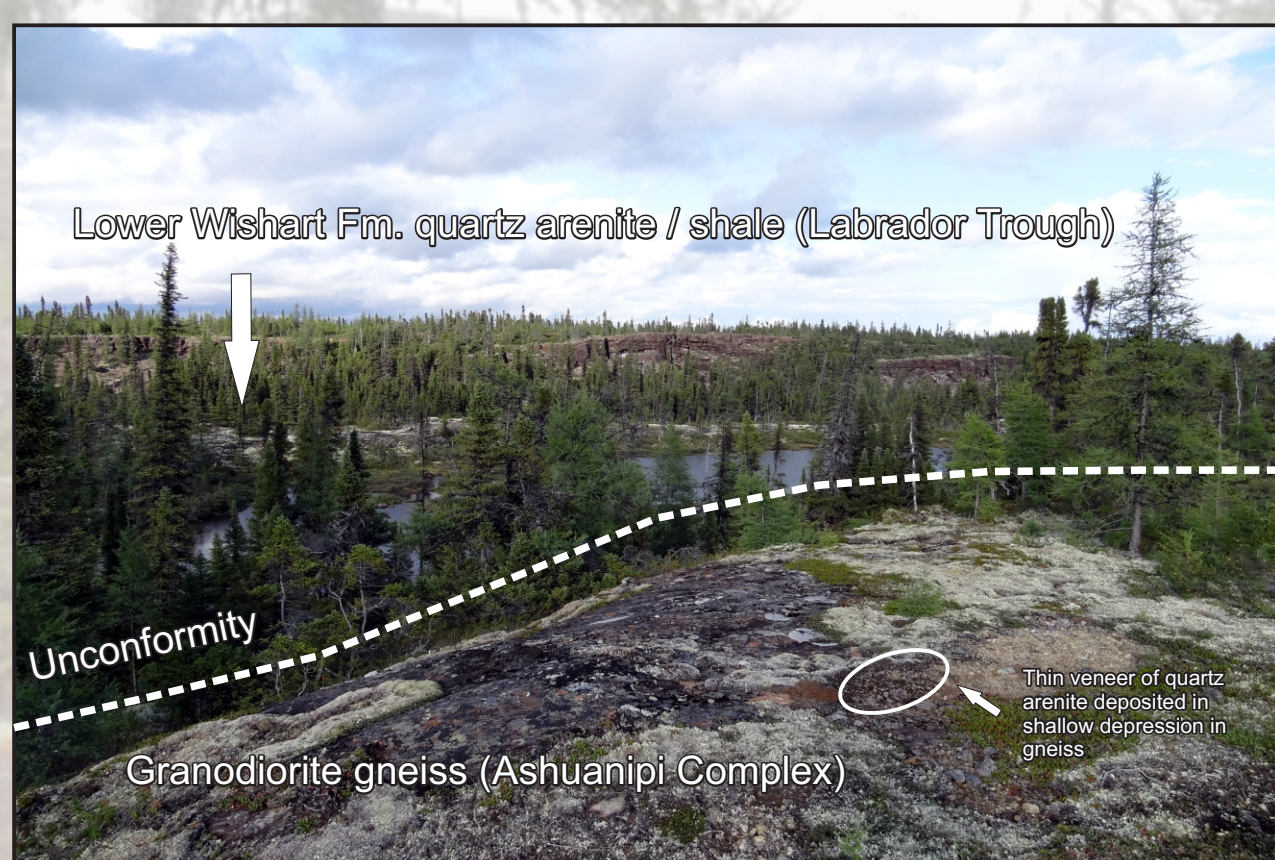


# GEOLOGY OF THE ARCHEAN ASHUANIPI COMPLEX, SUPERIOR PROVINCE, NORTHWESTERN LABRADOR

Tim van Nostrand

The Ashuanipi Complex of the Archean Superior Province in northwestern Labrador is dominated by granulite facies migmatitic paragneiss, granitic orthogneiss, variably deformed granite, granodiorite and tonalite diatexite and subordinate gabbroic and pyroxenitic rocks. Garnet-pyroxene-leucosome assemblages in many rock types indicate granulite facies conditions were attained during D1 deformation, however, some pyroxene-bearing assemblages are interpreted as relict igneous phases with evidence of a subsequent metamorphic overprint. Archean structures in the region are dominated by a west-northwest-striking  $S_1$  regional trend and west-northwest-plunging, tight to isoclinal minor  $F_2$  folds. Kinematic indicators associated with major southwest-striking fault zones suggest a dominant dextral sense of strike-slip movement along these structures.

The region has gold and base metal potential associated with bornite, pyrrhotite, arsenopyrite and chalcopyrite mineralization hosted in pyritic ( $\pm$  graphitic) gossan zones in gneissic units and pyroxenite and gabbro lenses. In addition, local galena and molybdenite occur in late, undeformed quartz + carbonate veins cutting gneissic rocks of the Ashuanipi complex immediately below the unconformity with Mesoproterozoic sedimentary rocks of the Labrador Trough. Local, elevated total count radioactive signatures are recorded from several late, coarse-grained, pegmatitic alkali feldspar-rich veins and small intrusions which post-date the majority of rocks in the area and suggests possible potential for uranium mineralization.



Unconformity of granodiorite gneiss of the Ashuanipi Complex in the foreground, with overlying quartz arenite and shale of the Lower Wishart Formation in the background. West of the unconformity, thin veneers of quartz arenite and conglomerate occur locally in shallow depressions within the underlying gneiss.



Localized shearing of anastomosing quartz veins in strongly deformed garnet-orthopyroxene granodiorite gneiss. Displacement of quartz veins and shallow-plunging stretching lineations indicate dextral slip movement along a major strike-slip fault within the map area.



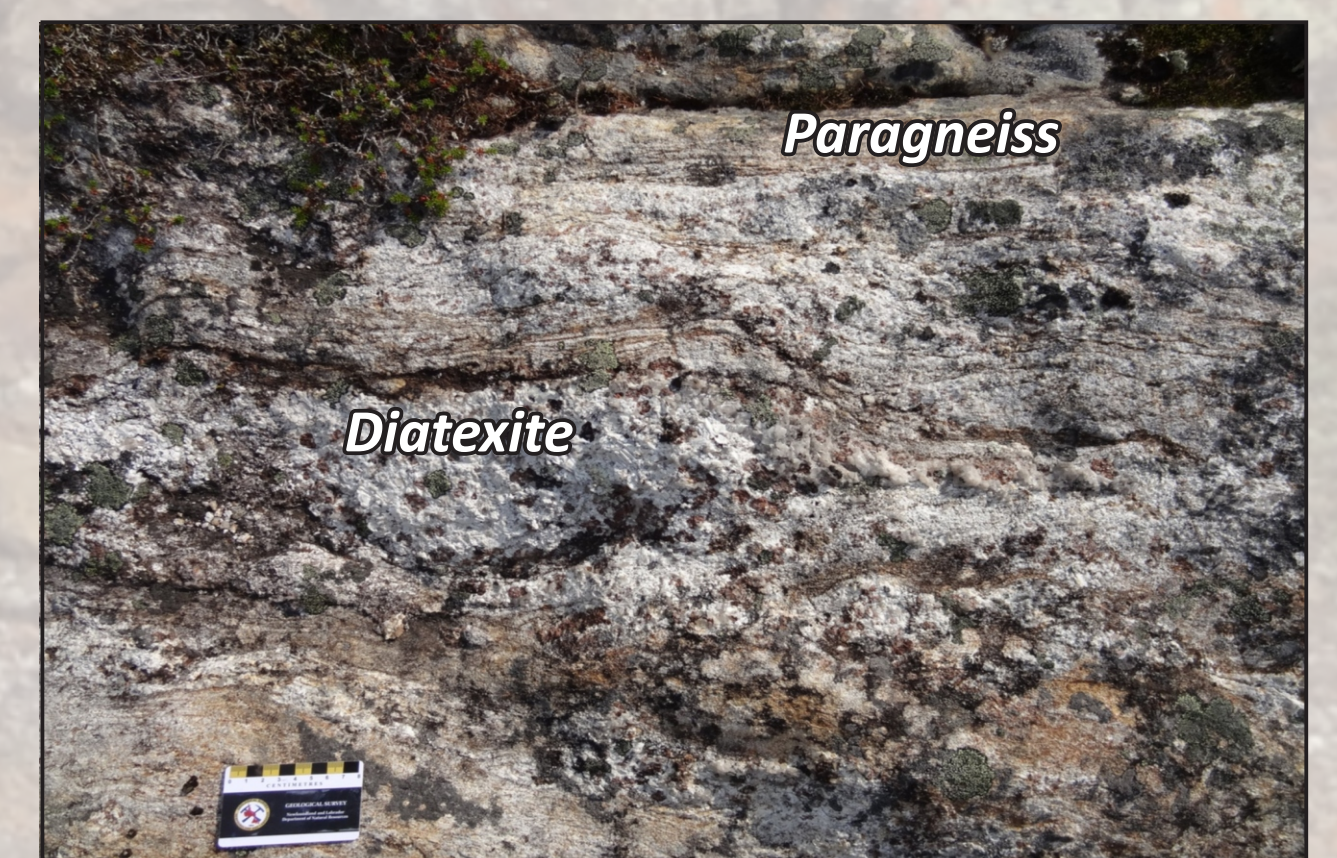
Limeonite-altered, graphite-pyrite-bearing gossan zone in well-banded migmatitic orthopyroxene-garnet paragneiss. The gossan is one of numerous sulphide-bearing alteration zones in gneissic rocks, some of which are reported to contain elevated gold, arsenic, copper and silver values. The mineralization includes disseminations and thin stringers of bornite and pyrrhotite, with minor, local arsenopyrite and chalcopyrite grains.



Limeonite-altered gossan zone in strongly deformed, layered gabbro lens associated with a pyroxenite intrusion (exposed in background). The gossan zone hosts disseminated bornite, pyrrhotite and chalcopyrite in the dark-weathering core and local, scattered grains throughout the outer altered areas. These mafic-ultramafic rocks occur as composite layers (probable sills?) intercalated with gneissic rocks in several areas throughout the map area and may have potential for hosting gold and platinum group elements.



Quartz + quartz arenite conglomerate lens marking the unconformity of orthopyroxene-garnet granodiorite gneiss of the Archean Ashuanipi Complex and overlying quartz arenite of the Proterozoic Wishart Formation (small grey-colored pebble fragments among larger quartz cobbles.)



Characteristic migmatitic texture defined by well banded, fine-, to medium-grained, orthopyroxene-garnet-bearing paragneiss and associated coarse-grained, massive, garnet-rich diatexite. The diatexite is interpreted as having formed by high degrees of partial melting of pre-existing gneissic rocks.



Migmatitic  $S_1$  layering in granodiorite gneiss defined by thin granitic leucosome (diffuse margins) and concordant syenogranite veins (sharp margins) alternating with orthopyroxene-garnet-biotite-rich melanosome. Note dextral displacement of migmatitic layering along two cross-cutting shear zones containing late stage coarse alkali feldspar granite.



Galena crystals in quartz + carbonate vein cutting migmatitic paragneiss of the Ashuanipi Complex. The occurrence consists of two sets of late veins containing 1-3% coarse galena crystals and fine-grained disseminations. The veins are located immediately below the unconformity with arenite and conglomerate of the Mesoproterozoic Wishart Formation of the Labrador Trough.