

# Field investigations in the Ashuanipi Complex, Superior Province, western Labrador. (NTS Sheets 23J/05, 23J/06 and 23J/07)

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The Ashuanipi Complex is the easternmost subprovince of the Archean Superior Province. In western Labrador (Figure 1) the rocks of the complex consists of older migmatitic metasedimentary gneisses which are intruded by pre-D<sub>1</sub> tonalite to diorite plutons, early mafic dykes and layered gabbro to ultramafic sills. These rocks pre-date the intrusion of diatexite migmatite, foliated granite, tonalite, syenite and diorite, mafic dykes and granite to alkali feldspar granite veins and pegmatite. All rocks in the area are affected by D<sub>2</sub> deformation, with the exception of some pegmatites and late (Proterozoic?) gabbro dykes. Orthopyroxene-garnet-bearing assemblages in most rock types and extensive migmatization of metasedimentary rocks and early tonalite to diorite indicates granulite facies metamorphic conditions were attained during D<sub>1</sub> and D<sub>2</sub> deformation. The predominant structural features are a northwest-striking regional S<sub>1</sub> fabric, large- and small-scale F<sub>2</sub> folds and west-northwest-striking brittle faults. Rare kinematic indicators suggests both sinistral and dextral shear sense in local ductile fault zones. (Percival and Girard, 1988; van Nostrand and Bradford, 2014). The rocks of the region have the potential to host gold, base metals and Platinum Group Elements. Mineralization consists primarily of disseminated to locally semi-massive pyrrhotite, bornite, arsenopyrite and chalcopyrite in strongly altered gossans and several zones have elevated gold and base metal contents. Host rocks include metasedimentary gneiss and associated silicate-facies iron formation lenses, tonalite gneiss, diatexite and mafic and ultramafic intrusions. Local, anomalous uranium and thorium occurs in some syn- to late tectonic granite to alkali feldspar granite pegmatite veins. Although the mineral potential of the region has been assessed previously through several exploration surveys many areas remain largely untested. The discovery of significant gold mineralization hosted in similar rocks in adjacent Quebec (Scheffor Project, Figure 1; Ivanov, 2012) and local elevated gold and PGE in mafic and ultramafic intrusions (Thomas and Butler, 1987; Leonard, 1997) would warrant further investigation of these rocks to assess their economic potential.

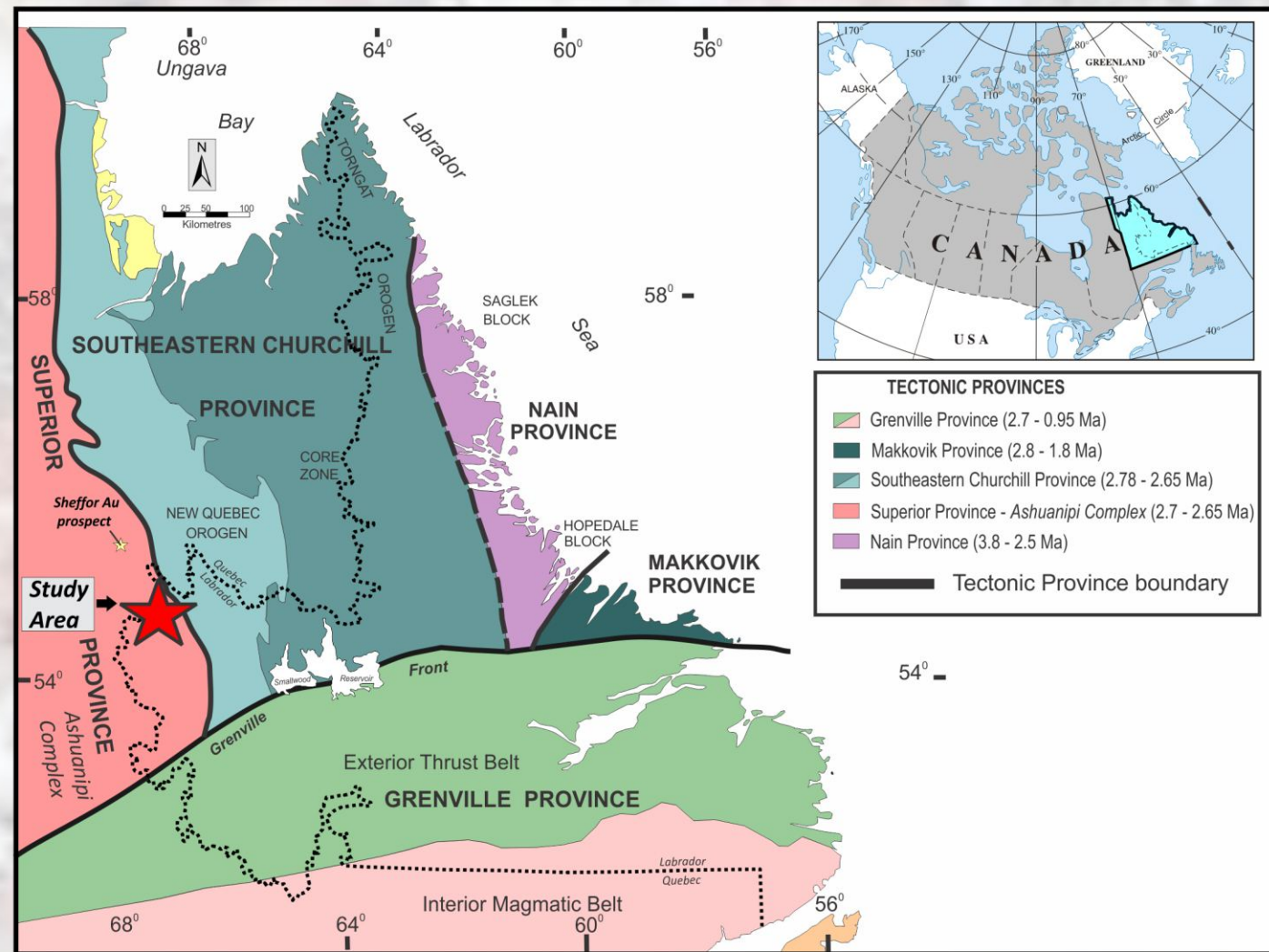


Figure 1: Map of the tectonic subdivision of Labrador and surrounding region. Location of study area in western Labrador (red star) and location of the Scheffor Gold Project in Quebec (yellow star) are shown. (Figure is modified from Wardle et al., 1997)



Garnet-rich layer in well-banded metasedimentary gneiss. The S<sub>1</sub> migmatitic fabric, visible as a thin layering at top left, is obscured by the heterogeneous texture of the rock. The coarse-grained, irregular leucocratic "patches" are remnants of deformed quartz-rich veins which in a few areas cut larger garnet aggregates and the vein segments preserve an oblique angle to the main fabric.



Grey-brown weathering, well-banded metasedimentary gneiss showing the S<sub>1</sub> migmatitic fabric wrapping around a coarse-grained, garnet-rich alkali feldspar granite boudin of a D<sub>1</sub> deformed vein. Scale card is 8 cm in length.



Fine-grained, grey-weathering, homogeneous, early (pre-D<sub>1</sub>) tonalite intruded by thin, tightly F<sub>2</sub> folded, granite veins and boudinaged and folded coarse-grained orthopyroxene-bearing pegmatite. Scale card is 8 cm in length.



Pre-D<sub>1</sub> tonalite exhibiting inhomogeneous deformation. The texture ranges from a migmatitic and banded S<sub>1</sub> fabric, with local, tight F<sub>2</sub> folding of some white-weathering leucosome layers (right center) to a weakly foliated texture which preserves inclusion-rich, anhedral orthopyroxene crystals, interpreted as oikocrysts (dark-grey weathering patches).



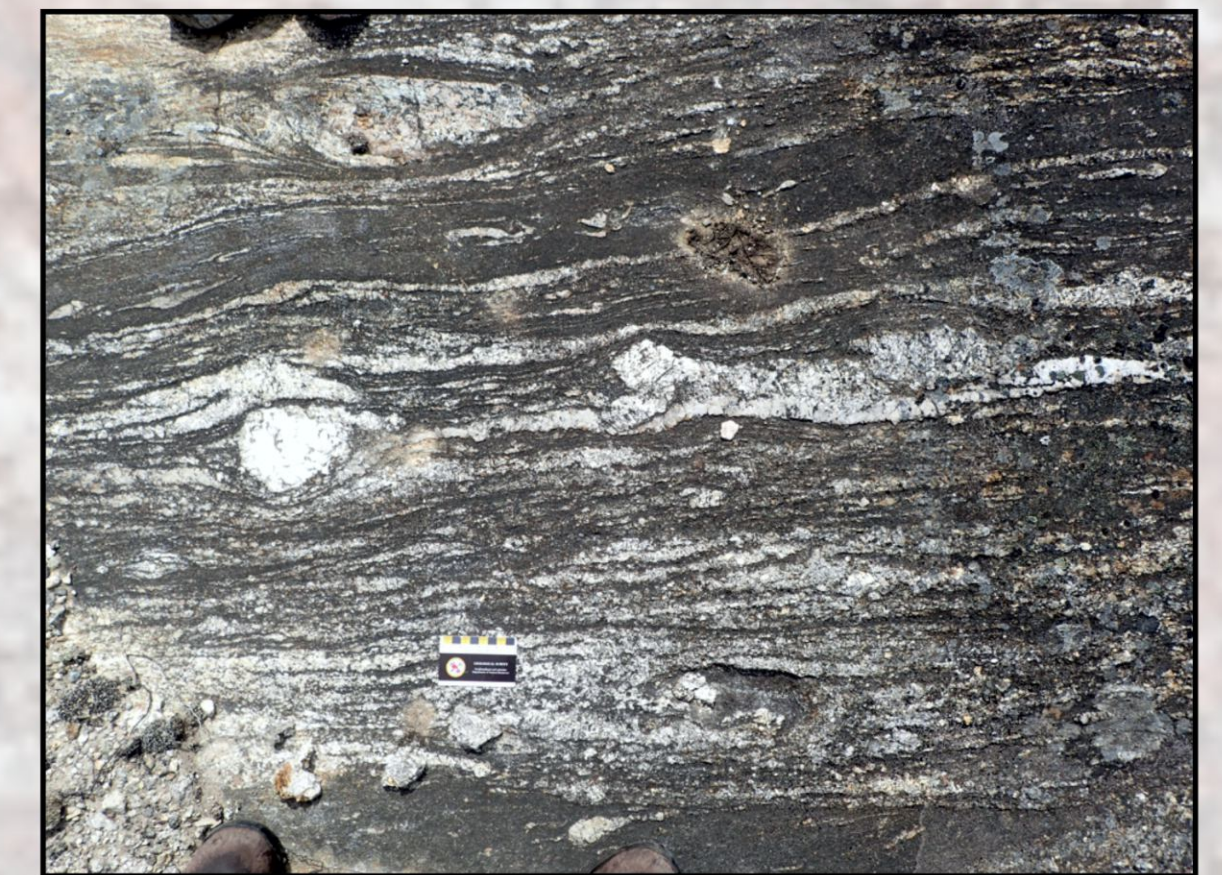
A large, inclusion-rich, anhedral garnet in which the rim is partially overgrown by a small, inclusion-free, subhedral garnet in a granodiorite diatexite. The relationship suggests an early and later phase of garnet growth in these rocks. Coin is 2.5 cm in diameter.



Well-banded metasedimentary gneiss enclave in garnet-dominant granodiorite diatexite. The slight warping of the S<sub>1</sub> migmatitic fabric around the large inclusion-rich garnet at top right suggests the diatexite (and garnet growth) formed pre- to syn-D<sub>1</sub> deformation.



Early (pre-D<sub>1</sub>) migmatitic tonalite gneiss intruded by boudinaged, fine-grained diorite to gabbro dyke and pre-D<sub>1</sub> granite veins. The deformed granite veins and folded boudin (at right) are interpreted as D<sub>2</sub> structures. The thin, dark-coloured rim surrounding the mafic boudins are later alteration haloes. Hammer is 35 cm in length.



Dark-weathering, foliated pyroxenite intruded by strongly deformed, coarse-grained alkali feldspar granite veins within a sinistral shear zone. The ultramafic rock is a part of a boudinaged sill intruding metasedimentary gneiss and the extensive veining and strong deformation are localized along the contact zone. Scale card is 8 cm in length.



Fold hinge in a metre-scale, limonitic-altered garnet+pyroxene-rich lens containing 5 to 25 % disseminated pyrrhotite and bornite and trace chalcopyrite. These rocks occur sporadically within metasedimentary gneiss in the study area and are interpreted as boudinaged silicate-facies iron formation layers. Several of these occurrences have elevated gold and base metal contents, and similar rocks in adjacent Quebec host significant gold prospects (Ivanov, 2012). Scale card at center is 8 cm in length.



Limonitic-altered, graphite-rich gossan zone hosted in migmatitic metasedimentary gneiss. The mineralization consists of 10 % disseminated to local, semi-massive pyrrhotite and bornite with trace arsenopyrite. The occurrence is coincident with a small, elliptical-shaped aeromagnetic high and suggests that in some cases, the mineralized zones in these rocks are coincident with anomalous magnetic signatures. Scale card is 8 cm in length.



Limonitic-altered gossan zone in a layered gabbro-ultramafic sill. The mineralization consists of semi-massive pyrrhotite and bornite and local disseminated arsenopyrite and chalcopyrite. The intrusion is exposed for approximately 100 metres along strike and the mineralized zones range from sporadic, 1-2 metre-long by 10s of cm-wide semi-massive lenses to irregular, 2-5 % disseminated sulphide zones up to 4 metres long. Leonard (1997) reported up to 2.25 g/L Au, 7 ppb Pt and 6 ppb Pd from a strongly altered zone from this occurrence. MODS Occurrence 23J/02/Au001. Hammer is 50 cm in length.

References:  
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