# GEOLOGY OF THE BANDED IRON FORMATION-HOSTED GOLD DEPOSIT, CHURCHILL PROVINCE, NUNAVUT.

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0.00 to 0.38 7.15

0.38 to 0.89 14.33

0.89 to 1.42 14.33 1.42 to 1.92 14.33

epresenting the aboundance of electlean and Barrett, 1993) in Na2O and K2O in absolute weigh

ment X versus gold content of percent for the section 6175.

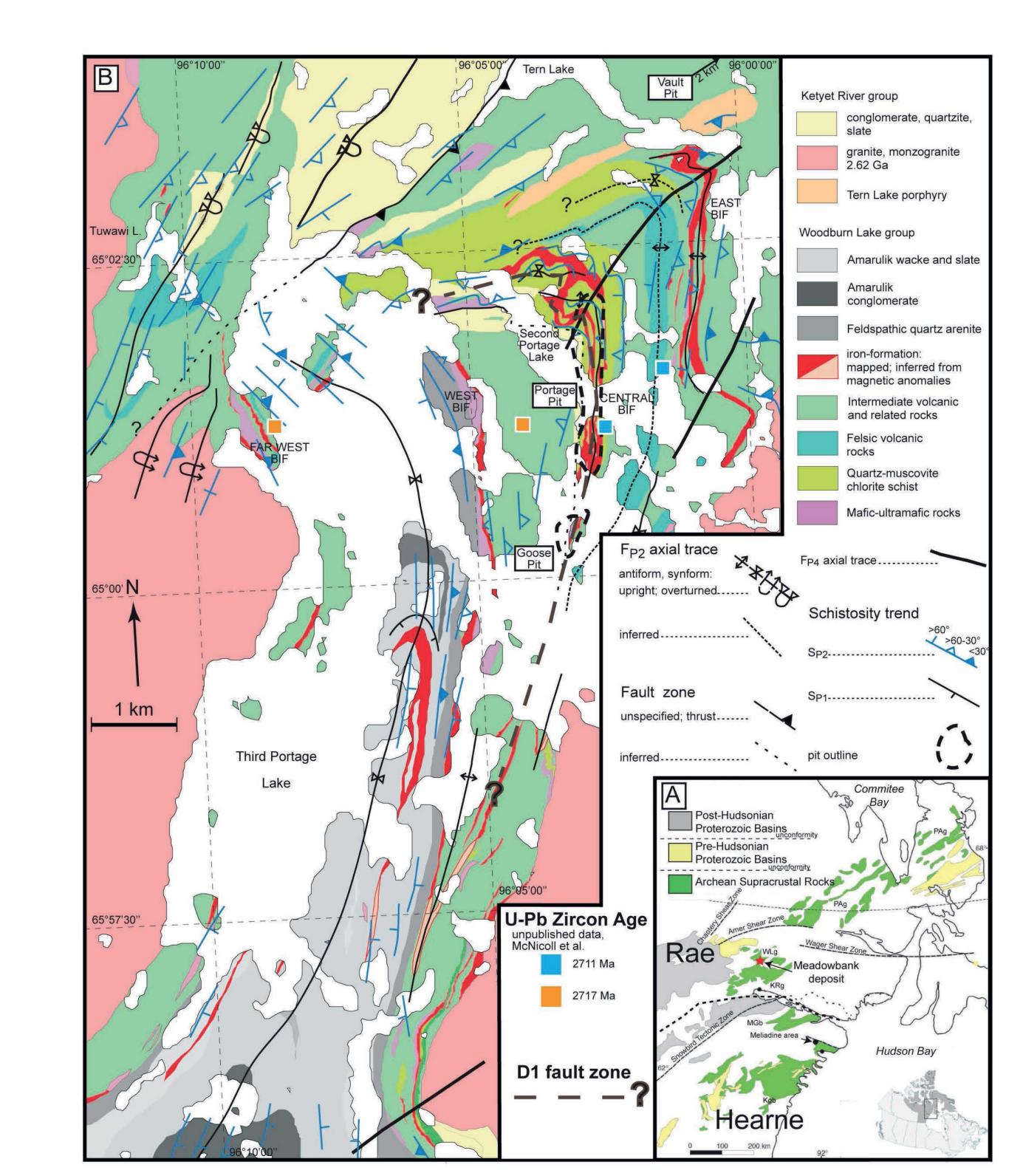
1.92 to 5.41 14.33



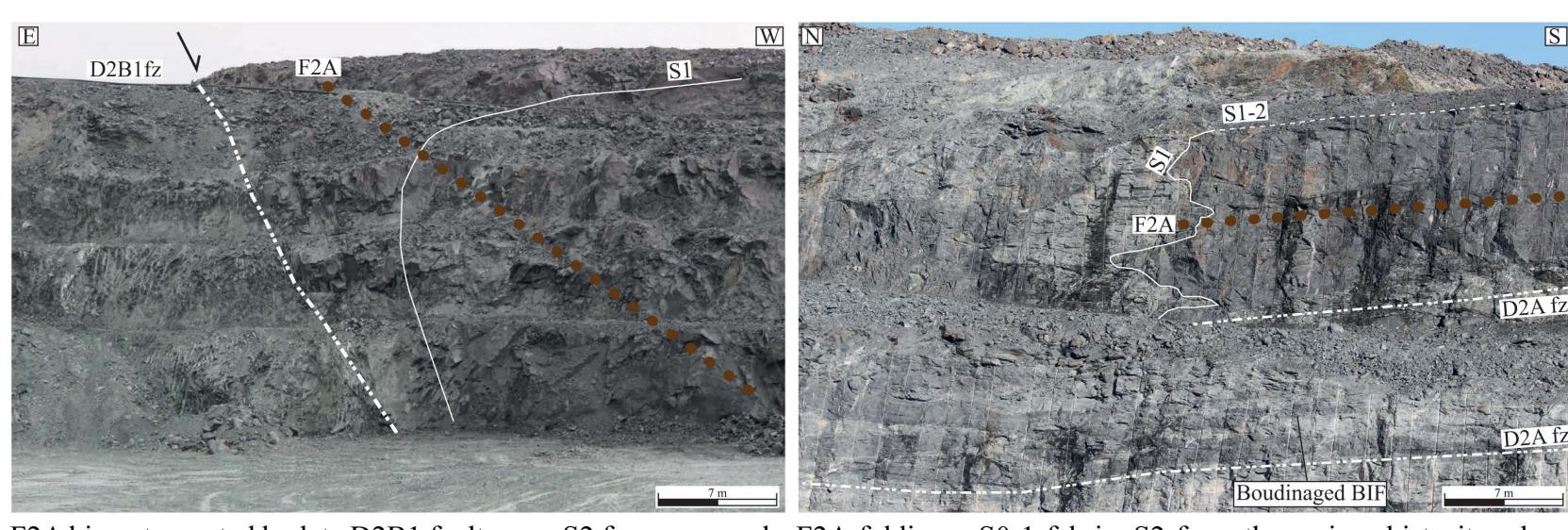


## 1 - GEOLOGICAL SETTING

The Meadowbank gold deposit is hosted in banded iron formations (BIF) of the ca. 2711-2710 Ma Pipedream-Third Portage volcanic sequence of the Woodburn Lake Group. This sequence comprises several similar BIFs of which only one contains economical gold mineralization (Central BIF). Host rocks consist of greenschist to amphibolite grade intermediate to felsic volcaniclastic rocks, mafic and ultramafic rocks, quartzite and BIFs.

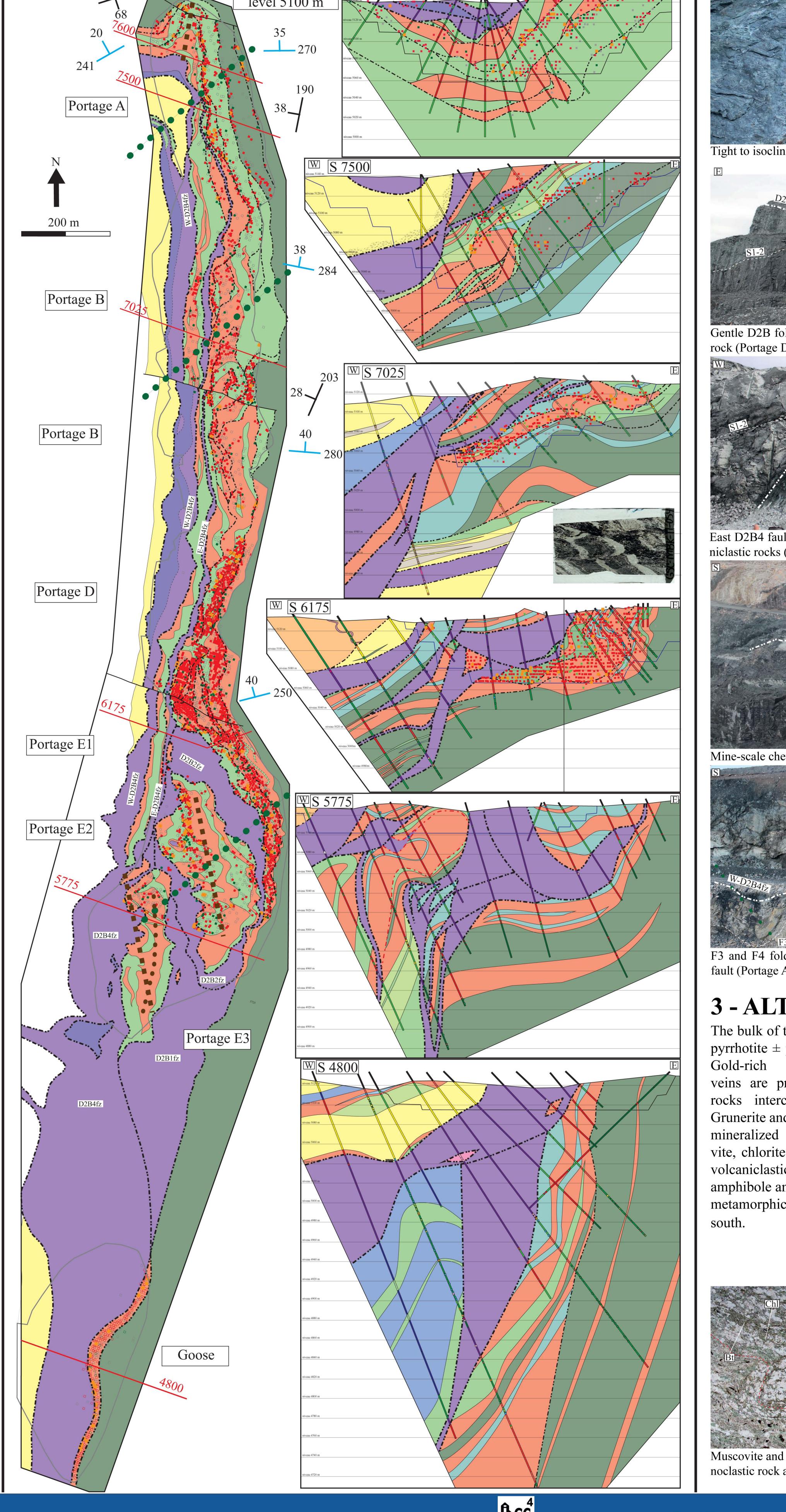


Apart of cryptic and strongly overprinted Archean tectonism, four phases of Proterozoic deformation have been isoclinal F1 folds and S1 schistosity overprinted by 2) south-trending isoclinal F2A folds and associated D2A fault zones. Late D2B deformation consists of a late D2B1 and D2B2 fault zones, north-trending gentle F2B3 folds and late D2B4 fault zone, 3) open to closed SW-plunging F3 folds, and 4) south-verging shallowlyinclined, open to tight, chevron-style F4 folds. Crosscutting relationships suggest that the gold was probably introduced along D1 structures and was strongly remobilized during D2A deformation, especially along sheared contacts and F2A fold limbs.

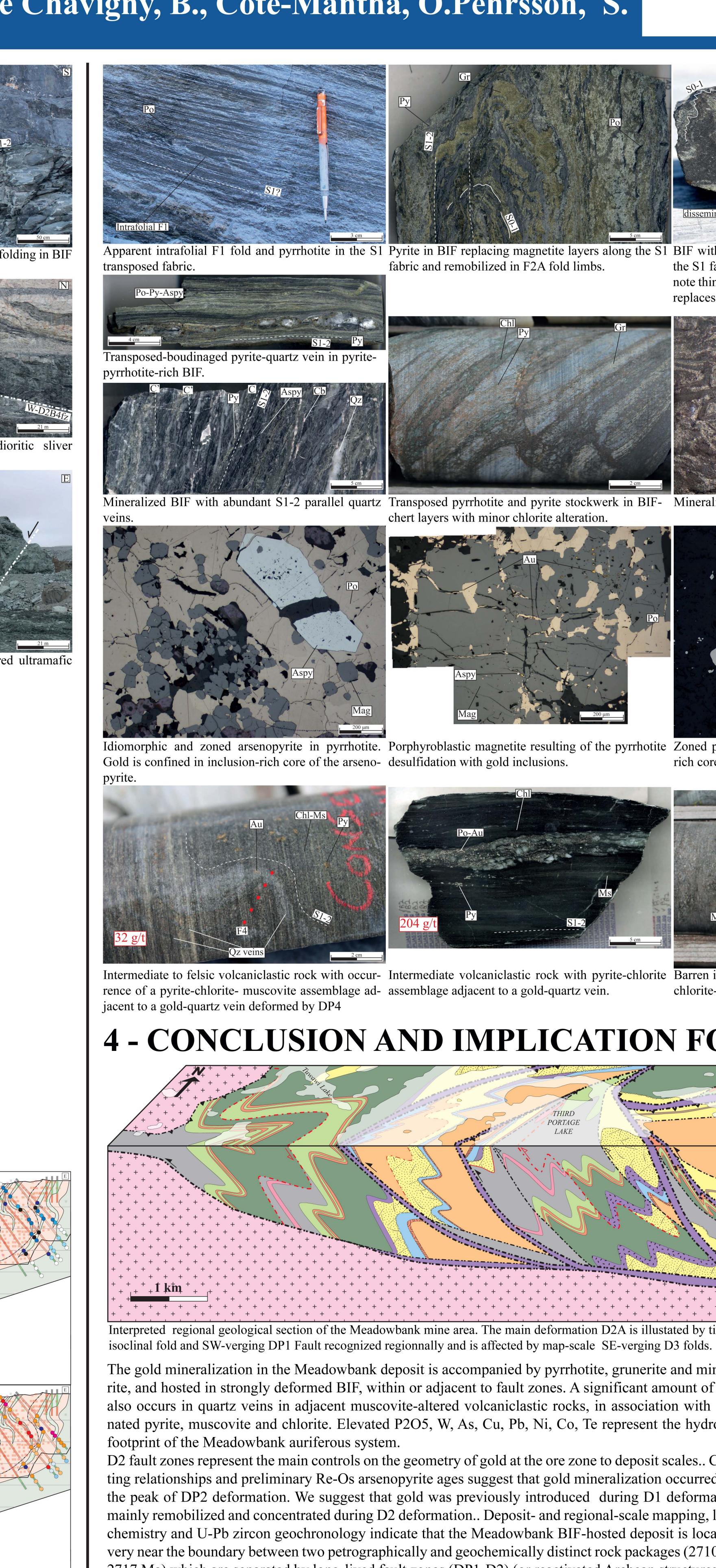


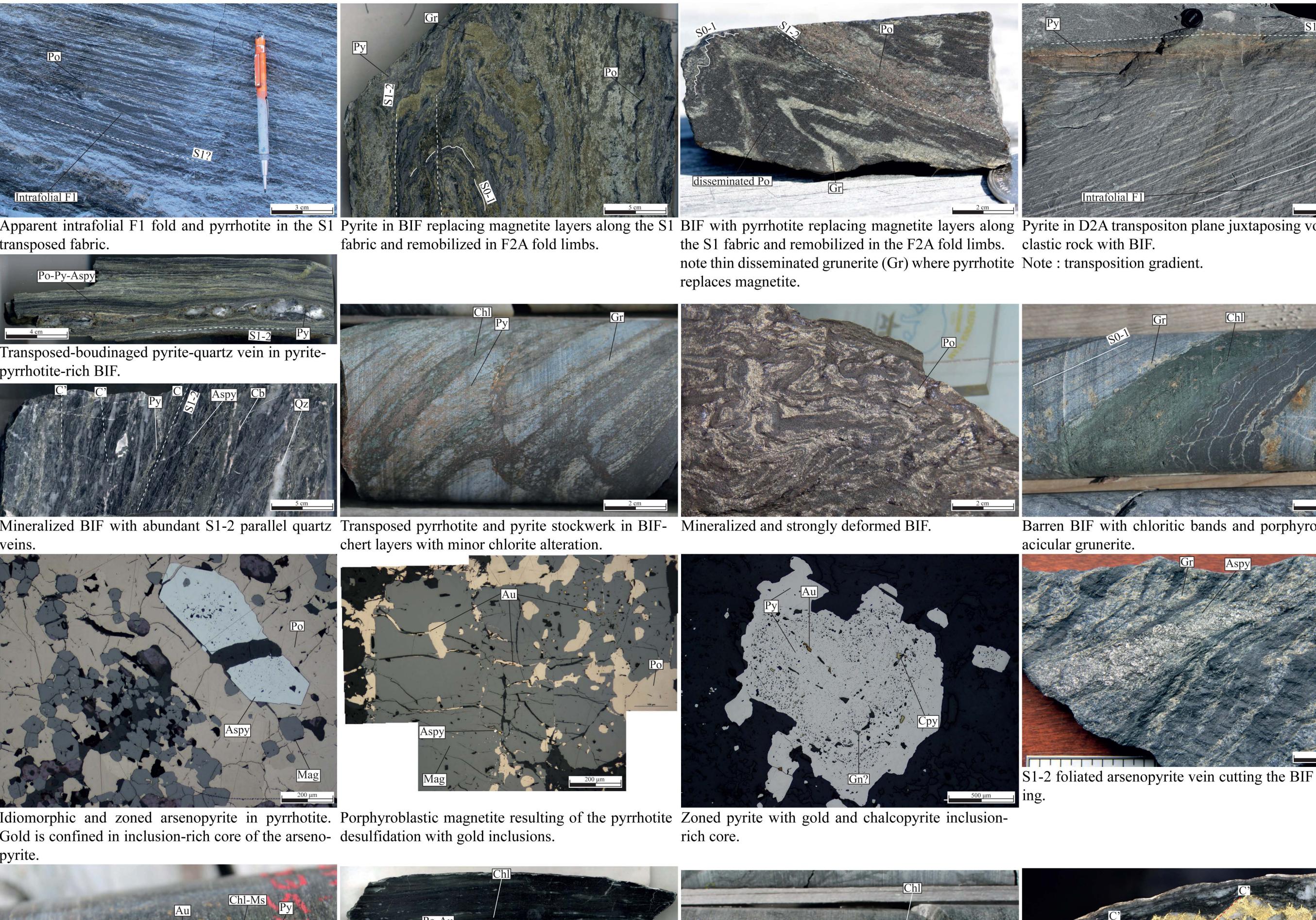
cleavage where the intensity of D2 deformation is less import he intensity of D2 deformation is strong. BIF layers are boudinaged in the vicinity of the D2A fault zone (Portage C).

### **GEOLOGICAL STRUCTURES GEOLOGICAL UNITS (mine nomenclature)** 1a - Intermediate volcaniclastic rock Undifferentiated i. volcaniclastic rock (V9i) — Inferred geological contact 1b - Intermediate volcaniclastic rock (V9i) ----- Inferred D1 fault 1c - Intermediate volcaniclastic rock (V9i) ----- D2A fault zone ---- D2B fault zone 2a - Intermediate-felsic volcaniclastic rock / Undifferentiated i.-f .volcaniclastic rock (V9a) • • • • • • F2A axial plane 2b - Intermediate-felsic volcaniclastic rock (V9a) F2B3 axial plane 2c - Intermediate-felsic volcaniclastic rock (V9a) • • • • F3 axial plane 3 - Felsic volcaniclastic rock (V9a) • • • • F4 axial plane Iron Formation (IF) 4 - Mafic volcanic rocks (V3) 5a-5b-5c-5d - Ultramafic mylonite volcanic rocks (V4a)

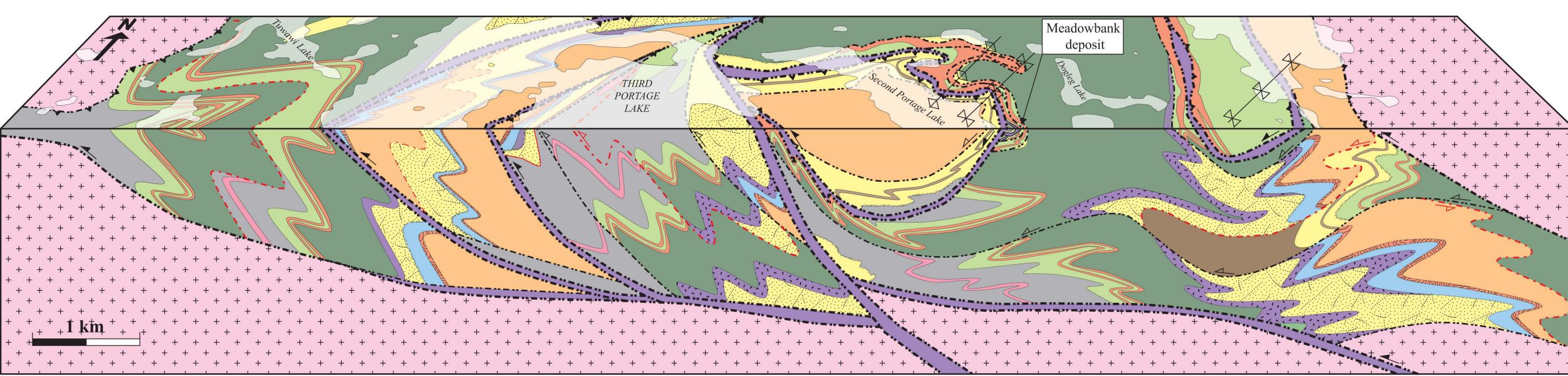








## 4 - CONCLUSION AND IMPLICATION FOR EXPLORATION



Interpreted regional geological section of the Meadowbank mine area. The main deformation D2A is illustated by tigh folds associated with NW-verging D2A fault zone. The D2A deformation affected previous DP

The gold mineralization in the Meadowbank deposit is accompanied by pyrrhotite, grunerite and minor chlo- GEOLOGICAL ASSEMBLAGE rite, and hosted in strongly deformed BIF, within or adjacent to fault zones. A significant amount of the gold Ketyet river Group also occurs in quartz veins in adjacent muscovite-altered volcaniclastic rocks, in association with dissemiand basal conglomerate (quartzite pebbles) nated pyrite, muscovite and chlorite. Elevated P2O5, W, As, Cu, Pb, Ni, Co, Te represent the hydrothermal

D2 fault zones represent the main controls on the geometry of gold at the ore zone to deposit scales.. Crosscutting relationships and preliminary Re-Os arsenopyrite ages suggest that gold mineralization occurred prior to Banded chert-magnetite iron formation the peak of DP2 deformation. We suggest that gold was previously introduced during D1 deformation and Homogenous intermediate tuff mainly remobilized and concentrated during D2 deformation.. Deposit- and regional-scale mapping, lithogeo- Quartzite - Arenite chemistry and U-Pb zircon geochronology indicate that the Meadowbank BIF-hosted deposit is located at or Ultramafic rock very near the boundary between two petrographically and geochemically distinct rock packages (2710 Ma and Research Homogenous to laminated tuff 2717 Ma) which are separated by long-lived fault zones (DP1-D2) (or reactivated Archean structures?). Such Zaminated chert-magnetite-volcanite iron formation an interpretation may explain why gold is confined to the central BIF. Identifying and following such early Bande-laminated lapillis-cristal tuff structures may constitute regional exploration vectors. Research results presented herein suggest that some of STRUCTURE the gold mineralization processes are older than previously thought, which may have implications for exploration strategies in Archean sequences affected by younger Proterozoic deformation.

**STRATIGRAPHY** Amarulik wacke and slate with iron formation by sheared ultrmafic rock  $\rightarrow \rightarrow F3$  axial antiform ----- NW-verging D2A fault zone <del>∑</del> F3 axial synform ----- NW-verging D2B fault zone

affected by the SP4 crenulation cleavage.



Quartzite (S)

6 - Mafic volcanic rock in quartzite

7 - Intermediate volcanic rock in quartzite

Intermediate-felsic laminated volcaniclastic rock

**GOLD VALUES** 

 $\Box$  0.5 - 1 g/t  $\Box$  2 - 10 g/t

 $\Box$  1 - 2 g/t  $\Box$  >10 g/t

felsic rock samples showing the gains and