CANADIAN GEOSCIENCE MAP 159 DESCRIPTIVE NOTES The Baie Verte map area in the northwest part of Baie Verte Peninsula (Newfoundland and Labrador) is one of three 50 000 scale maps in this area that are based on new and compiled bedrock geological and remotely sensed data g. 1; Skulski et al., 2015a, b). This part of the Newfoundland Appalachians is underlain by Mesoproterozoic basement cks, Neoproterozoic to Ordovician rocks of the Humber continental margin, dismembered Cambrian ophiolite, Ordoviciar ophiolite cover, and Upper Ordovician to Silurian continental volcano-plutonic complexes (Fig. 2; IUGS Time Scale of Cohen et al. (2013) is utilized herein). TECTONOSTRATIGRAPHY AND SETTING The East Pond Metamorphic Suite constitutes Mesoproterozoic basement (de Wit, 1980, de Wit and Armstrong, 2014) to the overlying Fleur de Lys Supergroup and consists of psammitic and semipelitic gneiss, quartzite, amphibolite, migmatitic gneiss, and granitic gneiss (unit mPEPm). The overlying Fleur de Lys Supergroup represents the Humber continental margin that now comprises three tectonic entities (van Staal et al., 2013): the ocean-continent transition (Birchy Complex), ar ATLANTIC OCEAN extensional allochthon (Rattling Brook Group), and a para-autochthonous continental margin (Ming's Bight, Old House Cove, and White Bay groups). The Birchy Complex includes: interbedded psammite and pelite (unit nPBq) overlain by tholeiitic metabasalt and mafic metatuff cut by metagabbro sills and dykes (unit nPBm), coarse-grained mafic metaclast rocks (unit nPBe), and coarse-grained gabbro sills dated at 558.3 ± 0.7 Ma (location 25, Table 1; unit nPBg). These are overlain by interbedded psammite, semipelite with coticules, minor metabasalt and gabbro, intermediate tuff dated at 556 ± 4 Ma (location 24, Table 1), and tectonic mélange including large chaotic blocks of serpentinized ultramafic rock (unit nPou), metapyroxenite, metagabbro, mafic volcanic and metasedimentary clasts, and locally, ultramaficmafic–derived wacke (unit nPBc). These are intruded by quartz diorite and trondhjemite (unit nPBt) and overlain by graphitic pelite (unit nPBp) and calcareous semipelite (unit nPBcp). The Flat Point Formation (unit nPBFP) lies at the top of the Birchy complex, resembles units in the Rattling Brook Group and consists of psammitic schist, metawacke, and pebbly conglomerate. Detrital zircon grains in Flat Point psammite have a Laurentian provenance and maximum depositional age of ______ 90 ± 52 Ma (van Staal et al., 2013). The Rattling Brook Group, believed to originally conformably overlie the Birchy Compl (van Staal et al., 2013), comprises massive to possibly pillowed, conformable mafic schist and amphibolite (unit nPORBa) Table 2. Past and current mines. overlain by graphitic schist (locally unit nPORBg), marble, calcareous pelite, and marble breccia (unit nPORBm), Paraautochthonous Humber margin rocks include Ediacaran rift-facies and Cambrian to Early Ordovician drift-facies metasedimentary rocks (carbonate and transgressive clastic sediments) subdivided into three, likely coeval, nostratigraphic groups that basinward include the White Bay (west of present map area). Old House Cove. and Min

Status Commodity Secondary commodity Ming mine Producing Copper Gold, silver, zinc Ming West mine Past producer Copper Gold, silver, zinc, lead East mine Past producer Copper Gold, silver Rambler Main mine Past producer Copper Gold, silver, zinc, cadmium, lead Deer Cove mine Past producer Gold Big Rambler Pond mine Past producer Copper Goldenville mine Past producer Gold Copper, iron Stog'er Tight mine Past producer Gold Silver, copper, molybdenum, zin Pine Cove mine Producing Gold Terra Nova mine Past producer Copper 14 Baie Verte mine Past producer Asbestos igure 1. Map sources: 1 = Anderson, 1998; 2 = Bélanger, 1995; 3 = Bursnall, 1975; 4 = Christie and Dearin, 1986; 5 = Colman-Sadd and Crisby-Whittle, 2002; 6 = Dimmell and MacGillvray, 1991; 7 = Dubé et al., 1993; = Dunsworth, 2004; 9 = Evans, 2004; 10 = Fitzpatrick, 1981; 11 = Gale, 1971; 12 = Gower, 1987a; 13 = Gower, 1987b; 14 = Hibbard, 1983; 15 = Huard, 1990a; 16 = Huard, 1990b; 17 = Jourdain and Oravec, 1996; 8 = Kambampati, 1984; 19 = Kennedy, 1971; 20 = Kerr and Collins, 1983; 21 = Kidd, 1974; 22 = Kidd et al., 1978; 23 = Miller and Abdel-Rahman, 1994; 24 = Norman, 1973; 25 = Piercey, 1996; 26 = Regular, 2005; 7 = Shepperd et al., 1987; 28 = Snow, 1989; 29 = Stewart, 1995; 30 = Tuach, 1976 AC: Advocate Complex BC: Betts Cove Complex LABRADOR SEA PC: Pacquet complex PR: Point Rousse Complex BVL: Baie Verte Line BBG: Black Brook group CBP: Cape Brule Porphyry CSJ: Cape St. John Group DG: Dunamagon granite GP: Gull Pond Ridge pluton LG: La Scie granite MG: Ming's Bight Group RC: Reddits Cove gabbro SI: Seal Island Bight syenite TP: Trap Pond granite ----- Fault Thrust fault Normal fault Zrn 491 Ma (23) ontinental overlap assemblages DEER COVE SOLE THRUST SLAUGHTER HOUSE FAULT Wild Cove Pond Igneous Suite King's Point volcanic complex Ultramafic (mantle and cumulate) NEOPROTEROZOIC TO EARLY PALEOZOIC UPPER ORDOVICIAN-SILURIAN Burlington plutonic suite Rattling Brook Group (extensional allochthe NEOPROTEROZOIC: EDIACARAN Birchy Complex (ocean-continent transition) East Pond Metamorphic Suite (basement) Figure 2. a) Tectonic map of Newfoundland and b) simplified geological map of the Baie Verte Peninsula (modified from Hibbard, 1983; Skulski et al., 2010; Commodity Secondary commodity W H I T ERomeo and Juliet B A YWest Pond Priest's Prospect 1807 Zone Hodder Copper Dorset Extension Carb/Fuel Bog Balcony Pine Cove-Western Extension CRML 6851-1 Biarritz Corner Shore Brass Buckle Krissy Trend Cabot Graphite Upper Ming Footwall South Brook Gold Traverstown Table 3. Drilled prospects.

NEOPROTEROZOIC-(?) LOWER ORDOVICIAN Fleur de Lys Supergroup

Serpentinized ultramafic rock including brecciated talc- and/or tremoliteearing serpentinite to listwanite, and fuchsite-tremolite schist; tectonized blocks occur as metre- to decimetre-scale lenses in graphitic schist and other netasedimentary rocks; may represent mantle (metaharzburgite), and/or possibly ultramafic cumulate (pyroxenite-websterite).

nPOa Mainly massive, black-green amphibolite dykes, sills, and pods.

Gabbro-eclogite sills and dykes; overprinted in part by amphibolite facies assemblage; amphibolite retrogression dated at 465 ± 12 Ma (Loc. 109, Table 1). Old House Cove Group Medium- to coarse-grained feldspar porphyroblastic mica schist; tectonite.

Middle Arm Metaconglomerate: polymictic metaconglomerate, includes matrix-

and clast-supported varieties; interbedded with yellowish-grey psammite.

Unsubdivided semipelitic, pelitic, and psammitic schist; minor greenschist,

Grey, brown, and black graphitic schist, locally feldspar-porphyroblastic;

Mainly medium to dark green amphibolite and greenschist. Amhibolite is

pically massive, medium-grained and feldspar-porphyroblastic. Contacts

surrounding rocks are locally gradational. Bulbous, pillow-like forms

Unseparated buff- to grey-weathering psammitic and semipelitic schist, minor

Flat Point Formation: Psammitic schist including feldspathic metawacke,

locally interbedded with semipelite; locally with pebbles and graded.

quartz-pebble metaconglomerate and semipelitic to graphitic schist containing

nPOOHm | Marble and calcareous pelite.

psammitic schist and graphitic schist.

Rattling Brook Group

marble, and graphitic schist.

sulphidic and rusty-weathering.

Ming's Bight Group

tectonic mélange (see nPBc).

East Pond Metamorphic Suite

Lithological or stratigraphic contact

Approximate

Inferred

Fault or shear zone

D₃ thrust or reverse fault

— — — · Approximate

-= − · Approximate

Visited in this study

²⁰ × Facing known, vertical

Inclined

Inclined

Vertical

S₁, inclined

S₁, vertical

S₂, inclined

S₂, vertical

S₃, inclined

S₃, vertical S₄, inclined

S₅, inclined

F₃, U-shaped

F₄, U-shaped

F₅, U-shaped

F₂, S-shaped

F₂, Z-shaped

F₃, Z-shaped

Sinistral

40 Ar/³⁹ Ar age data in Ma

Geochronology location (see Table 1) ▼ U-Pb age data in Ma

Past-producing

Drilled prospect (see Table 3)

Mineral or stretching lineation

Fault or shear zone ¹⁵ Normal

Mine (see Table 2)

Pillow facing

Gneissic foliation

Axial plane of fold

Note: Compiled historical data are shown in purple.

Normal fault

Dextral fault

age of 1491 ± 19 Ma (Loc. 110, Table 1).

Dominantly fine- to medium-grained, grey psammitic and semipelitic schist and

073 ± 19 Ma (Loc. 111, Table 1) and pink granite gneiss has a crystallization

gneiss, grey banded quartzofeldspathic gneiss, migmatite gneiss, and minor

pink granitic gneiss. Paragneiss has a maximum detrital age of less than

NEOPROTEROZOIC: EDIACARAN

nPORBm Buff to white marble and calcareous pelite; minor marble breccia.

pods of metagabbro and coarse actinolite schist.

Dunamagon granite: medium- to coarse-grained, pink biotite monzogranite dated at 427.2 ± 1.4 Ma (Loc. 4, see Skulski et al., 2015b) to the east. Mainly medium to dark green amphibolite. Buff- to grey-weathering, medium- to coarse-grained psammitic and

Cape St. John Group Unseparated Cape St. John Group including clastic, pink-red sedimentary SCSJu rocks, massive amygdaloidal mafic volcanic, and/or abundant felsic vocanic пРООНр semipelitic schist (with plagioclase and garnet porphyroblasts); minor pebbly rocks, and metamorphic equivalents. Beaver Cove formation: beige to red-grey, crossbedded coarse-grained

Early synvolcanic intrusive rocks SCBd Cape Brule Porphyry: quartz-feldspar porphyry, locally aplite, ring dyke.

White-pink, locally modally layered, quartz–two feldspar–biotite porphyritic SCBp monzogranite with a fine- to medium-grained groundmass. May contain fuchsitic xenoliths; dated at 429 ± 4 Ma (Loc. 6, see Skulski et al., 2015b); pendants of mafic/ultramafic rocks. SCBi Melanocratic, coarser grained phase of the Cape Brule Porphyry comprising porphyritic (quartz-feldspar) granodiorite to monzogranite.

BCs calcareous arkose and pebble conglomerate containing volcanic-derived

clasts from underlying ophiolite and ophiolite cover sequence.

(?) SILURIAN-DEVONIAN

garnet granite

SILURIAN: WENLOCK-LUDLOW

Post tectonic intrusive rocks

King's Point volcanic complex

Synvolcanic intrusive rocks

Confusion Bay plutonic suite

Synvolcanic intrusive rocks

White to light grey, medium-grained, massive, leucocratic muscovite±

Pale reddish-brown to brown-grey, feldspar±quartz porphyritic syenite and

Upper volcanic unit: quartz-feldspar porphyritic comenditic ash-flow tuff and

breccia units and possible hypabyssal intrusive equivalents forming ring dykes.

granite (quartz syenite dated at 427 ± 2 Ma (Loc. 109, Table 1)).

SILURIAN: LLANDOVERY-WENLOCK Micmac Lake Group Fox Pond formation

SMFi Red porphyritic eutaxitic ignimbrite (high-K rhyolitic and dacitic).

Pink-weathering, arkosic sandstone, flat-bedded, well graded. North of Flat Water Pond, sandstone is recrystallized and bleached grey-buff. MFt Massive, flinty, dark purplish, slighly mottled trachytic alkaline basalt.

Massive, vesicular purplish-green basalt, alkaline basalt, basanite (plagioclase-

Biotite granodiorite-monzogranite dated at 433 ± 0.8 Ma (Loc. 8, Table 1),

SBgdb locally contains hornblende (or amphibole replaced by biotite), and accessory

Pink-red volcanic rock–derived, pebble to boulder conglomerate. North of Flat MFc Water Pond, basal metaconglomerate contains plutonic clasts and is nPBcp Calcareous semipelite, typically interbedded at contact with semipelite (nPBp). bleached white. Alkaline basaltic to mugearitic, lapilli tuff, tuff breccia, well bedded and graded containing abundant broken plagioclase crystals; dated at less than 430 ± 4 Ma Graphitic pelite, semipelite, and graphitic schist; commonly associated with (Loc. 7, Table 1).

phyric), and hawaiite. North of Flat Water Pond, metamorphosed mafic nPBt Quartz diorite, trondhjemite. metavolcanic units weather medium green. Strugglers Pond formation Interbedded psammite, semipelite, coticule, minor metabasalt and metagabbro, and minor intermediate tuff dated at 556 ± 4 Ma (Loc. 24, Table 1). Includes Massive, green, purplish-green- or purplish-weathering, aphyric basalt. Mainly positional and tectonic mélange including a chaotic assemblage of large occurs on west side of Micmac Flat Water fault. blocks of serpentinized ultramafic rock (nPOu), tremolite-fuchsite alteration

of smaller metapyroxenite blocks, altered gabbro, mafic volcanic rocks, clastic Red pebble to boulder conglomerate, basal conglomerate contains clasts of sedimentary rocks, and marble blocks in graphitic to actinolite schist; locally SMSc granodiorite, nonporphyrityic maroon rhyolite, rare quartz-feldspar porphyry with detrital chromite clasts and chromite-rich beds. and basalt. Locally overlies plutonic regolith. Tholeiitic metagabbro, foliated, medium- to coarse-grained, plagioclase+ hornblende-bearing dated at 558.3 ± 0.7 Ma (Loc. 25, Table 1); includes UPPER ORDOVICIAN-SILURIAN: LLANDOVERY leucocratic calc-silicate layers (originally feldspathic), and more

coarse-grained mafic metaclastic rocks. Biotite±hornblende granodiorite dated at 441 ± 1.2 Ma (Loc. 9, Table 1), biotite-hornblende quartz monzodiorite and granodiorite.

Tholeiitic metabasalt, greenschist (likely metaclastic and/or epiclastic) with layers of fine-grained amphibolite, banded amphibolite, and metagabbro. Chalky-weathering, medium- to coarse-grained, foliated to gneissic hornblende-biotite granodiorite dated at 445 ± 4 Ma; (Loc. 11, Table 1). nPBq Psammite interbedded with thin pelite and semipelite beds.

MESOPROTEROZOIC uOqfp Flow-banded, massive rhyolite dyke dated at 458 ± 4 Ma; (Loc. 13, Table 1). LOWER-MIDDLE ORDOVICIAN Synvolcanic intrusive rocks

Tholeiitic gabbro sills includes plagioclase±clinopyroxe–phyric to fine-grained gabbro (and diabase). Commonly rich in Fe-Ti-oxide minerals. Thin tholeitic gabbro dykes cut pillowed boninite in the southern Pacquet complex. The og'er Tight gabbro sill intrudes the lower Scrape Point Formation and has an age of 483.1 +8.7/-4.8 Ma (Loc. 20, Table 1).

Diorite sills and small plugs.

Snooks Arm Group

Balsam Bud Cove Formation

UPPER ORDOVICIAN

———· Approximate Unseparated volcanic and sedimentary rocks of the Snooks Arm Group. D₁ thrust or reverse fault — → — · Approximate Round Harbour Formation: clinopyroxene+plagioclase-phyric, tholeiitic pillow D₂ thrust or reverse fault basalt units and sheet flows; amygdaloidal; thin, siliceous mudstone interbeds; locally intense brecciation and epidotization. — → — — · Approximate

Felsic (rhyolitic) tuff, and lapilli tuff, calc-alkaline dated at 470 ± 3 Ma (Loc.15, Approximate Volcaniclastic turbiditic wacke, siltstone, and black, graphitic phyllite, lower part is interbedded with thin felsic tuff units, and rare buff-grey-green metabasalt units.

Venams Bight Formation: pillowed tholeiitic basalt and sheet flows; plagioclase±clinopyroxene±magnetite porphyritic and vesicular; thin F₂ axial trace of anticline grey-green siliceous mudstone layers. —··----- Upright **Bobby Cove Formation** —··↓··—·· Overturned Thin and discontinuous chert, ferruginous chert, and magnetite iron-formation. F₂ axial trace of syncline

—··∦··—·· Upright —...₩...—.. Overturned Medium to dark green, volcanogenic turbiditic wacke and siltstone interbedded with grey-green siliceous mudstone units, subordinate felsic tuffs. F₂ axial trace of antiform —··-‡···—·· Upright Mafic tuff and lapilli tuff (localy crystal tuff with plagioclase), grades into

overlying epiclastic unit. Locally interbedded with thin basalt flows. F₂ axial trace of synform —··
↓
··
Upright Felsic crystal tuff, lapilli tuff, dated at 470 ± 4 Ma (Loc. 16, see Skulski et al., F₃ axial trace of antiform 2015b) overlying Betts Cove Complex to the east.

─────── Upright Prairie Hat member: clinopyroxene-phyric (metamorphic actinolite or F₃ axial trace of synform hornblende pseudomorphs; to megacrystic; ≤1 cm) crystal tuff (calc-alkaline, basaltic andesitic), lapilli tuff, and tuff breccia. —···\₩···— Upright Plagioclase-phyric pillow basalt and andesite, calc-alkaline affinity (TiO₂ <1.5%).

Scrape Point Formation Mafic volcaniclastic rocks including tuff, lapilli tuff, and epiclastic sandstone and shale, locally interbedded with pillow basalt. Pillowed and massive, amygdaloidal, tholeiitic, plagioclase+clinopyroxene-

Green wacke, siltstone, and mafic tuff to lapilli tuff.

Buff-pink-weathering, locally sericitized dacite, rhyodacite, and or felsic tuff dated at 476.5 ± 4 Ma (Loc. 17, Table 1). Nugget Pond member: magnetite iron-formation, black chert beds interbedded OSPi with volcanic-derived siltstone.

granodiorite, chert, marble, basalt, and boninite clasts in black shaly, chloritic matrix dated at less than 479 ± 4 Ma (Loc. 18, see Skulski et al., 2015a). Igneous layering Megaconglomerate with large clasts and blocks of ophiolitic gabbro in a black

Kidney Pond conglomerate: conglomerate containing ophiolitic gabbro,

Baie Verte Oceanic Tract Pacquet complex, Point Rousse Complex, Advocate Complex Rambler Rhyolite formation Quartz and feldspar-phyric rhyolite and rhyodacitic flows locally interbedded with felsic volcanic, tuff and breccia. Felsic volcanic flows are dated at 487 ± 4 Ma (Loc. 21, Table 1).

Felsic volcaniclastic rock including rhyolitic and rhyodacitic tuffs, lapilli tuff, and tuff breccia; locally strongly sericitized and silicified. Mt. Misery Formation: plagioclase±pyroxene-phyric pillow basalts. Island arc tholeiitic affinity, low TiO₂ <1.0%) and light rare-earth element–depleted. Interbedded with boninite in southern Pacquet complex. Betts Head Formation

CBHf Thin, rhyodacite and rhyolite flows and lapilli tuff; boninitic affinity.

Spherulitic amygdaloidal sparsely olivine+chromite+orthopyroxene-phyric boninitic pillow lavas with aphanitic dark-green groundmass. Ophiolitic intrusive rocks Mixed dykes and lavas; dyke swarms with 2-10 m wide septa of spherulitic

Sheeted dykes; typically 100% dykes. Includes fine-grained aphyric dykes as well as plagioclase-phyric fine-grained gabbro dykes. Island-arc tholeiitic Late Intrusive Suite: dominantly massive gabbro-gabbronorite, subordinate ornblende diorite and trondhjemite, locally plagioclase-phyric or layered

dated at 488.6 +3.1/-1.8 Ma (Loc. 22, see Skulski et al., 2015b).

Massive medium- to fine-grained gabbro cut by gabbroic dykes. Rodingite, garnet-prehnite-diopside alteration of gabbro.

whitish zoisite-prehnite schist and zoisite-fuchsite schist.

Anorthositic gabbro and trondhjemite, typically altered to calc-silicate assemblage (e.g. zoisite-prehnite) dated at 491 ± 5 Ma (Loc. 23, Table 1). Layered melagabbro and gabbronorite, pyroxenite, gabbro cumulate; cut by

Calc-silicate alteration of ophiolite gabbro and anorthositic gabbro including

gabbro dykes and sills. Includes cumulate with tholeiitic and boninitic affinities.

€BHI Listwenite, carbonatized ultramafic cumulate Layered peridotite includes poikilitic lherzolite, and subbordinate harzburgite

and dunite; commonly serpentinized. Oceanic mantle (Advocate Complex) Serpentinized ultramafic rock, originally oceanic mantle, but may include lavered ultramafic cumulate (CBHu). Locally with talc-carbonate and quartz-carbonate-fuchsite (virginite) alteration.

Harzburgite with minor dunite and pyroxenite, partly replaced by serpentine, carbonate, and tremolite.

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| | Method | Mineral | Rock type | Code | Age (Ma) | Interpretation | Note | Reference |
|-----|--|---------------------|----------------------------------|--------|-----------------|-----------------------------|--|-----------------------------------|
| 7 | U/Pb SHRIMP | Zircon | Mafic lapilli tuff | SMFtb | <430 ± 4 | Maximum crystallization age | | Skulski et al., 2 |
| 8 | U/Pb-TIMS | Zircon, titanite | Biotite granite | SBgdb | 433.0 ± 0.8 | Weighted average of zircon | | Skulski et al., 2 |
| 9 | U/Pb-TIMS | Zircon, | Biotite±hornblende | SBgd | 441.0 ± 1.2 | Weighted average of zircon | | Skulski et al., 2 |
| 11 | U/Pb SHRIMP | titanite Zircon | granodiorite Hornblende-biotite | SBgdh | 445 ± 4 | Crystallization age | | Skulski et al., 2 |
| 13 | U/Pb SHRIMP | Zircon | Granodiorite Quartz-feldspar | uOqfp | 458 ± 4 | Crystallization age | | Skulski et al., 2 |
| 17 | U/Pb SHRIMP | Zircon | porphyry dyke Rhyolite flow | OSPf | 476.5 ± 4 | Crystallization age | | Skulski et al., |
| | U/Pb-TIMS | | Amphibolite, | | | | | 1 |
| 19 | | Zircon | metagabbro | CBHm | 482.9 ± 0.8 | Crystallization age | | Skulski et al., 2 |
| 20 | U/Pb-TIMS | Zircon | Gabbro | OSAg | 483.1 +8.7/-4.8 | approximate age | | Ramezani, 19 |
| 21 | U/Pb SHRIMP | Zircon | Rhyolite flow | ERRt | 487 ± 4 | Crystallization age | | Skulski et al., 2 |
| 23 | U/Pb SHRIMP | Zircon | Trondhjemite | Євнs | 491 ± 5 | Crystallization age | | modified fro Skulski et al., 2 |
| 24 | U/Pb LA-ICPMS | Zircon | Intermediate tuffaceous schist | nPBg | 556 ± 4 | Crystallization age | | van Staal et al., |
| 25 | U/Pb-TIMS | Zircon | Metagabbro | nPBg | 558.3 ± 0.7 | Crystallization age | | van Staal et al., |
| 26 | U/Pb LA-ICPMS | Zircon | Hornblende metagabbro | nPBg | 564 ± 7.5 | Crystallization age | | van Staal et al., |
| 27 | U/Pb LA-ICPMS | Zircon | Muscovitic psammite | nPBFP | <990 ± 52 | Maximum detrital age | | van Staal et al., |
| 31 | U/Pb-TIMS | Titanite | Hornblende biotite granodiorite | OBgdh | 440.1 ± 0.7 | Cooling age | | Skulski et al., 2 |
| 35 | ⁴⁰ Ar/ ³⁹ Ar furnace | Amphibole | Mafic dyke | nPOa | 393 ± 5 | Metamorphic cooling age | Recalculated as 7 step plateau (100% ³⁹ Ar); | Dallmeyer, 19 |
| 36 | step-heating 40Ar/39Ar furnace | Amphibole | | | 418 ± 5 | Metamorphic cooling age | see note 2. Recalculated as 5 step plateau (100% ³⁹ Ar); | |
| | step-heating 40Ar/39Ar furnace | | Mafic dyke | nPO0a | | | see note 2. Recalculated as 5 step plateau (100% ³⁰ Ar); | Dallmeyer, 19 |
| 37 | step-heating 40Ar/39Ar furnace | Amphibole | Mafic dyke | nPOa | 428 ± 5 | Metamorphic cooling age | see note 2. Plateau age, 89.2% gas release; | Dallmeyer, 19 |
| 38 | step-heating | Amphibole | Granodiorite | SBgdh | 420 ± 10 | Metamorphic cooling age | see note 3. | Dallmeyer and Hibb |
| 39 | ⁴⁰ Ar/ ³⁹ Ar furnace step-heating | Amphibole | Granodiorite | SBgd | 409 ± 5 | Metamorphic cooling age | See note 3. | Dallmeyer and Hibb |
| 42 | ⁴⁰ Ar/ ³⁹ Ar furnace step-heating | Amphibole | Granodiorite | SBgd | 416 ± 5 | Metamorphic cooling age | See note 3. | Dallmeyer and Hibb |
| 43 | ⁴⁰ Ar/ ³⁹ Ar furnace step-heating | Amphibole | Granodiorite | SBgd | 417 ± 5 | Metamorphic cooling age | See note 3. | Dallmeyer and Hibbs |
| 45 | ⁴⁰ Ar/ ³⁹ Ar furnace step-heating | Amphibole | Schist | OBCv | 358 ± 5 | Metamorphic cooling age | See note 3. | Dallmeyer and Hibbs |
| 47 | ⁴⁰ Ar/ ³⁹ Ar furnace | Amphibole | Granodiorite | SBgdh | 467 ± 5 | Inherited gas age | See note 3. | Dallmeyer and Hibbs |
| 49 | step-heating 40Ar/39Ar laser | Amphibole | Gabbro | OSAg | 392.1 ± 10.3 | Metamorphic cooling age | Plateau, 100% gas release. | Castonguay et al. |
| 50 | step-heating 40Ar/39Ar laser | | Mafic schist | nPBc | 519.4 ± 3.4 | | Combined plateau from two aliquots, | |
| | step-heating 40Ar/39Ar laser | Amphibole | | | | Cooling age | 88% gas released. | Castonguay et al |
| 51 | step-heating 40Ar/39Ar laser | Amphibole | Gabbro | nPBc | 460.5 ± 14.2 | Metamorphic cooling age | Plateau, 99% gas released. | Castonguay et al |
| 52 | step-heating | Amphibole | Gabbro | EBHs | 453.5 ± 8.6 | Metamorphic cooling age | Plateau,100% gas released. | Castonguay et al |
| 54 | ⁴⁰ Ar/ ³⁹ Ar laser step-heating | Amphibole | Mafic schist | nPBc | 466.4 ± 6.5 | Metamorphic cooling age | Pseudo-plateau, 86% gas released, 1 step dropped. | Castonguay et al |
| 55 | 40Ar/39Ar laser step-heating | Amphibole | Gabbro | €вндс | 465.1 ± 4.3 | Metamorphic cooling age | Plateau,100% gas released. | Castonguay et al. |
| 56 | ⁴⁰ Ar/ ³⁹ Ar laser step-heating | Amphibole | Gabbro | €внт | 470.2 ± 3.5 | Metamorphic cooling age | Plateau, 79% gas released. | Castonguay et al |
| 57 | ⁴⁰ Ar/ ³⁹ Ar laser | Amphibole | Gabbro | Євнs | 432.4 ± 3.2 | Metamorphic cooling age | Plateau, 75% gas released. | Castonguay et al |
| 58 | step-heating 40Ar/39Ar laser | Amphibole | Basalt | €MMm | 382.4 ± 4.2 | Metamorphic cooling age | Combined plateau from two aliquots, | Castonguay et al |
| 67 | step-heating 40Ar/39Ar furnace | | | | | | 90% gas released. Mylonitic amphibolite: | |
| | step-heating 40Ar/39Ar laser | Amphibole | Amphibolite | OVBm | 388 ± 3 | Metamorphic cooling age | see note 3. | Anderson et al., |
| 68 | step-heating 40Ar/39Ar laser | Amphibole | Gabbro | €BHs | 433.3 ± 4.3 | Metamorphic cooling age | Inverse isochron age from 2 aliquots. Combined plateau from three aliquots, | Castonguay et al. |
| 69 | step-heating | Amphibole | Gabbro | €BHs | 432 ± 3 | Metamorphic cooling age | 50% gas released. | Castonguay et al |
| 70 | 40Ar/39Ar laser step-heating | Amphibole | Gabbro | OSAg | 383.4 ± 4.2 | Metamorphic cooling age | Combined plateau from two aliquots, 100% gas released. | Castonguay et al |
| 71 | 40Ar/39Ar laser step-heating | Amphibole | Mafic schist | OBCm | 380 ± 4.1 | Metamorphic cooling age | Combined plateau from two aliquots, 100% gas released. | Castonguay et al. |
| 72 | ⁴⁰ Ar/ ³⁹ Ar laser step-heating | Amphibole | Mafic schist | Єммт | 347.3 ± 3.2 | Metamorphic cooling age | Plateau, 60% gas released. | Castonguay et al. |
| 73 | ⁴⁰ Ar/ ³⁹ Ar laser step-heating | Amphibole | Mafic schist | €BHm | 481.2 ± 6.4 | Metamorphic cooling age | Pseudo-plateau, 87% gas released, 2 steps dropped. | Castonguay et al |
| 74 | ⁴⁰ Ar/ ³⁹ Ar furnace | Muscovite | Schist | пРООНр | 398 ± 5 | Metamorphic cooling age | Recalculated as six step plateau (100% ³⁹ Ar); see note 2. | Dallmeyer, 19 |
| 75 | step-heating 40Ar/39Ar furnace | Muscovite | Schist | nPOOHp | 424 ± 5 | Metamorphic cooling age | Recalculated as five step plateau (95% ³⁹ Ar); | Dallmeyer, 19 |
| | step-heating 40Ar/39Ar furnace | | | • | | | see note 2. Recalculated as six step plateau (100% ³⁹ Ar); | |
| 76 | step-heating 40Ar/39Ar furnace | Muscovite | Schist | nPOOHp | 419 ± 5 | Metamorphic cooling age | see note 2. Recalculated as six step plateau (100% ³⁹ Ar); | Dallmeyer, 19 |
| 77 | step-heating 40Ar/39Ar laser | Muscovite | Schist | пРООНр | 401 ± 5 | Metamorphic cooling age | see note 2. | Dallmeyer, 19 |
| 79 | step-heating | Muscovite | Schist | nPBc | 466.9 ± 2.5 | Metamorphic cooling age | Plateau from two aliquots, 70% gas released, few steps dropped. | Castonguay et al |
| 80 | ⁴⁰ Ar/ ³⁹ Ar laser step-heating | Muscovite | Psammite | пРвс | 424.9 ± 3 | Recrystallization age | Plateau, 70% gas released. | Castonguay et al |
| 90 | ⁴⁰ Ar/ ³⁹ Ar furnace step-heating | Muscovite | Schist | пРОМВ | 370 ± 4 | Metamorphic cooling age | Muscovite defines S ₄ ; see note 4. | Anderson et al., |
| 92 | ⁴⁰ Ar/ ³⁹ Ar laser step-heating | Muscovite | Carbonatized ultramafic rock | €вни | 408.4 ± 2.2 | Metamorphic cooling age | Fuchsite, combined plateau from two aliquots, 70% gas released. | Castonguay et al |
| 94 | ⁴⁰ Ar/ ³⁹ Ar furnace step-heating | Biotite | Schist | пРООНр | 376 ± 5 | Metamorphic cooling age | Total gas age from 6 steps; see note 2. | Dallmeyer, 19 |
| 95 | ⁴⁰ Ar/ ³⁹ Ar furnace | Biotite | Mafic dyke | пРООНр | 374 ± 5 | Metamorphic cooling age | Total gas age from 7 steps; | Dallmeyer, 19 |
| 96 | step-heating 40Ar/39Ar furnace | Biotite | Schist | nPOOHp | 384 ± 5 | Metamorphic cooling age | see note 2. Total gas age from 6 steps; | Dallmeyer, 19 |
| | step-heating 40Ar/39Ar furnace | | | • | | | see note 2. Total gas age from 6 steps; | |
| 97 | step-heating 40 Ar/39 A furnace | Biotite | Mafic dyke | nPOOHp | 388 ± 5 | Metamorphic cooling age | see note 2. Total gas age from 6 steps; | Dallmeyer, 19 |
| 98 | step-heating | Biotite | Mafic dyke | nPOOHp | 389 ± 5 | Metamorphic cooling age | see note 2. | Dallmeyer, 19 |
| 99 | ⁴⁰ Ar/ ³⁹ Ar furnace step-heating | Biotite | Granodiorite | SBgdb | 345 ± 5 | Metamorphic cooling age | Plateau age 10 steps; see note 3. | Dallmeyer and Hibb |
| 100 | ⁴⁰ Ar/ ³⁹ Ar furnace step-heating | Biotite | Granodiorite | SBgdb | 347 ± 5 | Metamorphic cooling age | Plateau age 10 steps; see note 3. | Dallmeyer and Hibb |
| 101 | ⁴⁰ Ar/ ³⁹ Ar furnace step-heating | Biotite | Gneiss | mPEPm | 394 ± 5 | Metamorphic cooling age | Total gas age from 7 steps; see note 2. | Dallmeyer, 19 |
| 102 | ⁴⁰ Ar/ ³⁹ Ar furnace step-heating | Biotite | Granodiorite | SBgd | 412 ± 10 | Metamorphic cooling age | Discordant spectrum, total gas age; see note 3. | Dallmeyer and Hibb |
| 107 | ⁴⁰ Ar/ ³⁹ Ar furnace | Biotite | Gabbro | OSAg | 349 ± 5 | Metamorphic cooling age | Four step plateau age; | Dallmeyer and Hibb |
| | step-heating | | Gabbro eclogite | | | | see note 3. Metamorphic zircon dates, | |
| 109 | U/Pb SHRIMP | Zircon | dyke | nPOae | 465 ± 12 | Metamorphic cooling age | amphibolitization of eclogite. | Castonguay et al |
| | | Zircon | Pink granite gneiss | mPEPm | 1491 ± 19 | Approximate age | | de Wit and Armstro |
| 110 | U/Pb SHRIMP | | griciss | | | | | + |

Skulski, T., Castonguay, S., Kidd, W.S.F., McNicoll, V.J., van Staal. C.R.. and Hibbard, J.P., 2015, Geology, Baje Verte and parts of Fleur de Lys. Newfoundland and Labrador, NTS 12-H/16 and part of NTS 12-I/1:

Bight groups. The Ming's Bight Group is exposed east of Ming's Bight in a Devonian extensional uplift (Anderson et al.

001). It includes psammite, semipelitic schist, quartz-pebble conglomerate, and graphitic schist with pods of metagabbi

and metapyroxenite (unit nPOMB). The metaclastic rocks are associated with panels of massive to pillowed, tholeitic

metabasalt and amphibolite (Pelly Point schist of Hibbard (1983)), that are correlated with the Birchy Complex. The Old

unconformably overlies the East Pond Metamorphic Suite (de Wit, 1980; unit mPEPm). The basement and

metaconglomerate are separated from the Old House Cove Group by tectonized mica schist (unit nPOHt). Structurally

overlying psammite, semipelitic schist, minor pebbly psammitic schist, graphitic schist (unit nPO0Hp), massive amphibolite

gabbro sills and dykes (unit nPOae) locally cut the East Pond Metamorphic Suite and Middle Arm Metaconglomerate.

(unit nPOu) occur as meter- to decimetre-scale lenses or as fault-bounded slivers and may represent mantle

The Baie Verte Line (Hibbard, 1983) is a steeply dipping, reworked tectonic zone that separates the Humber margin to

(unit nPOOHa), and marble and calcareous pelite (unit nPOOHm) make up the rest of the group. Amphibolitized eclogit

Massive amphibolite dykes, sills, and pods (unit nPOa) cut the Old House Cove Group. Serpentinized ultramafic rocks

the west, from the Baie Verte Oceanic Tract and its ophiolite cover to the east. The Baie Verte Oceanic Tract includes intac

ophiolite of the Betts Cove Complex to the east and correlative, but dismembered ophiolite complexes that expose

ogressively deeper structural levels toward the west. The Pacquet complex only exposes the volcanic section comprising

pillowed boninite of the Betts Head Formation (unit CBHb), locally interbedded with thin felsic volcanic flows

unit CMMm). These are capped by a felsic volcanic dome comprising fragmental rocks (unit CRRt) and flows (unit CRRI) of

the Rambler Rhyolite formation dated at 487 ± 4 Ma (location 21, Table 1). The Point Rousse Complex contains fault-

bounded blocks of serpentinized ultramafic rock including oceanic mantle (unit CMs) and layered ultramafic cumulate rocks

(unit CBHu), and faulted blocks of layered gabbro and melagabbro (unit CBHg), massive gabbro, gabbro norite, and

trondhjemite dated at 491 ± 5 Ma (location 23, Table 1). The upper section includes sheeted dykes (unit CBHs) and pillowed

light rare-earth element-depleted, island-arc tholeiitic basalt of the Mount Misery Formation. Boninitic lavas are not

Complex includes kilometre-scale, fault-bounded tracts of serpentinized oceanic mantle and mantle harzburgite

gabbro and trondhjemite (unit CBHa). Massive gabbro (unit CBHm) is locally cut by dykes and altered to rodingite

The Lower to Middle Ordovician Snooks Arm Group overlies the Baie Verte Oceanic Tract across Baie Verte Peninsula

(Skulski et al., 2010). Basinward, the lower contact with the Pacquet and Point Rousse complexes is locally

paraconformable and consists of a discontinuous magnetite-black chert iron-formation called the Nugget Pond member o

the Scrape Point Formation (unit OSPi). Overlying the Advocate Complex, the basal Scrape Point Formation comprises

megaconglomerate with decimetre-scale clasts of ophiolite-derived gabbro in a black shaly matrix (unit OSPX). The

nexposed contact with the underlying Advocate Complex is interpreted to be an angular unconformity (Skulski et al., 2010)

Overlying this unit is the Kidney Pond conglomerate (unit OSPc), a polymictic unit with clasts of ophiolite-derived gabbro

serpentinite, boninite, and of continental margin-derived marble, quartzite, and granitoid rock in a mixed sandy and shall

matrix. A sample of the granitoid clasts has a zircon age of 479 ± 4 Ma (location 18, see Skulski et al., 2015a, south of map

overlain by the Nugget Pond iron-formation. A felsic to intermediate volcanic unit (dacite-andesite) overlies this unit and has

a zircon U/Pb age of 476.5 ± 4 Ma (location 17, Table 1; unit OSPf). The upper reaches of the Scrape Point Formation include

pillowed, high $ar{\mathsf{TiO}}_2$ (up to 3 weight per cent) tholeiitic basalt (unit OSPm) and mafic volcaniclastic and epiclastic rocks

(unit OBCm), and a regionally distinct marker, the Prairie Hat member, consisting of clionopyroxene-phyric (locally replace

by amphibole) mafic crystal tuff, lapilli tuff, and tuff breccia dated at 470 ± 4 Ma (location 16, see Skulski et al., 2015b, east of

the map area). The upper Bobby Cove formation includes mafic tuff (unit OBCv) and a westward-thinning mafic turbidite

sequence of wacke, siltstone, and shale (unit OBCe) capped by a magnetite-chert iron-formation (unit OBCi). Renewed,

tholeiitic mafic volcanism is marked by the appearance of the Venams Bight Formation (unit OVBm). The Balsam Bud Cove

Formation overlies this unit and comprises volcaniclastic turbiditic wacke, black graphitic schist, and thin felsic tuff units

(unit OBBs) that are dated over the Pacquet complex at 470 ± 4 Ma (location 15, see Skulski et al., 2015b, east of the map

area). Tholeiitic pillow basalt units of the Round Harbour Formation mark the top of the stratigraphy (unit ORHm). Tholeiitic

e Stog'er Tight gabbro sill near the base of the Scrape Point Formation has an imprecise zircon age of 483.1 +8.7/-4.8 Ma

(location 20, Table 1). A 458 ± 4 Ma (location 13, Table 1) felsic, flow-banded dyke cuts the Snooks Arm Group overlying the

The Burlington plutonic suite marks a major transition in the Notre Dame Subzone to felsic plutonism and coeval

subaerial volcanism in the Late Ordovician-Silurian (Llandovery-Wenlock) that was accompanied by episodic regional uplift

and emergence of the continental margin sequence, and by the Wenlockian, was synchronous with the Salinic Orogeny

(Skulski et al., 2010). The Burlington plutonic suite comprises an early phase of calc-alkaline, hornblende+biotite

granodiorite (unit OBgdh) dated at 445 ± 4 Ma (location 11, Table 1), an intermediate, synvolcanic (see below) phase of

iotite±hornblende granodiorite (unit SBgd) dated at 441 ± 1.2 Ma (location 9, Table 1), and a late ferroan phase of biotite

The Micmac Lake Group consists of two unconformity-bound, Silurian formations with redbeds and subaerial volcanic

rocks: the Strugglers Pond, and overlying Fox Pond formations. The Strugglers Pond formation is best exposed south o

phase. The base contains massive basalt, basanite, and hawaiite (unit SMFb), overlain by alkaline basaltic to mugea

boulder conglomerate with clasts of granodiorite, rhyolite, quartz-feldspar porphyry, and basalt (unit SMSc). The

present map area have been dated at 442 ± 4 Ma (location 10, see Skulski et al., 2015a). The Fox Pond formation lies

lapilli tuff (unit SMFtb) dated at younger than 430 ± 4 Ma (location 7, Table 1), and volcanic- and plutonic-derived, pebble to boulder conglomerate (unit SMFc). These are overlain by massive trachytic alkaline basalt (unit SMFt), arkosic sandstone

The Confusion Bay plutonic suite and Cape St. John Group are exposed in the east and include the early synvolcanic

ape Brulé Porphyry consisting of melanocratic, porphyritic quartz-feldspar granodiorite to monzogranite (unit SMFb) and

finer grained, locally modally layered, quartz-feldspar-biotite porphyritic monzogranite (unit SCBp; dated to the east at

429 ± 4 Ma; location 6, see Skulski et al., 2015b). The latter is cut by a quartz-feldspar porphyry (locally aplite) ring dyke (unit SCBd). The lower Cape St. John Group includes red arkose and pebbly sandstone of the Beaver Cove formation

(unit SBCs; dated at 427.8 ± 0.6 Ma to the east; location 5, see Skulski et al., 2015b) and overlying, unseparated volcanic

(location 4, see Skulski et al., 2015b). The King's Point volcanic complex is coeval with the Cape St. John Group and is

massive leucocratic muscovite±garnet granite (unit SDPPg) that cuts tectonic fabrics on the northwestern shore of

Ten mines have operated in the map area including two that are currently in production and eight that are past producing

past-producing Rambler Main, Big Rambler Pond, and East mines, and the recently reopened, Ming and Ming West mines

(Pilote and Piercey, 2013; Brueckner et al., 2014). These are copper-rich (±zinc), volcanogenic massive-sulphide orebodies

with gold and silver mineralization. The Ming and Rambler deposits are massive and stratabound, and occur in the upper

reaches of the Rambler Rhyolite formation. The East deposit is disseminated and stratabound and hosted in altered, distal

elsic volcanic rocks. The Big Rambler Pond deposit has stockwork disseminated and stringer mineralization hosted in the

Mount Misery Formation. The Advocate mine operated between 1963 and 1994 and produced asbestos hosted in

ousse Peninsula. The Goldenville deposit (Hibbard, 1983; Evans, 2004) is a small past-producing gold deposit hosted b

the Nugget Pond member of the Scrape Point Formation. Gold is associated with pyrite, quartz-pyrite, and quartz-

carbonate-sulphide veins that cut beds of ferruginous chert, chlorite-magnetite, and massive magnetite iron-formation

A number of small gold deposits are associated with the iron-formation (Goldenville horizon of Evans, 2004) and these are

is a small gold deposit hosted by locally altered, tholeiitic gabbro sills hosted in the Scrape Point Formation. Gold is

2000; Evans, 2004). The Pine Cove deposit is an active gold mine on southern Point Rousse Peninsula (Evans, 2004;

Kerr and Selby, 2012). Gold mineralization is hosted by pervasively altered mafic volcanic rocks and gabbro and is associated with disseminated pyrite cut by discrete quartz veins and quartz-carbonate breccia (Kerr and Selby, 2012).

Notwithstanding the Grenvillian tectonometamorphism affecting the East Pond Metamorphic Suite (D, of Hibbard (1983)), rocks of the western Baie Verte Peninsula have been affected by at least four phases of deformation

Castónguay et al., 2009 and Skulski et al., 2010 compiled from Gale, 1971; Kénnedy, 1971; de Wit, 1972; Kidd, 1974

Bursnall, 1975; Tuach and Kennedy, 1978; Hibbard, 1983; Anderson, 1998; Anderson et al., 2001). Structural correlations

Structures and metamorphic imprint related to D₁ (D₂ of Hibbard, 1983) are best preserved in the Birchy Complex, less so

in the rest of the Fleur de Lys Supergroup, locally developed in the ophiolitic rocks, and absent in the cover sequence. Relict

 S_1 fabrics are preserved locally in the hinges of F_2 folds and are transposed on limbs of folds. Strongly overprinted D_1 fault

zones are northwest-directed thrust faults that are commonly decorated with serpentinite in the Fleur de Lys Supergroup

ibbard, 1983 and references therein). The D, phase is interpreted to be related to obduction of ophiolite complexes

Naldron et al., 1998, van Staal et al., 2007). Age constraints on Taconic deformation and metamorphism vary from 467 Ma

Penetrative D₂ deformation (Dm of Hibbard, 1983) and greenschist- to amphibolite-facies metamorphism affects all rock

units of the Baie Verte Peninsula. Although locally folded, the S_2 foliation is generally steep, trending to the south-southwest in the Fleur de Lys Supergroup, Advocate Complex, and its cover rocks. D₂ is associated with tight folds and bivergent

fault zones (southeast- and northwest-directed). In the Point Rousse and Pacquet complexes east of Baie Verte, the main

 S_2 foliation is southwest- to northwest-dipping, locally characterized by a strong L>S fabric, and is cogenetic

D₂ fabrics are locally overprinted by asymmetric and upright chevron F₃ folds, associated with an axial-planar S₃ strain-

D₃ of Bursnall, 1975) is associated with two sets of asymmetric folds. In the Pacquet complex, D₃ deformation (D₄ of

uach and Kennedy, 1978) is characterized by undulating to close, northeast-trending and -plunging cross folds, locally

Thrust, D₃ folds and fabrics are related to sinistral east-directed transpressional shear zones (Kidd et al., 1978; Hibbard, 983; Anderson, 1998). D₂ and D₃ are interpreted as part of an overall Salinic sinistral transpressional regime (Waldron et al.

198). The age of Salinic deformation and metamorphism is locally constrained to be between 432 Ma (location 57, Table 1

The fourth and fifth deformation phases (D_L of Hibbard (1983); D_2 and D_3 of Anderson et al. (2001)) are mainly documented along the Baie Verte Line, in and around the Ming's Bight Group, but also as reactivating (inverted) fault zones. A series of major, but relatively narrow steep fault zones (i.e. Baie Verte Road Fault and the Marble Cove Slide; Neale and

Kennedy (1967); Hibbard (1983)) occur along the Baie Verte Line, and overprint earlier structural fabrics and shear zones.

hey are associated with small-scale, steeply plunging, dextral chevron F_4 folds and display dextral, compressional, o extensional kinematics (Goodwin and Williams, 1996; Anderson et al., 2001). Post D₂ (D₄ or D₅) extensional shear bands

1993). In the Point Rousse Complex, extensional reactivation of D₂ faults is marked by moderately to steeply north-dipping

crenulation, kink-bands, and shear bands suggesting brittle-ductile, north-side-down motion (Kidd et al., 1978; Anderson,

1998; Castonguay et al., 2009) compatible with the D₅ structures surrounding the Ming's Bight Group (D₃ of Anderson et al (2001)). The composite D₄₋₅phase is interpreted to have initiated during progressive Devonian extensional unroofing of the Ming's Bight Group and surrounding units, and was accompanied by amphibolite-facies metamorphism (405 Ma ⁴⁰Ar/³⁰Ar

ornblende; location 65, Table 1 to 358 Ma ⁴⁰Ar/³⁹Ar muscovite; location 84, see Skulski et al., 2015b; both east of map area; Anderson et al. (2001)) during an overall dextral (transpressional to transtensional) regime (Waldron et al., 1998) across the

Baie Verte Peninsula. Late transverse structures, such as the northwest-trending Advocate and Little Lobster Harbour faults (Bursnall, 1975; Hibbard, 1983) have apparent down-to-the-northeast normal offset, with a probable sinistral component

Northwestern Baie Verte Peninsula (Newfoundland and Le sous-sol de la partie nord-ouest de la péninsule Baie

National Topographic System reference and index to adjoining

du Canada

une partie de 12-I/2) est constitué d'un socle

mésoprotérozoïque formé de la Suite métamorphique

upergroupe de Fleur de Lys; d'ophiolites démembrée

d'East Pond; de roches du Néoprotérozoïque à l'Ordovicien de la marge laurentienne appartenant au

du Cambrien des complexes de Pacquet, de Poin

Rousse et d'Advocate: de la succession sous-marine d

couverture des ophiolites de l'Ordovicien du Groupe de

Snooks Arm; des roches plutoniques continentales de

la suite plutonique de Burlington de l'Ordovicien-

constituées du Groupe de Micmac Lake, du complexe

volcanique de King's Point et du Groupe de Cape St

John et des plutons apparentés. Dix mines ont été

anciennes). Les ophiolites sont les hôtes de gisements

de sulfures massifs volcanogènes riches en cuivre-or

East Mine, Ming et Ming West) et d'amiante (mine

Advocate). Le Groupe de Snooks Arm est l'hôte de troi

gisements d'or (mines Goldenville, Stog'er Tight et Pine

touché la région dont : D. documentée le mieux dans

le Complexe de Birchy, est reliée à l'obduction des

ophiolites: D₂, une déformation régionale et pénétrative a été accompagnée d'un métamorphisme du faciès des

schistes verts au faciès des amphibolites; D₃, rapportée

rapportée à la formation de plis couchés dans le nord-

est et à la formation de failles d'extension et de failles

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dextres ainsi qu'à la réactivation de failles.

à des plis, communément asymétriques; et D

Cove). Quatre phases de déformation régionales on

(mines Terra Nova, Rambler Main, Big Rambler Pond,

Silurien: ainsi que des unités sus-iacentes du Silurie

nmediate footwall of the Scrape Thrust suggest that it was affected by normal-sense reactivation (Jamieson et al.

ssociated with a subvertical fracture or crenulation cleavage. In the Point Rousse Complex and in the vicinity of the Scrape

slip foliation (D₁ of Hibbard, 1983). D₃ fabrics are apparently concentrated in zones (Kidd, 1974; Bursnall, 1975) and account

for local deflection of the main structural grain. In the Birchy and Advocate complexes. D₂ (D₂, and D₂ of Kidd, 197

with macroscopic F₂ folds and south-directed reverse faults and shear zones, such as the Scrape Thrust.

partial underthrusting of the Humber margin and arc collision of the Baie Verte Oceanic Tract during the Taconic Orogeny

to 460 Ma in the Birchy Complex (location 51, 54, and 79, Table 1; 40Ar/39Ar amphibole and muscovite ages) and from 481 Ma to 465 Ma from the structural base of the Advocate Complex (location 73, 55, and 56, Table 1; 40Ar/39Ar amphibole ages). A

concordant ca. 465 Ma U-Pb metamorphic zircon age (location 109, Table 1) was obtained from an amphibolitized eclogite in

across the Baie Verte Line are rendered difficult due to intense and long-lived strain along the complex fault zone, which has

associated with pyrite in albite-pyrite alteration cut by quartz-albite-ankerite veins (Ramezani, 1992; Ramezani et a

correlated with the Nugget Pond member overlying the Betts Cove Complex (Skulski et al., 2010). The Stog'er Tight depos

serpentinized ultramafic rocks of the Advocate Complex. The Snooks Arm Group is host to three gold deposits on Point

Table 2; Hibbard, 1983; Evans, 2004). Numerous mineralized areas have also been explored by drilling (Table 3). The Terra Nova mine in the town of Baie Verte operated between 1860 and 1915. The deposit consists of lenses of copper-rich

exposed in the south. The Upper volcanic unit (unit SKqfa) consists of quartz-feldspar porphyritic comenditic ash-flow tu breccia, and possible hypabyssal intrusive equivalents, forming a prominent ring dyke. Feldspar±quartz porphyritic syenite form late synvolcanic stocks that are dated at 427 ± 2 Ma (Coyle, 1990). Post-tectonic intrusive rocks include

unconformably on the Strugglers Pond formation and Burlington plutonic suite, including the ca. 433 Ma monzogranite

gabbro sills and dykes (unit OSAg) and diorite (unit OSad) cut both the underlying Pacquet complex and Snooks Arm Grou

southern Pacquet complex, and is coeval with deposition of the Black Brook formation south of the map area.

granodiorite to monzogranite (unit SBgdb) dated at 433 ± 0.8 Ma (location 8, Table 1).

(unit SMFs), and eutaxitic ignimbrite (unit SMFi).

juxtaposed rock units of different origins and structural levels

by Mesoproterozoic basement of the East Pond

Metamorphic Suite; Neoproterozoic to Ordovician

Laurentian continental margin rocks of the Fleur de Lys

Supergroup: Cambrian dismembered ophiolite including Pacquet, Point Rousse, and Advocate complexes;

submarine Ordovician ophiolite cover of the Snooks

Arm Group: and Ordovician-Silurian, continental

plutonic rocks of the Burlington plutonic suite and

overlying Silurian Micmac Lake Group; King's Point

volcanic complex; and Cape St. John Group and related

current, eight past-producing). The ophiolitic rocks host

Cu-Au volcanogenic massive-sulphide (Terra Nova,

West mines) and asbestos deposits (Advocate mine). The Snooks Arm Group hosts three gold deposits

(Goldenville, Stog'er Tight, and Pine Cove mines). Four

phases of regional deformation affected this area including D₁, best documented in the Birchy Complex, is

related to ophiolite obduction; D₂, regional, penetrative

deformation was accompanied by greenschist- to

amphibolite-facies metamorphism: D₂ related to folds

faults and reactivation of faults.

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BAIE VERTE AND PARTS OF

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commonly asymmetric: and D₄, related to recumbent

folding in the northeast and extensional and dextral

Rambler Main, Big Rambler Pond, East, Ming, and Ming

plutons. Ten mines have operated in this area (two

the East Pond Metamorphic Suite.

ECONOMIC GEOLOGY

unit OSPv). Overlying these units is the Bobby Cove Formation, comprising plagioclase-phyric, calc-alkaline pillow basal

area) representing a maximum age for sediment deposition. North of Flat Water Pond, the Mount Misery Formation is locally

(unit CBHr) near serpentinized zones. Sheeted dykes (unit CBHs) include aphyric and plagioclase-phyric dykes. Boninite

(unit EMh), and faulted blocks of layered ultramafic cumulate, layered melagabbro, pyroxenite and gabbro, and anorthosi

illow breccia is rare and the majority of the pillow lavas belong to the Mount Misery Formation.

(unit CBHf), overlain by plagioclase-phyric, island-arc tholeiitic basalt and boninite units of the Mount Misery Formation

(metaharzburgite; van Staal et al. (2013)) and or ultramafic cumulate rocks.

House Cove Group includes a lower polymict metaconglomerate (Middle Arm Metaconglomerate; unit nPOOHc) that

Authors: T. Skulski, S. Castonguay, W.S.F. Kidd, V.J. McNicoll, C.R. van Staal, and J.P. Hibbard Geology by T. Skulski, S. Castonguay, and C.R. van Staal; I. Kerr (University of Victoria): Y. Moussallam (University Ottawa); S. Hinchey (Memorial University); 2006–2008 W.S.F. Kidd (Cambridge University), 1970–1971; and J. Hibbard (Geological Survey of Newfoundland and Labrador), 1976-1982 Geological compilation by T. Skulski and S. Castonguay, 2008–2013

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GEOLOGY BAIE VERTE AND PARTS OF FLEUR DE LYS Newfoundland and Labrador NTS 12-H/16 and part of NTS 12-I/1

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Initiative of the Geological Survey of Canada, conducted under the auspices of the Appalachian TGI-3 Project as part of Natural Resources Canada's Targeted Geoscience Initiative (TGI-3) Map projection Universal Transverse Mercator, zone 21. North American Datum 1983 Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications. Elevations in metres above mean sea level Magnetic declination 2015, 19°56'W, decreasing 11.6' annually.

This map is not to be used for navigational purposes

Title photograph: Sheeted dykes of the Point Rousse Complex west shore Ming's Bight, Newfoundland and Labrador. Photograph by S. Castonguay. 2014-110 The Geological Survey of Canada welcomes corrections or additional information from users. Data may include additional observations not portrayed on this map. See documentation accompanying the data. This publication is available for free download through GEOSCAN (http://geoscan.nrcan.gc.ca/).

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