Geology of new gold discoveries in the Coffee Creek area, White Gold District, west-central Yukon

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ABSTRACT

A new widespread, structurally controlled gold mineralizing system has been identified during the 2010 exploration drilling program at the Coffee Project, west-central Yukon. The Coffee Creek area is underlain by a sequence of shallowly to moderately south to southwest-dipping Paleozoic metamorphic rocks that are considered to be part of the Yukon-Tanana terrane and are intruded by the Cretaceous Coffee Creek granite along a west to northwest-trending contact. During the 2010 drilling program, structurally controlled gold mineralization was discovered in all major lithological units underlying the Coffee property. Importantly, these mineralized zones correspond to a number of discrete structural corridors. The gold zones are steeply dipping and characterized by extensive silicification in addition to sericite and clay alteration accompanied by variable As-Ag-Sb-Ba-Mo enrichment. Polyphase breccias of both hydrothermal and tectonic origin, in addition to andesite-dacite dykes, are common within the gold-bearing structural corridors. The dominant sulphide is pyrite, although trace arsenopyrite, chalcopyrite and stibnite are observed locally. The similarity of breccia textures and alteration/sulphide mineralogy between all gold zones currently defined on the Coffee property implies a common mineralizing event.

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INTRODUCTION

Economic accumulations of gold that occur in the Dawson Range of west-central Yukon include the historic and producing placer deposits of the Klondike, in addition to numerous auriferous bedrock deposits related to fossil magmatic-hydrothermal systems (*e.g.,* the Mesozoic Casino and Minto porphyries; Mortensen and Hart, 2010). A surge of exploration activity in the region, in part spurred by the recent discovery of 'Golden Saddle' on the White Gold property by the former Underworld Resources, has led to several new discoveries that indicate the emergence of a new gold district in Yukon. The Coffee property (Fig. 1a), located 130 km south of Dawson City and 30 km south of the Golden Saddle deposit, represents the southernmost known gold occurrence of this new district. Significant and widespread gold mineralization has been identified during the 2010 exploration drilling program at the Coffee Project. Gold is hosted in steeply dipping structures outlined by a 15 km-long, east to northeast-trending array of gold-in-soil anomalies. In this contribution we describe the geology of the Coffee property, as well as breccia textures, alteration, sulphide phases and the nature of mineralization that occurs within the gold zones discovered to date. The mineralized zones are referred to as Supremo, Latte, Double Double, Americano, Espresso and Kona (Fig. 2). Details of the host lithologies, style of gold mineralization and important mineralized intersections are summarized for each zone in Table 1.

REGIONAL GEOLOGY

The Coffee Project is located in the Yukon-Tanana terrane (YTT), an accreted pericratonic sequence that covers a large part of the northern Cordillera from northern British Columbia to east-central Alaska (Colpron *et al.*, 2006; Fig. 1a). The YTT hosts several gold deposits and occurrences that are genetically related to Mesozoic intrusions, including the Mt Nansen past-producing mine, the Nucleus deposit at Freegold Mountain, and the Casino Cu-Au-Mo porphyry deposit, located southeast of the Coffee property (Fig. 1b; Bennett *et al.*, 2010; Bineli Betsi and Bennett, 2010). The YTT consists of Paleozoic schists and gneisses that were deformed and metamorphosed in the late Paleozoic, and intruded by several suites of Mesozoic intrusions that range in age from Jurassic to Eocene (Mortensen, 1992; Colpron *et al.*, 2006; Fig. 1b). The Paleozoic rocks are pervasively foliated and contain at least two overprinting rock fabrics (Ryan and Gordey, 2004; Mackenzie and Craw, 2010; MacKenzie *et al.*, 2008). From Late Permian to Early Jurassic, the rocks were tectonically stacked along foliation-parallel thrust faults (Mortensen, 1996; Berman *et al.*, 2007). Extensional (or at least partly tensional) tectonics, although not described in the Dawson Range, may have occurred during the mid-Cretaceous in western Yukon, similar to that documented in east-central Alaska (Pavlis *et al.*, 1993).

PROPERTY GEOLOGY

For simplicity, we have subdivided the geology of the Coffee property into two main west to northwest-trending, south to southwest-dipping panels of metamorphic rocks that border a third intrusive panel to the south. From north to south, these include (i) an augen gneiss-mafic schist sequence (augen gneiss panel) that is overlain by (ii) a heterogeneous package of intercalated biotite-feldspar schist, highly-strained felsic rocks, metagabbro, talc schist and metacarbonate (biotite schist panel). The foliated rock sequences are intruded by (iii) mid to Late Cretaceous equigranular granite along a west to northwest-trending contact located in the south end of the property (Fig. 2a). Both the Paleozoic metamorphic rocks and the mid to Late Cretaceous intrusive complex are cut by intermediate to felsic dykes of unknown age. Numerous structures are interpreted based on mapping, drill core logging and ground magnetic survey interpretation (Fig. 2b). The main rock units are briefly described below and summarized in Table 2.

AUGEN GNEISS

Augen gneiss, which represents an important host rock lithology in the Supremo area, is characterized by variable amounts of quartz, alkali feldspar augens (typically 0.5-1.5 cm in length), biotite and muscovite (Fig. 3a). Augen gneiss is structurally intercalated with subordinate biotite-feldspar (±quartz, ±muscovite) schist (Fig. 3b). Discontinuous lenses of biotite schist vary from 0.3 to 10 m apparent width as observed in drill core, and represent approximately 30% of the overall rock volume within the unit.

a

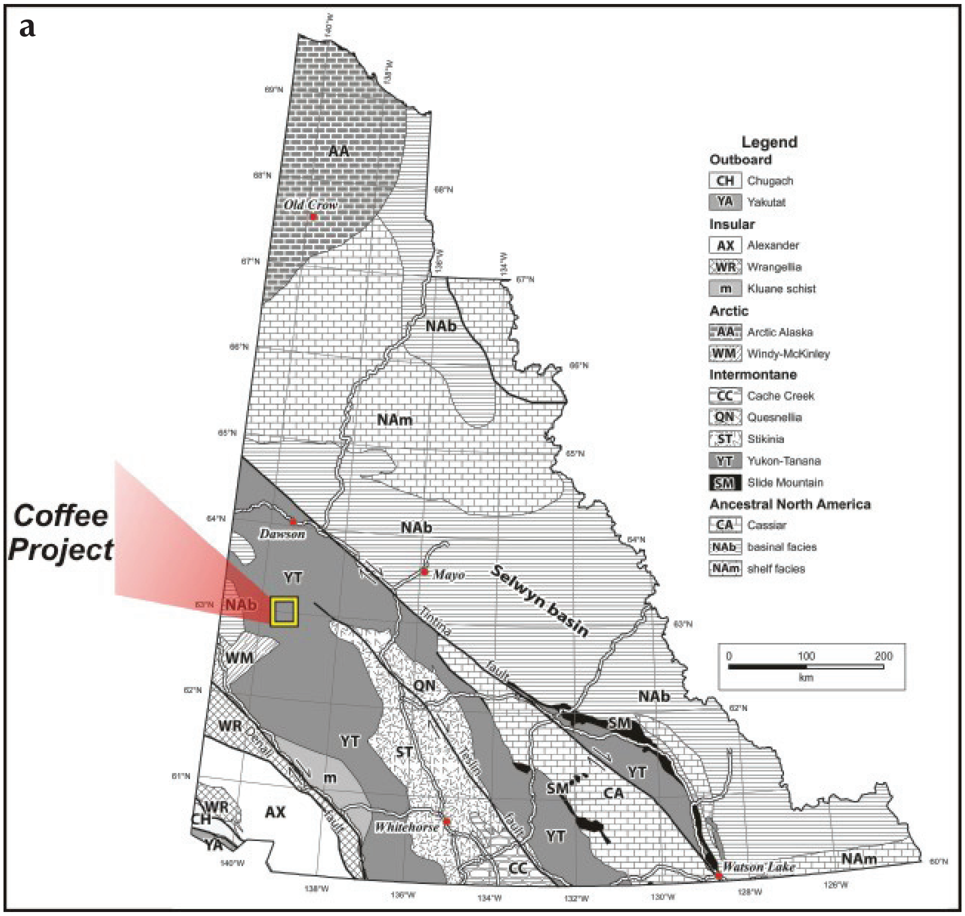

Figure 1. ***(a)*** *Regional terrane and location map, and* ***(b)*** *regional geology map for the Dawson Range.*

b

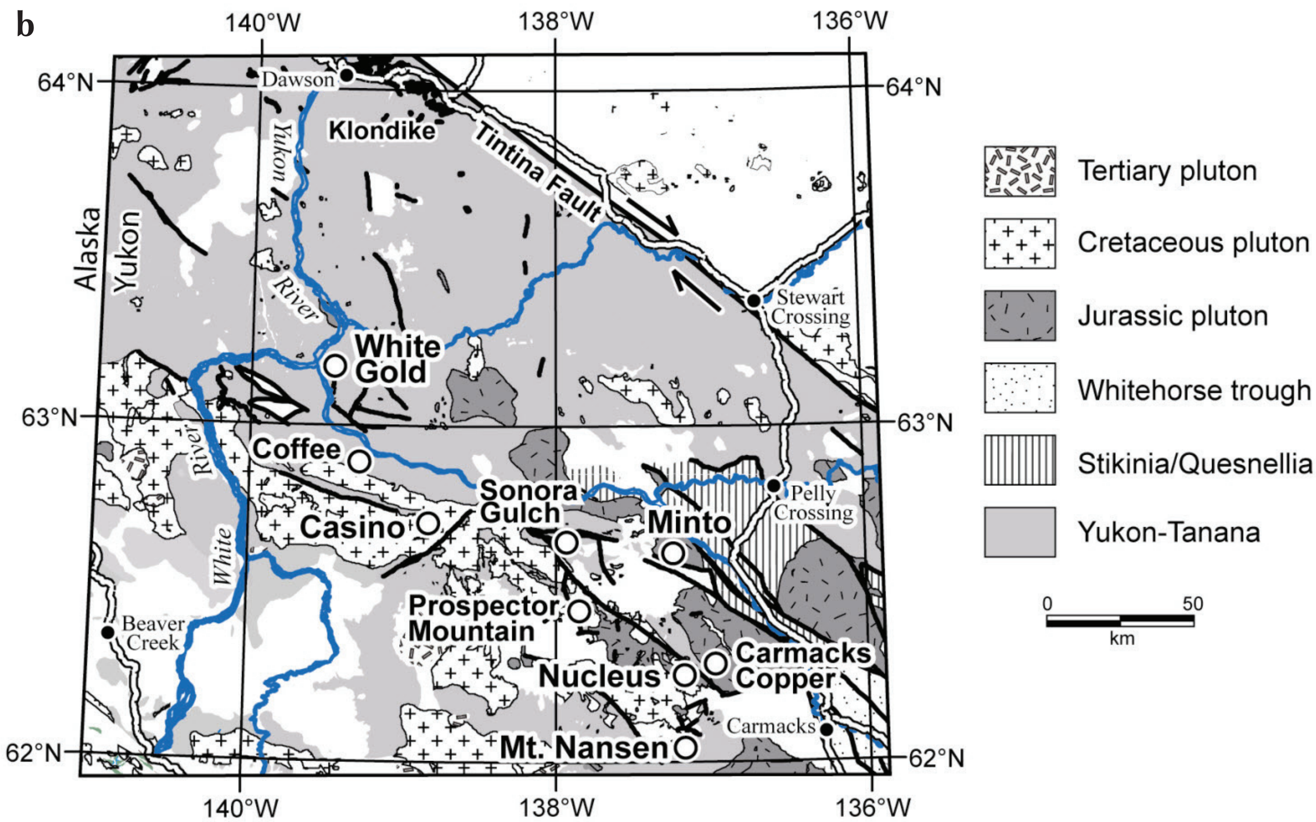

Table 1. *Discrete mineralized areas at the Coffee property.*

Zone	**Host rock panel**	**Au occurrence and representative grade**	**Comment**
Supremo Zone	augen gneiss	narrow Au-bearing brittle structures; *e.g.,* CFD001, 17.07g/t over 15.50 m; CFD016, 12.43g/t Au over 14 m	gold commonly hosted in matrix-supported breccia and dacite dykes
Latte Zone	biotite-feldspar schist	**UPPER LATTE**: wide zones of disseminated and fracture controlled sulphide and oxide; *e.g.*, CFD011, 2.35g/t over 51 m; CFD044, 1.83g/t over 58 m **LOWER LATTE**: narrow zones of high grade gold along discrete structures; *e.g.*, CFD010, 3.71g/t over 16 m; CFD012, 17.4g/t over 1 m; CFD048, 5.55g/t over 9 m	gold hosted in limonitic high-strain rocks; Fe-oxides replace disseminated and fracture-controlled pyrite (Upper Latte); sooty-pyrite rich gold zones in narrow, high-grade shear zones (Lower Latte)
Double Double Zone	biotite-feldspar schist	narrow gold bearing brittle structures; *e.g.*, CFD027, 6.3g/t over 35 m; CFD028, 15.91g/t over 5 m	gold hosted in matrix-supported breccia including dacite porphyry fragment breccia
Kona Zone	granite	broad zones of fracture-controlled and disseminated pyrite associated with dacite dykes; *e.g.*, CFD053, 2.21g/t over 56.75 m and 1.92g/t over 23 m	gold hosted in quartz-sericite altered granite; Fe-oxides after disseminated pyrite, pyrite veinlet stockworks and sooty-pyrite rich shear zones
Americano Zone	granite	zones of fracture-controlled and disseminated pyrite; *e.g.*, CFD064, 2.36g/t over 18 m	gold hosted in quartz-sericite altered granite similar to Kona
Espresso Zone	granite	zones of fracture-controlled and disseminated pyrite; low-grade gold encountered	gold hosted in quartz-sericite altered granite similar to Kona

Table 2. *Rock units mapped in drill core and outcrop at the Coffee property.*

Rock unit	**Location**	**Comment**
augen gneiss	Supremo area	intercalated with biotite-feldspar schist; dominant host rocks surrounding high-grade breccias in the Supremo zone
ribbon quartz mylonite	Upper Sequence at Latte zone; rare thin intervals in the Lower Sequence	favourable gold host in the Upper Latte zone
feldspar-muscovite schist	occurs in the Latte zone; most commonly in the Upper Sequence	favourable gold host in the Upper Latte zone
biotite-feldspar schist	dominant unit in central panel	minor intercalated metacarbonate; host for high-grade gold in the Lower Latte zone; host for Double Double zone
talc schist	talc schist occurs in the vicinity of metagabbro; possible strained mafic-ultramafic intrusions	not associated with gold
metagabbro	below Lower Sequence at Latte	not associated with gold
dacite dykes	cuts all rock units	strong spatial association with gold zones
andesite dykes	cuts all rock units	weaker spatial association with gold zones
granite	Kona area	large Coffee Creek granite batholith trends west-northwest. mid to Late Cretaceous

BIOTITE SCHIST

Biotite-feldspar (± quartz, ± muscovite) schist dominates the central rock panel in the Coffee property area (Figs. 2 and 3b). Mineralogy varies from biotite-feldspar dominant to quartz-muscovite dominant, defining compositional layering in the schist, which ranges from a few centimetres to >10 cm in thickness. Biotite-feldspar schist is locally intercalated with metacarbonate bands that range in width from 3 cm to >1 m and which increase in volumetric significance to the south. The degree of penetrative strain development is also variable, but increases significantly to the south, particularly within close proximity to the Latte zone.

Biotite schist is structurally interleaved locally with mylonite (comprising predominantly feldspar-quartz-muscovite) and metagabbro lenses. The highly strained feldspar-quartz-muscovite rocks are characterized by a thinly banded texture that includes pale mica-rich layers alternating with feldspar-rich and ribbon-quartz layers (Fig. 3c). Highly strained metagabbro is common within the biotite schist unit and locally exhibits intense foliation development and compositional banding (Fig. 3d). The high-strain fabric locally wraps around the more competent pyroxene porphyroclasts. Subordinate talc schist intervals are spatially associated with the metagabbro zones, and are characterized by strongly altered pale green and fine-grained foliated chlorite (Mg-chlorite?), which is associated with local coarse magnetite crystals.

GRANITE

The Coffee Creek granite underlies the southern third part of the map area and is characterized by an equigranular texture comprising approximately 30-50% plagioclase (5-10 mm in length), 20-30% K-feldspar (5-12 mm in length), 20-30% quartz (3-8 mm in diameter), 3-5% biotite (1-3 mm in diameter) and 3-5% hornblende (1-3 mm in length) (Fig. 3e). The contact between the granite and Paleozoic rocks was observed in drillhole CFD054 (at 54.5 m). Immediately along the contact zone, a 50 cm-wide andesite dyke has been emplaced in a pre-existing zone of weakness between the two adjacent lithologies. The foliated rocks are neither hornfelsed nor strongly altered in the drill core adjacent to the intrusion and no significant chilled margin textures have been observed within the granite.

DYKE SUITES

Andesite dykes are characterized by fine to coarse-grained plagioclase phenocrysts occurring within a dark aphanitic groundmass (Fig. 3f). The unit is largely unaltered and does not host gold mineralization. Although there is a spatial association between the andesite dykes and the gold-bearing structures, we interpret this suite to post-date the gold mineralizing event that occurs on the Coffee property.

Dacite porphyry dykes are unfoliated and are spatially associated with gold mineralization within several zones across the Coffee property (*e.g.,* Supremo, Latte, Kona). This suite of dykes is characterized by 10-30% feldspar phenocrysts (1-3 mm in length) and minor quartz (0-5%; <1 mm in diameter) that occur within an aphanitic light grey-green groundmass. Ferromagnesian mineral phases (hornblende, ± biotite) are the focus of macroscopic alteration, and where identified, have been pervasively replaced by pyrite.

STRUCTURAL GEOLOGY

Structural data measured from oriented drill core indicates that the transposed fabric of the augen gneiss in the Supremo zone (augen gneiss panel) strikes northwest and dips shallowly to the southwest (<20°; Fig. 4a), whereas foliation measurements from the Latte and Double Double zones indicate that the prevailing structural grain dips more steeply (40-50°; Figs. 4b,c), but maintains the same strike. Faults which are ubiquitous in drill core are both steeply dipping and foliation parallel, based on cross section interpretation of -50° and -70° paired drillholes (*i.e.,* shallow to moderate dip). Importantly, correlations between cross section interpretations and assay interval results indicate that gold-bearing structures are steeply dipping and crosscut all rock units throughout the Coffee property. Data from oriented drill core, such as vein orientations and breccia zone contacts, are less reliable due to the incohesive nature of drill core from the gold-rich zones.

The orientation of gold-bearing structures varies across the Coffee property. Within the Supremo zone, located in the northeast part of the property, the controlling structures are interpreted to strike north and cut the augen gneiss host. In contrast, within the Latte and Double Double zones (1.5 km south and 1.5 km southeast of Supremo, respectively), gold mineralization is associated

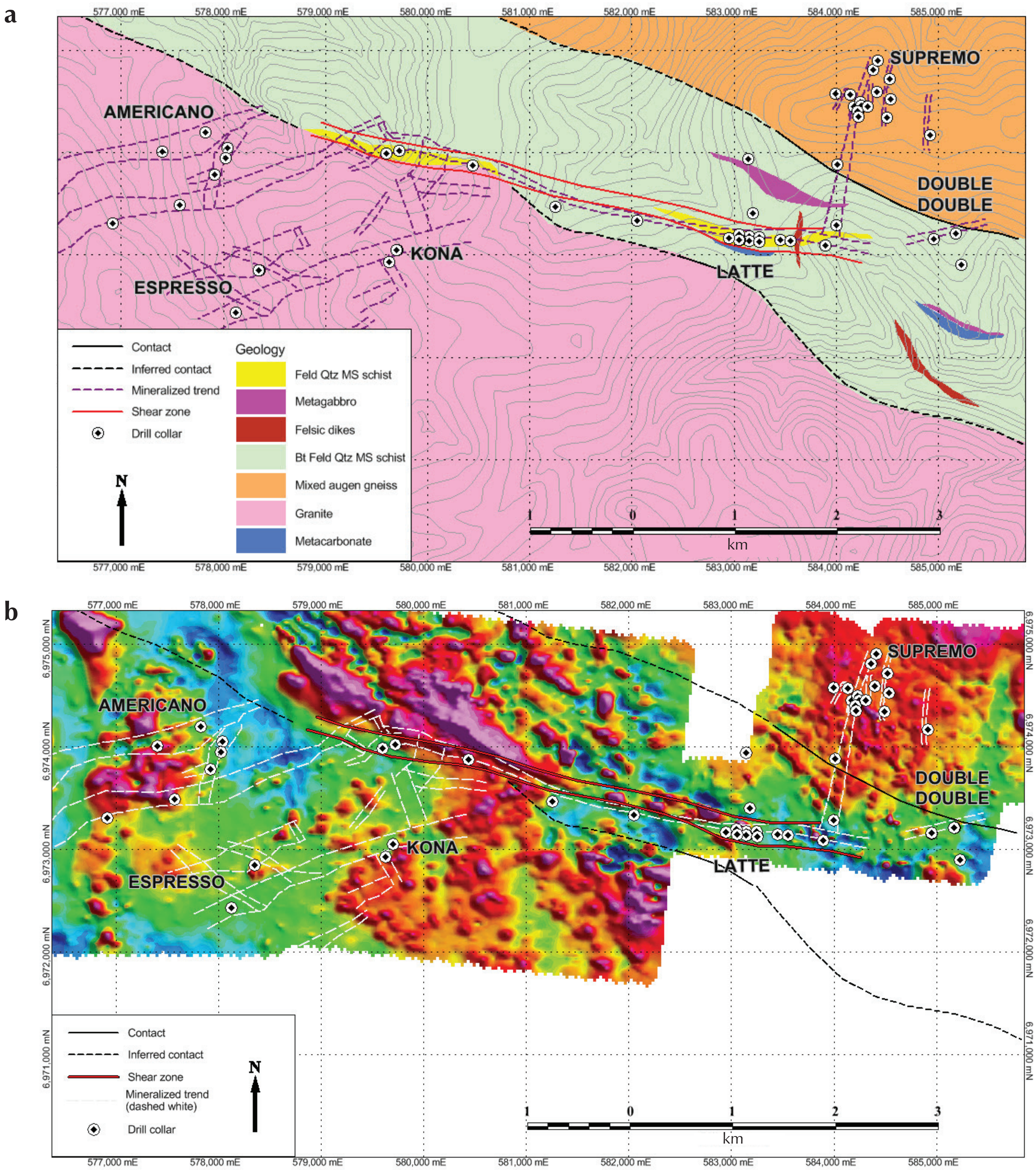

Figure 2. (a) *Simplified property geology map displaying lithologies, structures and drill collar locations, and* ***(b)*** *map of ground magnetic data and interpreted structures. Coordinate system is UTM NAD83 zone 7.*

Figure 3. *Photographs of Coffee property area rock units:* ***(a)*** *augen gneiss (CFD033 – 167.3 m);* ***(b)*** *biotite-feldspar schist (CFD067 – 239 m);* ***(c)*** *feldspar-quartz mylonite (CFD038 – 188.3 m);* ***(d)*** *mylonitized gabbro (CFD060 – 145 m);* ***(e)*** *granite (outcrop; Kona area); and* ***(f)*** *andesite porphyry (sampled from trench in the Supremo area).*

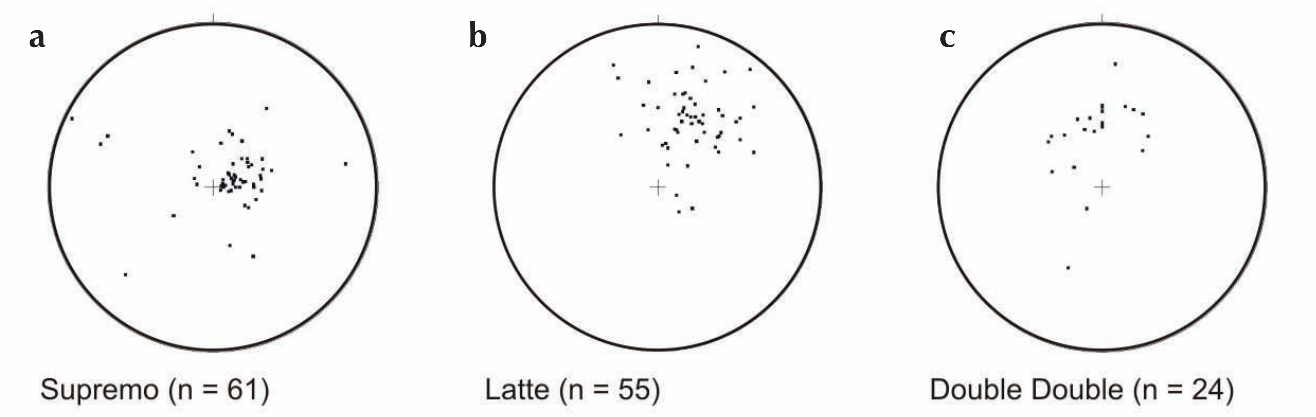

Figure 4. *Lower hemisphere stereonet projections of poles to foliation:* ***(a)*** *Supremo;* ***(b)*** *Latte; and* ***(c)*** *Double Double.*

with regionally significant, east-trending, south-dipping structures (Latte structure) and related splays (Fig. 2). The Latte structure comprises breccias that overprint older ductile strain fabrics occurring within the host biotite schist, consistent with a multiply reactivated shear zone environment. The Kona, Espresso and Americano gold zones which are located 3 to 8 km to the west-southwest of Supremo (Fig. 2) are hosted in steeply dipping fault zones that crosscut the Coffee Creek granite. The fault zones are characterized by brecciation, intense fracturing, sulphide veining and pervasive alteration of primary minerals. These structures correspond to a variety of orientations demarcated by linear gold-in-soil anomalies, and may represent an array of main faults connected by linking structures as interpreted in Figure 5.

OVERVIEW OF MINERALIZED ZONES

Gold mineralization throughout the Coffee property is characterized by extensive silica, sericite and clay alteration and is accompanied by variable As-Ag-Sb-Ba-Mo enrichment. Polyphase breccias (clast to matrix-supported) are commonly spatially associated with dacite dyke emplacement. The dominant sulphide species occurring within breccia zones is pyrite (arsenian and non-arsenian) with trace arsenopyrite, chalcopyrite and stibnite. Thin, microcrystalline silica veinlets are observed within gold zones, whereas opaque, white, foliation-parallel veins and vein fragments are common in the host rocks, and not commonly observed within the gold zones. Mineralization thus far encountered is strongly oxidized, with depths of oxidation ranging from 75 to 100 m. Sulphides are partially to completely replaced by Fe-oxides within gold-bearing zones. The lack of any recent glaciation in the region has helped preserve the oxidized zones, which often occur less than 2 m below the overburden and/or felsenmeer.

SUPREMO

Gold mineralization within the Supremo zone occurs within a 600 m-wide corridor and is hosted within several parallel, north-trending, steeply dipping fault structures that are spaced 50 to 100 m apart. Discrete mineralized zones associated with the faults have been outlined by linear gold-in-soil anomalies and subsequently defined by drilling. Although gold mineralization is hosted within steeply dipping north-northeast structures, assays from paired -50° and -70° drillholes along the same cross section line indicate that concentrations of gold may locally have a moderate to steep plunge down the plane of the steeply dipping structures. We interpret this on the basis of the distribution of alteration mineralogy and the presence of gold within the paired holes.

Gold mineralization is associated with silicified clast breccias (Fig. 6a) and dacite dykes (Fig. 6b). Furthermore, mineralized intervals are associated with intense clay and sericite alteration in addition to abundant oxidized pyrite. Secondary limonite, which replaces pyrite, occurs as clots, disseminations, and within fracture networks in all rock types including breccia clasts and the wallrock. Peripheral to mineralized zones, alteration consists of silica, chlorite, albite and epidote. The genetic association of this distal alteration assemblage to mineralization is not yet established.

Breccias are typically associated with higher gold grades within the Supremo zone. Matrix compositions range from incompetent limonite-clay material to indurated silicified cement (Fig. 6a). Angular to subrounded clasts range from 0.5 to 5 cm in diameter and consist predominantly of highly silicified fragments and subordinate altered wallrock and dacite porphyry fragments. Breccia textures range from mature matrix-dominant phases with rounded

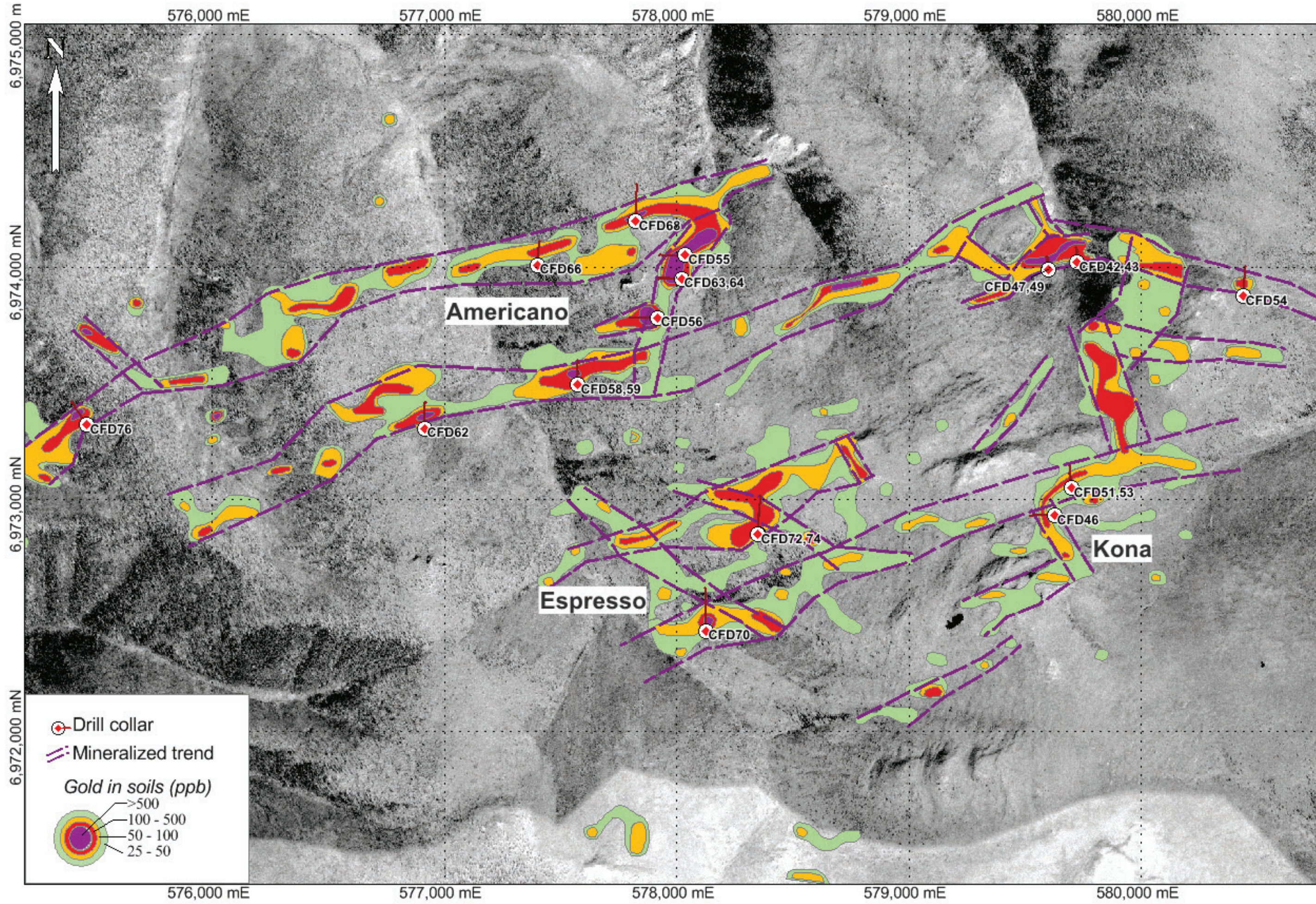

Figure 5. *Map of contoured gold-in-soil anomalies and drilled gold zones hosted in the Coffee Creek granite. Interpreted structures are indicated with dashed lines. Coordinate system is UTM NAD83 zone 7.*

fragments to wall-rock crackle breccias. Angular to subangular quartz microfragments (<1 mm) are locally observed in the matrix of all breccia subtypes observed.

Thin chalcedonic and porcelainic veins, as well as veins with open-space textures (*e.g.,* drusy and cockscomb), occur within some of the mineralized intervals. The silica veinlets cut both altered clasts and matrix material within the breccia units. Calcite veinlets are also noted, although these are not restricted to the gold-rich zones and may have formed during the loss of Ca from the alteration of plagioclase to albite in the host rocks.

LATTE

The Latte zone occurs within the biotite schist panel (Fig. 2a), and is characterized by moderately south-dipping ribbon quartz mylonite that prevails in what is termed 'Upper Latte' or the structurally higher part of the Latte zone. Gold also occurs in deeper biotite-feldspar schist within 'Lower Latte', or the structurally lower interval of the Latte zone. Upper and Lower Latte are underlain by metagabbro intercalated with lenses of talc schist. Drilling in 2010 has defined a zone of west-trending and steeply south-dipping gold mineralization that extends for at least several hundred metres within the Latte zone. Upper and Lower Latte are defined on the basis of differences in the style of gold mineralization and the type of host rock.

Alteration associated with gold-bearing rocks within the Latte zone consists of silica, clay and sericite. Although strong limonite is noted in Upper Latte, the overall sulphide content (oxidized or unoxidized) appears to be higher in the mineralized intervals in Lower Latte.

Low to moderate gold grades over long intervals are associated with breccia and alteration zones that cut feldspar-muscovite schist, dacite dykes (Fig. 6b) and ribbon-quartz mylonite (Fig. 6c), in the westernmost drillholes within the Upper Latte zone. In this part of the Latte zone, gold is typically not associated with biotite-feldspar schist. In contrast, higher-grade intervals of gold mineralization do occur in biotite-feldspar schist located in the easternmost part of the Latte zone. Mineralization is hosted in silicified-clast breccia with associated sulphide-rich matrix (Fig. 6d). Abundant pyrite (up to 12-15%) is strongly associated with breccia matrix and to a lesser extent located in fine sulphide veinlets that crosscut silicified host rock material.

DOUBLE DOUBLE

The Double Double zone is hosted in the biotite schist panel (Fig. 2a) in what we interpret as an east to northeast-trending splay off of the main west to northwest-trending Latte structure. Mineralization is accompanied by intense breccia development and strong quartz-sericite alteration and associated pyrite/limonite.

Mineralized breccia occurring within the Double Double zone ranges from polymictic to monomictic, and clast size varies from 1 to 4 cm. The clasts are hosted in either a clay-limonite or silica-pyrite matrix. Subangular clasts include silicified fragments of unknown origin, quartz vein fragments and dacite porphyry fragments (Fig. 6e). Sulphides are commonly oxidized to limonite and occur in clasts, matrix, as well as in networks and sub-parallel arrays of thin veinlets. Porcelainic to chalcedonic silica microveinlets are locally observed in the mineralized intervals.

KONA, ESPRESSO AND AMERICANO ZONES

The Kona, Espresso and Americano zones are hosted in the Cretaceous Coffee Creek granite and are located 3 to 8 km west of the Latte zone (Fig. 2a). Alteration typically consists of clay and limonite (Fig. 6f) with local relict zones of quartz-sericite-pyrite alteration. Pyrite commonly replaces ferromagnesian minerals (hornblende, ± biotite), and also occurs as veins/veinlets, fracture fill, and in the sulphide-rich matrix of fault breccias within these three zones. Andesitic to dacitic dykes are spatially associated with gold mineralization in the Kona area.

PRELIMINARY OBSERVATIONS ON LINKAGES BETWEEN GOLD, ALTERATION MINERALS AND SULPHIDES

A Portable Infrared Mineral Analyzer (PIMA) was used to determine alteration assemblages for samples from drillholes located both within mineralized corridors and unmineralized shoulders to establish linkages between gold zones and specific alteration minerals. We report preliminary results of PIMA analysis for diamond drillholes CFD016 and CFD017 (Supremo zone), which were paired drillholes from the same drill pad setup. CFD016 (-50° angle) contained a zone of significant Au concentration, whereas CFD017 (-70° angle) did not contain any significant zones of Au concentration. We also present data for mineralized and unmineralized sections of drillholes CFD029 (Supremo zone), CFD011 (Latte zone), CFD027 (Double Double zone) and CFD053 (Kona zone).

The preliminary PIMA data suggests that both the mineralized and unmineralized samples are characterized by specific white mica and clay mineralogy (Table 3). Within the gold bearing zone of CFD016, ammonium-bearing illite, illite and smectite are common, whereas in the unmineralized undercut hole CFD017, these minerals are absent to rare and the alteration assemblage is instead dominated by kaolinite. Similar results were obtained for Supremo hole CFD029, although high crystallinity illite was detected in the unmineralized section of drill core (not detected in the unmineralized section of hole CFD016 or in CFD017). Mineralized rocks in the Latte zone (CFD011) and Kona zone (CFD053) are characterized by ammonium-bearing illite, illite and smectite and unmineralized rocks are associated with kaolinite, high crystallinity illite and trace dickite. Gold-bearing rocks from the Double Double zone are characterized by illite alteration, whereas the unmineralized rocks in the drillhole are associated with smectite and kaolinite.

Aluminum-hydroxyl (Al-OH) responds on the PIMA at approximately 2200 nm, however shifts in the response can often be observed and have been correlated to, in the case of illite, changes in the crystallinity, Al content and Fe/Mg ratio of the illite (Hauff, 2005). These changes have also been linked to changes in the temperature at which the illite crystallized (Post and Noble, 1993; Hauff, 2005). Thus, higher wavelengths correspond to lower Al content and higher Mg/Fe ratios. These higher wavelengths also correlate to higher temperatures at which illite crystallized (Hauff, 2005). Within the zones examined to date, it

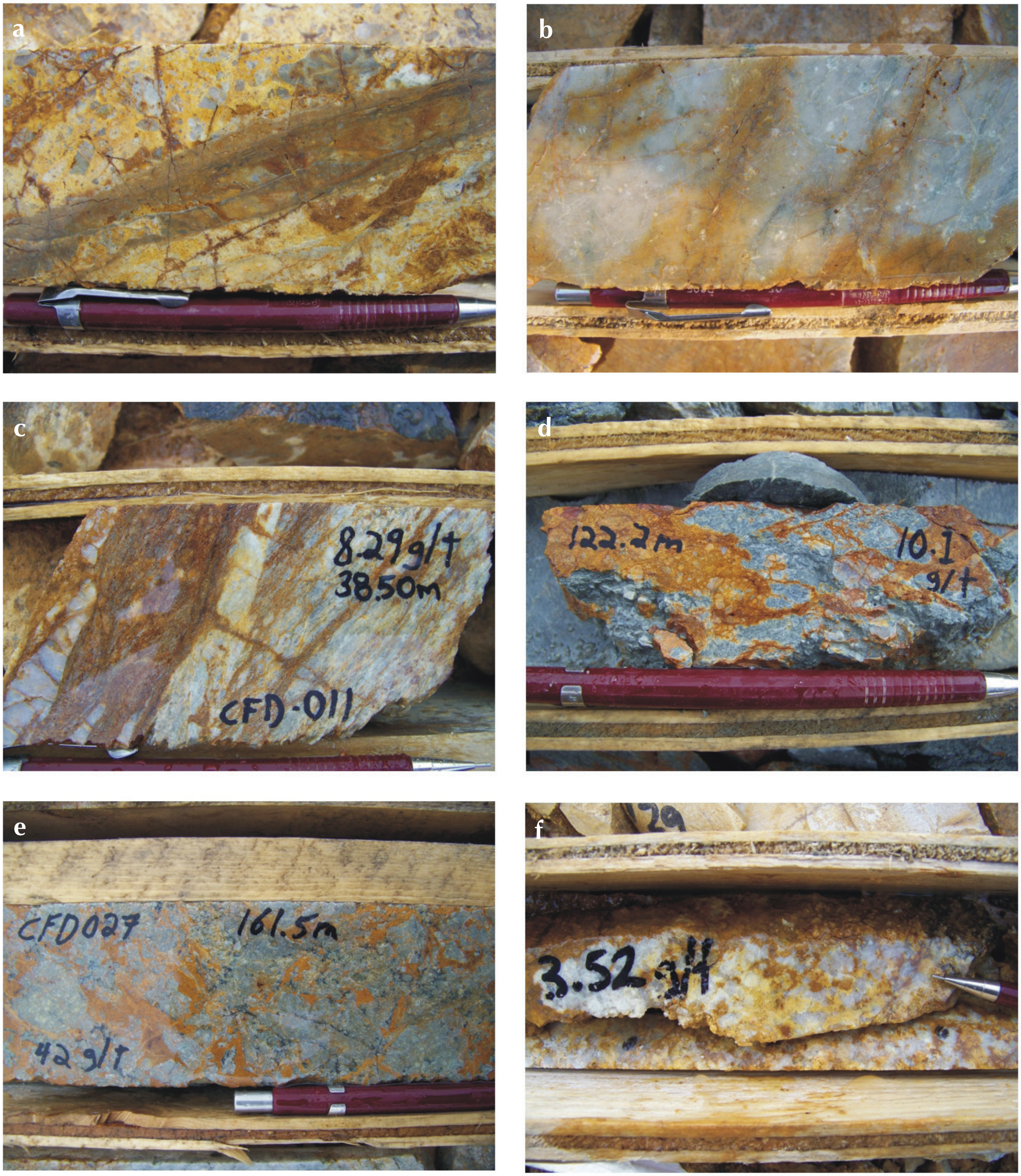

Figure 6. *Photographs of mineralized drill core from the Coffee property:* ***(a)*** *silicified-clast breccia cut by later chalcedonic (jasperoidal) silica veins (CFD001 – 28.60 m; Supremo zone);* ***(b)*** *quartz-sericite-altered dacite porphyry dyke (CFD006 – 68.75 m; Latte zone);* ***(c)*** *quartz-sericite-altered feldspathic schist (CFD011 – 38.50 m; Latte zone);* ***(d)*** *fine pyrite matrix, silicified-clast breccia (CFD010 – 122.2 m; Latte zone);* ***(e)*** *dacite porphyry clast breccia (CFD027 – 161.5 m; Double Double zone); and* ***(f)*** *clay limonite-altered granite (CFD051 – 30.1 m; Kona zone).*

Table 3. *Alteration mineral species detected by PIMA; listed by zone and mineralized vs. non-mineralized.*

	NH_4	HiXL_Ill	Illite	Smec	Kaol	Chl	Cb	Dik	Jar	Sil
Supremo Mineralized (>0.1g/t Au)										
CFD-16	**Tr-yes**	No	**Yes**	**Yes**	Tr	No	No	No	No-tr	?
CFD-17 (Hole not mineralized)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CFD-29	**Tr-yes**	No	**Yes**	**Yes**	Tr	Tr	No	No	No	?
Supremo Unmineralized (<0.1g/t Au)										
CFD-16	No	No	**Yes**	No-tr	**Yes**	**Yes**	**Yes**	No	No	?
CFD-17	No	No	Tr	No	**Yes**	Tr	No	No	No	?
CFD-29	No	**Yes**	Tr-yes	No	**Yes**	No	No	No	No	?
Latte Mineralized (>0.1g/t Au)										
CFD-11	**Tr**	No	**Yes**	**Yes**	Tr	Tr	No	No	No	?
Latte Unmineralized (<0.1g/t Au)										
CFD-11	No	**Yes**	No-tr	No	**Yes**	Tr	**Tr**	**Tr**	No	?
Double Double Mineralized (>0.1g/t Au)										
CFD-27	?	**Tr**	**Yes**	No	No	No	Tr	No	No	?
Double Double Unmineralized (<0.1g/t Au)										
CFD-27	No	No	Tr	**Yes**	**Yes**	**Yes**	**Tr-Yes**	No	No	No
Kona Mineralized (>0.1g/t Au)										
CFD-53	**Tr**	No	**Yes**	**Yes**	Tr	No	No	No	No	?
Kona Unmineralized (<0.1g/t Au)										
CFD-53	No	No	No	Tr-Yes	**Yes**	?	?	**Tr**	No	?

*CFD-17 had no samples above the 0.1 g/t threshold; above is a compilation of n=42 for CFD-16, n=42 for CFD-17, n=54 for CFD-29, n=66 for CFD-11, n=49 for CFD-27 and n=32 for CFD-53; NH_4=ammonium bearing illite, HiXL_Ill=high crystallinity illite, Smec=Smectite, Kaol=Kaolinite, Chl=Chlorite, Cb=Carbonate, Dik=Dickite, Jar=Jarosite, Sil=Silica, Tr=trace. Bold text indicates distinctive mineralogy for both mineralized and non-mineralized rocks.

appears that gold-bearing rocks are largely associated with wavelength responses between 2201 and 2212 nm (Fig. 7).

Preliminary scanning electron microscope (SEM) work has been completed on a limited number of mineralized samples from the Supremo and Latte areas. Thin section analysis of breccia samples from Supremo indicates that oxidized sulphide is fine grained to sub-microscopic. Backscatter electron images reveal micron-sized crystals of barite disseminated throughout breccia matrix. Gold grains occur within outer growth bands of pyrite, along oxidized margins of pyrite, and within fractures cutting the pyrite grains (Fig. 8). Gold mineralization at Latte is strongly associated with pyrite and linked with other secondary hydrothermal phases consisting of barite, monazite, apatite, zircon and rare arsenopyrite. Pyrite in the gold zones exhibits arsenic-rich domains and it occurs as fine-grained concentrations along pre-existing rock fabrics.

SUMMARY

GEOLOGY AND STRUCTURE

The Coffee property is underlain by intercalated Paleozoic schistose, mylonitic and gneissic rocks that are in contact with the younger mid-Cretaceous Coffee Creek granite to the south. The absence of a significant contact metamorphic aureole implies that the basement-granite contact may have been faulted. Other major structures that have been identified on the Coffee property include the Latte structure, which is spatially associated with gold mineralization, in addition to foliation-parallel shear zones associated with metagabbro and talc schist intervals in the structurally deep part of the Latte zone.

Soil sampling, detailed ground magnetic surveys, aerial photograph lineament analysis, trenching and subsequent drilling indicate that gold mineralization is structurally

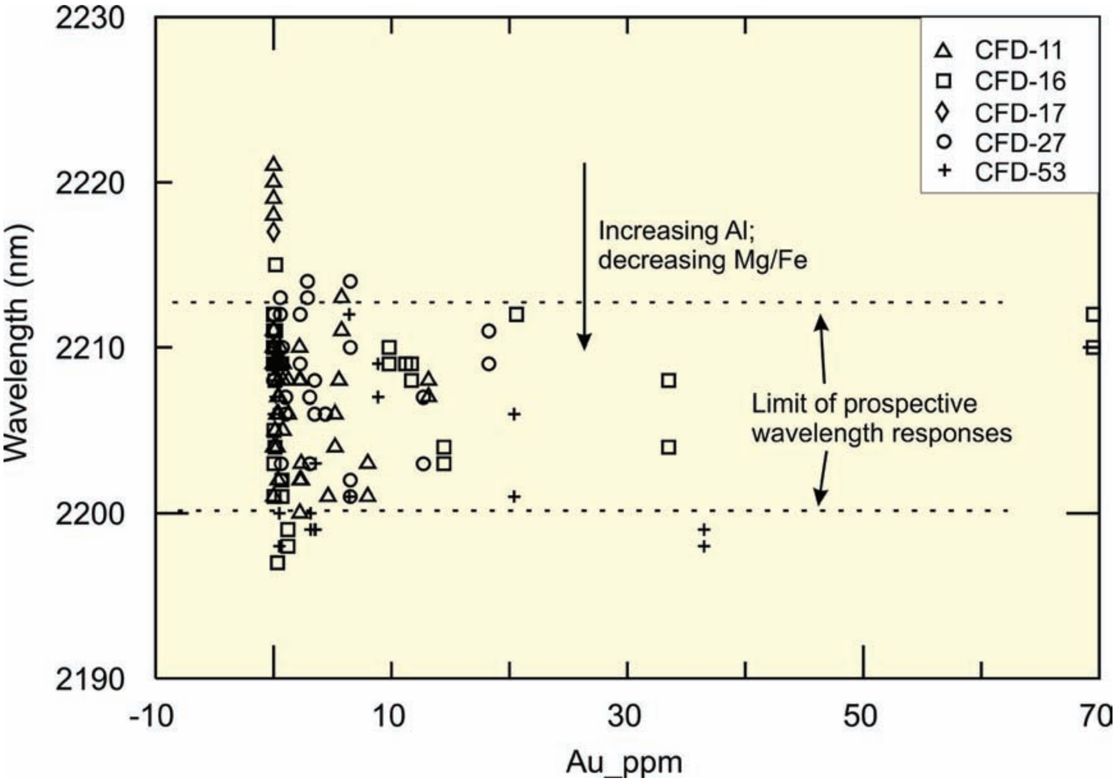

Figure 7. *Portable Infrared Mineral Analyzer (PIMA) data plot of gold (ppm) versus wavelength (nm).*

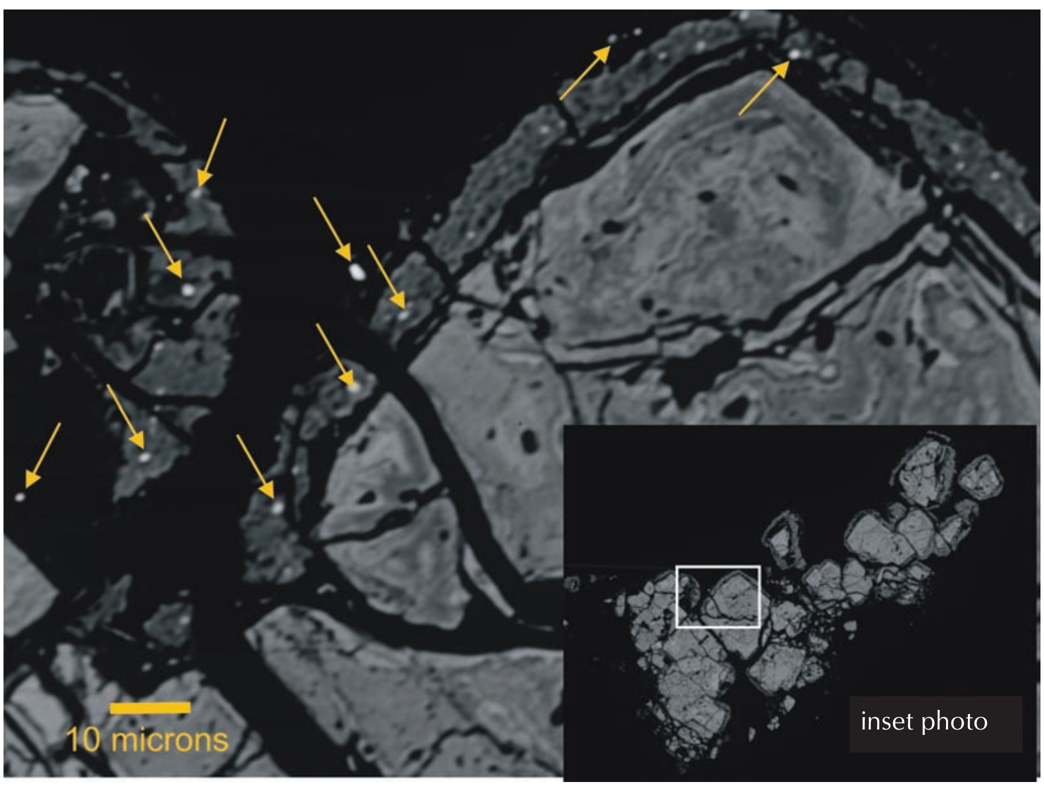

Figure 8. *Backscattered electron image of pyrite grain within Supremo breccia illustrating the linkage between gold (denoted with gold arrows) and pyrite. Note the occurrence of gold grains on the oxidized pyrite rim and near cracks in the grain. The grade over the one-metre interval in which this sample was taken was 34 g/t Au.*

controlled and cuts all lithologies on the property (Figs. 2b and 5). The metamorphic and intrusive host rocks are cut by dacite dykes that are spatially associated with gold and are interpreted as pre to syn-mineralization. A suite of andesite dykes appears to largely post-date the mineralization due to consistent lack of alteration and mineralization in these intrusive phases. The orientation and location of these dykes may have been influenced by pre-existing strain fabrics occurring in the Paleozoic metamorphic rocks. Fault zones occurring across the Coffee property have been multiply re-activated and exploited by the gold-bearing fluids, pre to post-mineralization dyke suites, in addition to relatively recent meteoric waters that contributed to the deep oxidation of the gold zones.

ALTERATION AND MINERALIZATION

Fragmental textures in each of the mineralized zones identified to date on the Coffee property record overprinting episodes of alteration, brecciation and veining. Breccia development may in part be due to fault propagation, but may also be due to the introduction of hydrothermal fluids. Breccia zones are generally strongly altered and well-mineralized, suggesting that they served as loci of high permeability for gold-bearing fluids.

Similar alteration assemblages, in addition to similar textures and styles of mineralization (*i.e.,* breccia, dacite dykes), as well as ubiquitous pyrite, implies that the mineralized zones at the Coffee property are genetically linked by the same protracted structural and hydrothermal event. The mineralized zones appear to be generally associated with illite alteration and PIMA analysis wavelengths of 2201 to 2212 nm, although the potential effects of supergene oxidation on the alteration assemblages have yet to be ascertained. Chalcedonic silica microveinlets, which are rarely found in unmineralized areas, are common in the gold zones, as are pyritic (or limonitic) veinlets, suggesting that these are related to fluid phases associated with the gold mineralizing event. Conversely, the opaque, white, typically foliation-parallel veins and vein fragments are interpreted to be pre-mineral and pre to syn-metamorphic.

The dominant sulphide phase occurring within all gold zones on the Coffee property is pyrite (arsenic-rich). Locally, subordinate amounts of arsenopyrite, stibnite and chalcopyrite are observed and gold is associated with increased As-Sb-Mo-Ba-Ag throughout the project area. Importantly, SEM imaging indicates a relationship between gold and pyrite growth bands, rims, as well as the fractures cutting pyrite grains, which suggests that gold may have been introduced during multiple fluid pulses. Long, low to moderate-grade intervals of gold mineralization occurring within the Upper Latte zone appear to be preferentially hosted in ribbon-quartz mylonite, feldspar-muscovite schist and dacite dykes, as opposed to the shorter high-grade gold intervals at Lower Latte, hosted in biotite-feldspar schist. These contrasting host rocks imply some degree of lithological control on the style and tenor of gold mineralization within the overall Latte area.

CONCLUSIONS

The geology of the Coffee Creek area preserves a protracted history of Paleozoic metamorphism and ductile deformation, Cretaceous magmatism and subsequent faulting associated with the introduction of gold-bearing hydrothermal fluids. Gold mineralization occurs in a number of orientations and host rocks; however, we interpret the similarity of breccia textures and alteration/sulphide mineralogy between gold zones to be the result of a common mineralization event.

At this time, we prefer not to classify the deposit style; however, we suggest that the gold system at the Coffee property is hosted in a structurally controlled, vein-poor, quartz-sericite-pyrite breccia environment. Mineralization within the Coffee property is similar to the Golden Saddle deposit where gold is associated with arsenic, pyrite, and sericite, and is controlled by vein-poor brittle structures and host rock-fluid interaction (Mackenzie *et al.*, 2010; Weiershäuser *et al.*, 2010). The dacitic dykes that occur throughout the mineralized zones, or possibly a buried pluton beneath the dykes at the Coffee property, may have served as a heat source for the superposed hydrothermal system. The highest-grade gold zones at the Coffee property occur in breccia zones within the main structures, locally related to very high sulphide content, which we interpret to reflect strong fragmentation and fluid flux zones within the multiply-reactivated fault structures.

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