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Gold Metallogeny of the Southern Swayze Area, Abitibi Greenstone Belt: A Field Trip Guidebook

2017

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ONTARIO GEOLOGICAL SURVEY

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Gold Metallogeny of the Southern Swayze Area, Abitibi Greenstone Belt: A Field Trip Guidebook

by

E.C.G. Hastie

2017

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Abstract

This field trip guidebook is the product of 4 field seasons undertaken as part of a PhD study of gold mineralization in the southern Swayze greenstone belt (SGB), located approximately 40 km west of Shining Tree in northern Ontario. The main goal of the project is to characterize the different styles of gold mineralization in the southern SGB by determining the host rocks, alteration assemblages and types, deformation styles, element associations, and the relative and absolute timing of gold mineralization at representative deposits and prospects.

The SGB represents the southwestern extension of the Abitibi greenstone belt (AGB), which is considered to be one of the most "well-endowed", in terms of mineral deposits, greenstone belts in the world. Historically, exploration efforts and general consensus have both suggested that the SGB is not as richly endowed as the AGB. This attitude is reflected by the relatively low level of mineral exploration when compared to the AGB. Regional geological compilation combined with extensive geochronological sampling during the 1990s demonstrated, however, that the SGB has similar host rocks, stratigraphy and deformation history as the AGB. Furthermore, the SGB has major "breaks" or deformation corridors, which is an important similarity to the AGB. Finally, the discovery of the Côté Gold Au (-Cu) deposit, in 2009–2010 (>8 million ounces), represents a potentially new deposit type of intrusion-related affinity having a low-grade high-tonnage type mineralization, and demonstrates the potential for this style of mineralization elsewhere in the SGB.

This guidebook presents a look at 4 of the 5 gold deposits characterized throughout this project that demonstrate the potential and variety of mineralizing systems within the SGB that are similar to the AGB (syenite-associated, greenstone-hosted orogenic, and banded iron formation–hosted orogenic). Thus, the geological features and the presence of other significant, world-class gold deposit discoveries (e.g., Côté Gold) demonstrates that the SGB may be as prospective for gold as the AGB, as well as providing an opportunity for new insights into the processes of Archean gold mineralization in a greenstone belt that is presently underexplored.

Frontispiece. Sample 11917 from the Royal Ontario Museum showing visible gold in quartz from the Kenty deposit, in Swayze Township. Scale card is marked in centimetres.

Gold Metallogeny of the Southern Swayze Area, Abitibi Greenstone Belt: A Field Trip Guidebook

E.C.G. Hastie[1,2]

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[1]Earth Resources and Geoscience Mapping Section, Ontario Geological Survey, Sudbury, Ontario P3E 6B5
[2]Harquail School of Earth Sciences, Laurentian University, Sudbury, Ontario P3E 2C6
ehastie@laurentian.ca

Introduction

This field trip focusses on 4 gold deposits within the southern Swayze greenstone belt (SGB), which are part of a four-year PhD study of gold mineralization within the belt. This guidebook builds upon work completed in the 2014, 2015 and 2016 field seasons (Hastie 2014; Hastie, Lafrance and Kontak 2015; Hastie, Kontak and Lafrance 2016), during which the author was supported through the Ontario Geological Survey–Laurentian University Mapping School Agreement. Field trip participants should consult the references within this guidebook for further information on the geology of the SGB.

Although it is widely accepted that the SGB is the western extension the Abitibi greenstone belt (AGB; van Breemen, Heather and Ayer 2006; Thurston et al. 2008; Ayer et al. 2010), it is referred to in this field trip guidebook as the SGB rather than the AGB to facilitate geographical location. The SGB is located in northern Ontario approximately 40 km west of Shining Tree and, at present, is relatively underexplored compared to the remainder of the AGB. The reasons for the apparent lack of gold deposits in the SGB, compared to the rest of the AGB and other global greenstone belts, apart from under exploration, have not been addressed. Importantly, the 2009–2010 discovery of the Côté Gold deposit (*circa* 2740 Ma: Katz et al. 2015) (7.6 million ounces indicated and 1.1 million ounces inferred gold; IAMGOLD Corporation 2013), defines a new metallogenic gold event. This discovery, combined with deposit investigation by Kontak, Creaser and Hamilton (2012), suggest that the inferred lack of gold deposits may be more apparent than real.

The project reported on herein draws on previous geological studies that focussed on the tectonic and structural evolution of the SGB (Heather 2001) in an attempt to understand the nature and origin of the different types of gold deposits in the SGB and to address the issues noted in the preceding paragraph. Although the Côté Gold deposit is currently the only world-class gold deposit in the SGB (Rogers et al. 2013; Katz et al. 2015), there are several smaller, but significant, gold deposits with poorly constrained geological settings and genetic models (e.g., Jerome, Rundle, Kenty, Namex, 4K; Figure 1). These latter deposits provide a basis to address the links between different types of gold mineralization features and processes at the deposit scale and at a regional scale.

The main objectives of the project are to 1) compile and fully characterize the different types of gold deposits in the southern SGB; 2) provide a tectonic framework for the formation of these different types of gold deposits; 3) integrate these gold deposit types within the evolution of the SGB; and 4) compare these results with models for evolution of gold-endowed Archean greenstone terranes. The purpose of this field trip guidebook is to present information related to all of these objectives using selected, well-exposed, stripped exposures that are easily accessible with company permission.

All locations in this report are given as Universal Transverse Mercator (UTM) co-ordinates using North American Datum 1983 (NAD83) in Zone 17N.

General Geology

The SGB is located to the southwest of the AGB and is bounded by the Nat River granitoid complex to the north, the Kenogamissi Batholith to the east, the Ramsey–Algoma granitoid complex to the south, and the Kapuskasing Structural Zone to the west (*see* Figure 1). The SGB contains intrusive and extrusive rocks of ultramafic to felsic composition and chemical and clastic metasedimentary rocks, which, together, range in age from 2739 Ma to younger than 2690 Ma (Heather 2001; van Breemen, Heather and Ayer 2006). Work by Ayer, Ketchum and Trowell (2002) indicates the presence of alkaline metavolcanic rocks, with an age of 2670±2 Ma, in Swayze Township that are co-spatial with an east-trending string of

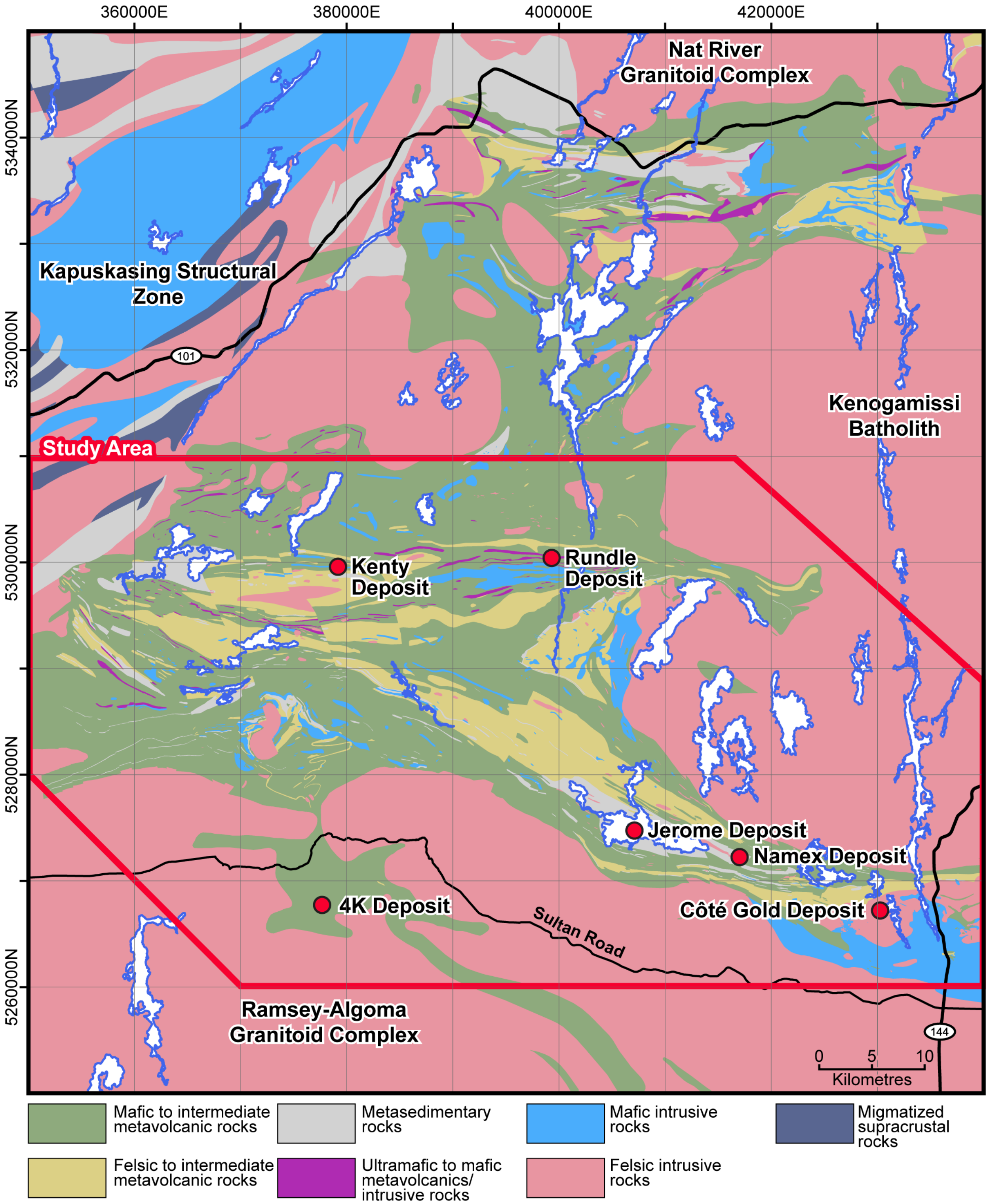

Figure 1. Simplified geologic map of the southern Swayze greenstone belt displaying areas of study (enclosed by red line). Location information provided as Universal Transverse Mercator (UTM) co-ordinates using North American Datum 1983 (NAD83) in Zone 17 (bedrock geology *modified from* Ontario Geological Survey 2011).

gold occurrences (e.g., Kenty and Rundle deposits; *see* Figure 1). These metavolcanic rocks are temporally equivalent to the Timiskaming-type basins (<2669 Ma) found in the AGB, which are dominated by coarse clastic metasedimentary rocks and minor alkaline metavolcanic rocks. In addition to this, 2 gold-rich fault systems, termed the "Rundle high strain zone" and the "Ridout high strain zone" (Heather 2001), extend across the central and southern portions of the SGB, respectively, and both have been proposed as the possible westward extensions of the Larder–Cadillac deformation zone (Atkinson 2013).

The results of past field work (Hastie 2014; Hastie, Lafrance and Kontak 2015; Hastie, Kontak and Lafrance 2016), assessment of exploration reports, and academic studies (Heather 2001; Kontak, Creaser and Hamilton 2012) have led to the identification of 6 gold deposits in the SGB representing 4 distinct deposit types. These deposit types include 1) the older intrusion-related Côté Gold deposit (*circa* 2740 Ma: Katz et al. 2015); 2) the younger and possibly intrusion-related (syenite-associated?) Jerome, Rundle and Namex deposits; 3) the greenstone-hosted Kenty deposit; and 4) the banded iron formation–hosted 4K gold deposits (*see* Figure 1).

Field Trip Stops

ACCESS

All of the field stops described herein are on private land held by mining and exploration companies that may be hazardous or active exploration sites, or both. Permission must be sought from the following companies to visit them (contact information as of September 18, 2017). Please respect the property rights of others, so that future access for other geologists is not adversely affected.

IAMGOLD Corporation (Stops 3 and 4)
Alan Smith, Unit 10 – 2140 Regent Street, Sudbury, Ontario P3E 5S8
Telephone: (705) 222-1520

Joshua Gold Resources Incorporated (Stop 2)
Drew Currah, 3048 Seneca Drive, Oakville, Ontario L6L 1A9
Telephone: (905) 469-9755

Rundle–Swayze Mines Incorporated (Stop 1)
Frank Zoebelein, P.O. Box 72, King City, Ontario L7B 1A4
Telephone: (905) 833-3939

The Swayze greenstone belt can be accessed from the all-weather Sultan Road (also referred to as the Sultan Industrial Road), which can be accessed from either Highway 144 in the east or Highway 129 in the west. All of the roads to the stops are accessed off of the Sultan Road.

SAFETY

For users of this guidebook, please bear in mind that some of the stops listed in this guidebook involve travel along gravel roads, some of which are used by logging operations, as well as semi-isolated work in the bush. Therefore, standard bush safety practices should be followed by users of this guidebook. Such practices include travelling in pairs; advising others of your starting time and location and your expected return time; carrying sufficient water for the trip; being prepared for sudden changes in the weather; and carrying the appropriate emergency and safety gear. Site-specific hazard information is provided at the beginning of each individual field trip stop, as needed.

STOP 1. RUNDLE DEPOSIT

Location: UTM 398950E 5300881N, Zone 17. Access from Doré and Orofino mine roads.

Local Hazards

1. Some of these outcrops are near old mining equipment and buildings. Please refrain from going in buildings or going near old equipment. There are also old mine workings and a ramp. These areas are to be avoided as well.
2. The Rundle deposit area is frequented by moose. Please be aware of wildlife and notify others should you spot animals. Care should be taken to avoid wildlife in general and particularly moose in this area, as they might charge if they feel threatened.
3. The outcrops can become quite slippery when wet or damp and have small vegetation that may be a tripping hazard. Care should be taken at all times on the outcrops to avoid slips and trips.

The Rundle gold deposit, currently held by Rundle–Swayze Mines Inc., is located in the central portion of the SGB in the southeast corner of Newton Township near its border with Dale Township (*see* Figure 1). This deposit occurs at the contact of a feldspar porphyry stock and an east-southeast-trending zone of sheared ultramafic to mafic metavolcanic rocks and was discovered in 1940 by Claude Rundle (Love and Roberts 1991). During the latter half of the 2015 field season, 2 gold-bearing zones (A-Zone south and Main/Shaft zones) were stripped, gridded and mapped with the focus on the A-Zone south by the author. The A-Zone south was previously interpreted to consist of komatiitic rocks (Love and Roberts 1991), but neither the geochemistry provided in company reports nor the presence in outcrop of textural evidence, such as spinifex texture, suggests that komatiitic rocks are present. Rocks in the A-South outcrop area consist of mafic metavolcanic and metasedimentary rocks that are strongly sheared to sericite-chlorite schist and intruded by at least 4 types of variably altered feldspar porphyry dike rocks (Figure 2). These dikes are, in turn, cut by quartz-feldspar and laminated quartz-pyrite veins.

Structural features present at the A-Zone south consist of upright, tight to isoclinal, shallowly west-plunging, F_1 folds that overprint the feldspar porphyry dikes. The folds are overprinted by a spaced (1–10 mm) S_2 cleavage that is defined by sericite, chlorite and feldspar. The S_2 fabrics strikes west-northwest and dips steeply to the north-northeast. It is oriented counterclockwise to the contacts between the mafic metavolcanic rocks and the feldspar porphyry dikes. A subhorizontal mineral stretching lineation (L_2) lies along S_2 fabrics. The feldspar porphyry dikes are boudinaged and folded by tight, Z-shaped folds plunging steeply to the east. Although these folds overprint S_2 fabrics , they have an axial planar cleavage that is parallel to the general strike of S_2 fabrics on the outcrop. The counterclockwise orientation of S_2 fabrics to lithological contacts, the presence of Z-shaped folds and dextral shear bands (Photo 1A) collectively suggest dextral shearing during D_2 deformation.

Gold mineralization has been shown to be associated with early fracture-controlled pyrite veins (Love and Roberts 1991) that are folded and deformed within the dextral shear zone at the A-Zone south. Pyrite veins are folded around the noses of Z-shaped dextral F_2 folds (Photo 1B), suggesting that they predate the shearing.

During the 2014 field season, 2 samples of altered feldspar porphyry, collected by the author, from the A-Zone south returned high gold values (>30 g/t Au). An additional 72 samples were collected from channel cuts during the 2015 field season by the author to further characterize the rocks for gold, alteration and structural features. This characterization collectively indicates that early pyrite-hosted gold mineralization predated shearing, and gold was liberated from pyrite during subsequent deformation, hydrothermal fluid infiltration, and dissolution–reprecipitation of pyrite.

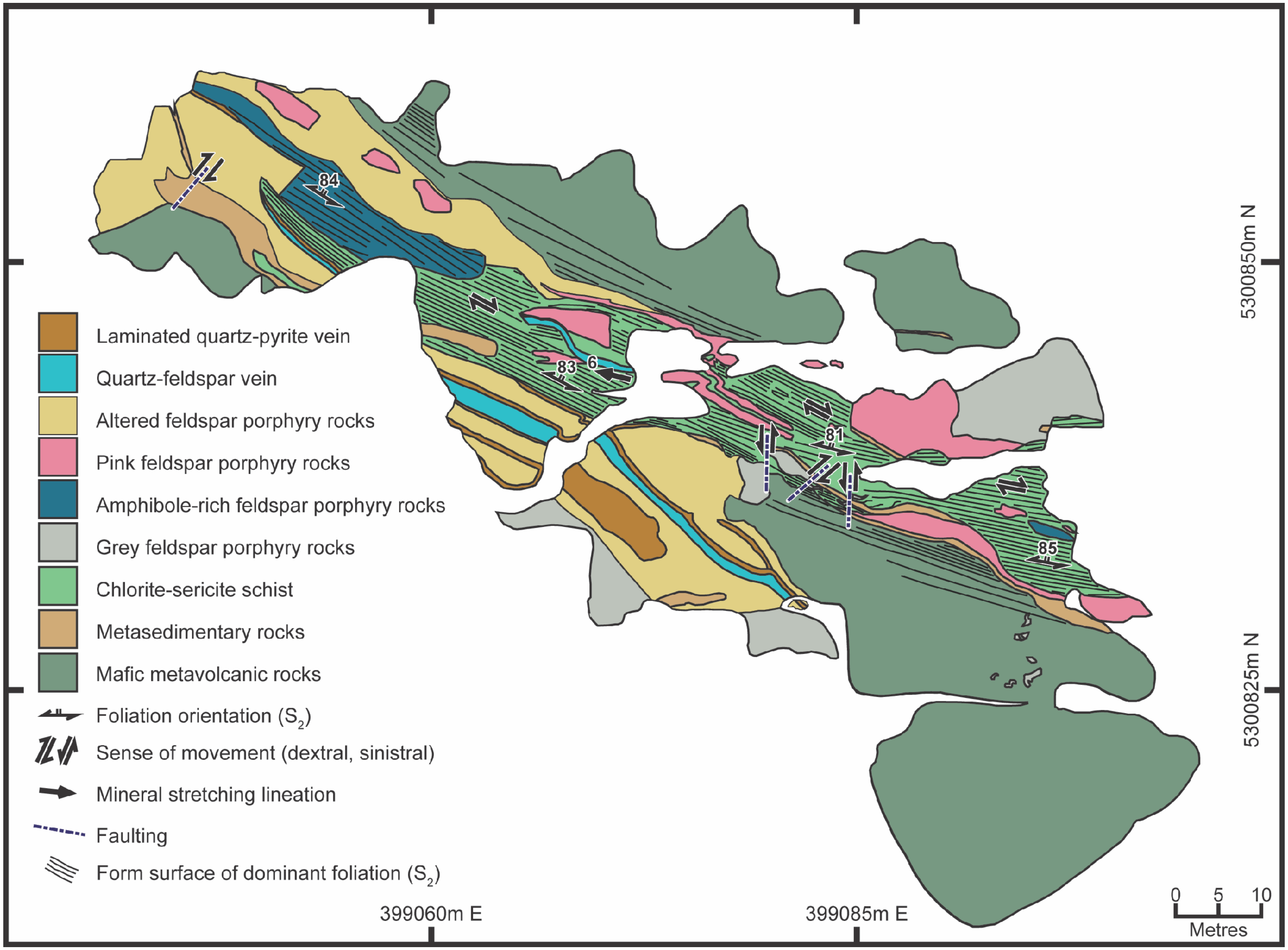

Figure 2. Geologic outcrop map of the A-Zone south at the Rundle deposit. Location information provided as UTM co-ordinates using NAD83 in Zone 17.

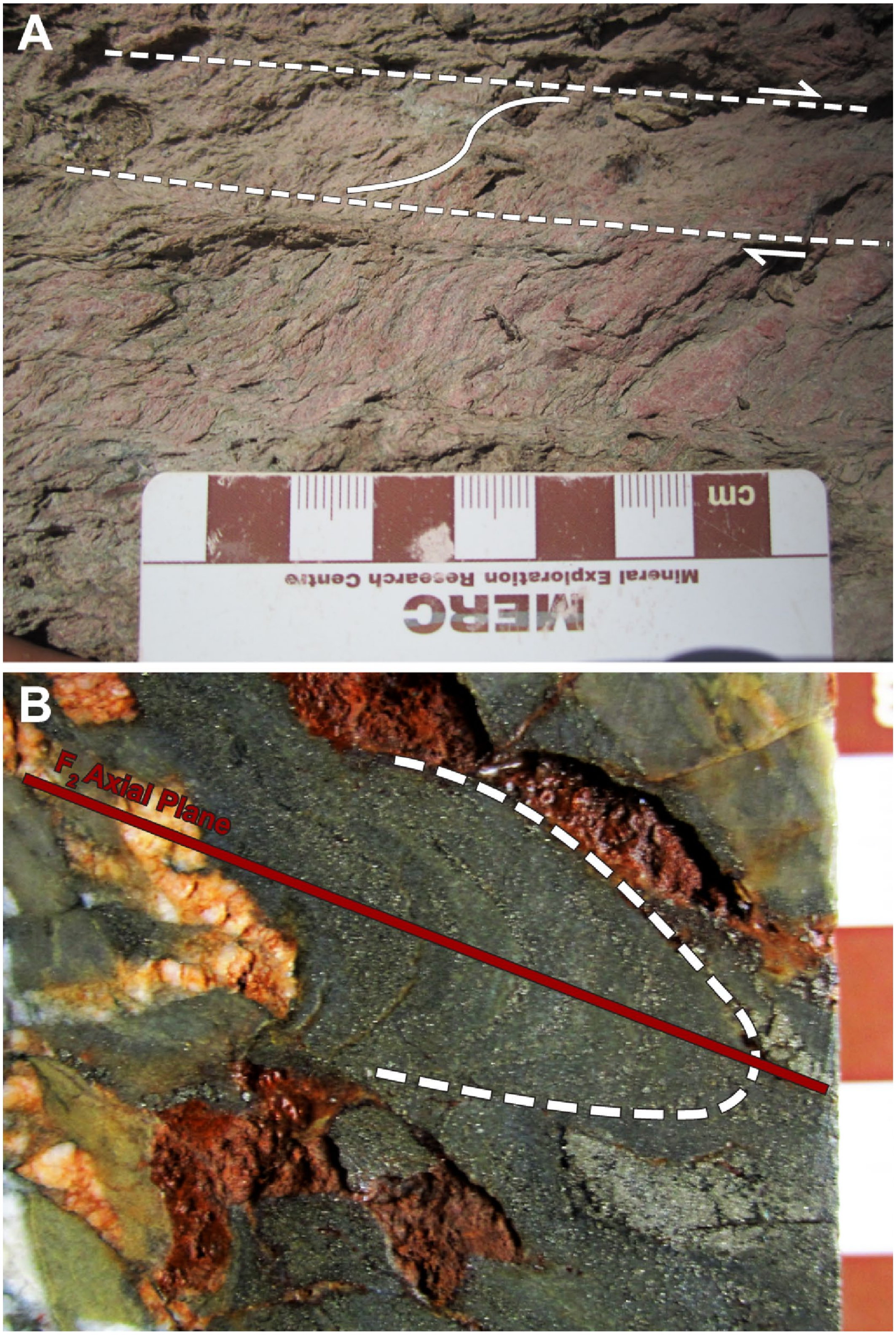

Photo 1. Outcrop photos from the Rundle deposit. **A**) Shear bands indicating dextral movement in chlorite schist. Scale card marked in centimetres. **B**) Gold-associated pyrite mineralization shown folded around F_2, Z-shaped fold hinge at A-Zone south outcrop. Scale card on right marked in centimetres.

STOP 2. KENTY DEPOSIT

Location: UTM 379209E 5299285N, Zone 17. Access from the Doré Road.

Local Hazards

1. Some of these outcrops are near old mining equipment and buildings. Please refrain from going in buildings or going near old equipment.
2. Please avoid any mining debris, such as old blasting wires or equipment. There also may be recent drilling activity in the area, so please avoid any drilling equipment or drill sites that we may encounter.
3. The outcrops can become quite slippery when wet or damp and have small vegetation that may be a tripping hazard. Care should be taken at all times on the outcrops to avoid slips and trips.

The Kenty gold deposit, discovered in 1931 by J.G. and J.L. Kenty, is located in the northeast corner of Swayze Township (*see* Figure 1) and can be accessed from the Doré Road. The deposit is hosted in a pillowed, iron-rich tholeiitic basalt intercalated with massive basalt flows and breccias; these rocks are intruded by younger feldspar porphyry, lamprophyre and altered diorite dikes. Gold mineralization is associated with occurrences of carbonate alteration, pyrite and quartz veins in all the rock units (Fumerton and Houle 1995). Two stripped outcrops that are currently held by Joshua Gold Resources Inc., the C1 Mortimer trench (Figure 3) and an outcrop 300 m southwest of this trench referred to as the Salo occurrence, were gridded and mapped by the author. Rocks in the mapped areas consist of metamorphosed pillowed basalts that have been intruded by intermediate and potentially ultramafic dikes up to 2 m width and a large feldspar porphyry unit (roughly 40 by 50 m) that makes up a significant portion of the C1 Mortimer trench (Photo 2A). Quartz-feldspar veins with basalt fragments crosscut all rock types and are surrounded by an alteration halo of ankerite-albite-sericite-pyrite ± chlorite (Photo 2B). The veins are 5 to 30 cm wide, strike northwest and have subvertical dips, with the exception of a quartz-feldspar vein at the C1 Mortimer trench that dips shallowly (≈30°) and has strikes that vary. This shallowly dipping vein follows the contact between the feldspar porphyry unit and the pillow basalt and cuts across the latter. The vein is both cut by and crosscuts subvertical quartz-feldspar veins (1–3 cm) that display 2 dominant trends (210° and 310°). Visible gold was found within conjugate fractures in a fold hinge of the shallowly dipping quartz-feldspar vein at the C1 Mortimer trench (*see* Figure 3).

Only weakly developed fabrics are present at the C1 Mortimer trench. A closely spaced S_1 shear foliation defined by chlorite and sericite occurs within 10 cm of the shallowly dipping quartz-feldspar vein. A mineral stretching lineation, plunging 25° toward 151°, is expressed by sericite and feldspar along the contact between the quartz-feldspar vein and the feldspar porphyry unit. Late open F_2 folds overprint the foliation and the shallowly dipping quartz-feldspar vein; this fold axis plunges 31° toward 110° (*see* Figure 3).

A sample of quartz-feldspar, including mineralized pillow basalt collected from the Salo occurrence by the author in 2014, obtained high gold values (>30 g/t Au). This assay result, in addition to the sighting of visible gold that is spatially associated with quartz-feldspar veins, indicates that the veins are mineralized; however, the continuity over larger distances would need to be explored further. In order to document and characterize the nature and location of the gold mineralization, host rock types, alteration assemblages, structural controls and relative timing of mineralization, 89 channel samples were collected by the author from the mapped areas. These samples indicate that gold was originally bound in pyrite and was later remobilized into favourable structural traps.

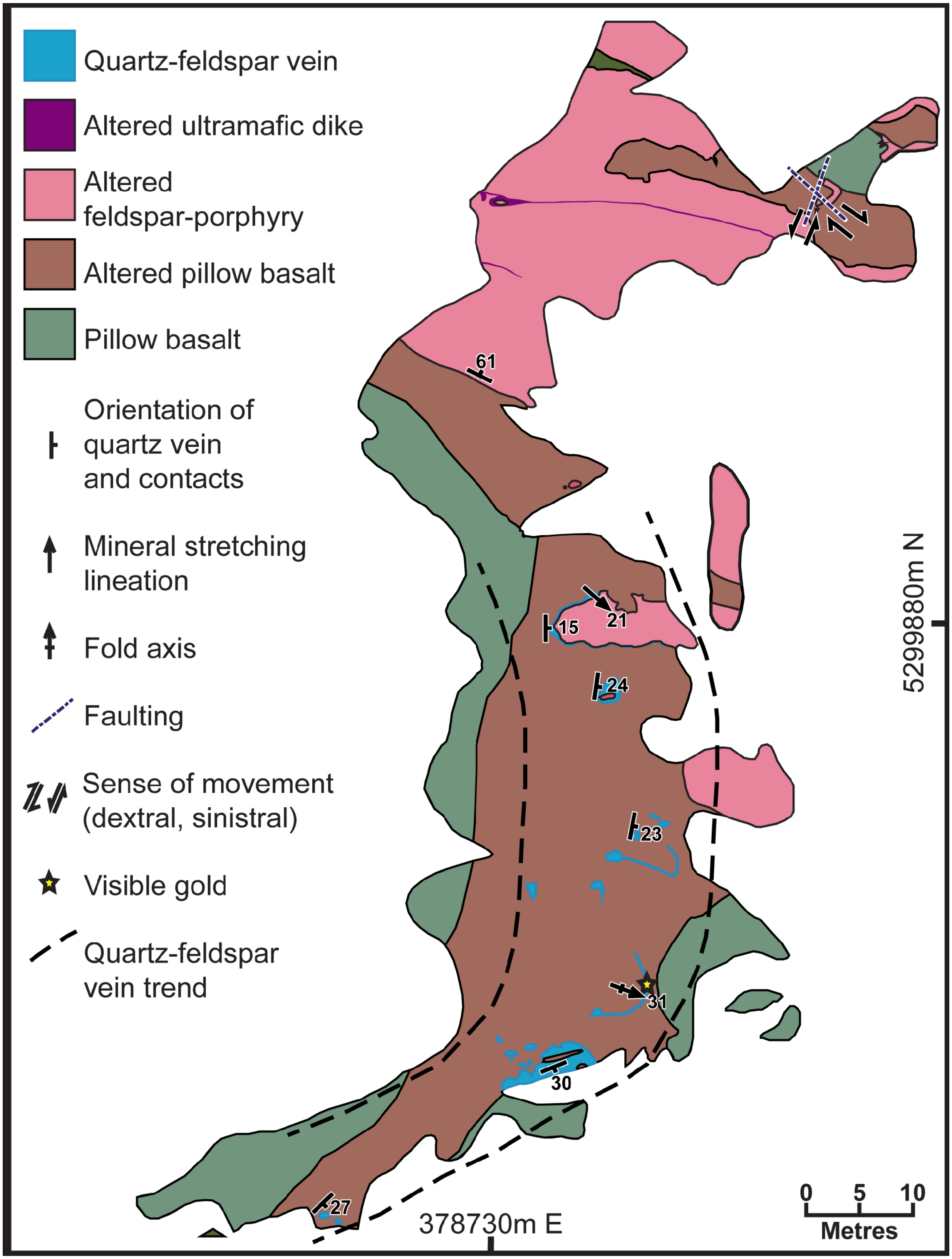

Figure 3. Geologic outcrop map of the C1 Mortimer trench at the Kenty deposit. Location information provided as UTM coordinates using NAD83 in Zone 17.

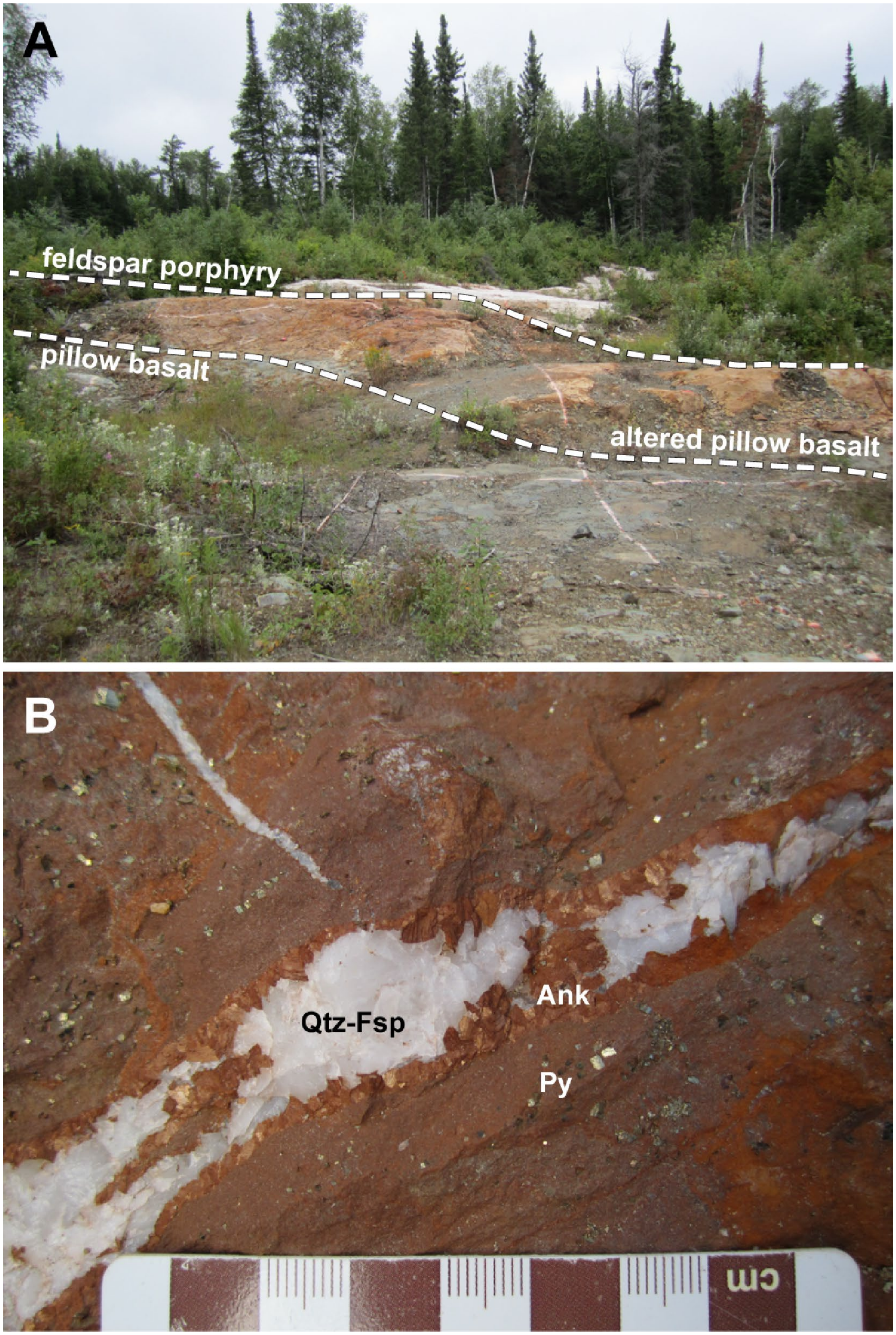

Photo 2. Outcrop photos from the Kenty deposit. **A**) Outcrop photo, looking north, of the C1 Mortimer trench at the Kenty deposit. **B**) Pyrite mineralization associated with gold-bearing quartz-feldspar-ankerite vein at the Kenty deposit. Scale card is marked in centimetres. Abbreviations: Ank, ankerite; Fsp, feldspar; Py, pyrite; Qtz, quartz. Host rock is altered pillow basalt.

STOP 3. NAMEX DEPOSIT

Location: UTM 416226E 5272334N, Zone 17. Access from the Yeo Road.

Local Hazards

1. Some of these outcrops are near old mining equipment and buildings. Please refrain from going in buildings or going near old equipment.
2. The outcrops can become quite slippery when wet or damp and having small vegetation that may be a tripping hazard. Care should be taken at all times on the outcrops to avoid slips and trips.
3. The Namex outcrops, particularly in the western area, are near trails containing holes and long grass. These are also particularly dangerous tripping hazards.

The Namex deposit (*see* Figure 1), so named by its recent development in 2007–2008 by Namex Explorations Inc. (formerly Huffman Lake property), is located in the southeast corner of Huffman Township just south of Huffman Lake. The deposit is currently owned by IAMGOLD Corporation and can be accessed from the Yeo Road. The Namex outcrop is a 340 by 140 m stripped exposure located within the Ridout high-strain zone. Detailed mapping by the author focussed on the eastern portion of the outcrop where the majority of gold mineralization is hosted (Figure 4). A feldspar porphyry unit, which constitutes roughly one-third of the outcrop, consists of 15 modal %, euhedral to subhedral, feldspar phenocrysts (0.5–2 cm) within a medium- to fine-grained matrix of feldspar, muscovite, quartz and ankerite (Photo 3A). It contains rare xenoliths of conglomerate clasts and intruded the bounding polymictic conglomerate (Photo 3B). A unit of polymictic conglomerate makes up the remainder of the outcrop (*see* Figure 4) and contains moderately to strongly deformed, elongate clasts (10–50 cm) of mafic to felsic volcanic rocks, gabbro, iron formation, breccia and feldspar porphyry rocks (Photo 3C). The matrix of the conglomerate shows a change from a dominantly felsic composition (quartz + feldspar + ankerite + muscovite) in the eastern part of the exposure to a mafic composition (chlorite + feldspar + quartz + muscovite) in the western part of the exposure. The conglomerate is clast supported in the southern part of the exposure, and matrix supported in the northern part of the exposure. Rare top indicators, seen in the matrix-supported portions of the stripped exposure and represented by cross-bedding in greywacke matrix, indicate a consistently north-younging direction (Photo 3D).

Structural features can be separated into 3 generations, based on overprinting relationships, which postdate the formation of the basin in which the conglomerates were deposited. The oldest generation of structures (G_1) is represented by isoclinal, east- and west-striking, F_1 folds defined by folded and transposed, clast-supported conglomerate beds. A cleavage (S_1), that is defined by the long axis of flattened clasts and by a closely spaced (1 mm) sericitic and chloritic cleavage in the sandy conglomerate matrix, is axial planar to the F_1 folds (Photo 3E). Early, steeply dipping and both east- and west-striking, barren quartz veins are boudinaged parallel to S_1 cleavages. The feldspar porphyry and conglomerate units also show boudinaged contacts that are crosscut at boudin necks by a second generation of steeply dipping, north- and south-striking extensional veins, which also cut the early barren veins and are consistent with north-to-south compression.

A second generation of structures (G_2) are represented by tight to isoclinal outcrop-scale F_2 folds with S-shaped asymmetry overprinting S_1 cleavages. The folds plunge roughly 70° toward east-southeast (*see* Figure 2). A third generation of extensional veins, consisting of quartz-ankerite-tetrahedrite, cuts across the S_1 cleavage. The veins are steeply dipping, strike both northeast and southwest, and show F_2 S-shaped asymmetry (Photo 3F). Evidence from G_2 structures point to sinistral shearing consistent with northeast-to-southwest bulk shortening.

A third generation of structures (G_3) is expressed by a strong S_3 foliation overprinting the S_1 cleavages and the axial plane of S-shaped F_2 folds. The S_3 foliation is a closely spaced (1 mm) fabric, defined by muscovite and chlorite. The S_3 foliation is counterclockwise to S_1 and to lithological contacts, and overprints the axial plane of sinistral F_2 folds locally (*see* Figure 2). Folding of S_3 along the margin of extensional veins produced asymmetrical fringe structures, indicating dextral movement after sinistral (*see* Photo 3F). An L_3 mineral stretching lineation, plunging approximately 15° toward the east, is present along the S_3 foliation. In addition, a fourth generation of extensional quartz + ankerite + tetrahedrite veins have been observed, which are steeply dipping, strike both northwest and southeast, and display Z-shaped asymmetry. These G_3 structures collectively suggest dextral shearing consistent with northwest-to-southeast bulk shortening.

Gold mineralization has 2 associations at the Namex deposit:

1. Low-grade gold (0.1–1 ppm Au) is present as disseminated pyrite hosted dominantly within the feldspar porphyry. Two drill holes from Namex Explorations Inc. showed an average grade of roughly 0.2 ppm Au over 100 m in both drill holes (Winter 2008). Samples of the feldspar porphyry rocks assayed as part of this study (Hastie 2014) show a very similar average grade.
2. Higher grade gold and silver values (1.5–11 ppm Au and 40–205 ppm Ag) from the 2015 field samples collected by the author are associated with tetrahedrite and telluride minerals that form within both the sinistral and dextral extension veins described above.

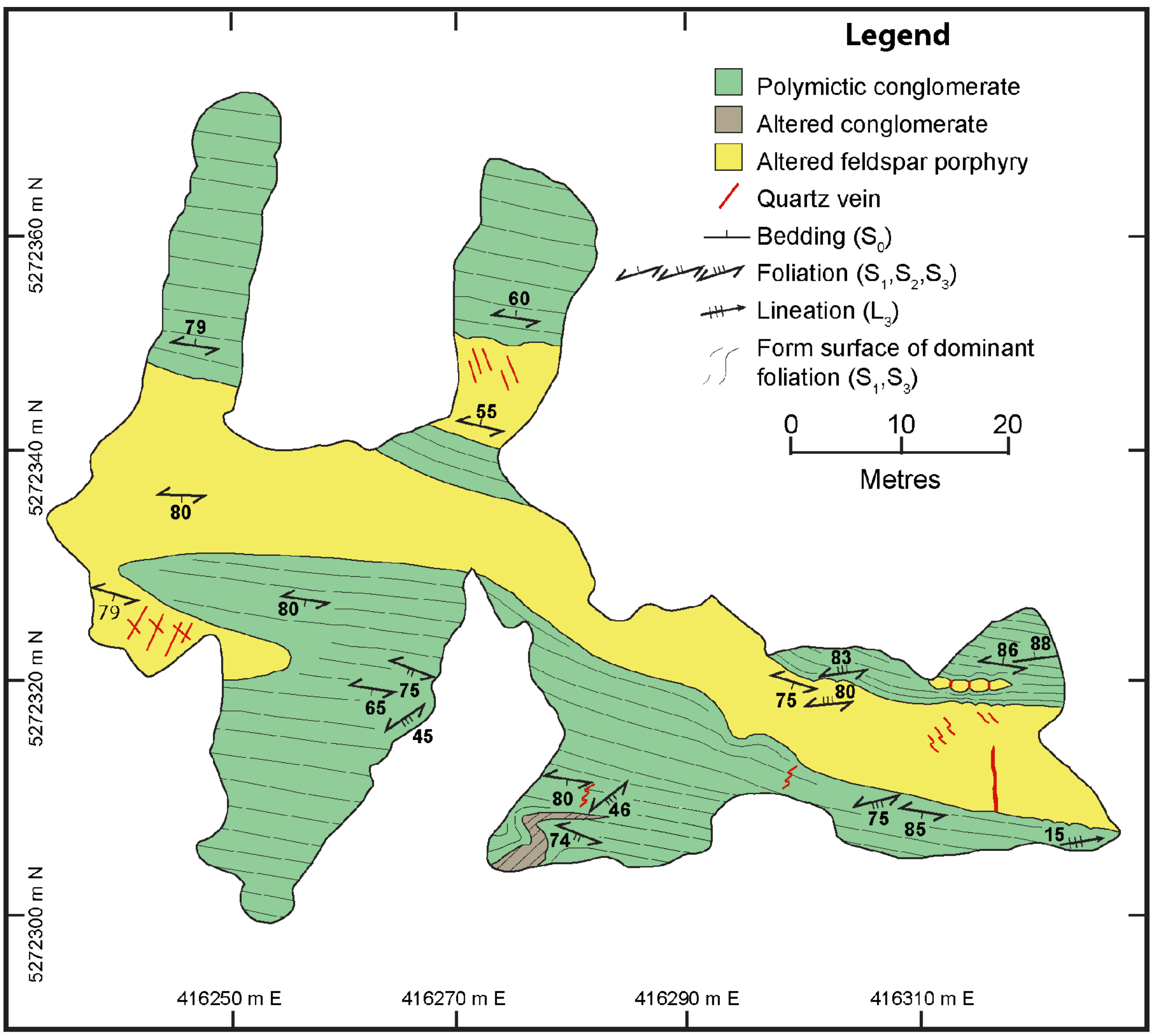

Figure 4. Geologic outcrop map of the Namex East stripped exposure at the Namex deposit. Location information provided as UTM co-ordinates using NAD83 in Zone 17.

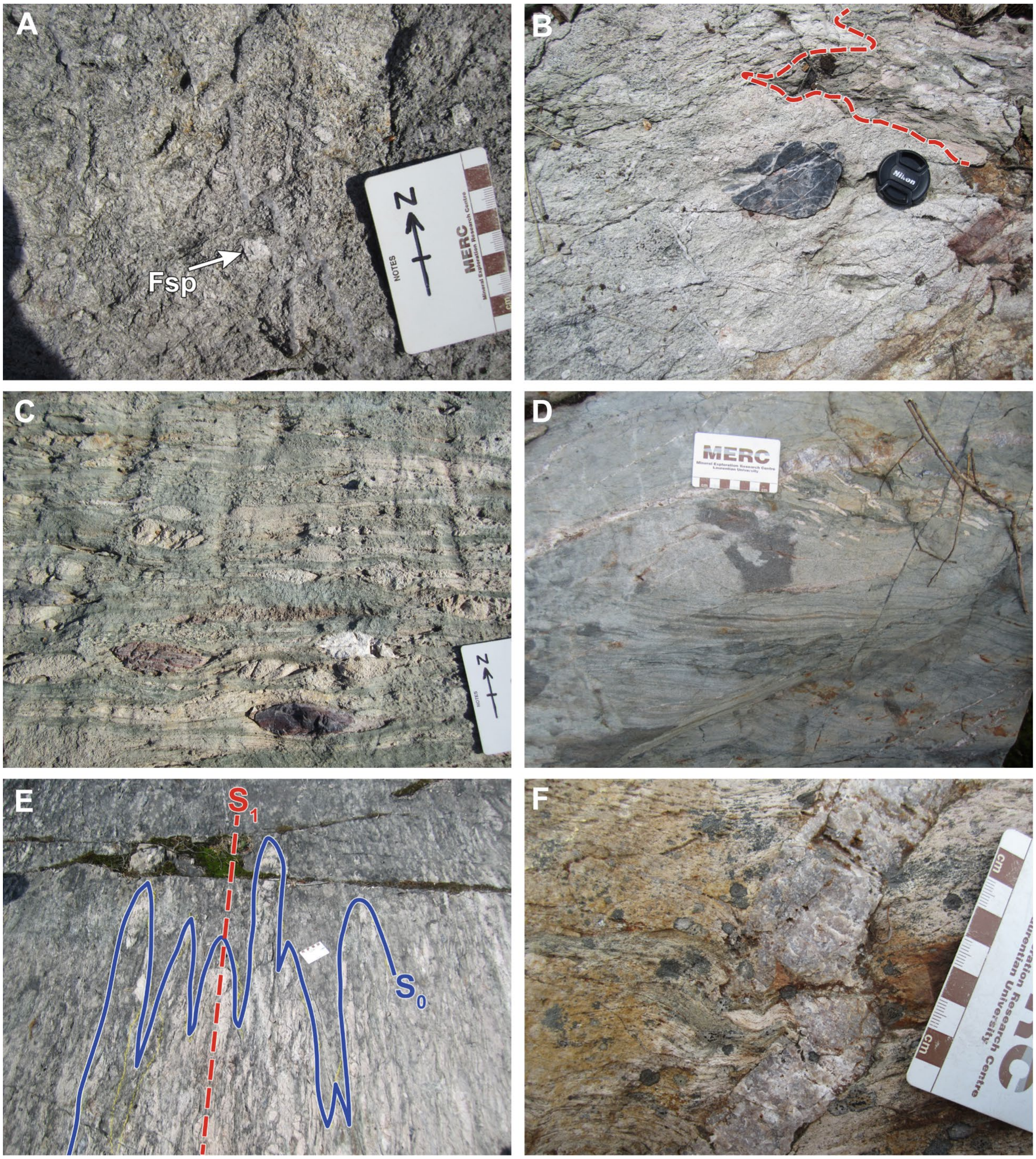

Photo 3. Outcrop photos from the Namex deposit. **A**) Representative photo of feldspar porphyry intrusive unit. Abbreviation: Fsp, feldspar. **B**) Feldspar porphyry containing a conglomerate clast and showing an intrusive contact (red dashed line) with the polymictic conglomerate. Lens cap is 5 cm in diameter and top of photo is facing to the south. **C**) Representative photo of polymictic conglomerate. Scale card is 9 cm long. **D**) Cross-bedding in greywacke matrix of conglomerate, which indicates younging to the north (top of the photo). **E**) Photo showing G_1 structures overprinting bedding in conglomerate. Bedding (S_0) defined by coarse clast-dominated beds in conglomerate shown by blue lines. Foliation (S_1), shown by dashed red line, is axial planar to isoclinal F_1 folds. Top of photo is facing to the west. **F**) Photo of sinistral quartz extension vein in conglomerate, which shows overprinting dextral fringe structures. Top of photo is facing to the north.

During the 2014 and 2015 field seasons, samples from the conglomerate were sent to Jack Satterly Geochronology Laboratory at the University of Toronto for U/Pb analyses of zircons to determine the age of the unit. The conglomerate samples yielded an age of younger than 2680±3 Ma using laser ablation inductively coupled plasma mass spectrometry (LA-ICP–MS) (Davis 2016). The feldspar porphyry shows convincing intrusive contacts with the conglomerate, which suggests that the feldspar porphyry rocks and the gold mineralization are younger than 2680±3 Ma. More recent geochronology work on the feldspar porphyry by LA-ICP–MS has confirmed this age relationship (MacDonald and Hastie 2017).

STOP 4. JEROME DEPOSIT

Location: UTM 406900E 5275123N, Zone 17. Access from the Jerome mine road.

Local Hazards

1. Drill cores examined from the Jerome deposit are stored by IAMGOLD Corp. at the Côté Gold site. In 2017, the Côté Gold site is an area of active exploration and day-to-day traffic. Please avoid any buildings unless IAMGOLD representatives have granted express permission to enter. IAMGOLD personnel will be present to ensure we adhere to their own safety protocols while on the Côté property.
2. There may be camping and cottage traffic on the road through the Côté Gold site. Please be careful when crossing the road and look for traffic before doing so.
3. Please avoid lifting the core boxes or shifting the stands they rest on. Improper lifting techniques and falling core boxes can cause serious injury.

The Jerome deposit, which is centred on Opeepeesway Lake, is located within the Ridout high-strain zone and lies approximately 20 km along strike east-northeast from the Côté Gold deposit in the Swayze greenstone belt (*see* Figures 1 and 5). Historically, the Jerome Mine produced 56 878 ounces of gold and 15 104 ounces of silver between 1941 and 1943 (Brown 1948). More recently, a National Instrument (NI) 43-101–compliant inferred resource estimate was made of 1.03 million ounces of gold

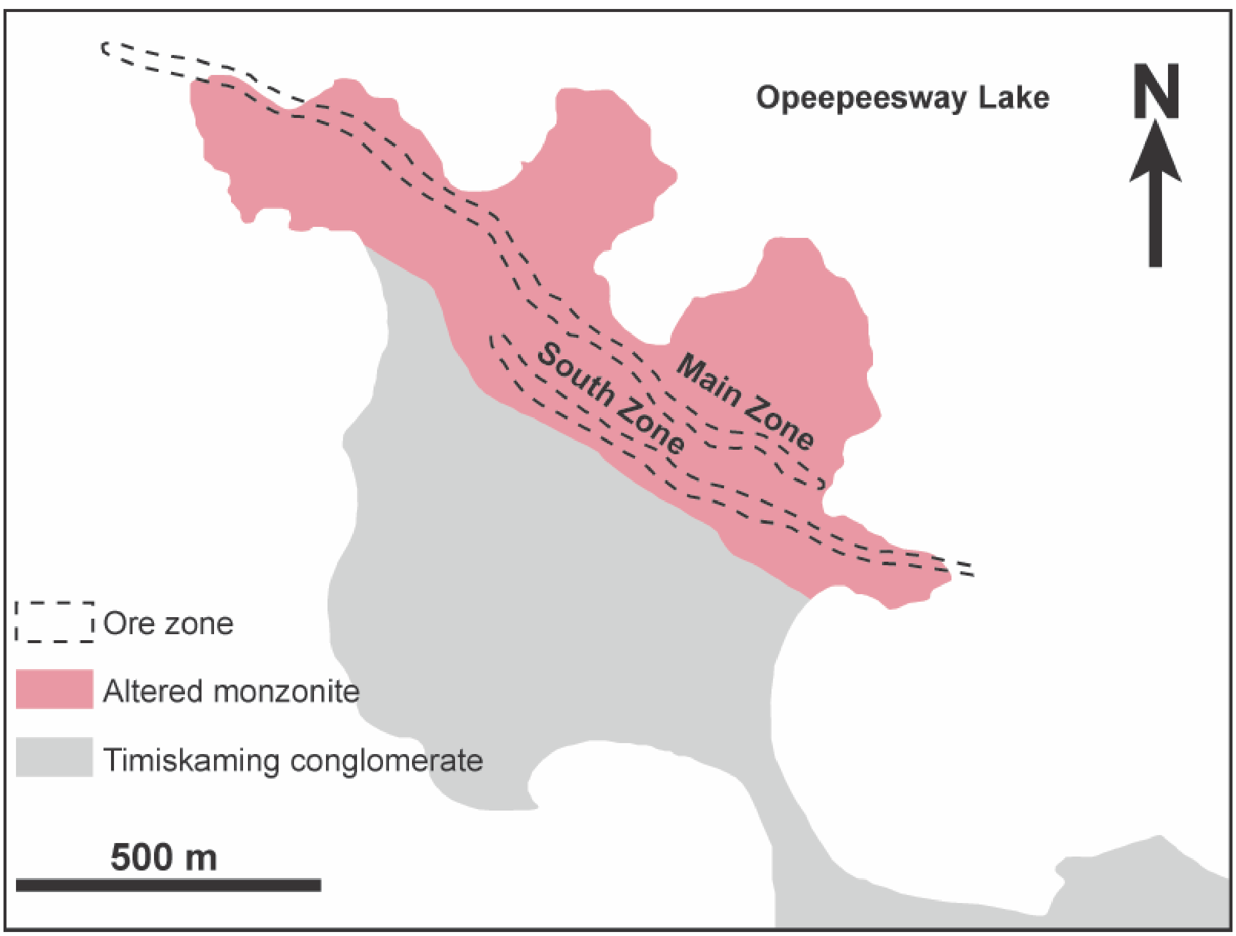

Figure 5. Simplified geologic map of the Jerome peninsula outlining a surface projection of the ore zones.

using a 0.3 g/t Au cut-off grade (Burt, Chance and Burns 2011). Access to the Jerome property is through the Jerome mine road, which branches north from the Sultan Road near the 40 km mark. The area around the Jerome Mine lacks outcrop; thus, it was necessary to use diamond-drill core (Photos 4A, 4B and 4C) to characterize the nature and distribution of the gold mineralization. This latter work was possible because IAMGOLD Corporation, which now controls the claims, provided the author with access to the diamond-drill core from Augen Gold Corporation's 2010 exploration program. Sixty-two samples were collected by the author from 10 diamond-drill holes that were re-logged in order to characterize the nature of the gold mineralization, the host rocks, the alteration assemblages and the relative timing of mineralization.

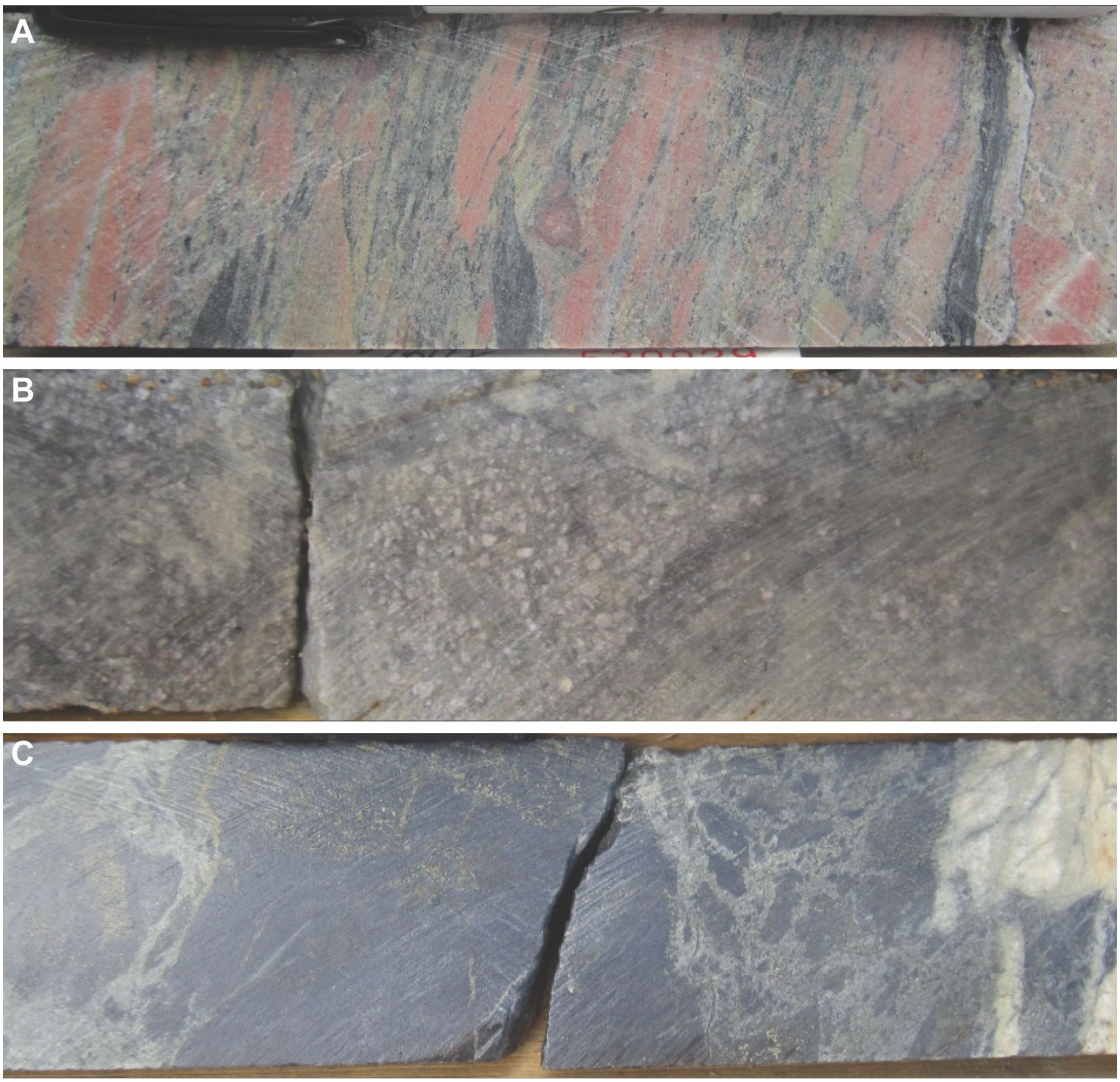

Photo 4. Diamond-drill core photos of the Jerome deposit. **A**) Diamond-drill core from the Jerome deposit showing polymictic conglomerate. **B**) Diamond-drill core from the Jerome deposit showing altered feldspar-quartz porphyry. **C**) Diamond-drill core from the Jerome deposit showing a blue quartz vein (black dashed line) and associated textures and alteration. Diamond-drill cores are 5 cm wide.

The host rocks to gold and silver mineralization are altered and deformed monzonitic rocks, referred to as feldspar porphyry rocks, which intruded polymictic conglomerates of “Timiskaming-age” (<2680±3 Ma; Hastie, Kontak and Lafrance 2016). The ore zones at the Jerome deposit consist of a stockwork of quartz-carbonate veins and breccias with associated arsenian pyrite mineralization that is predominantly hosted in the feldspar porphyry along the contact between the feldspar porphyry and the conglomerate where shearing is most extensive.

The feldspar porphyry contains rare xenoliths of conglomerate clasts and is intrusive to the bounding polymictic conglomerate (Brown 1948; Hastie, Kontak and Lafrance 2016). Pyrite occurs both in halos surrounding, and within, stockwork veins of quartz and ankerite where they crosscut and partially replace primary, relict feldspars.

The polymictic conglomerate contains moderately to strongly deformed, elongate clasts (10–50 cm) of mafic to felsic volcanic rocks, gabbro, iron formation, breccia and feldspar porphyry rocks. The matrix of the conglomerate is dominantly felsic in composition (quartz + feldspar + ankerite + muscovite). Because there is very little exposed outcrop and only a few oriented diamond-drill cores, it is difficult to interpret structural features present at the Jerome deposit; however, it is assumed that it shares a similar deformational history to that documented for the Namex deposit 10 km to the east-southeast, which has almost identical host rocks that are part of the same assemblage along the Ridout high-strain zone.

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Metric Conversion Table

Conversion from SI to Imperial			Conversion from Imperial to SI		
SI Unit	*Multiplied by*	*Gives*	*Imperial Unit*	*Multiplied by*	*Gives*
			LENGTH		
1 mm	0.039 37	inches	1 inch	**25.4**	mm
1 cm	0.393 70	inches	1 inch	**2.54**	cm
1 m	3.280 84	feet	1 foot	**0.304 8**	m
1 m	0.049 709	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	**1.609 344**	km
			AREA		
1 cm^2	0.155 0	square inches	1 square inch	**6.451 6**	cm^2
1 m^2	10.763 9	square feet	1 square foot	**0.092 903 04**	m^2
1 km^2	0.386 10	square miles	1 square mile	2.589 988	km^2
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
			VOLUME		
1 cm^3	0.061 023	cubic inches	1 cubic inch	**16.387 064**	cm^3
1 m^3	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m^3
1 m^3	1.307 951	cubic yards	1 cubic yard	0.764 554 86	m^3
			CAPACITY		
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	**4.546 090**	L
			MASS		
1 g	0.035 273 962	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 747	ounces (troy)	1 ounce (troy)	**31.103 476 8**	g
1 kg	2.204 622 6	pounds (avdp)	1 pound (avdp)	**0.453 592 37**	kg
1 kg	0.001 102 3	tons (short)	1 ton(short)	**907.184 74**	kg
1 t	1.102 311 3	tons (short)	1 ton (short)	**0.907 184 74**	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	**1016.046 908 8**	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	**1.016 046 9**	t
			CONCENTRATION		
1 g/t	0.029 166 6	ounce (troy) / ton (short)	1 ounce (troy) / ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights / ton (short)	1 pennyweight / ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

	Multiplied by	
1 ounce (troy) per ton (short)	31.103 477	grams per ton (short)
1 gram per ton (short)	0.032 151	ounces (troy) per ton (short)
1 ounce (troy) per ton (short)	20.0	pennyweights per ton (short)
1 pennyweight per ton (short)	0.05	ounces (troy) per ton (short)

Note: Conversion factors in ***bold*** *type are exact. The conversion factors have been taken from or have been derived from factors given in the* Metric Practice Guide for the Canadian Mining and Metallurgical Industries, *published by the Mining Association of Canada in co-operation with the Coal Association of Canada.*

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