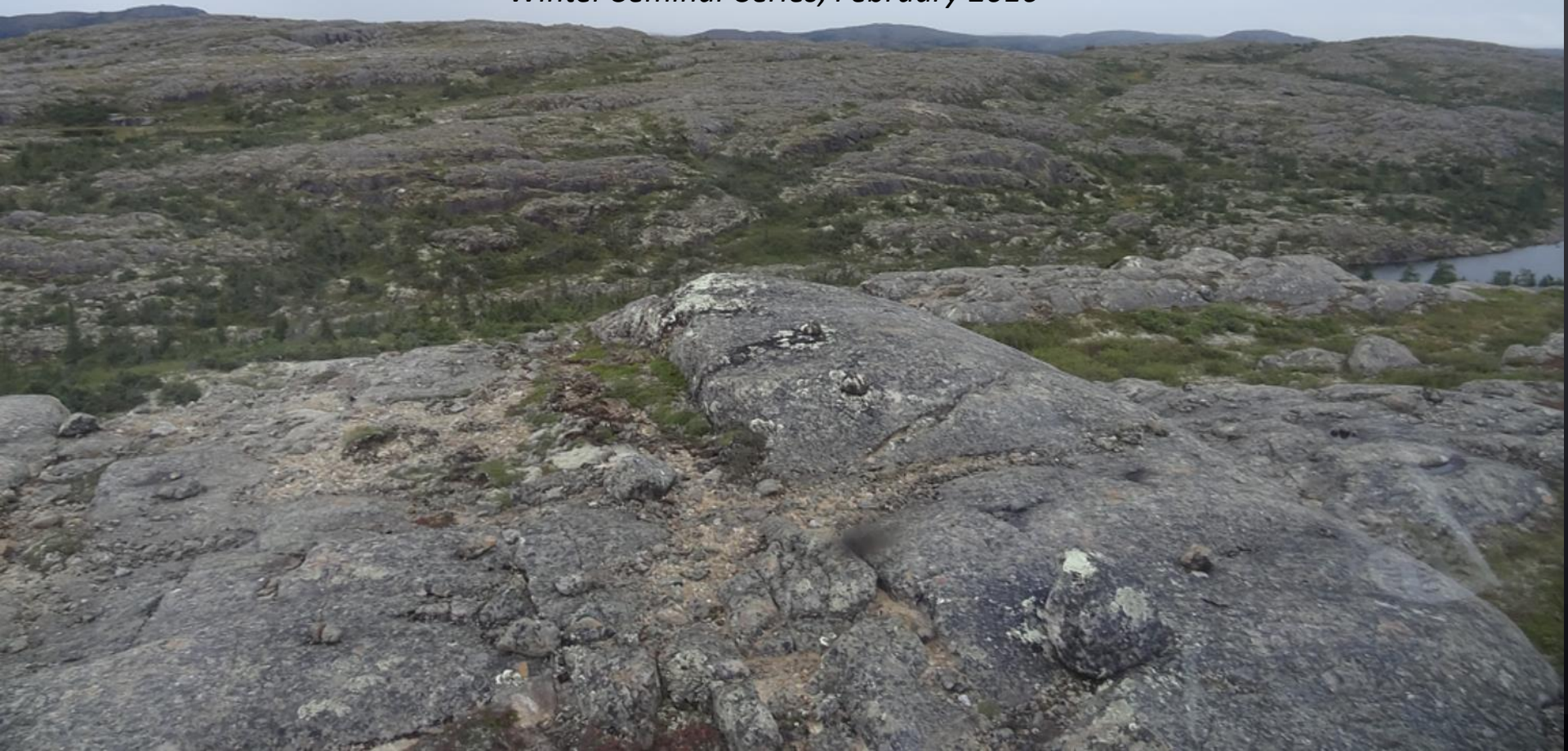


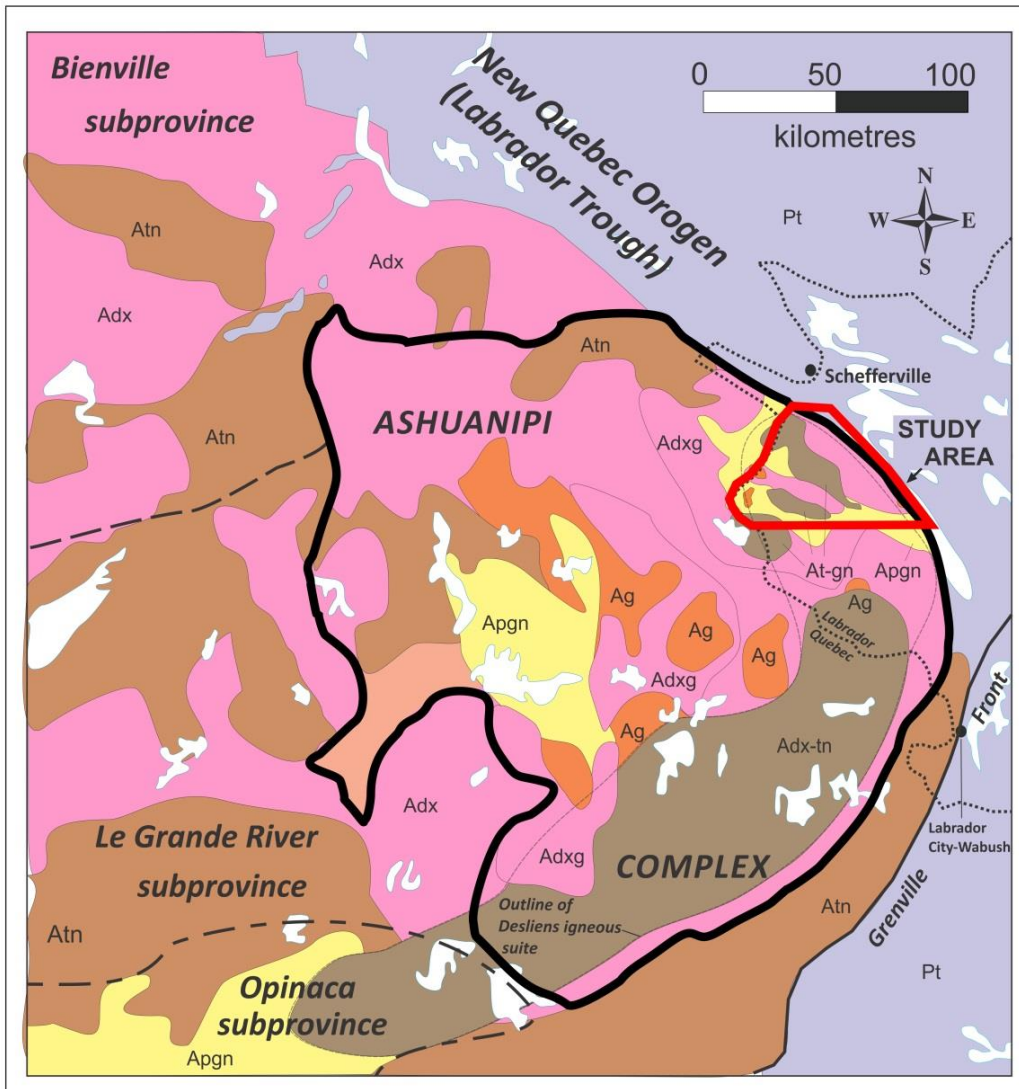
Migmatites and associated rocks of the Archean Ashuanipi Complex, western Labrador



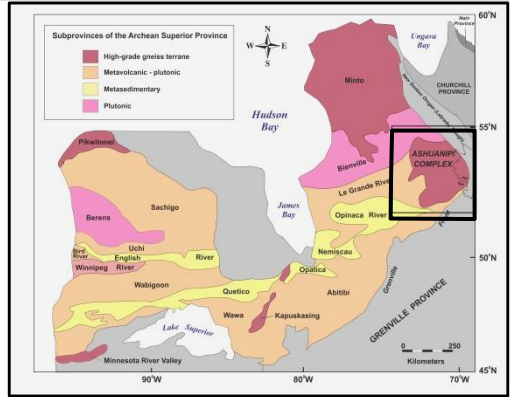
*T. Van Nostrand, NL Geological Survey
Winter Seminar Series, February 2016*



- Overview of the Ashuanipi Complex
- Geology of study area, western Labrador
- Migmatites
 - Classification
 - Textures
 - Relationships
 - Lithogeochemistry
- Summary



Modified after Wheeler et al. (1996)



Proterozoic

Pt Undivided supracrustal rocks of the New Quebec Orogen (Labrador Trough)

Archean (3.1-2.65 Ga)

Ag Undivided granitoid intrusions

Adx Undifferentiated diatexite

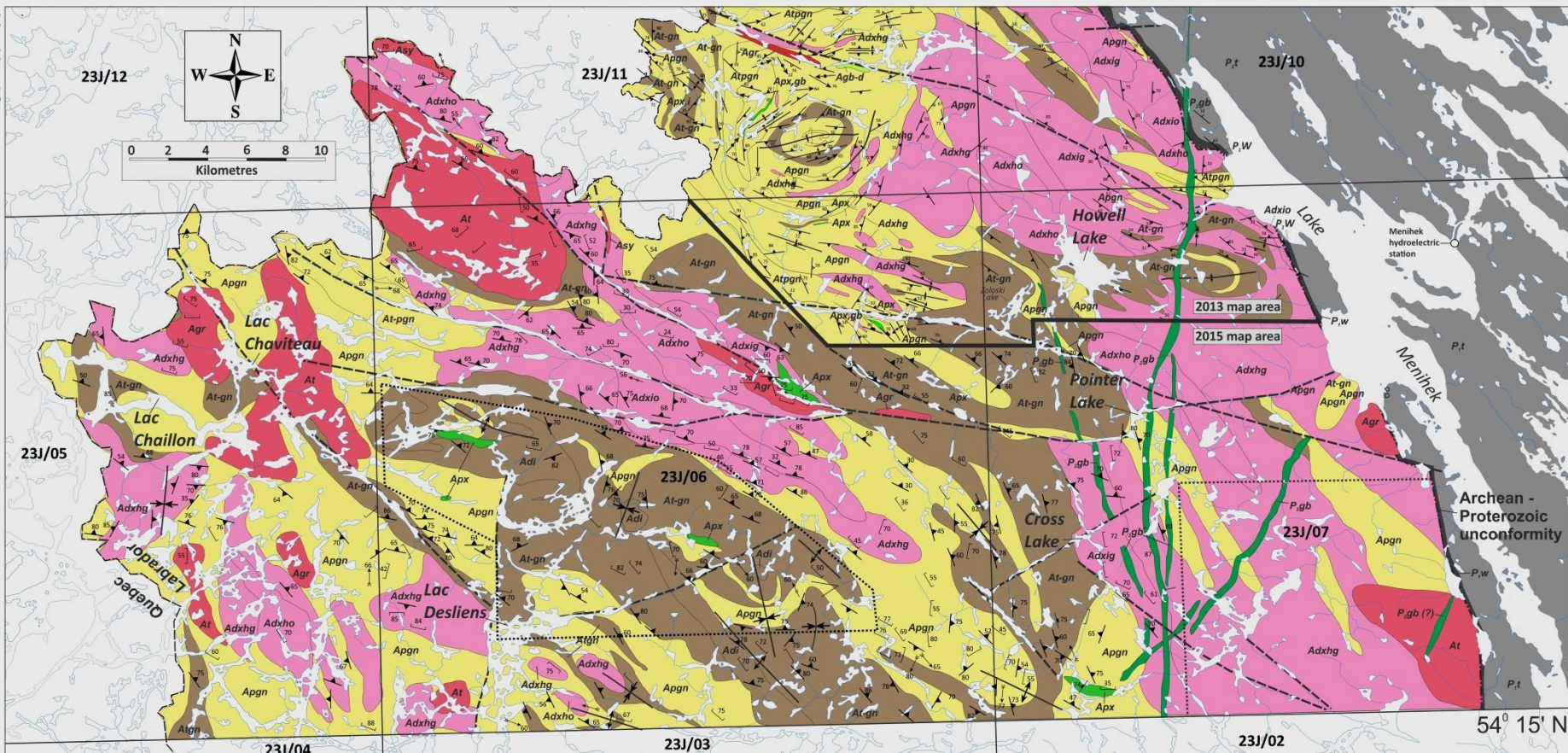
At-gn Tonalite-diorite intrusions - Desliens igneous suite (Percival, 1991a)

Atn Granulite facies gneiss

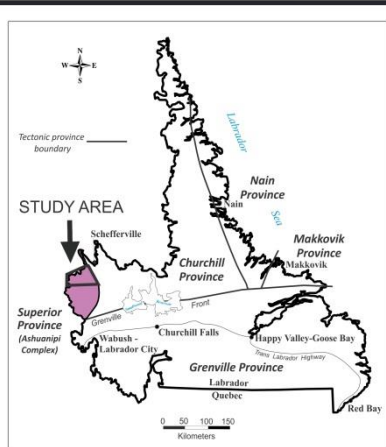
Apgn Metasedimentary gneiss; paragneiss

54° 36' N

67° 47' W



66° 32' W



Neoproterozoic ?

P.gb Gabbro dyke.

Paleoproterozoic

New Quebec Orogen (Labrador Trough)

P.t Undifferentiated Labrador Trough rocks

P.w Wishart Formation.

Archean

Agr Leucogranite

Asy Syenite

At Tonalite

Archean

Adxho Orthopyroxene diatexite

Adxio Orthopyroxene diatexite

Adxig Garnet diatexite

Adxhg Garnet diatexite

Apx Pyroxenite and melagabbro.

At-gn Tonalite - diorite (Desliens igneous suite) – 2.7 Ga

Apgn Migmatitic metasedimentary gneiss — 3.1 - 2.7Ga

Percival, 1991

2.68 - 2.65 Ga

(Metamorphism)

700-835°C and 3.5-6.5 kbar

MIGMATITES

Migmatite: Medium- to high-grade metamorphic rock consisting of two or more petrographically different parts.

Neosome - formed by partial melting

Paleosome - unaffected by partial melting

1st order subdivision

Metatexite: Heterogeneous and primary structures in the paleosome are preserved

Diatexite: Neosome is dominant throughout the rock

Metatexite migmatites (Stromatic-textured)

Orthopyroxene - melt metasedimentary gneiss

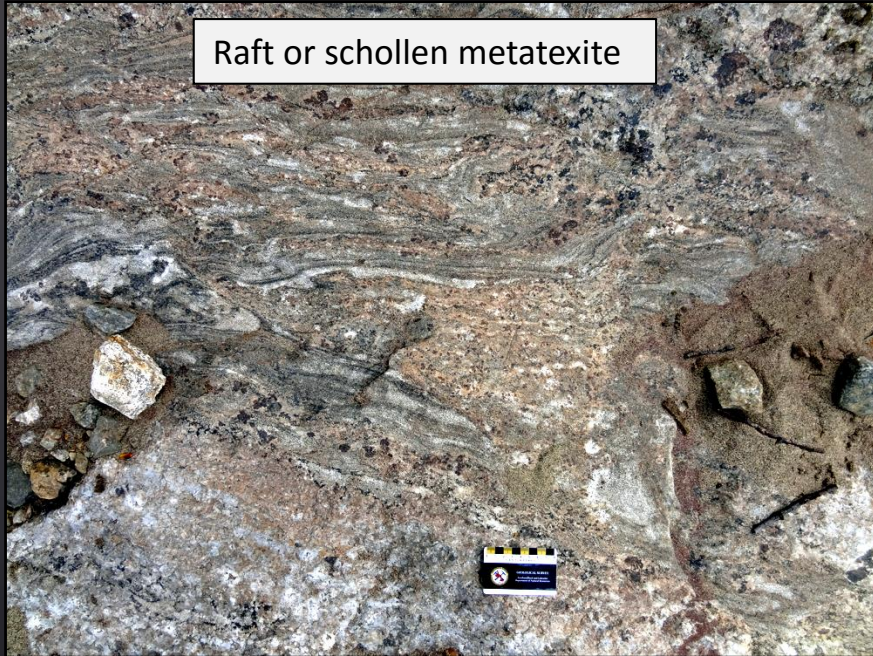


Tonalite gneiss (Desliens igneous suite)

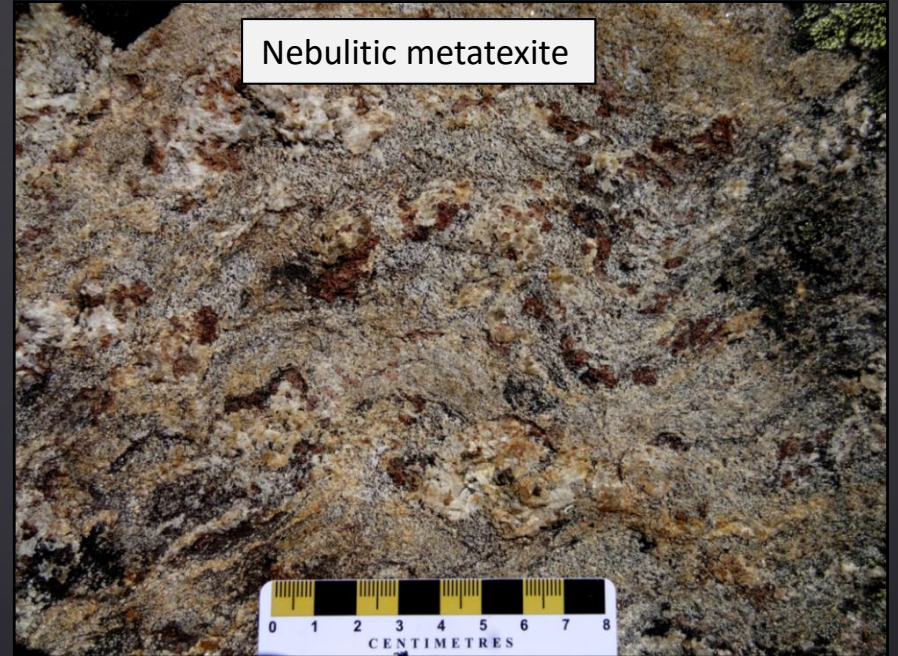


Metatexite – diatexite (transition) migmatites

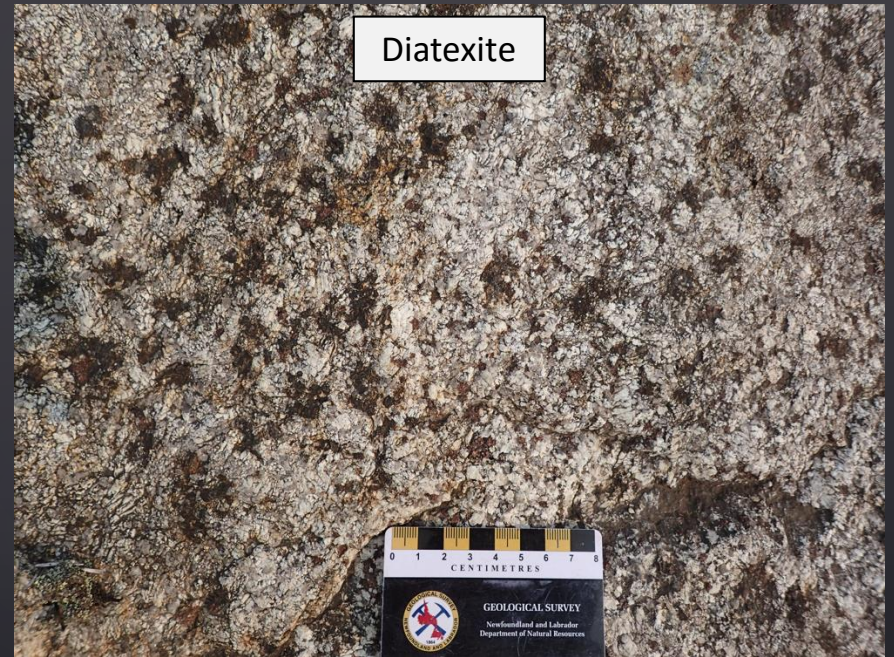
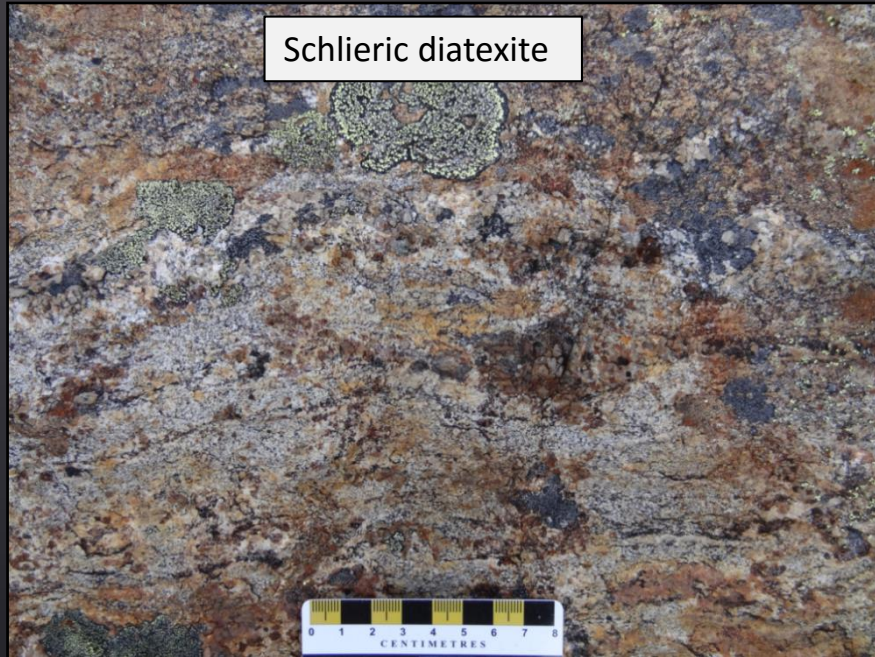
Raft or schollen metatexite



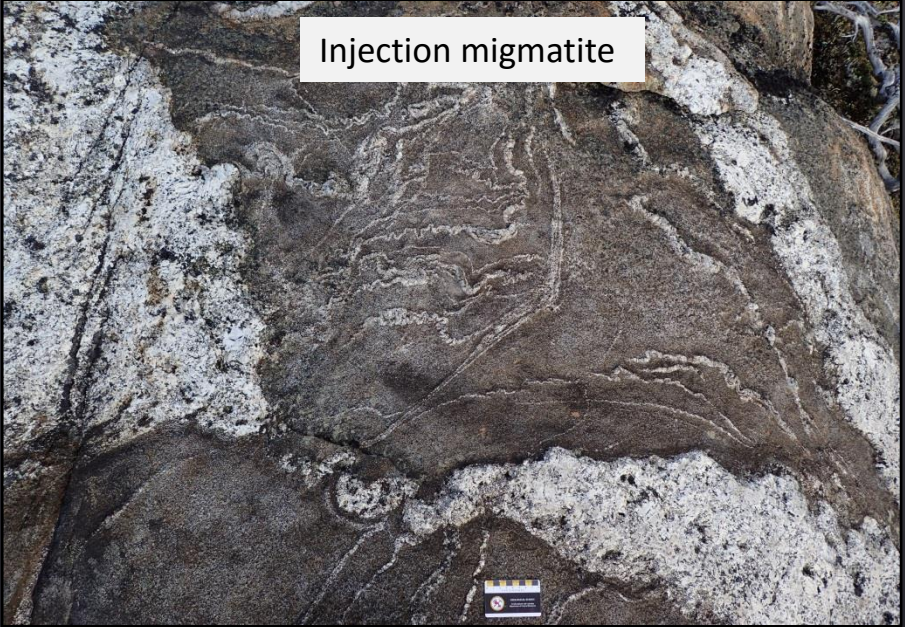
Nebulitic metatexite



Diatexite migmatites



Injection migmatite



Dilation diatexite

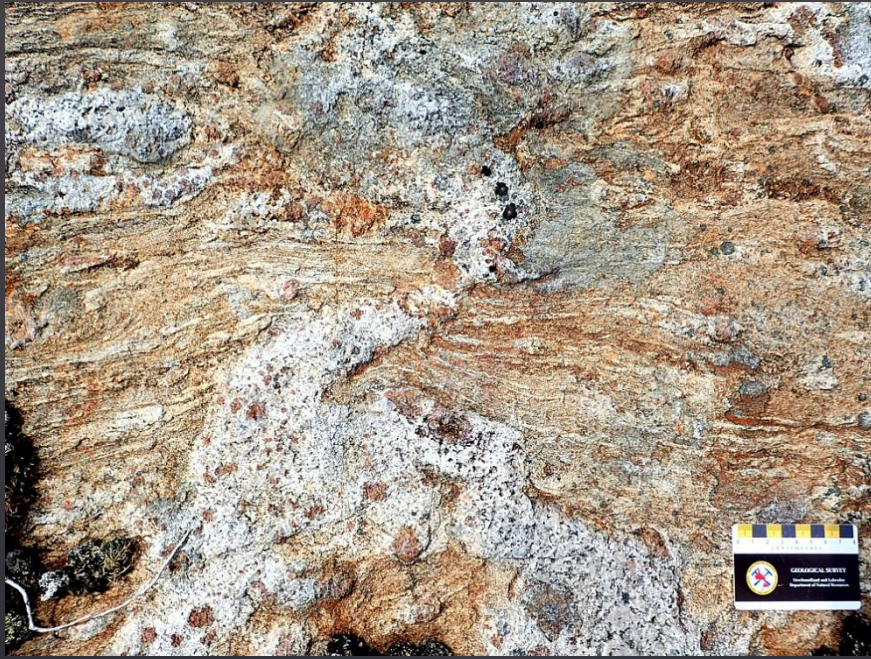




Metatexite – diatexite transitions

In situ melt derived from protolith and migrated to dilatant sites to form diatexite.

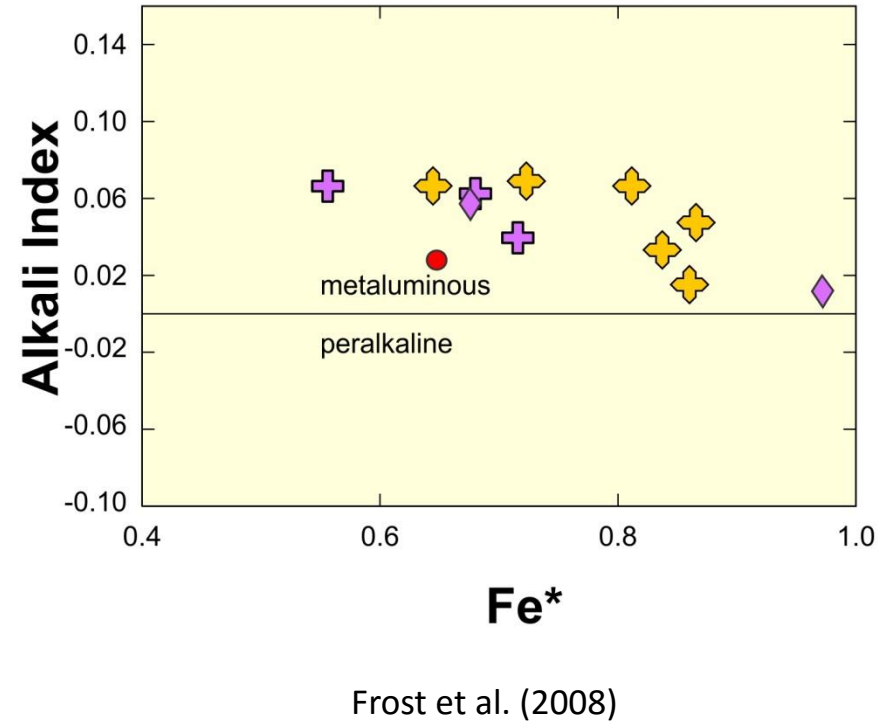
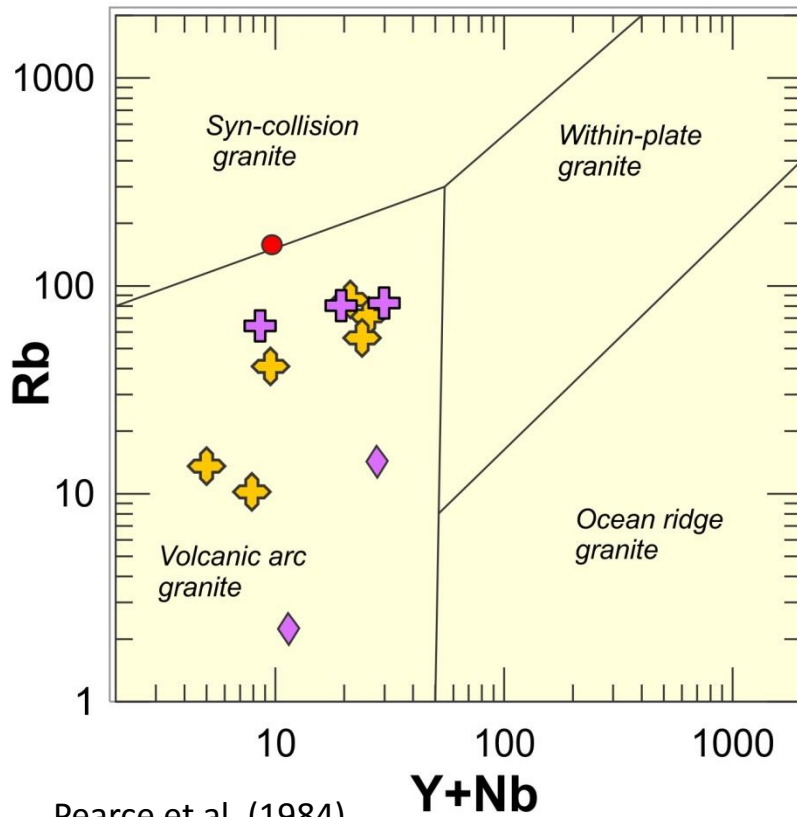
(Guernina, 2007).



'Intrusion model' – lack of transition textures

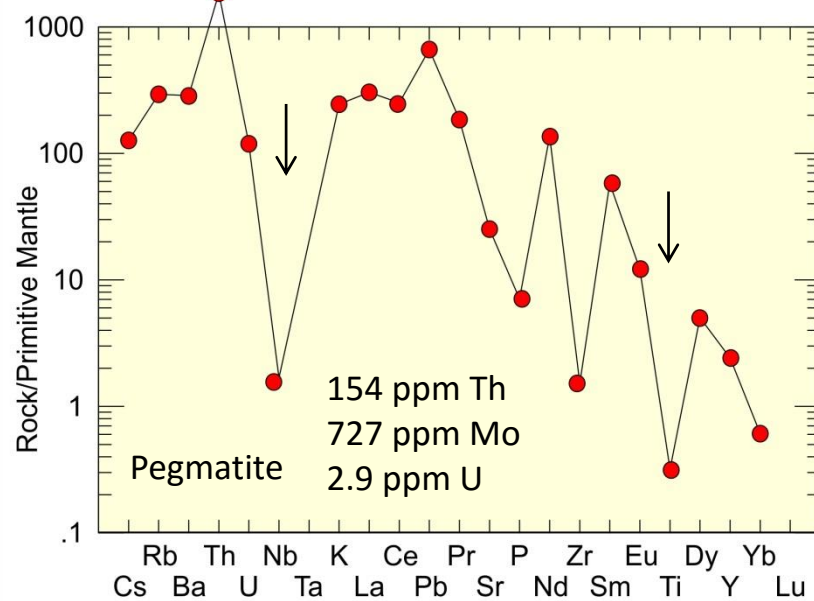
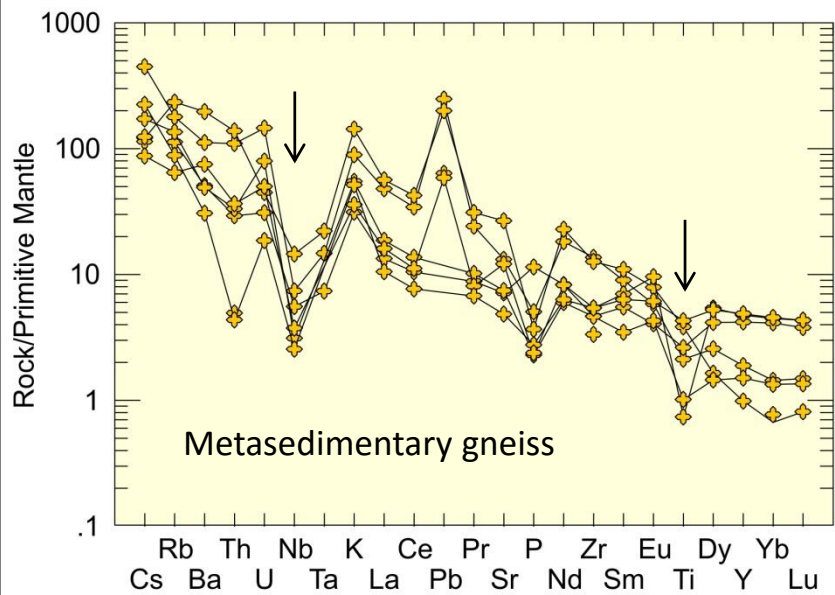
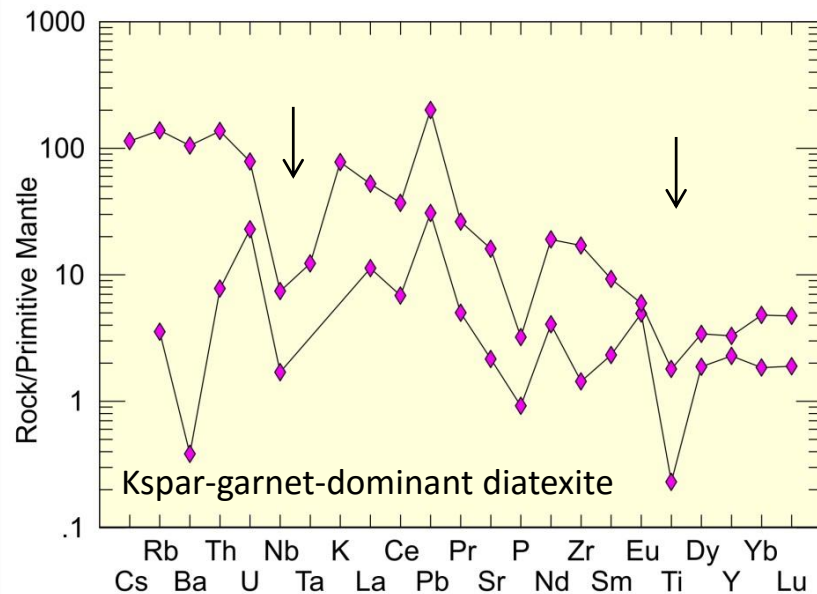
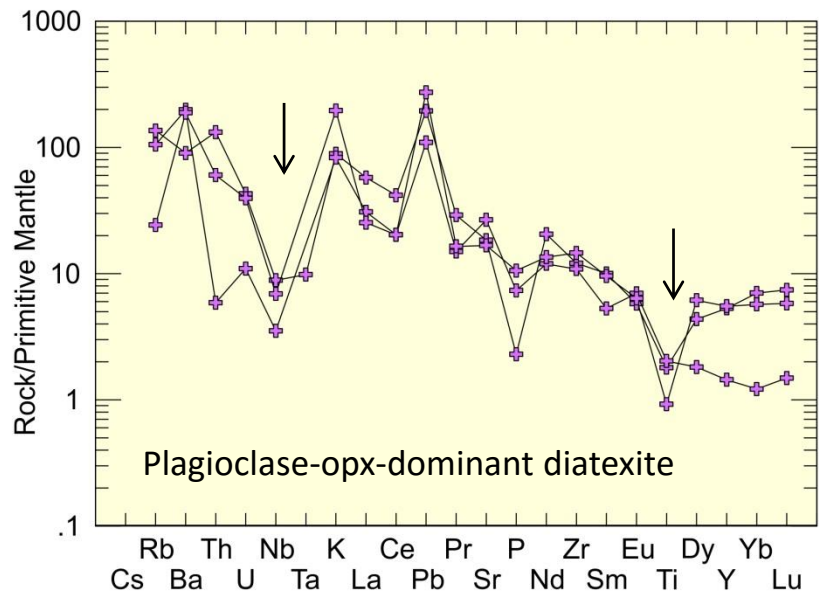
Diatexite formed by melting of metasedimentary rocks (or similar protolith) at lower crustal depth and intruded into gneissic units during metamorphism.

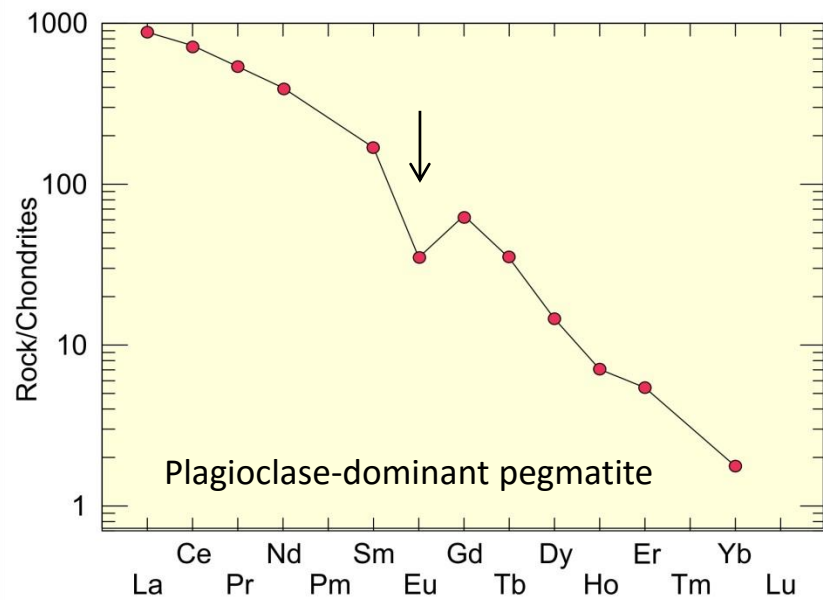
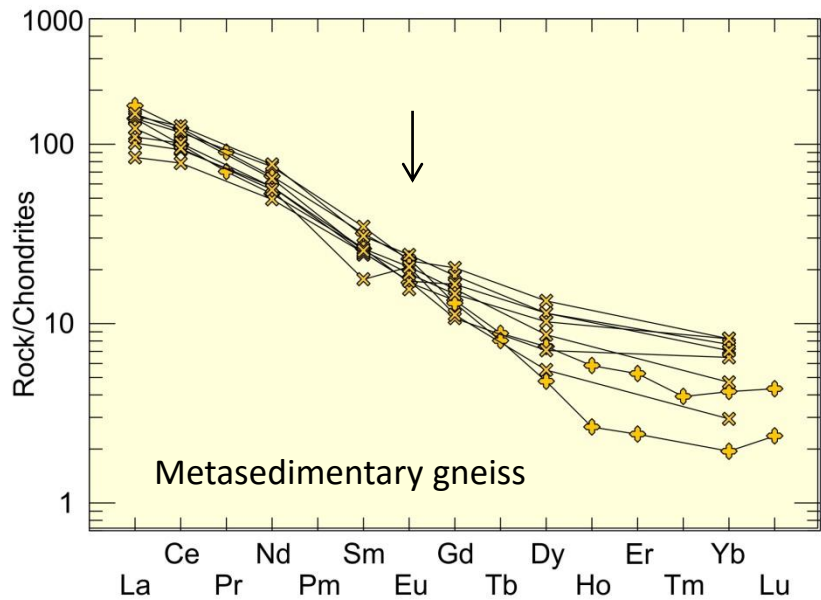
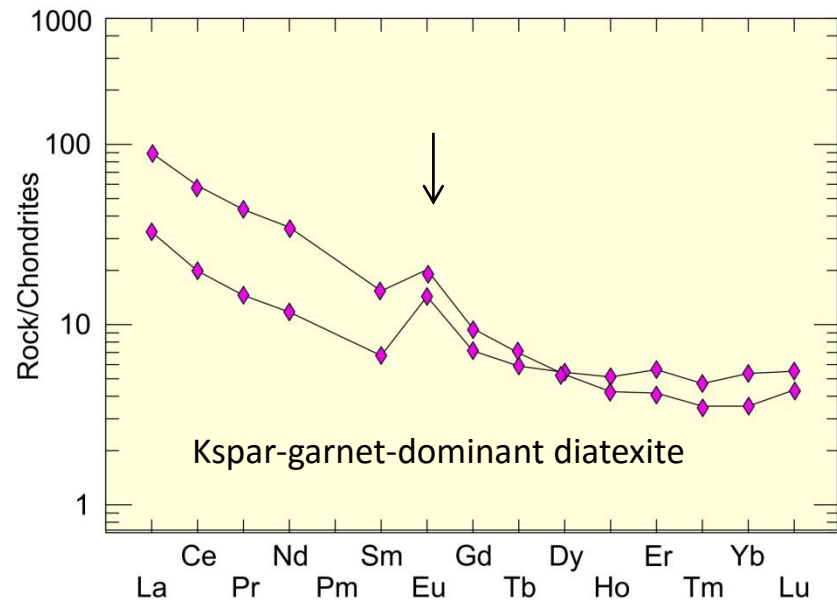
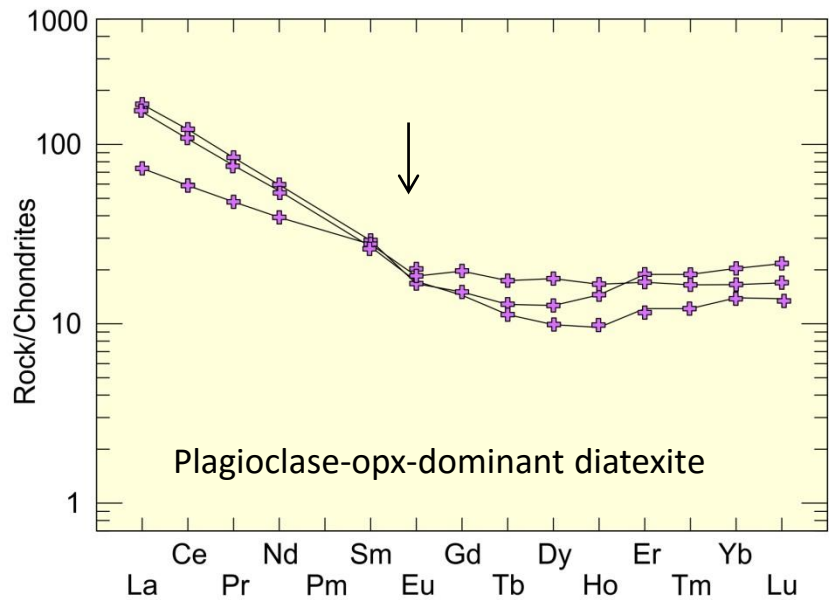
(Percival, 1991)



- + Metasedimentary gneiss (opx-garnet-melt)
- + Garnet-K-Feldspar-dominant diatexite
- ◇ Orthopyroxene-plagioclase-dominant diatexite
- Pegmatite

Rb vs Y+Nb and Alkali Index vs Fe discrimination plots for selected metasedimentary gneiss, diatexite and pegmatite, Ashuanipi Complex





Mineral Potential

Metatexites (gneisses) - Several gossan zones have elevated to anomalous Au, Ag and base metals, particularly in the metasedimentary gneiss.

Diatexites - Locally elevated Au and Ag in some gossan zones

Pegmatites - Locally elevated Mo (quartz veins) as well as anomalous U, Th and REE.

SUMMARY

Migmatite types: Metatexites : Stromatic (gneiss)

Transition: Raft, nebulitic, schlieric migmatites

Diatexites: K-Feldspar-dominant (garnet)
Plagioclase-dominant (opx)

Transitional: Metatexite → raft → nebulitic → schlieren → diatexite

Intrusive: Diatexite intruded into gneiss under granulite facies conditions

Metaluminous, LREE-enriched, volcanic arc granite signatures.

Potential for hosting Au, Ag in metatexite and diatexite and U, Th and REE mineralization in pegmatites

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