13	965.09
Pd	21	141	1327	3524	4220	1714	9304	1473	2402	884	39	2277.18
Cu	118	1780	1570	13060	18764	3444	4800	3324	9653	1662	866	5367.36
Co	29	55	132	378	308	150	693	45	235	42	58	193.18
Ni	173	264	1579	2973	2868	1759	7518	226	2354	273	74	1823.73
Rh					291	221						
Calculated anhydrous. Fe2O3 and other majors also corrected for sulfide												
	207951	207952	207953	207954	207955	207956	207957	207958	207959	207960	207961	
SiO2	51.44	46.59	64.99	55.63	51.95	50.34	50.74	49.44	57.83	51.20	51.40	
TiO2	0.64	0.52	1.32	0.97	0.64	0.69	0.60	0.62	0.58	0.85	1.77	
Al2O3	12.15	9.33	17.54	13.49	10.46	12.54	8.88	11.26	9.14	10.97	15.43	
Fe2O3corr	9.63	20.69	2.30	1.70	9.44	9.07	14.37	13.51	6.45	11.59	12.30	
MnO	0.21	0.45	0.16	0.30	0.26	0.24	0.27	0.22	0.32	0.27	0.25	
MgO	11.86	7.33	2.86	10.79	11.31	9.61	10.17	10.13	10.24	9.36	7.12	
CaO	10.99	12.48	7.46	13.97	13.44	14.81	12.75	12.43	13.23	13.41	9.65	
Na2O	2.02	1.93	2.65	2.23	1.70	1.85	1.34	1.62	1.45	1.72	1.28	
K2O	0.92	0.56	0.56	0.63	0.47	0.66	0.35	0.64	0.52	0.50	0.64	
P2O5	0.13	0.13	0.16	0.30	0.33	0.19	0.52	0.14	0.24	0.13	0.17	
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
Ba	319	437	161	168	376	203	32	233	131	139	296	
Cr	704	145	159	760	994	302	953	171	598	651	133	
Sr	361	217	142	268	192	271	109	269	183	173	128	
Zr	52	54	61	63	44	52	55	53	47	51	104	
Y	16	23	22	28	22	21	35	17	21	21	40	
Rb	22	3	21	1	10	19	12	17	11	13	24	
Mg#	73.1	43.8	76.7	93.6	72.5	70.0	60.9	62.3	79.4	64.0	56.1	
Rock type	GAB	GAB	GDIO	GAB/DIO	GAB	GAB	GAB	GAB	DIO	GAB	GAB	
Chemical affinity	HIGH MG THOL	THOL	THOL	THOL	HIGH MG THOL	HIGH MG THOL	THOL	THOL	THOL	THOL	THOL	