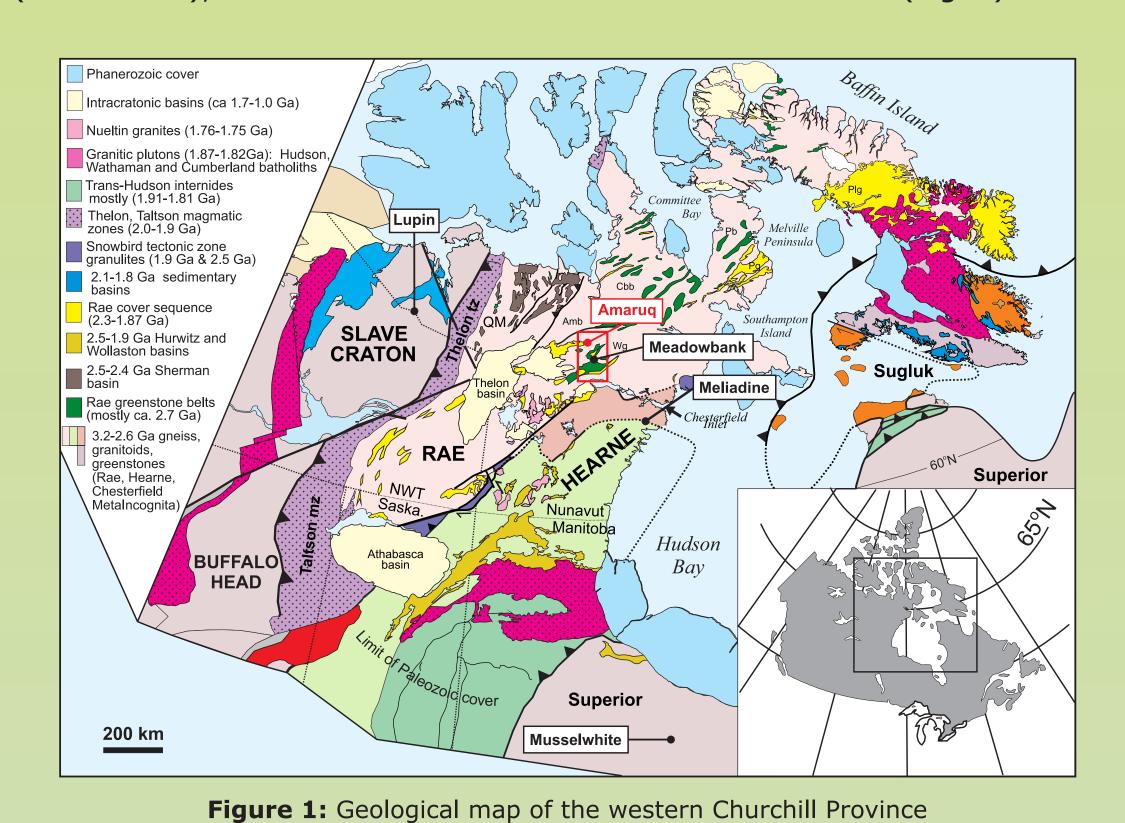
M. Valette¹, S. De Souza¹, P. Mercier-Langevin², O. Côté-Mantha³, M. Simard³, V. McNicoll⁴, and P. Barbe³

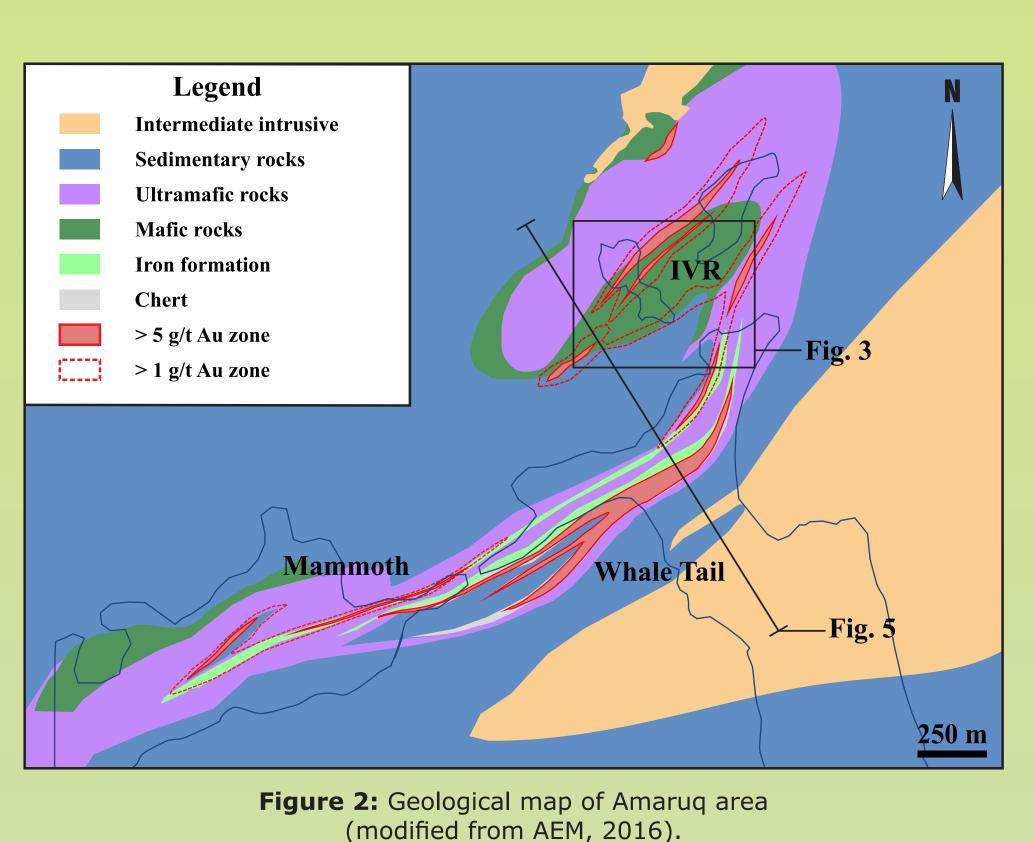
### INTRODUCTION

The Amaruq gold exploration project is owned by Agnico Eagle Mines Ltd. (total resources of 4.23 million ounces of gold at 4.59 g/t), and is located 50 kilometers NW of the Meadowbank mine and 120 kilometers NW of Baker Lake in Nunavut (Fig. 1). Preliminary observations indicate that mineralized zones are structurally controlled, and are hosted in complexly folded and faulted volcanic and sedimentary rocks, including chert and ironformation (Côté-Mantha et al., 2015). The principal objectives of the 2016 summer field season were to describe structural elements and their relationships with mineralization. The Amaruq area is underlain by the Archean supracrustal rocks of the Woodburn Lake group (ca. 2.71 Ga), within the Rae Domain of the Churchill Province (Fig. 1).



(modified from Pehrsson et al., 2013).

### I. LOCAL GEOLOGICAL SETTING



In the study area, the Woodburn Lake group comprises a 250 mthick horizon of mafic-ultramafic volcanic and intrusive rocks intercalated with chert and silicate-facies iron formations (Photo

Figure 3: Geological map of IVR zone (modified from AEM,

2015 and Hauseux, 2016).

1). This volcanosedimentary succession is bounded by plagioclase-

quartz-biotite-sericite greywacke (Photo 2). Two main gold zones

are present on the Amaruq property, i.e. the Whale Tail and IVR

zones (Fig. 2), and comprise different ore and alteration styles.

Photograph 1: Chert and silicate-facies iron-formation (IVR zone - AMQ16-566 drill

Photograph 2: Plagioclase-quartz-biotitesericite greywacke (IVR zone - AMQ16-846

## III. VEINS AND HYDROTHERMAL ALTERATION

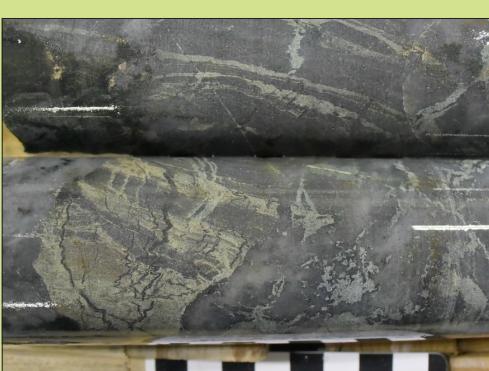
The Whale Tail zone is primarily characterized by stratabound (Photo 6) and discordant, disseminated to semi-massive pyrrhotitearsenopyrite-gold in silicate-facies iron formations, and by zones of « silica flooding » in chert layers (Photo 7). Gold is spatially associated with arsenopyrite and/or pyrrhotite (Photo 8).

The IVR zone outcrops 300 meters NE of the Whale Tail zone (Fig. 2), in an inferred fold hinge zone where three phases of deformation are documented. Although chert and iron formation replacements are present, the IVR zone is dominantly characterized by folded shallowdipping sulphide-poor quartz ± carbonate veins in mafic to ultramafic and sedimentary rocks that are affected by sericite, biotite and/or carbonate alterations (Photo 9). There are several sets of veins at IVR that contain visible gold, arsenopyrite, and/or traces of galena (Photos 10 and 11).

Preliminary structural analysis of IVR zone and drill hole sections indicates that auriferous recrystallized quartz ± carbonate veins are pre- to syn-D<sub>n</sub> (Photos 12 and 13) while the relative timing of emplacement of the other vein sets remains uncertain.



zone - AMQ16-566 drill hole).



lavers affected by «silica flooding» (Whale Tail zone - AMQ16-809 drill hole).

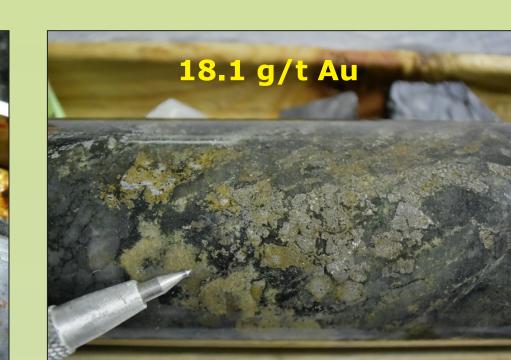




ultramafic rocks at contact with auriferous quartz veins (IVR zone -AMQ16-566 drill hole).



Photograph 10: Visible gold in Photograph 11: Greyish quartz vein recrystallized quartz vein hosted in ultramafic rocks (IVR zone - AMQ16-983 AMQ16-592 drill hole).



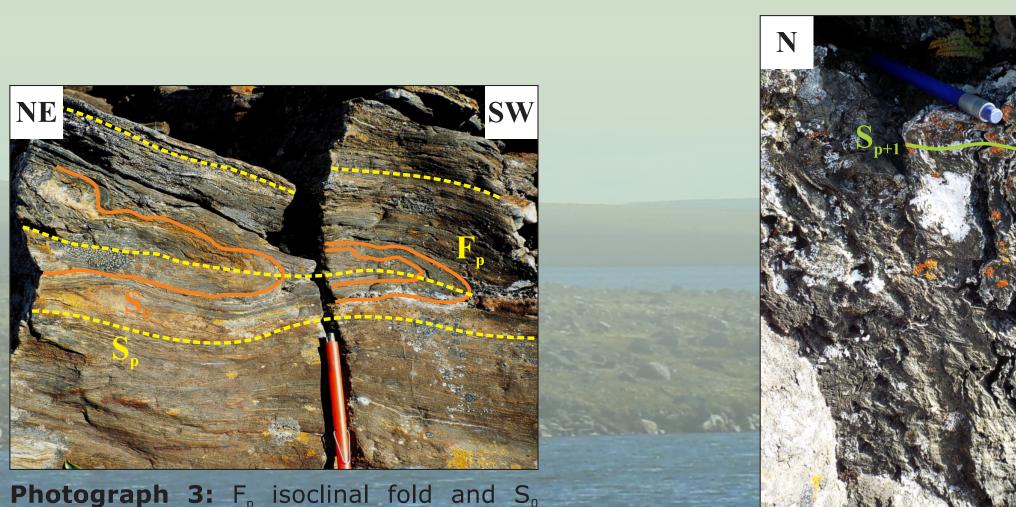
mineralized with arsenopyrite (IVR zone -

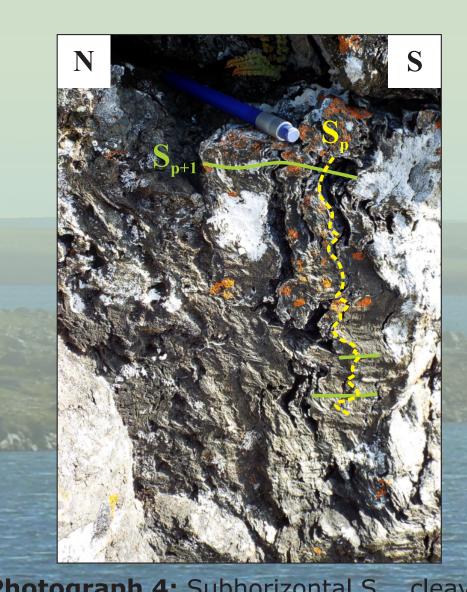
## II. STRUCTURAL GEOLOGY

The Woodburn Lake group was deformed and metamorphosed in the Archean, and during the Paleoproterozoic Trans-Hudson orogeny ca. 1.8 Ga (Pehrsson et al., 2013). At Amaruq, the mineralized zones are affected by at least three phases of Paleoproterozoic deformation, with peak metamorphic conditions at upper greenschist to lower amphibolite facies (Zaleski, 2005).

The main deformation (D<sub>D</sub>) is represented by a moderately to steeply SEdipping schistosity, by shallow-plunging (0-30°) tight to isoclinal folds (Photo 3), and by NW-verging thrust faults (Fig. 3). D<sub>o</sub> is affected by a subhorizontal crenulation cleavage associated to D<sub>p+1</sub> deformation (Photos 4 and 5), and by tight and recumbent folds plunging towards the NE or the SW (Fig. 4).

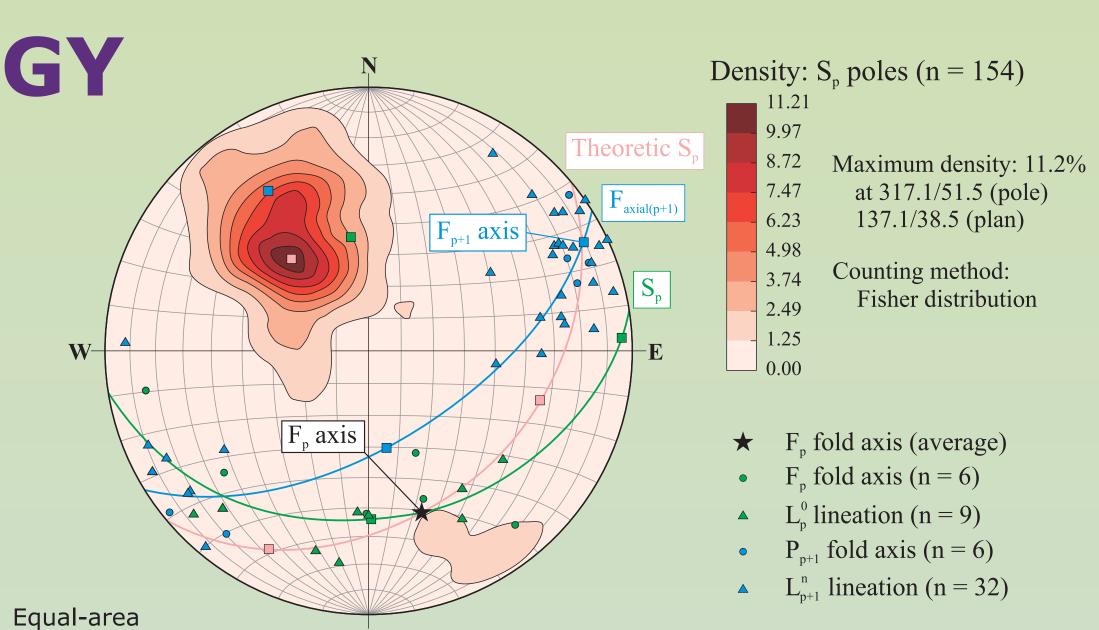
stratification affected by S<sub>p</sub> (location #1 on





Lower hemisphere

affecting S<sub>p</sub> schistosity (location #2 on Fig.



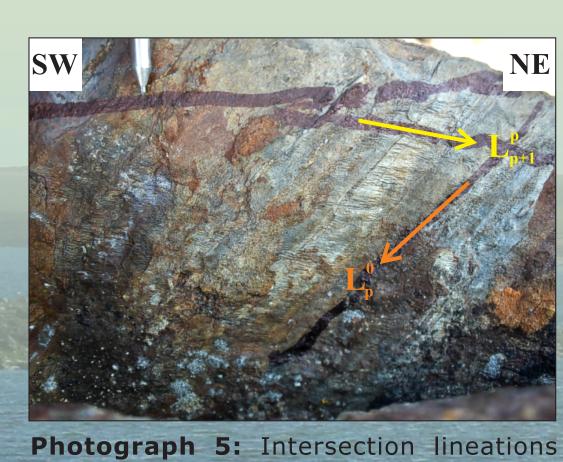
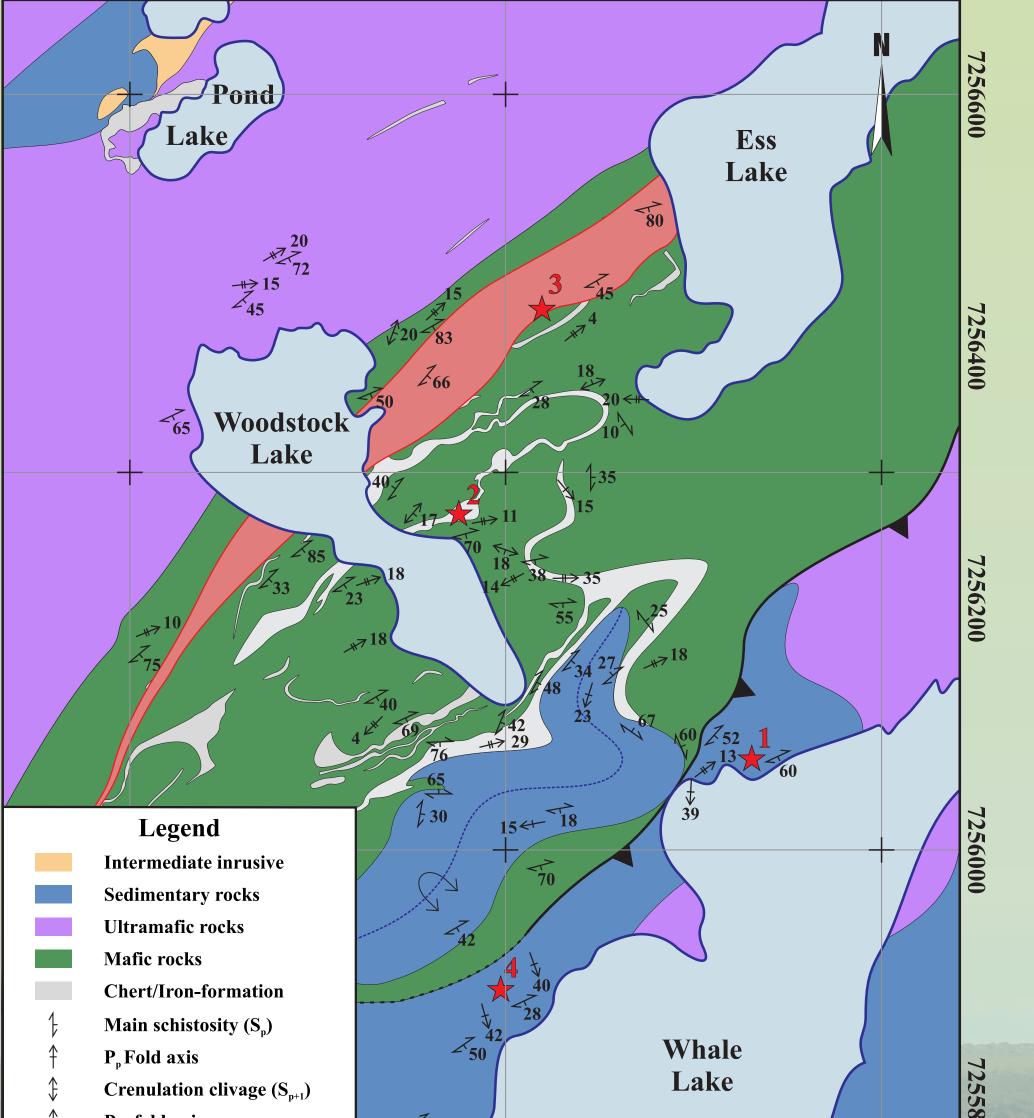
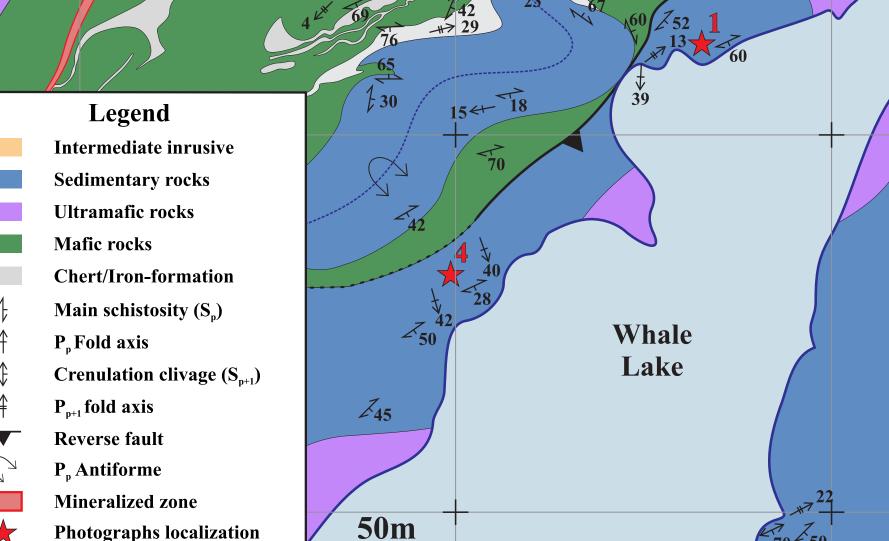


Figure 4: Stereographic plots for structural data.

between  $S_0/S_p$  and  $S_p/S_{p+1}$  (location #1 on





Photograph 13: Boudinaged quartz veins in S<sub>p</sub> indicate that they are pre- to syn-D<sub>p</sub> (location #4 on Fig. 3).

Photograph 12: Folded recrystallized

quartz veins sets indicate that they are pre-

to syn- $D_{p}$  (location #3 on Fig. 3).

# DISCUSSION AND CONCLUSION

The Amaruq property comprises major auriferous zones that are clearly distinct in style from other known gold occurrences in the region. Preliminary results indicate that the Amaruq gold system exhibits contrasting ore styles with dominantly stratabound, replacement-style ore zones in the Whale Tail zone and dominantly discordant veins in the IVR zone. Crosscutting relationships indicate that recrystallized quartz ± carbonate veins are pre- to syn-D, while the relative timing of other vein sets are still under investigation and any genetic relationship with gold is under study. Mafic-ultramafic and chemical sedimentary rocks, together with the presence of arsenopyrite and D<sub>D</sub> structures (folds and thrusts), appear to be critical at Amaruq (Fig. 5). Ongoing research at Amaruq aims at better understanding the key ore-forming processes active in the area, and at defining their diagnostic characteristics, to help vector towards favourable environments for gold mineralization in the Churchill Province and other Archean terranes.

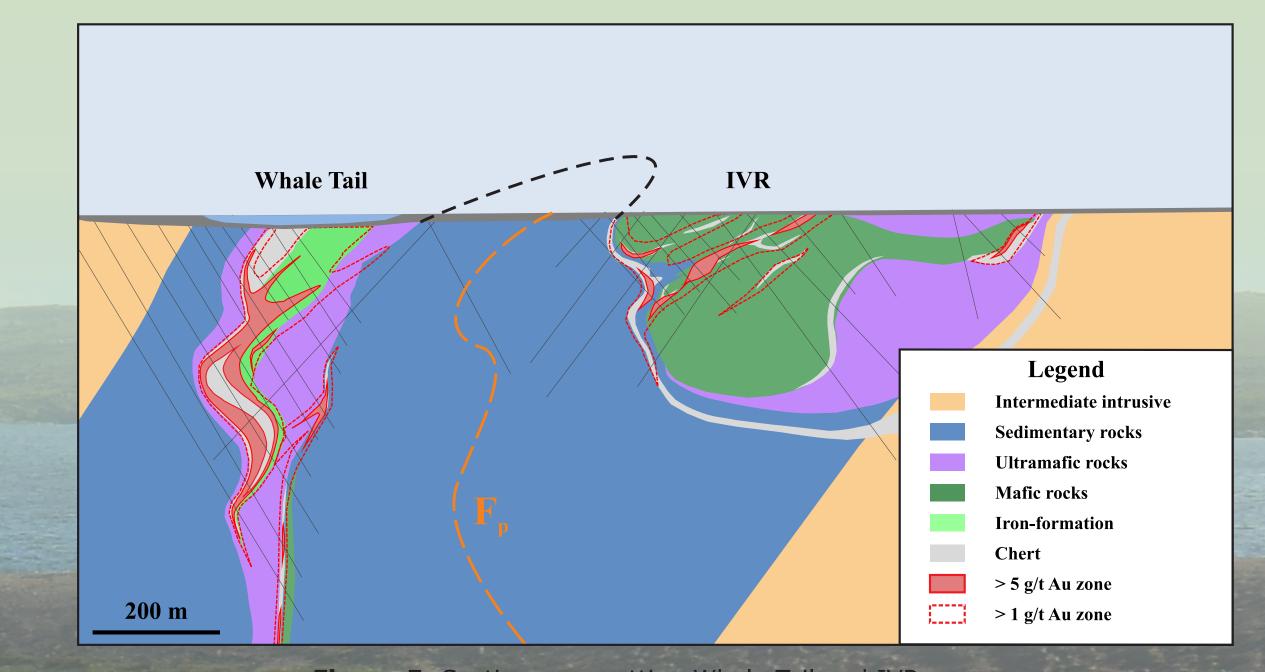


Figure 5: Section crosscutting Whale Tail and IVR zones (location on Fig. 2; modified from AEM, 2016)

Presented at the Prospectors and Developers Association of Canada–Society of Economic Geologists

## Agnico Eagle Mines Ltd. (2015 and 2016). Internal reports

The Ph.D thesis research is done at the University of Quebec at Montreal as part of the Targeted Geoscience Initiative 5 (Gold project) of Natural Resources Canada. We thank Agnico Eagle Mines Ltd. for access to the property, to drill cores and various databases, and for accommodation during fieldwork. The staff of the AEM exploration division are acknowledged for their time, full operational and scientific support and interest in this project. Thanks to Mitacs for

**ACKNOWLEDGEMENTS** 

Côté-Mantha, O., Gosselin, G., Vaillancourt, D. and Blackburn, A. (2015). Amaruq: A ne gold discovery in Nunavut, Canada. NewGenGold, p.41-46

REFERENCES

atural Resources Ressources naturelles

its financial support.

This publication is available for free download through GEOSCAN (http://geoscan.nrcan.gc.ca/).