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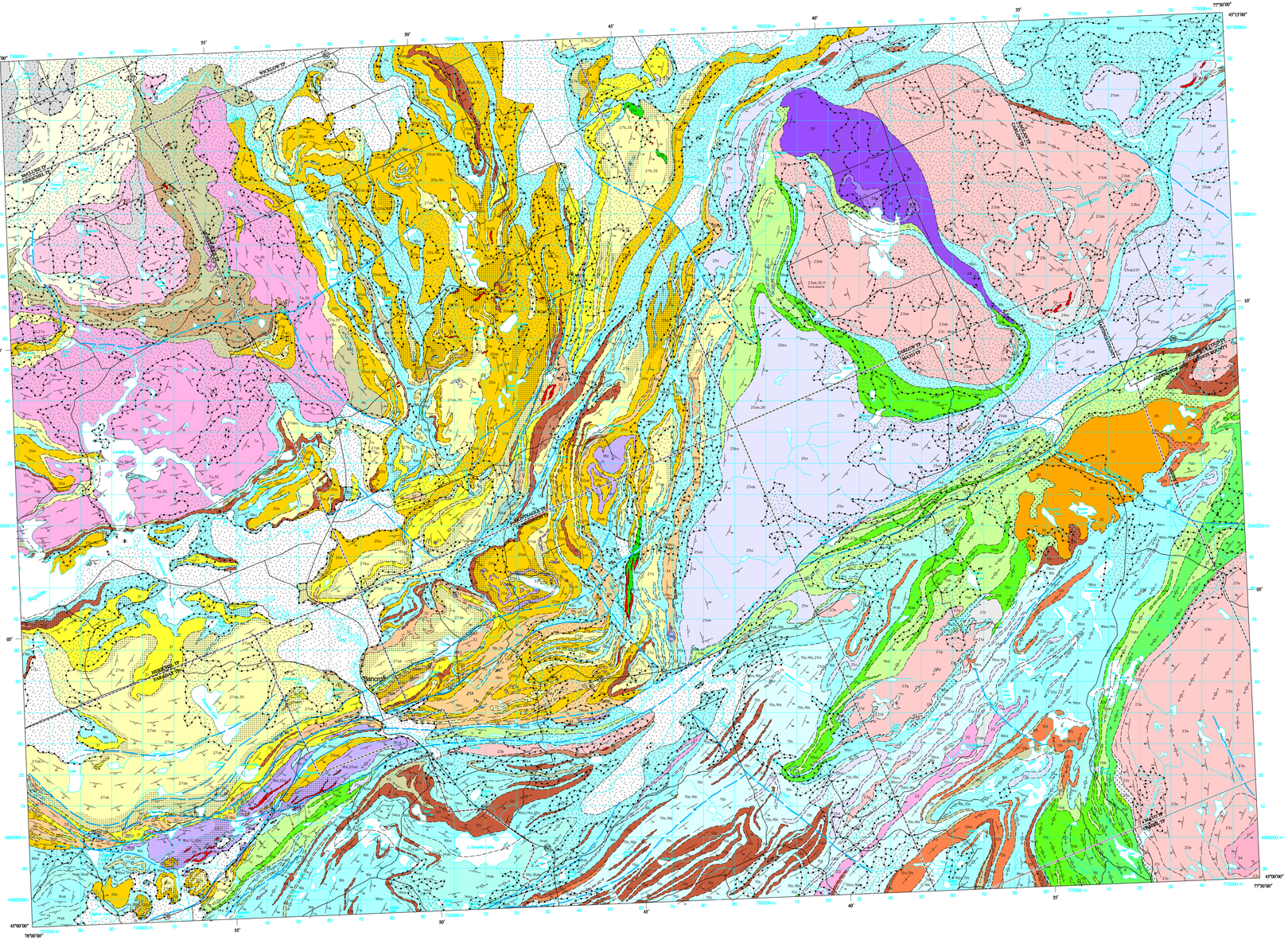

LEGEND

PHANEROZOIC

CENOZOIC •

QUATERNARY

PLEISTOCENE AND HOLOCENE

Swamp, bog and peat accumulations; marl; fluvial and lacustrine silt, sand, gravel; glaciofluvial sand, gravel, boulders; sandy, bouldery, glacial till.

UNCONFORMITY

PRECAMBRIAN

PROTEROZOIC

MESOPROTEROZOIC

CENTRAL METASEDIMENTARY BELT

Ferrite–Carbonatite Suite (1070–1040 Ma)[b]

35 **Late Pegmatite:** Pink, red, quartz-alkali feldspar pegmatite.[c]

34 **Late Pegmatite:** Nepheline-albite pegmatite.

33 **Carbonatite and Calcite Vein-dikes:** Carbonatite rich in calcite with various mixtures of alkalic pyroxene, amphibole, alkali feldspar, titanite, allanite, fluorite, apatite, pihkopoite, biotite, zircon, and U, Th, and REE minerals; ferrite fragments common. Forms small stocks up to 100 m across and vein-dikes less than 1 m wide.

32 **Ferrite:** Highly ferritized rocks marked by large concentrations of alkalic pyroxene and amphibole, fluorite, apatite, alkalic pyroxene syenite pegmatite, granite pegmatite, calcite-silicate veinlets; enriched in Na, K, Ca, Fe, Ti, P, F, Cl, U, Th, REE, Ba and Mo.

31 **Ferrite:** Highly syenitized rocks developed mainly in alaskite (Unit 27), patches and veinlets of alkalic pyroxene and amphibole are abundant; local patches of highly ferritized rocks (Unit 32); original lithology largely replaced by nepheline-normative alkali feldspar syenite.

INTRUSIVE ROCKS[d]

Monzonite–Diorite Suite (1090–1075 Ma)

30 **Granite:** Massive monzogranite with igneous textures; locally contains associated aplite and granite pegmatite dikes.

29 **Monzonite:** Massive, medium- to coarse-grained, porphyritic to equigranular monzonite with igneous textures.

28 **Mafic Rocks:** Massive gabbro and diorite with igneous textures.

REGIONAL METAMORPHISM [e]

Alaskite Suite (1250–1240 Ma)

27 **Felsic Intrusive Rocks**

27a Gneissic, metaluminous to marginally peraluminous alaskite with augen structure and relict igneous textures.

27b Unit 27a with laminated structure and a metamorphic fabric.

27c Gneissic, contaminated, metaluminous to marginally peraluminous alaskite formed by the assimilation and reaction of marble with alaskite magma. These rocks are mainly gneissic, biotite-hornblende monzogranite and quartz syenite.

Diorite Suite (1270–1240 Ma)

26 **Felsic Intrusive Rocks:** Gneissic trondhjemite and granodiorite with augen structure and relict igneous textures.

25 **Mafic Intrusive Rocks**

25a Gneissic diorite, gabbro, minor tonalite with augen structure and relict igneous textures.

25b Amphibolite with a metamorphic fabric locally containing relict phases of rocks of Unit 25a.

25c Gneissic gabbro and diorite sills and dikes with augen structure and relict igneous textures. [f]

25d Massive gabbro and diorite sills and dikes with igneous textures. [f]

Late Trondhjemite Suite (1280–1270 Ma)

24 **Granite:** Gneissic alkali feldspar granite and monzogranite with augen structure and relict igneous textures.

23 **Trondhjemite and Granodiorite**

23a Gneissic trondhjemite, minor granodiorite with augen structure and relict igneous textures.

23b Gneissic trondhjemite, minor granodiorite with laminated structure and a metamorphic fabric.

23c Unit 23a with granodiorite predominant.

23d Unit 23b with granodiorite predominant.

23e Faintly gneissic aphanitic to porphyritic trondhjemite cut by fine-grained aphanitic leucocratic epilite dikes; igneous textures largely preserved.

23f Gneissic granite pegmatite related to trondhjemitic intrusions.

23g Massive, equigranular to porphyritic, fine- to medium-grained trondhjemite with igneous textures.

22 **Albite Granite and Syenite:** Massive, fine- to medium-grained, leucocratic granite and minor albite syenite with igneous textures; syenitic phases formed by the assimilation and reaction of marble with albite granite magma.

21 **Mafic Intrusive Rocks**

21a Gneissic diorite, minor gabbro and tonalite with augen structure and relict igneous textures.

21b Gneissic amphibolite derived from rocks of Unit 21a.

21c Gneissic tonalite, minor diorite and gabbro with augen structure and relict igneous textures.

21d Massive to slightly foliated diorite with igneous textures.

21e Contaminated gabbro and diorite formed by the assimilation and reaction of mafic metavolcanics with trondhjemitic magma. These rocks contain numerous inclusions of hornfels and gneissic mafic metavolcanics.

Nepheline Syenite Suite (<1290 >1250 Ma)

20 **Alkalic Syenite**

20a Gneissic, leucocratic, potassium feldspar-bearing albite syenite and minor alkali feldspar syenite with augen to laminated structures and a metamorphic fabric.

20b Gneissic, leucocratic muscovite-albite syenite locally with corundum and vesuvianite; laminated to augen structures and a metamorphic fabric.

20c Coarse-grained biotite alkali feldspar syenite, minor alkalic diorite with relict igneous textures.

20d Gneissic pyroxene and amphibole alkali feldspar syenite probably formed by the assimilation and reaction of marble with albite syenite magma.

19 **Nepheline Syenite**

19a Gneissic potassium feldspar nepheline syenite, albite nepheline syenite and minor oligoclase nepheline syenite, with augen to laminated structures and a metamorphic fabric.

19b Gneissic oligoclase nepheline syenite and albite nepheline syenite with augen to laminated structures and a metamorphic fabric.

19c Gneissic feldspathic urtite, urtite and melagrite with augen to laminated structures and a metamorphic fabric.

19d Gneissic corundum-bearing nepheline syenite with augen to laminated structures and a metamorphic fabric.

19e Gneissic melagrite with augen to laminated structures and a metamorphic fabric.

18 **Mafic Alkalic Rocks**

18a Gneissic ijolite and melagrite with augen structure and a metamorphic fabric.

18b Massive alkalic gabbro with igneous textures.

18c Amphibolite derived from alkalic gabbro.

18d Massive to gneissic alkalic gabbro, diorite, anorthositic gabbro and anorthosite; nepheline normative; relict igneous textures common.

Anorthosite Suite (<1290 >1250 Ma)

17 **Gneissic Anorthosite**

17a Gneissic oligoclase anorthosite with accessory nepheline and relict igneous textures.

17b Corundum-bearing nepheline anorthosite; gneissic with a metamorphic fabric.

INTRUSIVE CONTACT

METASEDIMENTARY AND METAVOLCANIC ROCKS [g]

16 **Calcitic Marble (Medium to High Metamorphic Grade)[h]**

16a Medium- to coarse-grained, grey to white, gneissic calcitic marble containing up to 20% siliceous impurities; locally contains intercalated units of siliceous marble.

16b Medium- to coarse-grained, gneissic, siliceous calcitic marble containing 20 to 60% siliceous impurities; commonly contains thin intercalated units of amphibole-rich metasedimentary rocks.

16c Skarn developed from calcitic marble; light to dark green, dominated by various mixtures of diopside, amphibole, epidote, titanite, garnet, potassium feldspar, scapolite, calcite and quartz.

16d Mylonitized calcitic marble.

15 **Calcitic Marble (Low Metamorphic Grade)[h]**

15a Fine- to medium-grained calcitic marble containing up to 20% siliceous impurities; locally contains intercalated units of siliceous marble. In medium-grained calcitic marble; poorly preserved sedimentary fabric and bedding features.

15b Unit 15a containing 20 to 60% siliceous impurities and thin interbeds of calcareous sandstone and siltstone.

14 **Dolomitic Marble[h]**

14a Medium- to coarse-grained, white to greenish, dolomitic marble containing up to 20% siliceous impurities; local intercalations of tremolite-rich dolomitic marble.

14b Medium- to coarse-grained, cherty, dolomitic marble containing numerous discontinuous layers of coarsely recrystallized chert, possibly in part derived from silicified stromatolites and algal mats.

13 **Amphibole-rich Metasedimentary Rocks**

13a Calcareous mudstone and sandstone locally containing amphibole porphyroblasts; sedimentary fabric and bedding features poorly preserved; thin units of interbedded siliceous marble (Unit 15b) common; may in part be derived from calcareous tuff.

13b Unit 13a containing thin units of interbedded siliceous clastic metasediments (Unit 12).

13c Medium to high metamorphic grade equivalent of Unit 13a with a metamorphic fabric and mainly diopside-amphibole-plagioclase gneiss locally containing phases rich in potassium feldspar, quartz, biotite, scapolite, epidote, carbonate, titanite, pyrite and iron-titanium minerals; interbedded thin units of siliceous marble (Unit 16b) common.

13d Unit 13c containing interbedded thin units of Unit 12.

12 **Siliceous Clastic Metasedimentary Rocks[h]**

12a Medium-grained, feldspathic metagreywacke-metasiltstone with garnet porphyroblasts locally developed; poorly preserved sedimentary fabric and bedding features. Lower grade phases of these rocks contain evidence that they were eroded from volcanic terranes and deposited by turbidity currents; may include some siliceous tuffaceous deposits.

12b Medium to high metamorphic grade gneissic variety of Unit 12a with a metamorphic fabric.

Andesite–Dacite Suite (1280–1270 Ma)[i]

11 **Felsic Metavolcanic Rocks**

11a Schistose to gneissic, quartz-sodic, plagioclase-rich rhyolite to rhyodacitic flows, ash flows and fragment-poor tuffs with a metamorphic fabric.

11b Schistose to gneissic dacitic flows, ash flows and fragment-poor tuff with a metamorphic fabric.

11c Fragmental, gneissic rhyolitic to dacitic rocks.

11d Micaceous, sillimanite-bearing schist probably derived from dacitic tuff.

10 **Mafic Metavolcanic Rocks**

10a Amphibolite and minor biotite-hornblende-plagioclase gneiss derived mainly from basalt with some intercalated andesite; metamorphic fabric with poorly preserved flow features.

10b Unit 10a with andesitic metavolcanics predominant; includes thin units of felsic metavolcanics (Units 11a to 11d).

Tholeiitic Basalt Suite (1290–1275 Ma)

9 **Felsic Metavolcanic Rocks**

9a Schistose to gneissic, quartz-sodic, plagioclase-rich rhyolite and rhyodacitic flows, ash flows and fragment-poor tuffs with a metamorphic fabric.

9b Fragmental, schistose to gneissic, rhyolitic to rhyodacitic rocks.

8 **Mafic Metavolcanic Rocks:** Amphibolite schist and gneiss derived from mainly low- to intermediate-K tholeiitic basalt flows; metamorphic fabric with poorly preserved flow features such as pillows and flow breccias.

INTRUSIVE ROCKS[d]

Early Trondhjemite Suite (1370–1350 Ma)

7 **Felsic Intrusive Rocks**

7a Gneissic trondhjemite and minor granodiorite laminated and veined by lenses and discontinuous layers of quartzo-feldspathic material; metamorphic fabric; amphibolite xenoliths common.

7b Unit 7a with granodiorite predominant.

7c Gneissic tonalite and minor diorite with a laminated structure and a metamorphic fabric.

METASEDIMENTARY ROCKS (PRE EARLY TRONDHJEMITE SUITE)[g,h]

6 **Calcareous and Siliceous Shaly Metasedimentary Rocks:** Interstratified, thinly bedded, garnet-feldspar-biotite-quartz gneiss and schist locally containing phases rich in one or more of garnet, sillimanite, muscovite, plagioclase, potassium feldspar, scapolite, amphibole, carbonate, diopside, iron-titanium oxide minerals and pyrite (siliceous and calcareous mudstone); locally contains thin intercalated units of gneissic orthoquartzite, quartzo-feldspathic metasandstone, calcareous metasandstone and siliceous marble.

5 **Feldspathic and Quartzose Metasedimentary Rocks**

5a Quartz-rich feldspathic gneiss locally containing intercalated rocks of Units 6 and 4, amphibole-rich metasedimentary rocks; siliceous marble and skarn.

5b Gneissic orthoquartzite and subarkose with intercalated micaceous and amphibole-rich metasedimentary rocks.

4 **Impure Metasandstone**

4a Medium- to coarse-grained biotite-quartz-feldspar gneiss with intercalated medium- to coarse-grained quartzo-feldspathic gneiss, amphibole-rich metasedimentary rocks and siliceous marble. Probably derived from a medium- to coarse-grained impure sandstone-arkose-calcareous sandstone-siltstone sequence.

4b Similar to Unit 4a, except finer grained. Probably derived from a impure sandstone-arkose-siltstone sequence.

CENTRAL GNEISS BELT

INTRUSIVE ROCKS (1400–1500 Ma?)[d]

3 **Granite:** Gneissic, laminated monzogranite commonly containing veins and lenses of coarse-grained quartzo-feldspathic material; metamorphic fabric.

2 **Intermediate Rocks:** Gneissic, laminated monzodiorite, quartz monzodiorite and minor monzogranite and tonalite; mainly veined by lenses and discontinuous layers of quartzo-feldspathic material; metamorphic fabric.

INTRUSIVE CONTACT

1 **Mafic Rocks:** Gneissic, laminated tonalite and diorite; locally veined by quartzo-feldspathic material; dikes of monzogranite (Unit 3) locally present.

RS Rusty-weathering, graphitic, pyrite and pyrrhotite-bearing schist[j]

Notes:

[a] Only the thickest and most extensive Cenozoic deposits in which bedrock outcrops are absent or scarce are shown.

[b] Igneous rock suites and their ages are from Lumbers et al. (1990).

[c] Present only in the gneissic Precambrian rocks; only the largest known dikes and areas of marked dike concentrations are shown.

[d] Intrusive rocks are not necessarily named according to Streckeisen (1976). See Lumbers et al. (1990).

[e] Only those parts of the area underlain by gneissic Precambrian rocks were subjected to the high grade regional metamorphism.

[f] Multiple ages represented. Some sills and dikes may be related to volcanism (Units 8 to 11).

[g] Metasedimentary rocks of Units 12 to 16 are present in both the Haliburton (1400–1350 Ma) and Hastings (1300–1240 Ma) supracrustal sequences (Lumbers et al., 1990) and are undifferentiated with respect to these sequences. Metasedimentary rocks of Units 4 to 6 are part of the Haliburton sequence and are intruded by the early trondhjemite suite; some metasedimentary rocks of Unit 6 may also be part of the Hastings sequence.

[h] Rocks of these groups are subdivided lithologically and the order does not imply age relationships either within or between groups. Units 4 - 6 are locally highly deformed and have been called tectonites by some workers.

[i] Metavolcanic rocks of the andesite-dacite suite are in part contemporaneous with the late trondhjemite suite.

[j] Most rusty schists are probably hydrothermal replacement deposits in shear zones, but some may represent tuffaceous iron sulphide-bearing sediments or black shales.

Ontario

Ontario Geological Survey

P. 3385

PRECAMBRIAN GEOLOGY

BANCROFT AREA

Scale 1:50 000

1000 m 0 1 2 km

NTS Reference: 31 F/4

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1 cm equals 10 km

SYMBOLS

(horizontal)

- Foliation (vertical, inclined dip unknown)
- Compositional layering and/or parallel tectonic foliation (inclined, dip unknown)
- Compositional layering and/or parallel tectonic foliation (vertical)
- Lineation (dip, dip unknown)
- Bedding; sedimentary, volcanic or other (vertical, inclined, dip unknown)
- Bedding sedimentary, volcanic or other, (horizontal)
- Fault
- Geological Contact
- Contact metamorphic aureole.

Slight fenitization marked by patches and veinlets of alkalic pyroxene and amphibole, alkali feldspar, and minor syenitization developed as fracture fillings in host rocks older than 1240 Ma.

SOURCES OF INFORMATION

Base map derived from Map 31 F/4 of the National Topographic System, scale 1:50 000.

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Lumbers, S.B., Heaman, L.M., Vertolli, V.M. and Wu, T.W. 1990. Nature and timing of Middle Proterozoic magmatism in the Central Metasedimentary Belt, Grenville Province, Ontario; in Mid Proterozoic Laurentia-Baltica, Geological Association of Canada, Special Paper 38, p.243-276.

Streckeisen, A. 1976. To each plutonic rock its proper name; Earth-Science Reviews, v.12, p. 1-33.

Published maps and reports of the Geological Survey of Canada and the Ontario Geological Survey.

Unpublished undergraduate and post-graduate theses.

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CREDITS

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Geological compilation by S.B. Lumbers and V.M. Vertolli, 1990–91.

Drafting by Laura Reid.

Geology and legend reviewed by Mike Easton.

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