

Reconnaissance mapping in the Lardeau Group, SE BC, with implications for Outokumpu-style deposits and high technology battery metals Ni and Co

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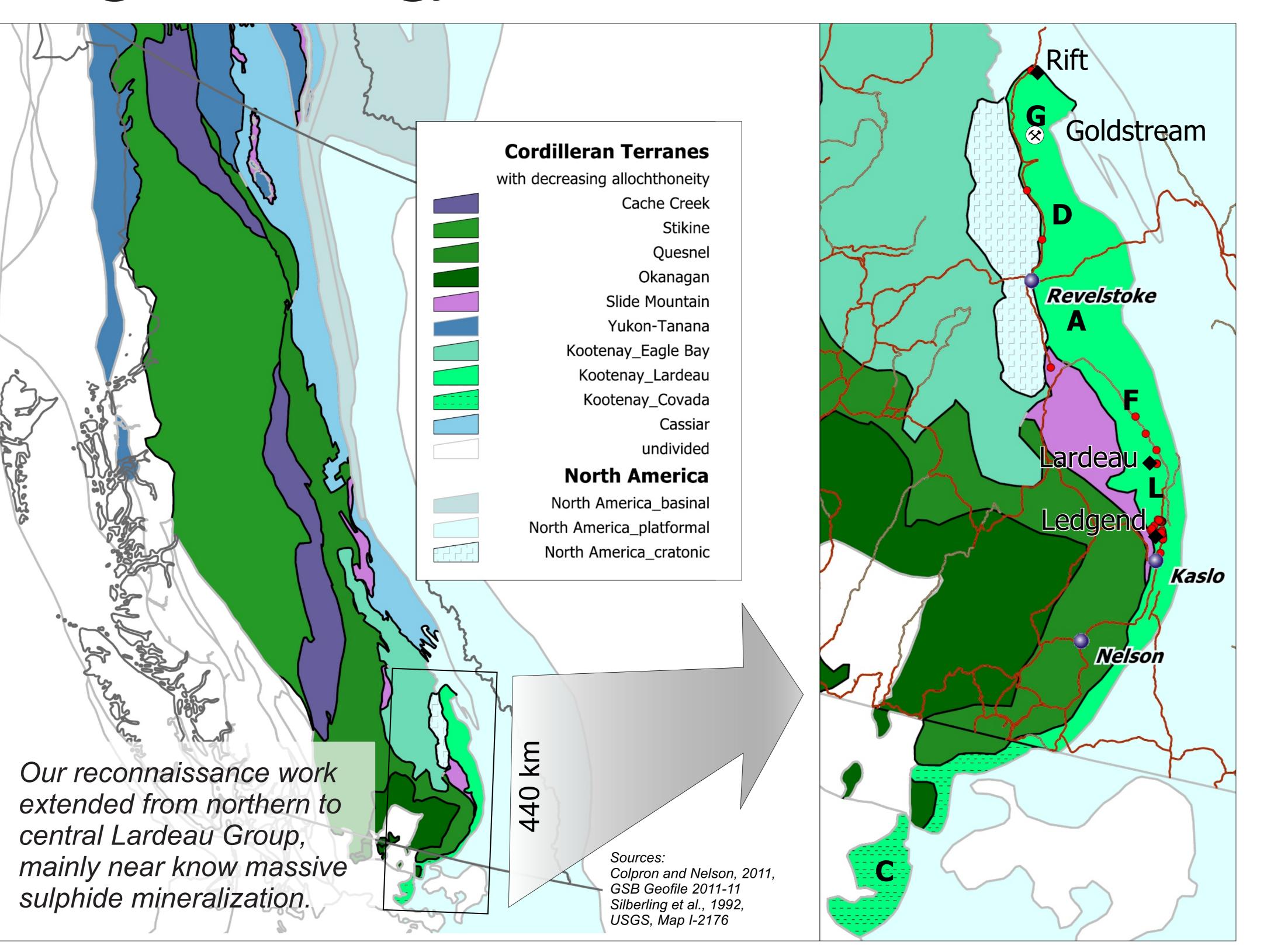
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Introduction

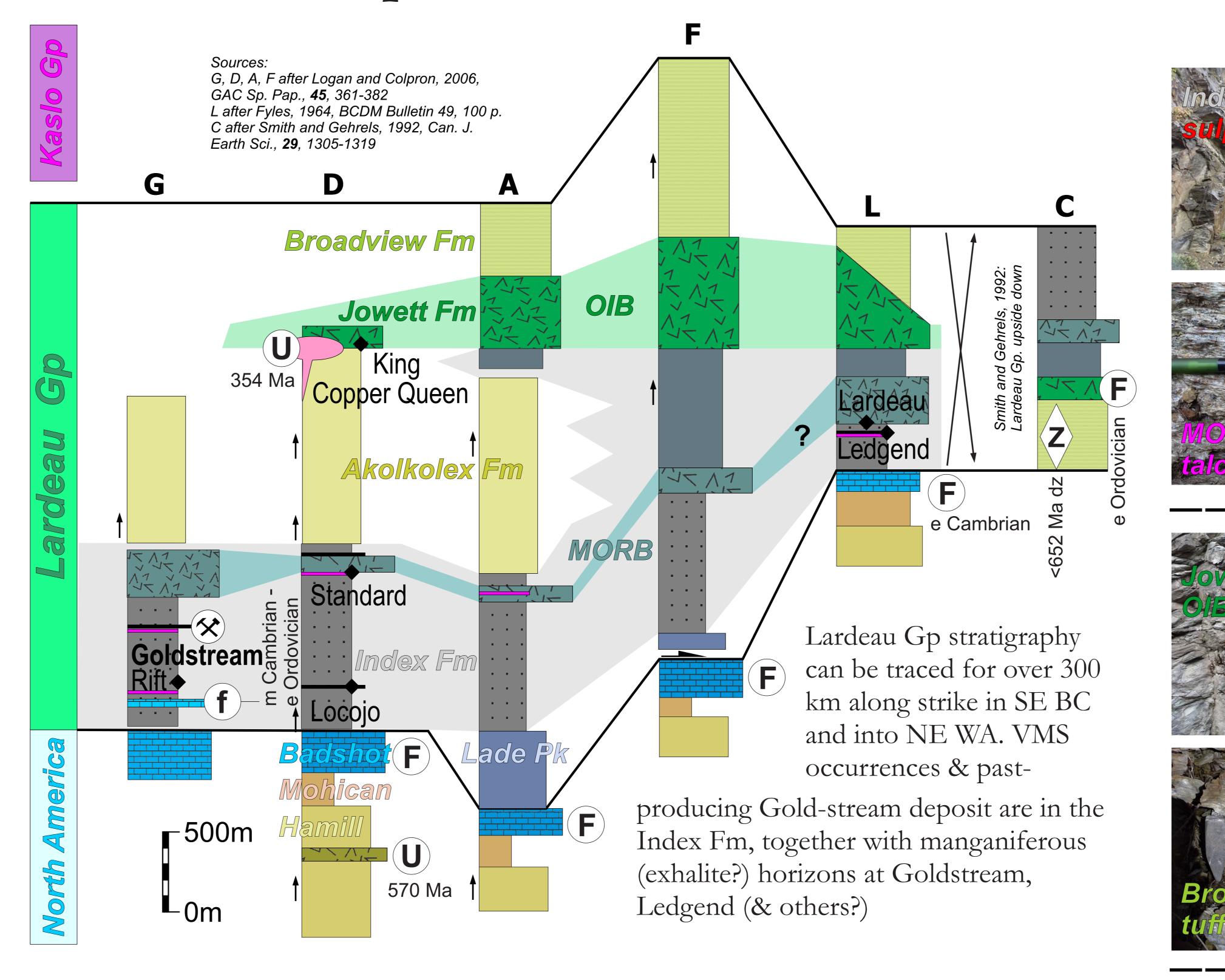
n 1981, unusual polymetallic mineralization (Ni-Cu-Co-LZn-Ag) was discovered near Kaslo, SE BC.

- in 2017, John Drobe (Cardero Res.) recognized similarity with Outokumpu-style sea-floor detach-ment-related deposits in Finland, for which a deposit model has only arisen in the last decade
- Ni and Co are enriched in these Besshi-like deposits because they develop over mantle
- But why are they in the "passive continental margin" succession of North America?
- previous?workers have mapped only small mafic-ultramafic intrusions. Could some be mantle?
- and how extensive is this mineralization within the 300+ km long Lardeau belt?
- in 2018, a week-long recce mapping/sampling program we looked into this "Outokumpu-style" mineralization for possible further study.

Regional Geology



Lardeau Gp. strata & correlatons



Why should you care?

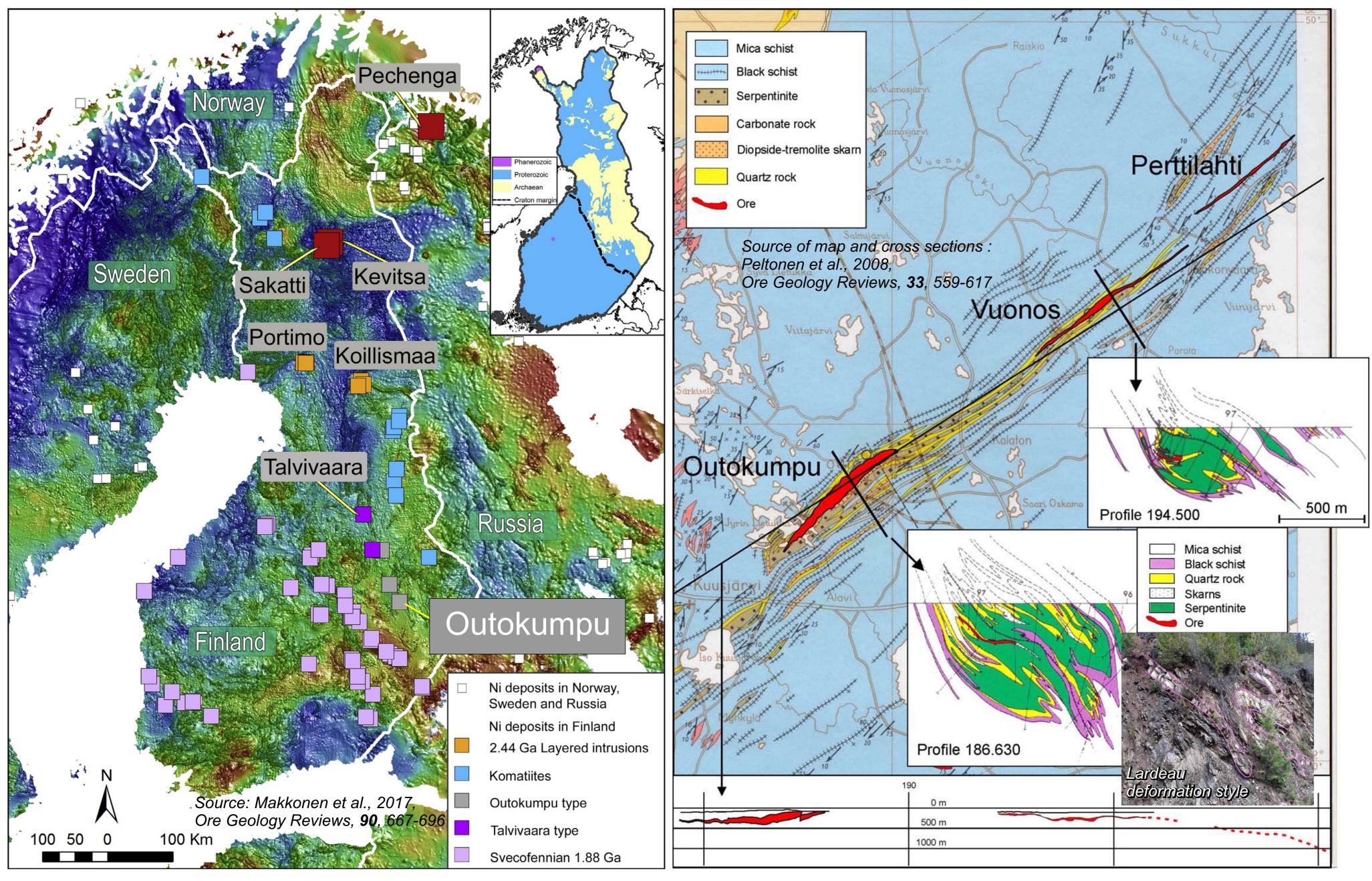
Like at its namesake locality, exploration for Outokumpu-style mineralization in the Lardeau Gp. is challenging because of polyphase deformation. However, in only one week we found mineralized Index Fm and talc layers and pods, 6km S along-strike

from the Ledgend. Exploration for this type of deposit in BC has only just begun.

Elevated Ag and Au in stream sediments

Always surprises! Photo of RGS site with 532 & 471 ppb Au, 2.26 ppm Ag (+As, Sb), within "Index Fm" (lat 50.033°, long -116.943°)

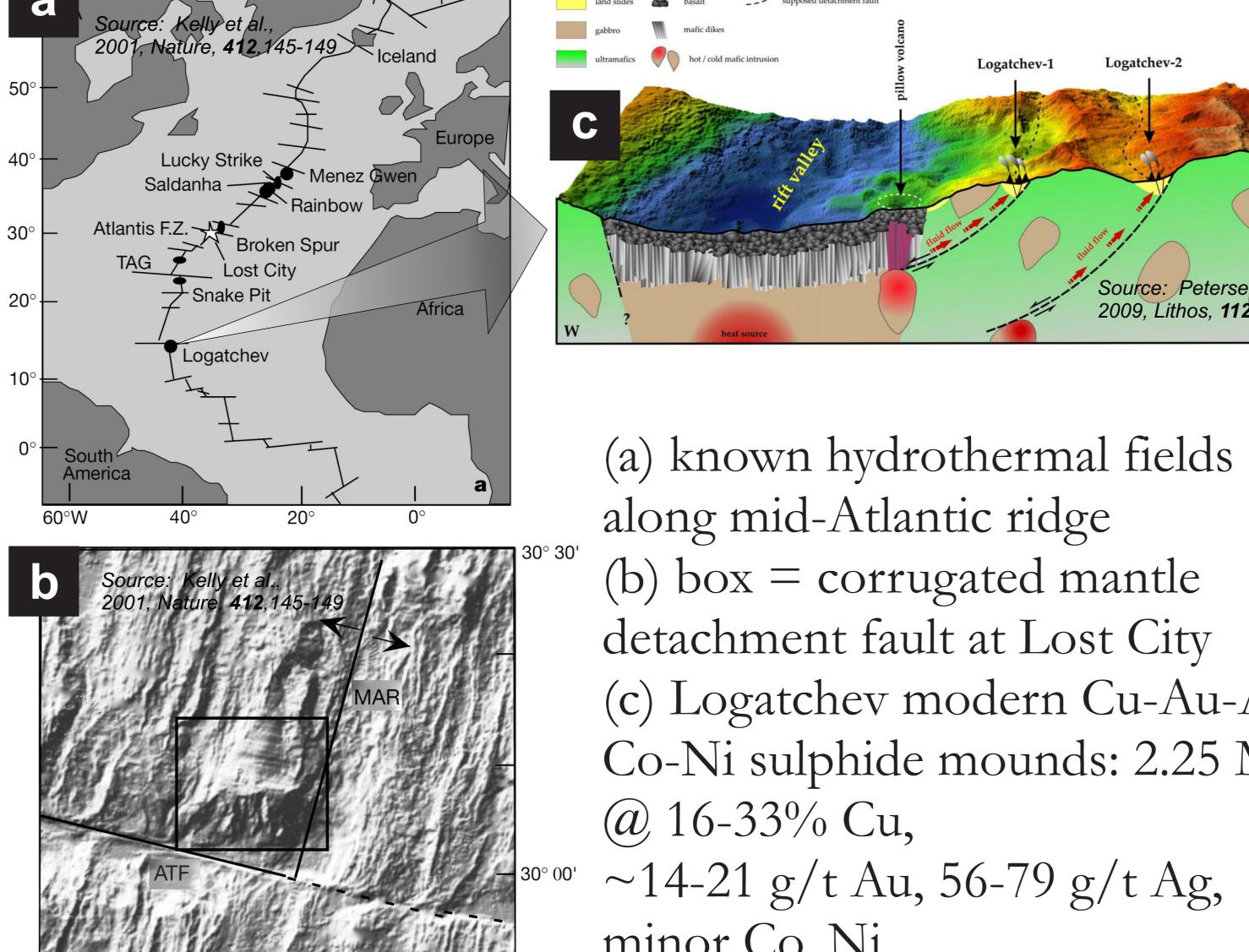
Outokumpu-type deposits



Outokumpu belt has produced since 1913

- 200 km x 25 km, roughly the same as Lardeau Gp.
- intimate association with ultramafic peri-dotite bodies 1 x 3m to kms x 100s of m
- sulphide lenses 5-50 x 50-400 x 200-4000m, <1-30
- wt.% grade: 3.8 Cu, 0.24 Co, 0.12 Ni,1.1 Zn; 8.9 g/t

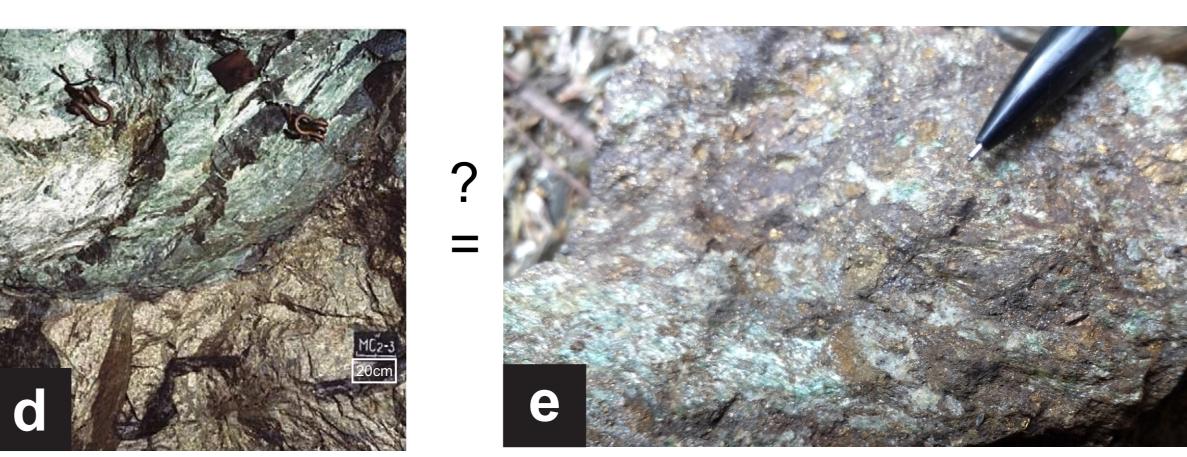
Modern analogues



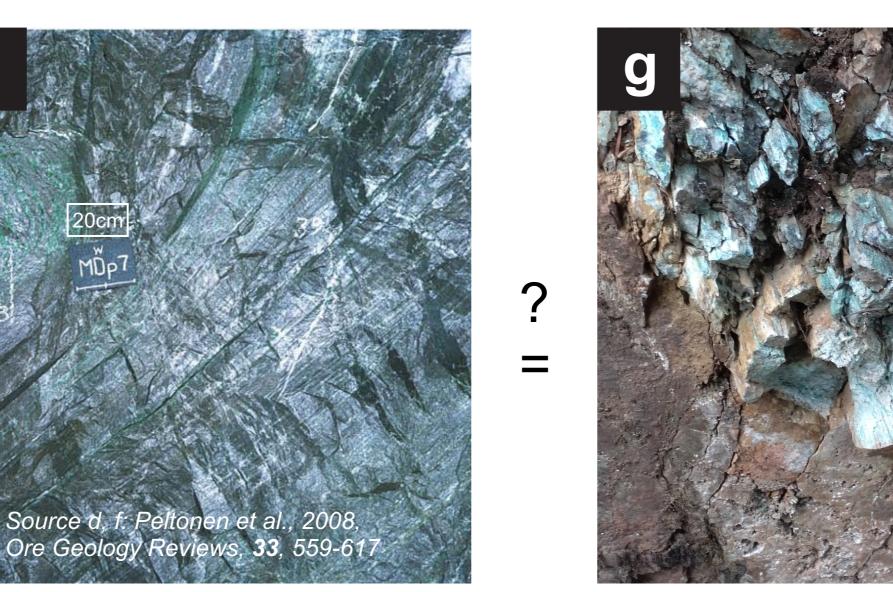
Source: Petersen et al., 2009, Lithos, **112**, 40-56

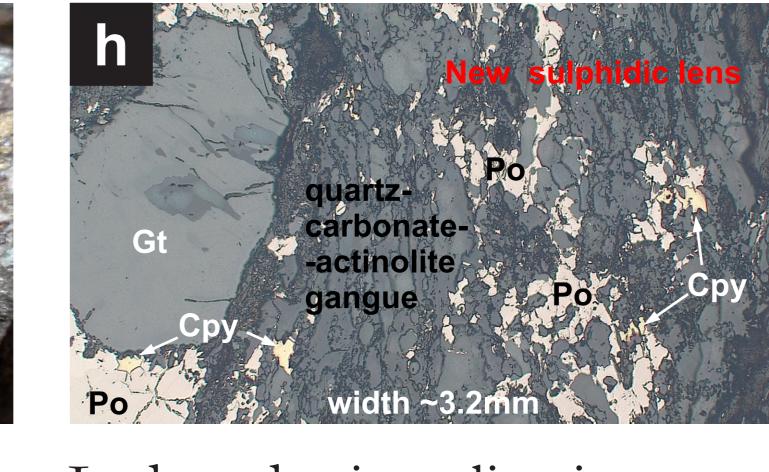
along mid-Atlantic ridge (b) box = corrugated mantledetachment fault at Lost City (c) Logatchev modern Cu-Au-Ag-Co-Ni sulphide mounds: 2.25 Mt

Mineralization



Outokumpu (d, f) and Ledgend (e, g) are similar. Ledgend mineralization Py-Po-Cpy massive sulphide (d, e) and "quartz rock" (f, g), all with green chrome micas (and Cr diopside in d, f).





grades reported by Cardero: 0.15 to 0.76% Ni and 0.01 to 0.09% Co and to 0.53% Cr. Elevated Mn may be a pathfinder, as well as Mngarnet (Gt) that forms within these greenschist

Is ultramafite-gabbrogreenstone and quartzitephyllite (Logan & Colpron 2006) a relict ophiolite?

What is Lardeau Gp.?

Rifting logically precedes ocean basin formation; therefore OIB/rift geochemistry and sparse age data support inverted Lardeau Gp. MORB + talc/serpentine (?mantle) suggest a structurally collapsed oceanic basin. Ongoing work is aimed at dating the Index and testing ultramafic mantle association.

