



Contrasting styles of mineralization along the Cap Burn Fault, East Otago, NZ

Doug MacKenzie¹, Kerry Stanaway² William Gray¹ and Alicia McKean¹

¹ University of Otago, Geology Department, Dunedin

² Mineral Rangahau Ltd., Auckland



New Zealand

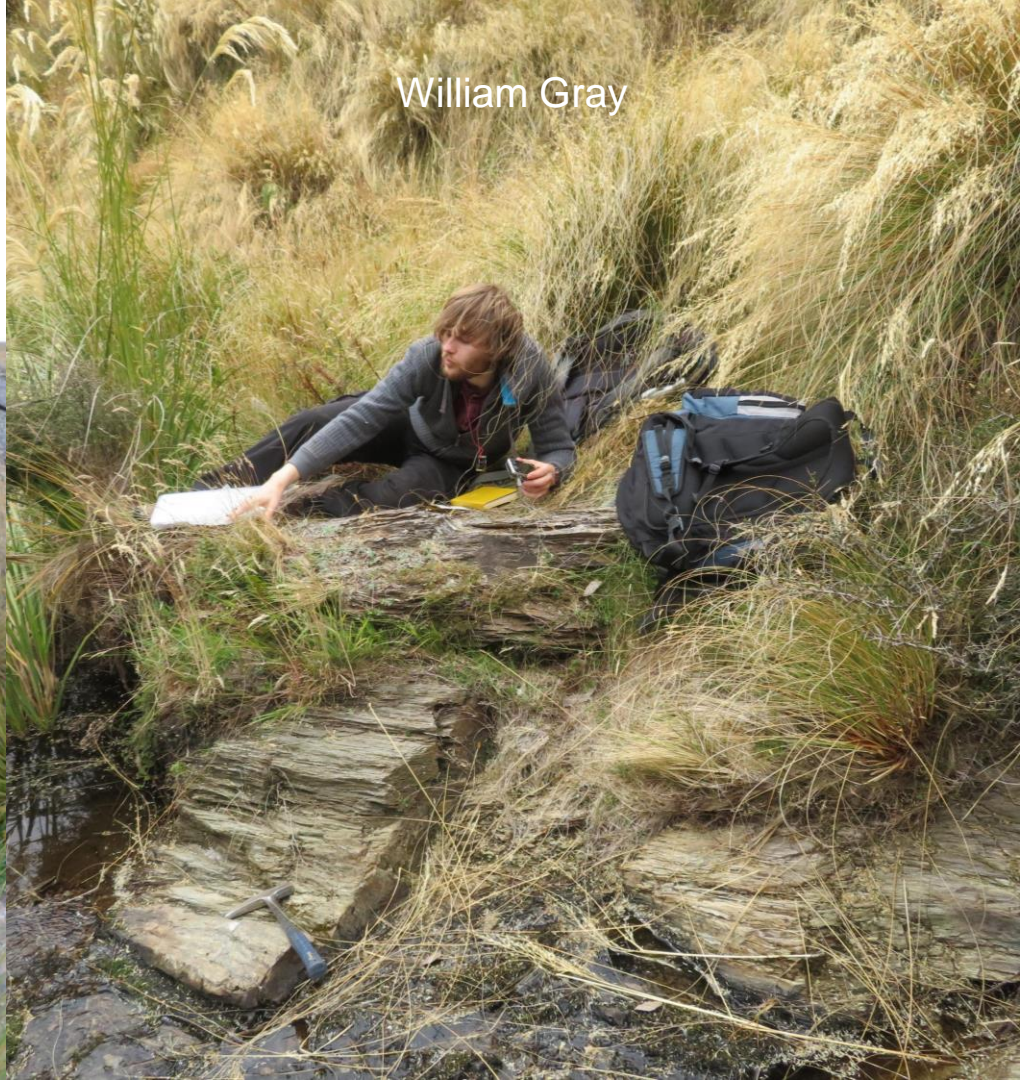
AusIMM New Zealand Branch Annual Conference - Enabling a Sustainable Future

20 - 22 August 2023
Rydgas Latimer Christchurch

Kerry Stanaway



William Gray



Cost-effective high-resolution soil sampling using a portable XRF: Orogenic gold exploration at the Cap Burn Prospect, Central Otago

C.B. Ryland¹ and K.J. Stanaway²

¹ RSC Consulting Ltd, Level 2, Queens Building, 109 Princess Street, Dunedin, 901
c.ryland@rscmme.com

² Mineral Rangahau Ltd, 31 Pohutukawa Rd, Beachlands, 2018.
ktstanaway@xtra.co.nz

Abstract

Cross-cutting the northern end of the Rock and Pillar Range in Central Otago, the Cap Burn Fault is interpreted as a north-western extension of the Hyde-Macraes Shear Zone. Although located only 20 km strike from the multi-million ounce Macraes deposit and in close proximity to several significant deposits, the Cap Burn prospect remains considerably under-explored. Much of the prospect was covered by prior explorers' soil sampling which successfully discovered significant areas with anomalous As and Sb. Two factors rendering potential for orebody grade intercepts low were wide sample spacing and complex topography. Multiple samples for single analyses; done to reduce costs. Other factors reducing probability not considered here were possible dilution by loess and grade variability within orebodies.

This study illustrates the benefits of a portable XRF unit for cost-effective exploration and adding value to a project. In this investigation a portable XRF unit was utilised in a low-cost, close-spaced, soil sampling programme to improve sample density. Geochemical data for indicator elements As, Sb, and W, as well as other trace elements, were measured from 255 soil samples collected over a 2km² area adjacent to the Cap Burn Fault. Results show that 119 of the soil samples within the 2km² area are anomalous in As with respect to background levels in the surrounding Otago Schist. These results are encouraging and confirm that the Cap Burn prospect is prospective for shear-hosted orogenic gold mineralisation.

Keywords: pXRF, Orogenic gold, Soil Sampling, Cap Burn, Otago Schist, Hyde-Macraes Shear Zone.

Otago gold in textural zone IV schist rather than quartz vein, lode, crush-zone or reef

K.J. Stanaway

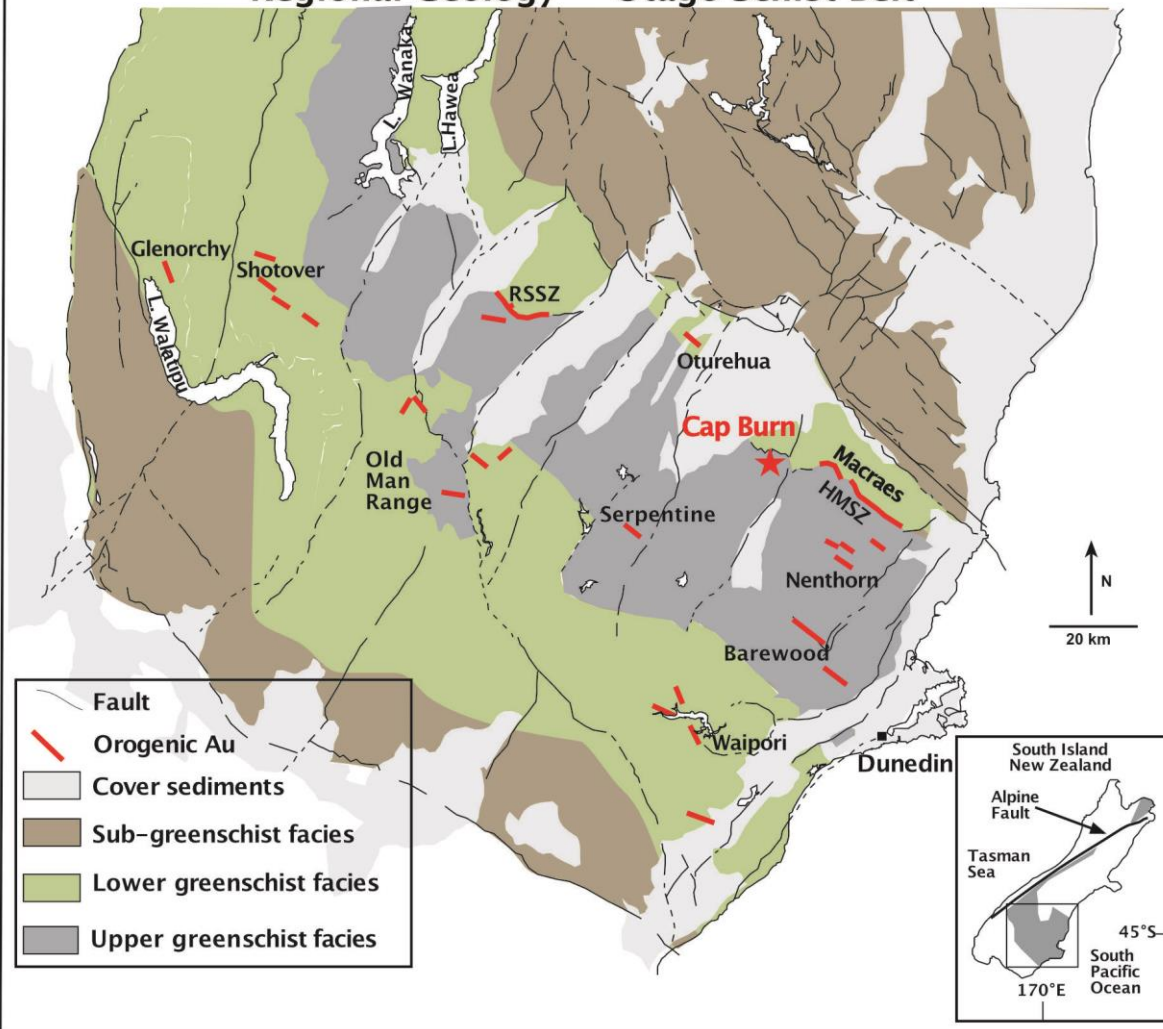
Mineral Rangahau Ltd, Director, 31 Pohutukawa Road Beachlands 2018 NZ,
ktstanaway@xtra.co.nz

Abstract

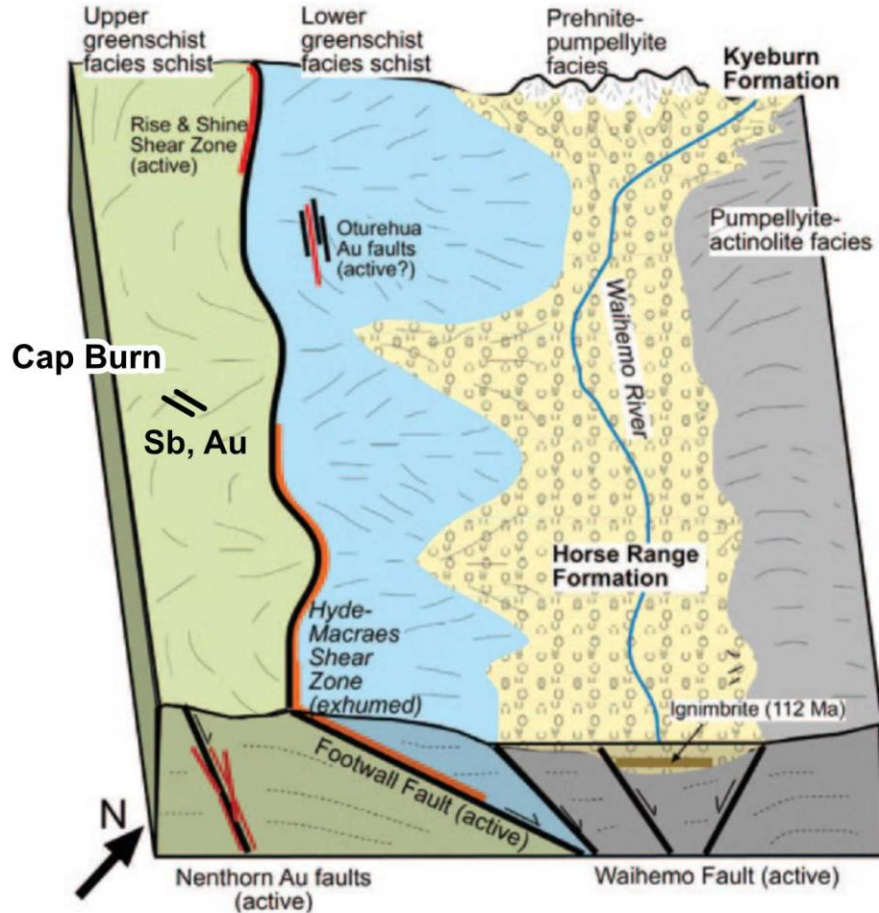
On the northern Rock and Pillar range, soil sampling reveals separate east and west areas of anomalous arsenic, antimony, tungsten and gold. Float sampling, done because of poor outcrop further reveals distinctly different mineralisation in each. In the east mineralisation lies within 2 km of, and parallels the Cap Burn fault. It shows quartz veining and fracturing at mm to cm-scale. Schist float yields sub-economic gold grades, and petrology is needed to see how mineralisation occurs. In the west mineralisation lies 8 km south of the fault and clearly cuts across schist foliation. Quartz veins and lodes occur, with pebble to boulder quartz float showing silicification, brecciation and open-space drusy cavities. Antimony is more abundant. In neither east nor west is quartz rock in unusual amount, although in the west mineralised pieces can be larger. This may account for past failures to find rock sources for placer gold. Both anomalous areas occur south of an extension of the Macraes mine Footwall fault, in TZ4 schist, not the TZ3 schist of the mine.

Keywords: Otago, upper greenschist, texture zone (TZ) 4, float, gold, arsenic, anomalous, pXRF.

Regional Geology - Otago Schist Belt



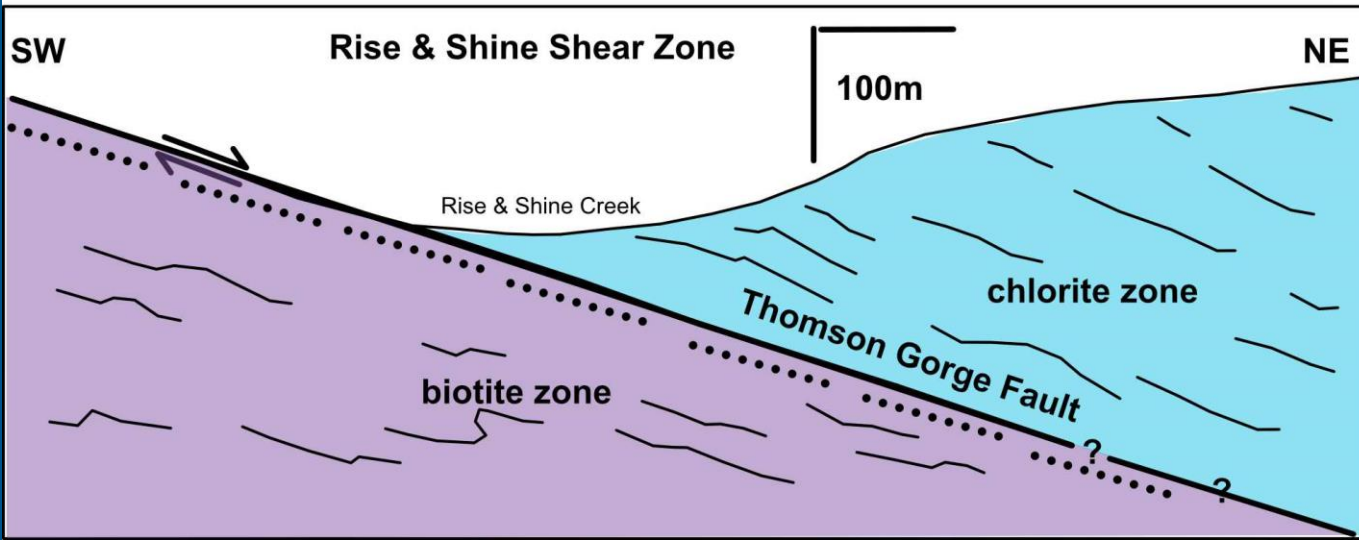
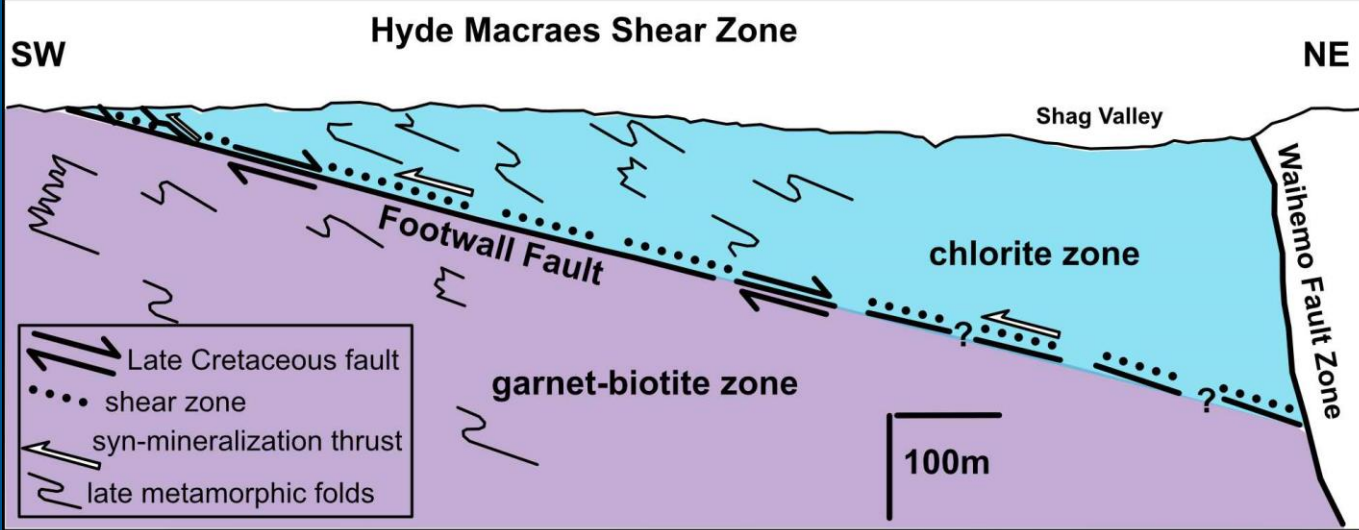
Cap Burn Fault –
N end of the Rock and Pillar Range

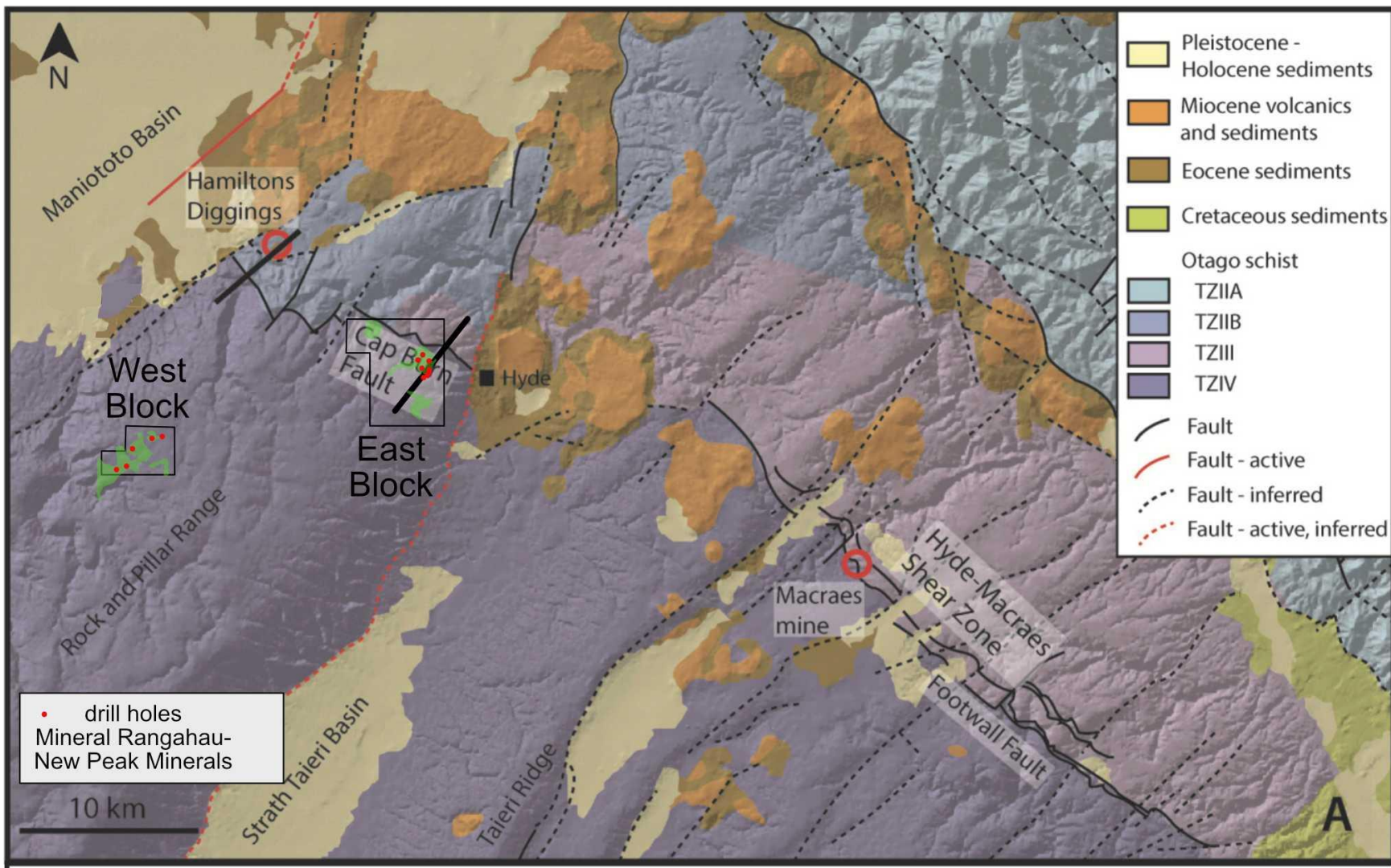


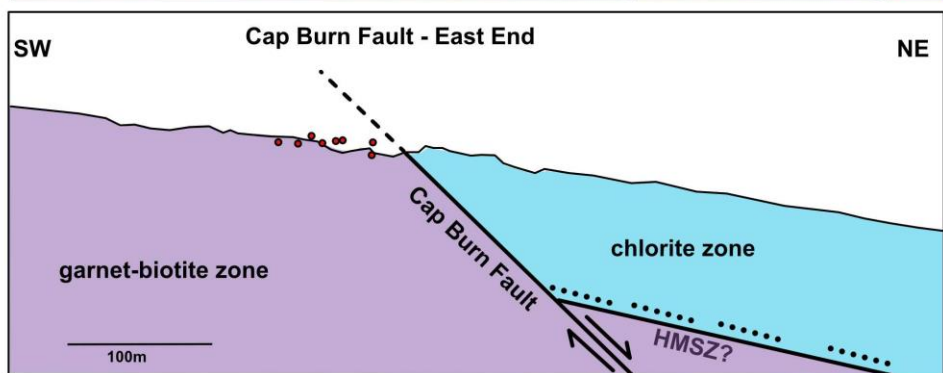
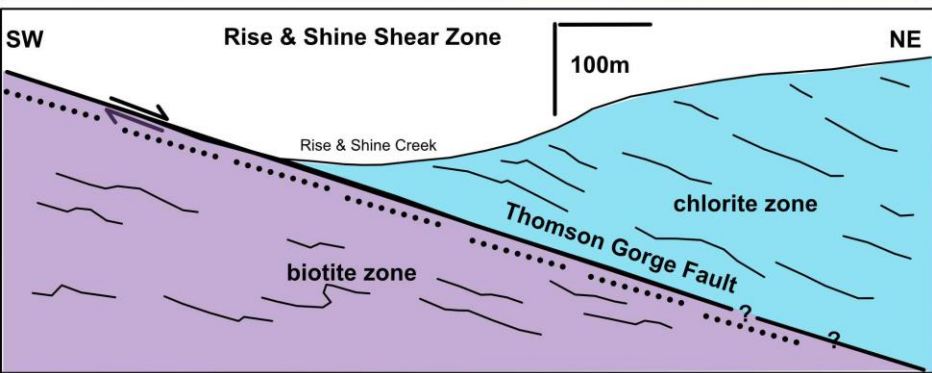
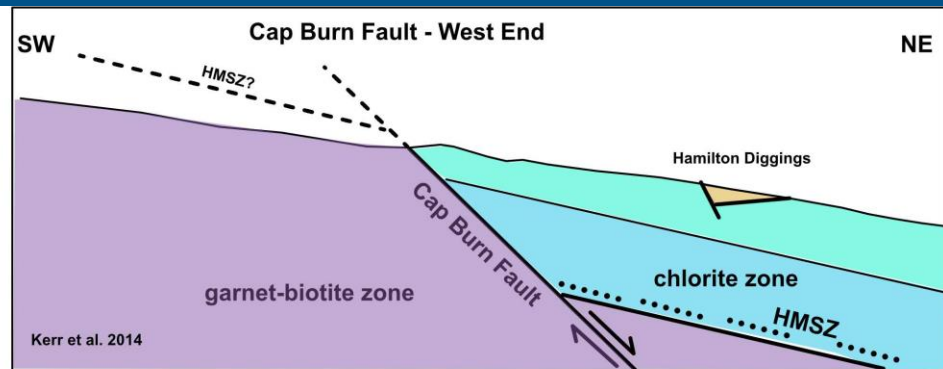
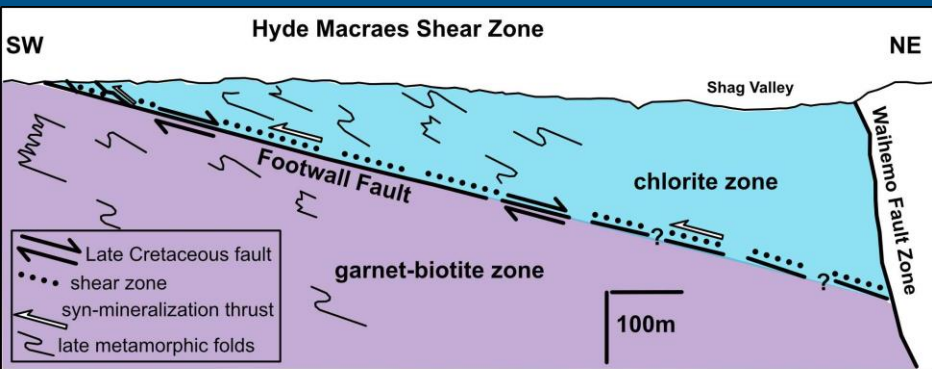
Early to mid-Cretaceous

Cap Burn Fault – along strike and part of
Footwall Fault and Thomson Gorge Fault

modified from Mitchel et al. 2009 and Mortimer et al. 2017





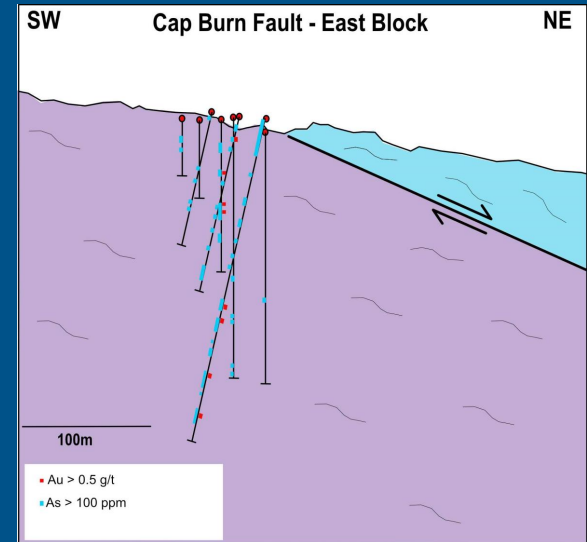
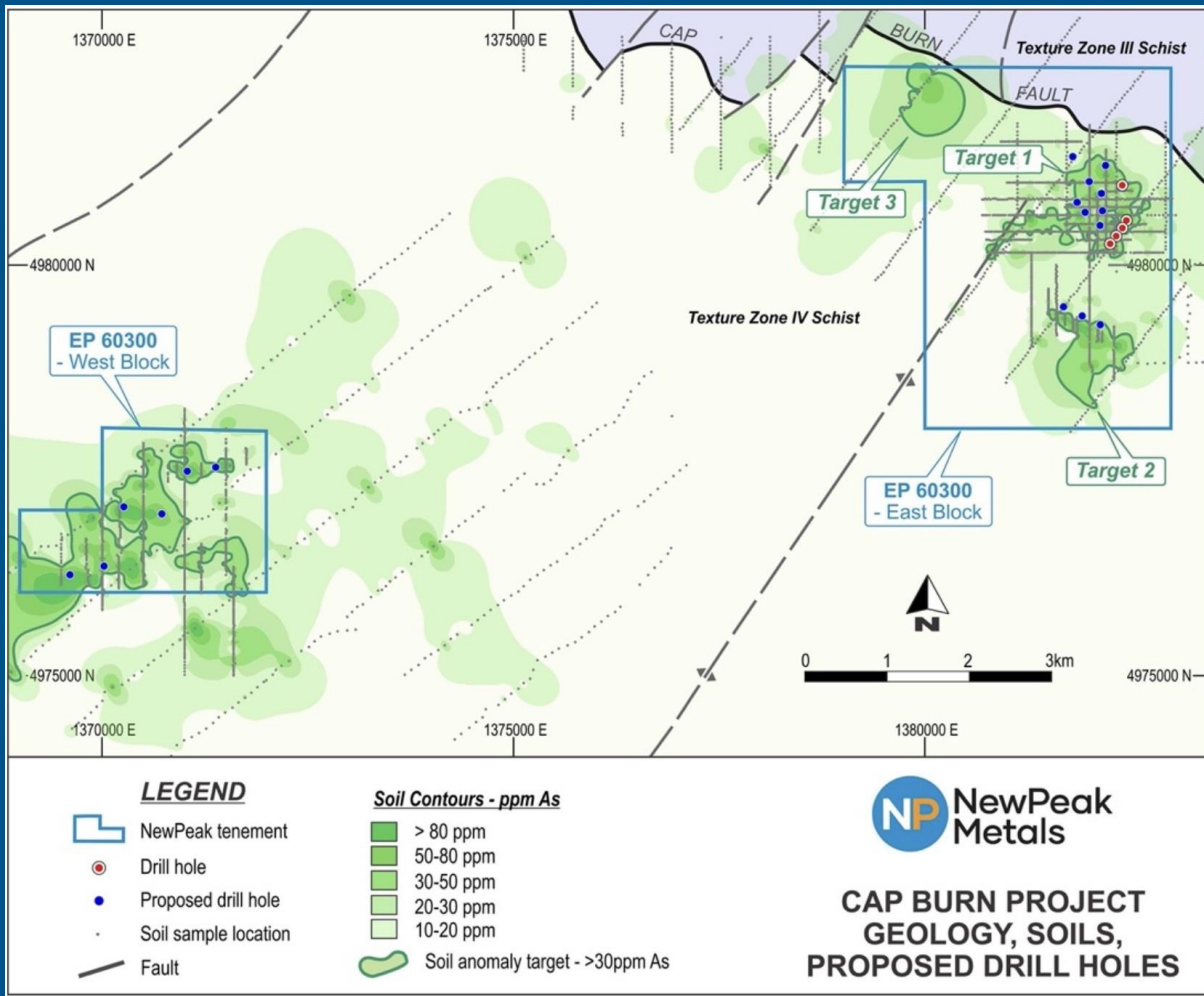


2020-2021

New Peak Metals - Mineral Rangahau

East Block – 8 diamond drill holes

West Block – 5 diamond drill holes



West Block – arsenopyrite-Au-bearing qz veins & stibnite cemented breccias

quartz veins hosted in normal faults – Au-Sb



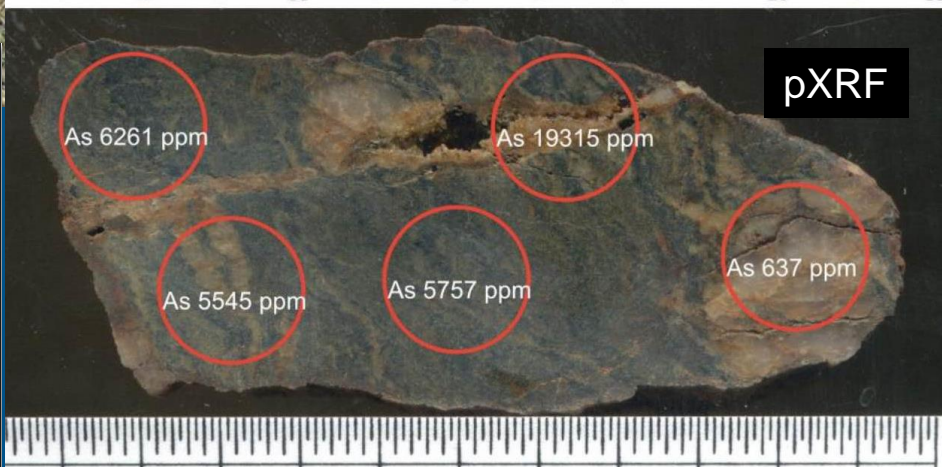
prismatic quartz and aspy



massive stibnite



fault breccia



pXRF

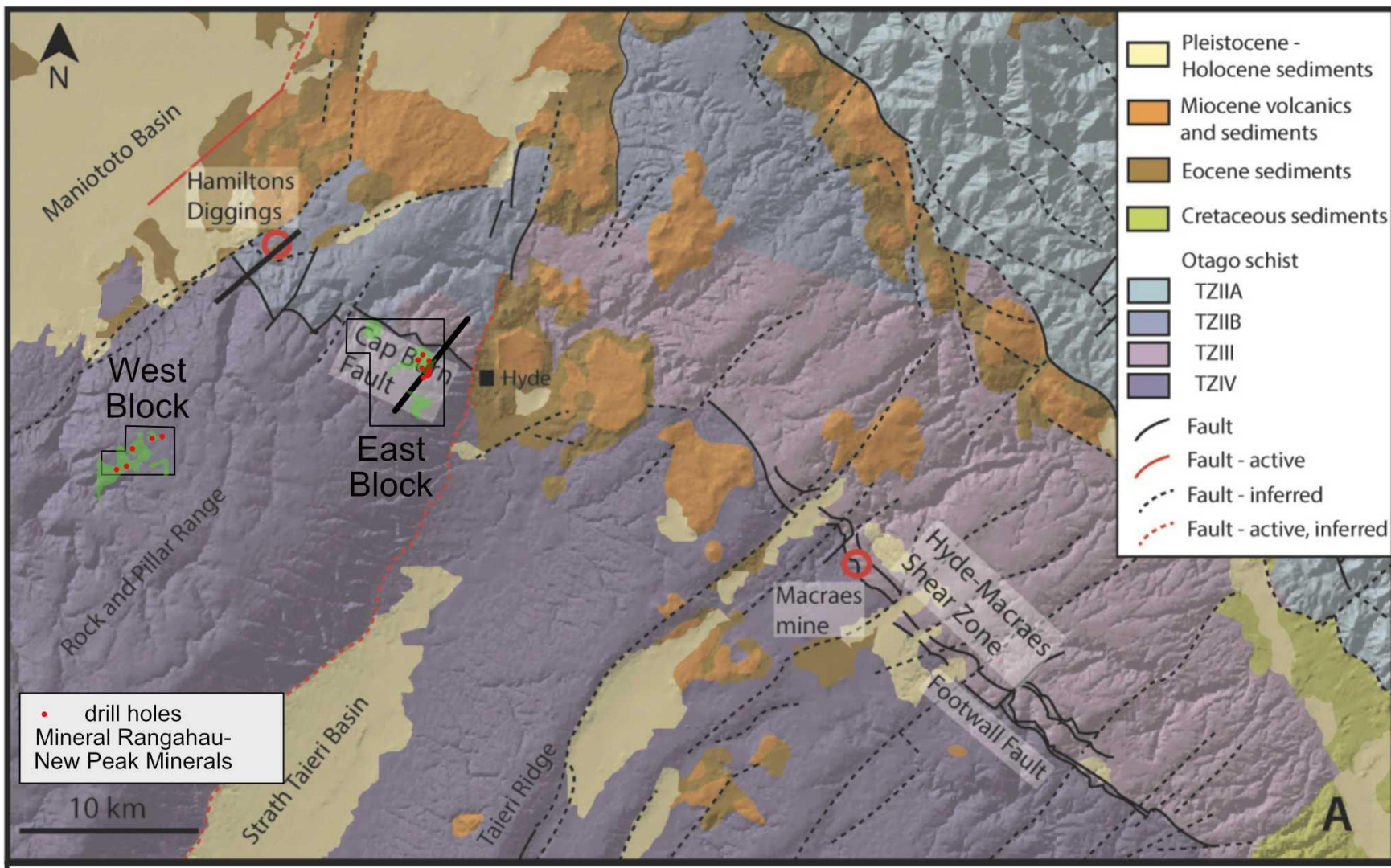
As 6261 ppm

As 19315 ppm

As 5545 ppm

As 5757 ppm

As 637 ppm





East Block

Host rocks – upper greenschist facies
pelitic schist (locally sheared)

psammitic schist (locally fractured
and veined)

F2 metamorphic folds



F3 folds (late metamorphic)



Kink folds (late/post metamorphic)



Cap Burn Fault Zone



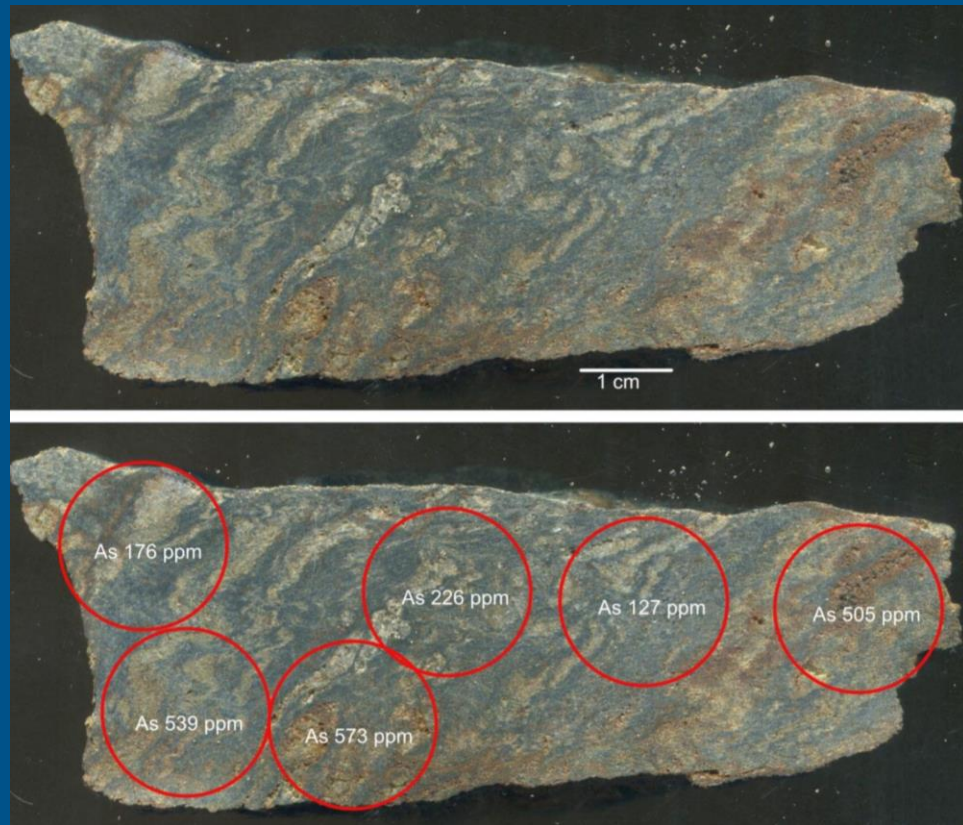
East Block – Silicified Breccias with sulphides



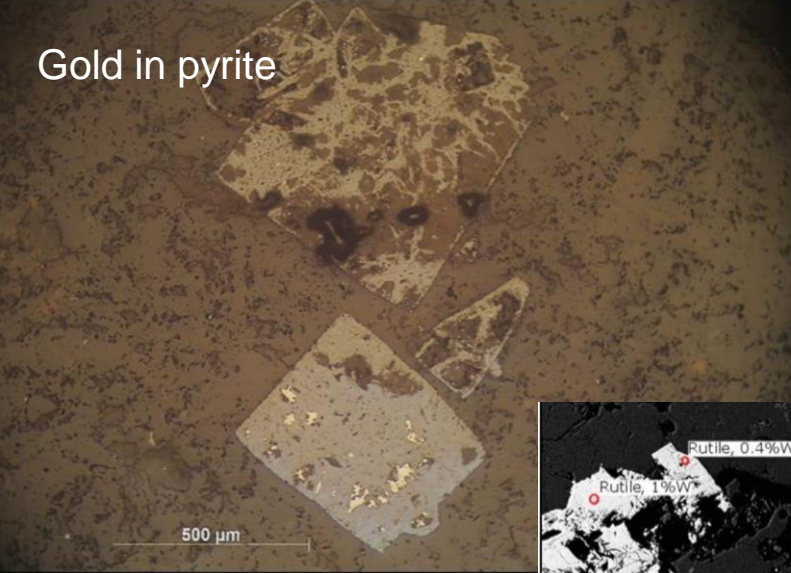
East Block – Arsenic-rich brittle fractures
overprinting kink folds



Sheared schist with elevated As

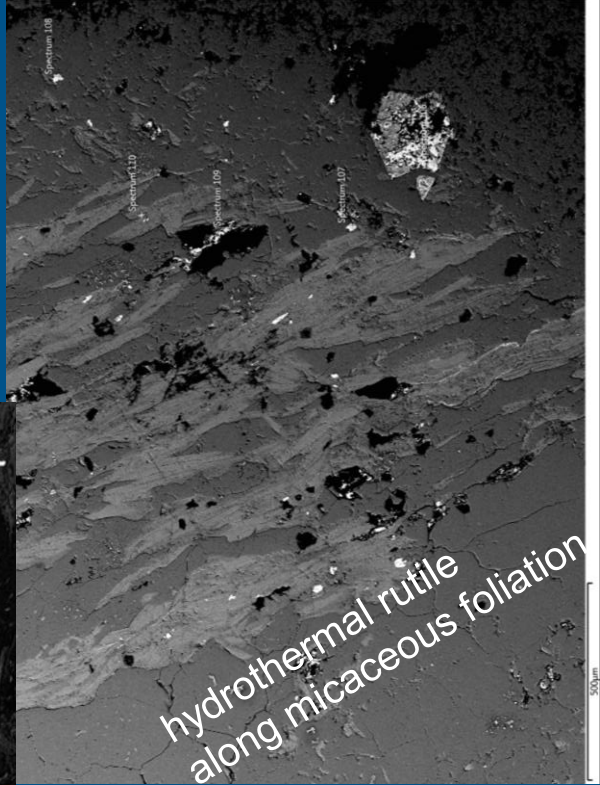
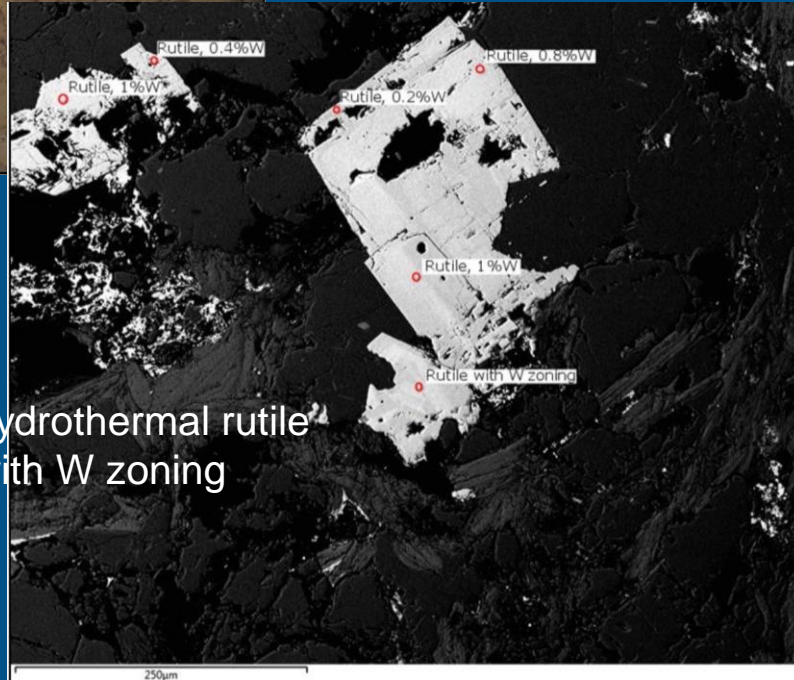


Gold in pyrite



East Block
mineralized schist
with
rutile alteration

hydrothermal rutile
with W zoning



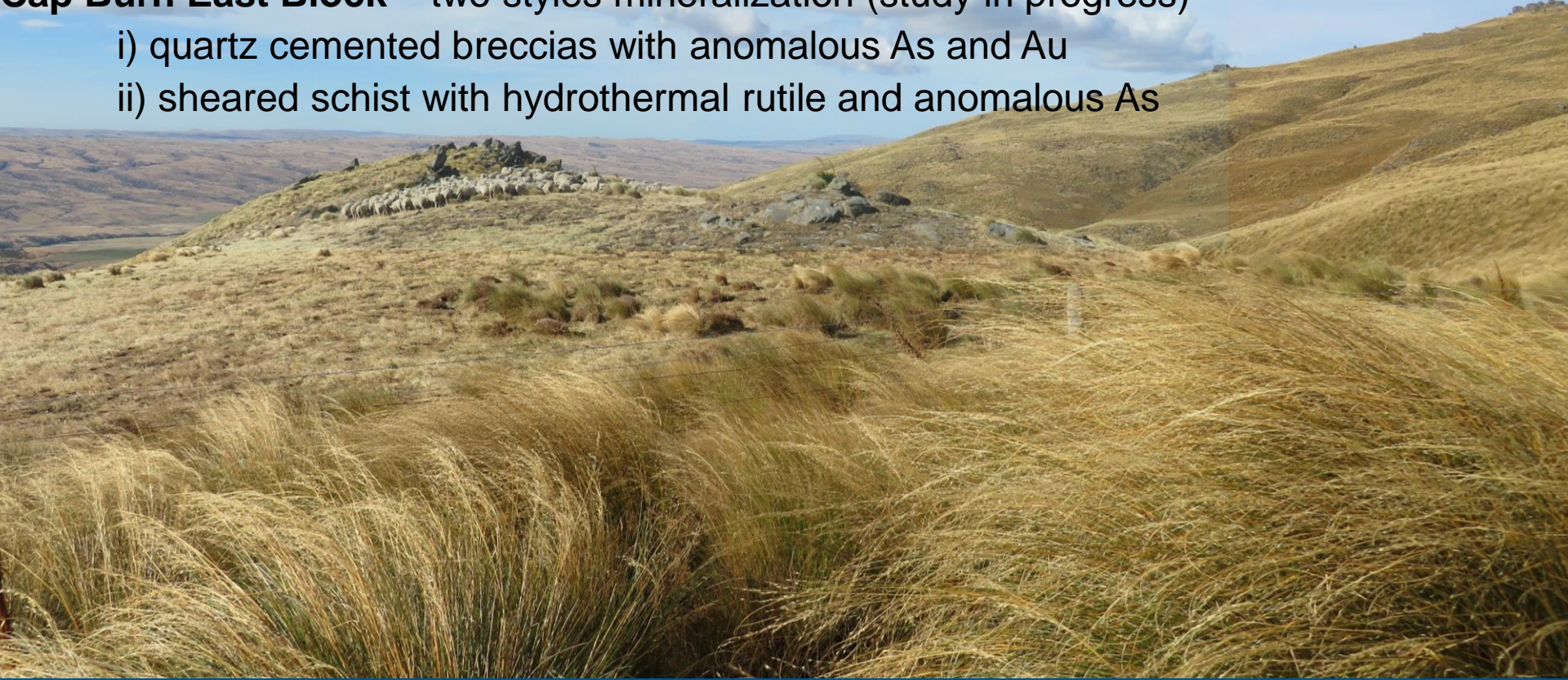
Conclusions

Cap Burn West Block – fault controlled Au-arsenopyrite and Au-stibnite quartz veins

Cap Burn East Block – two styles mineralization (study in progress)

i) quartz cemented breccias with anomalous As and Au

ii) sheared schist with hydrothermal rutile and anomalous As





Contrasting styles of mineralization along the Cap Burn Fault, East Otago, NZ

Doug MacKenzie¹, Kerry Stanaway² William Gray¹ and Alicia McKean¹

¹ University of Otago, Geology Department, Dunedin

² Mineral Rangahau Ltd., Auckland



New Zealand

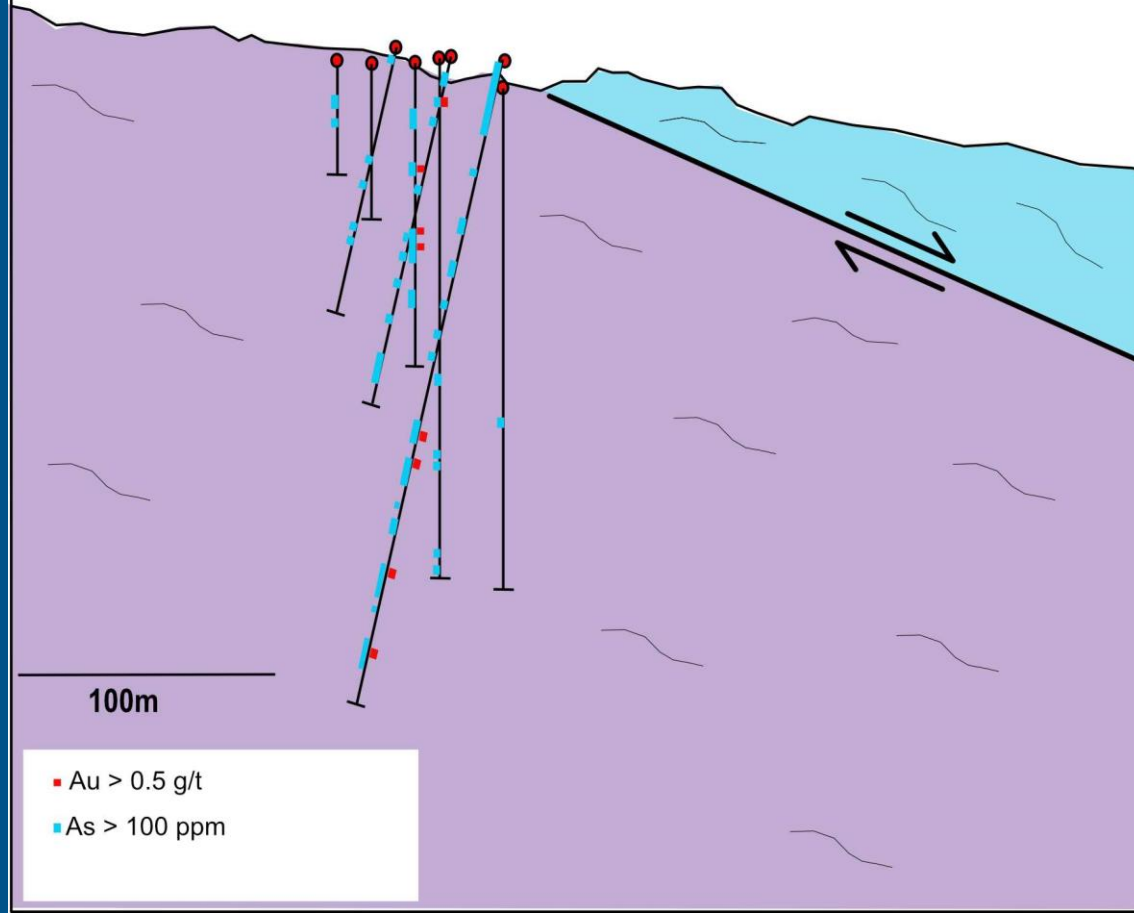
AusIMM New Zealand Branch Annual Conference - Enabling a Sustainable Future

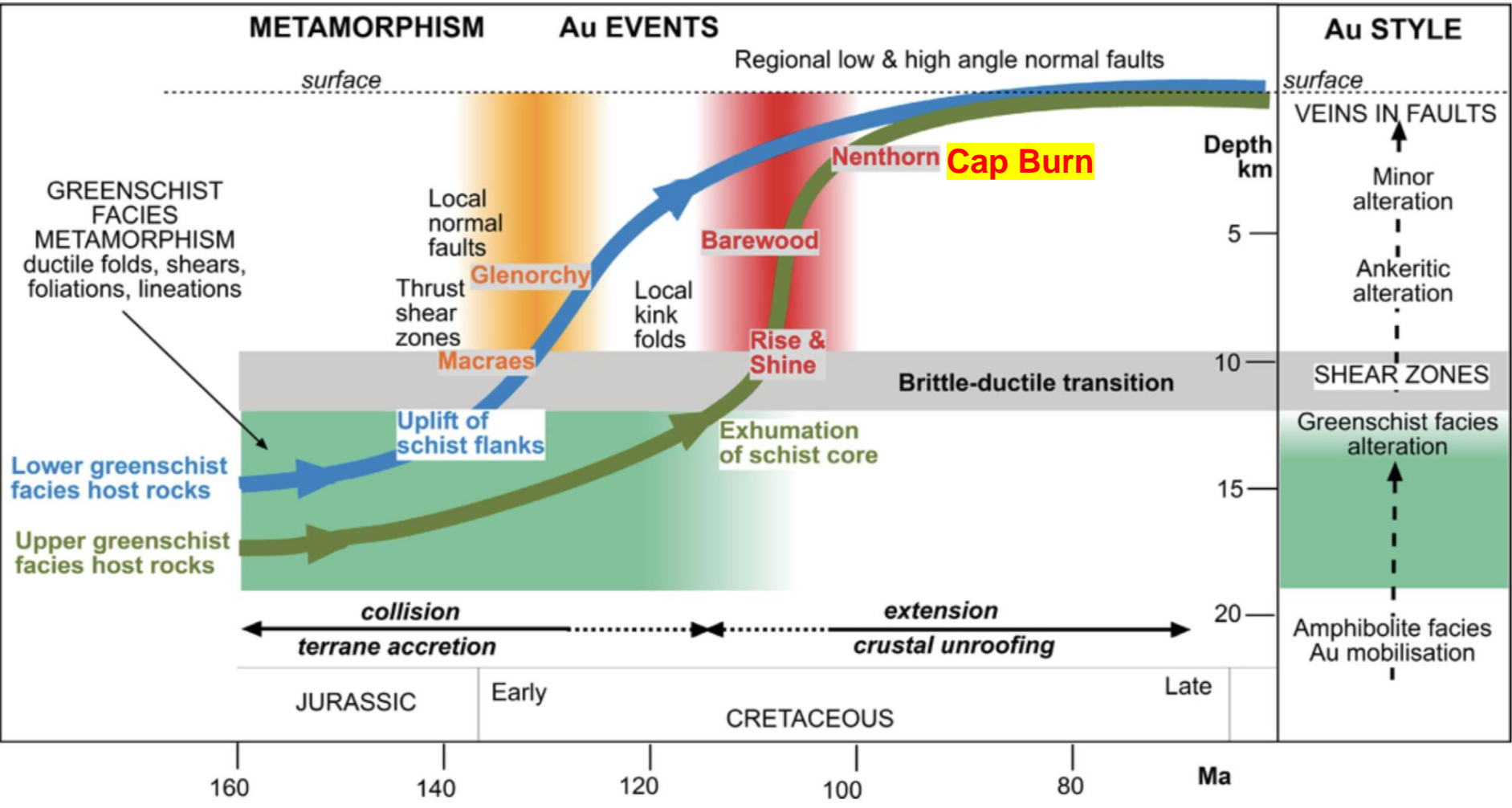
20 - 22 August 2023
Rydgas Latimer Christchurch

SW

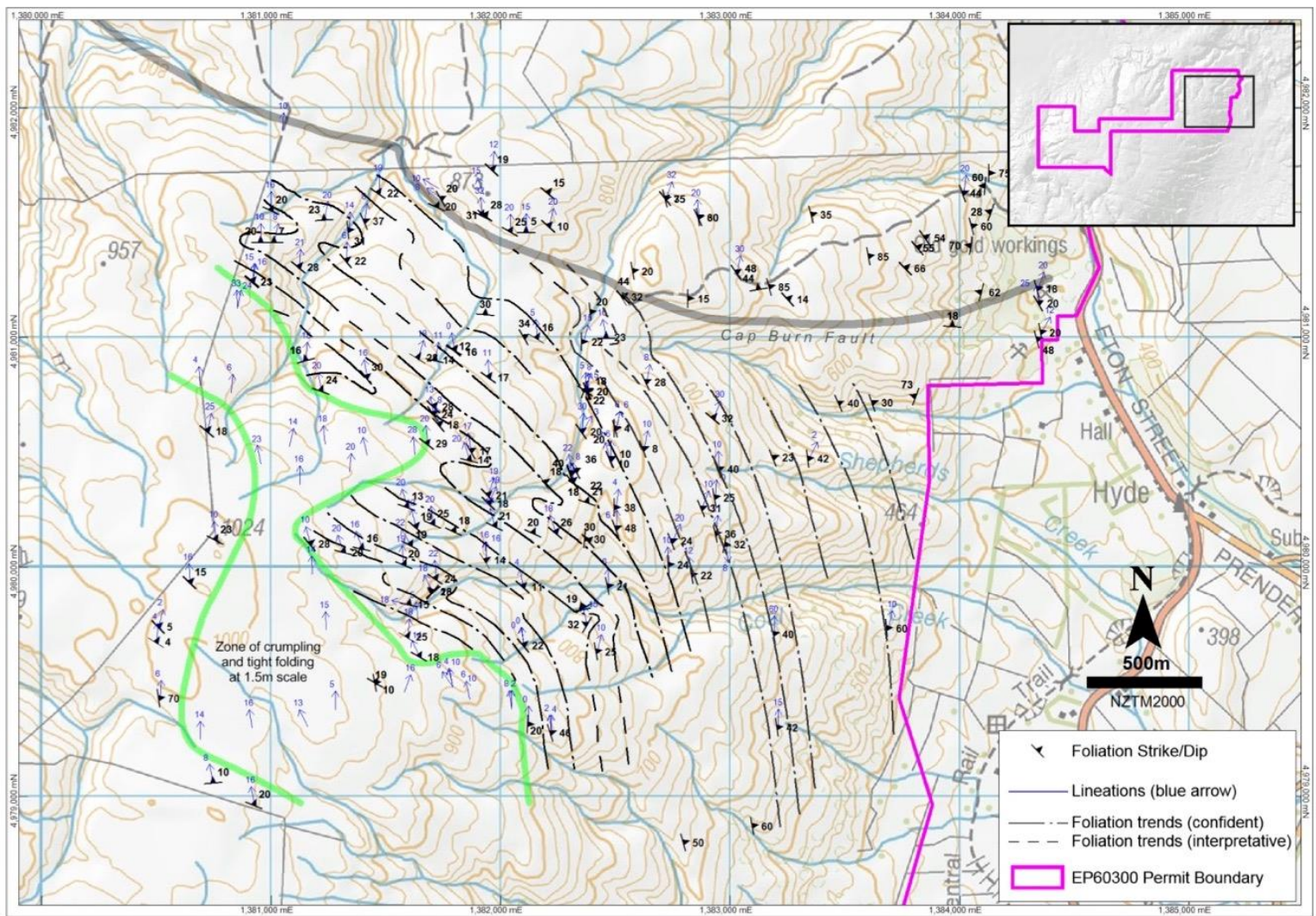
Cap Burn Fault - East Block

NE





modified Craw et al. 2006 and Mortimer et al. 2016

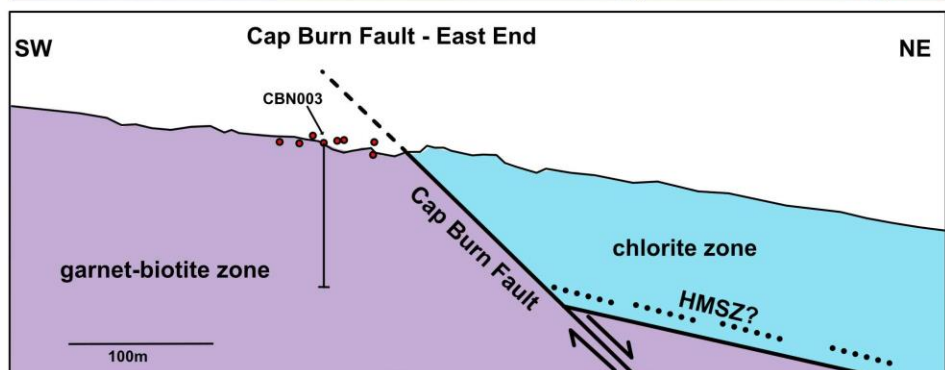
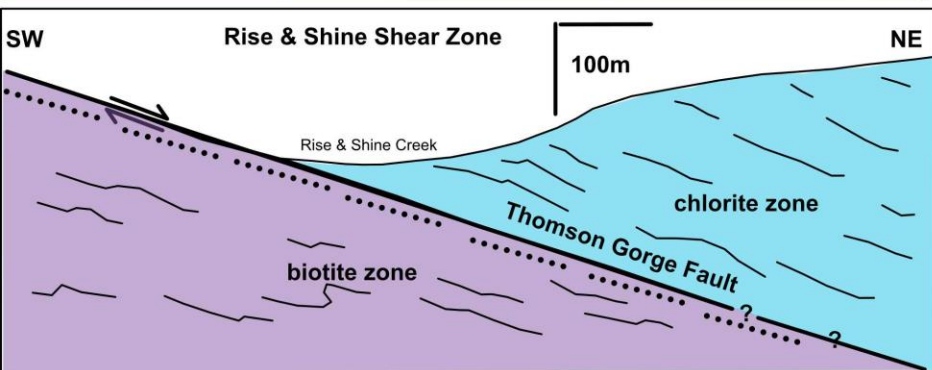
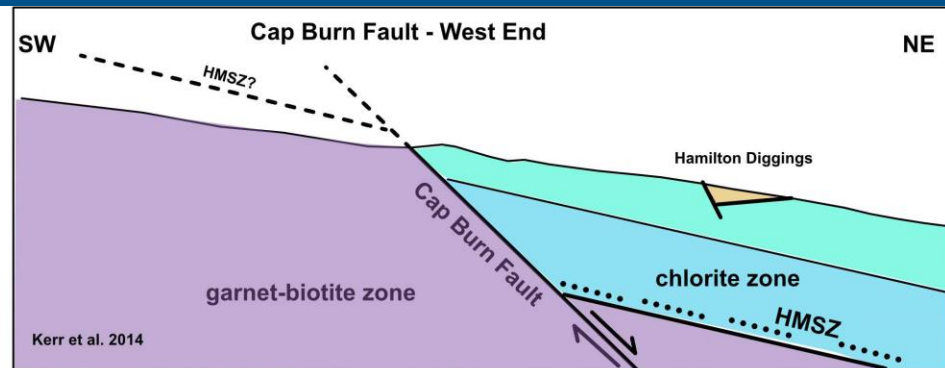
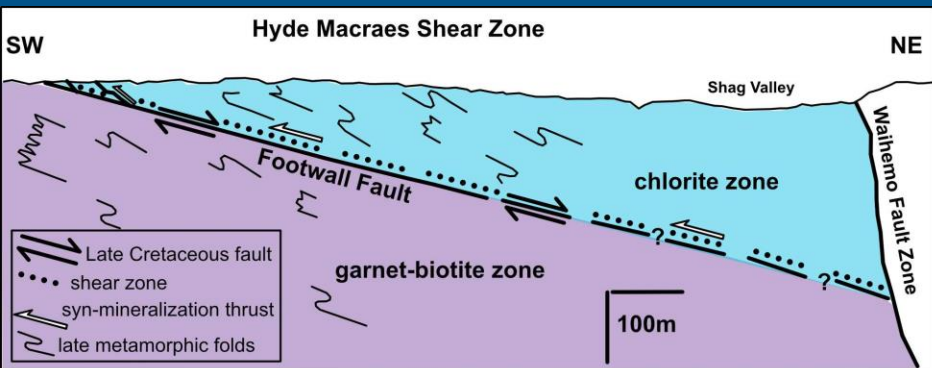


Zone of crumpling and tight folding at 1.5m scale

- ▲ Foliation Strike/Dip
- Lineations (blue arrow)
- - - Foliation trends (confident)
- - - Foliation trends (interpretative)
- █ EP60300 Permit Boundary

500m

NZTM2000





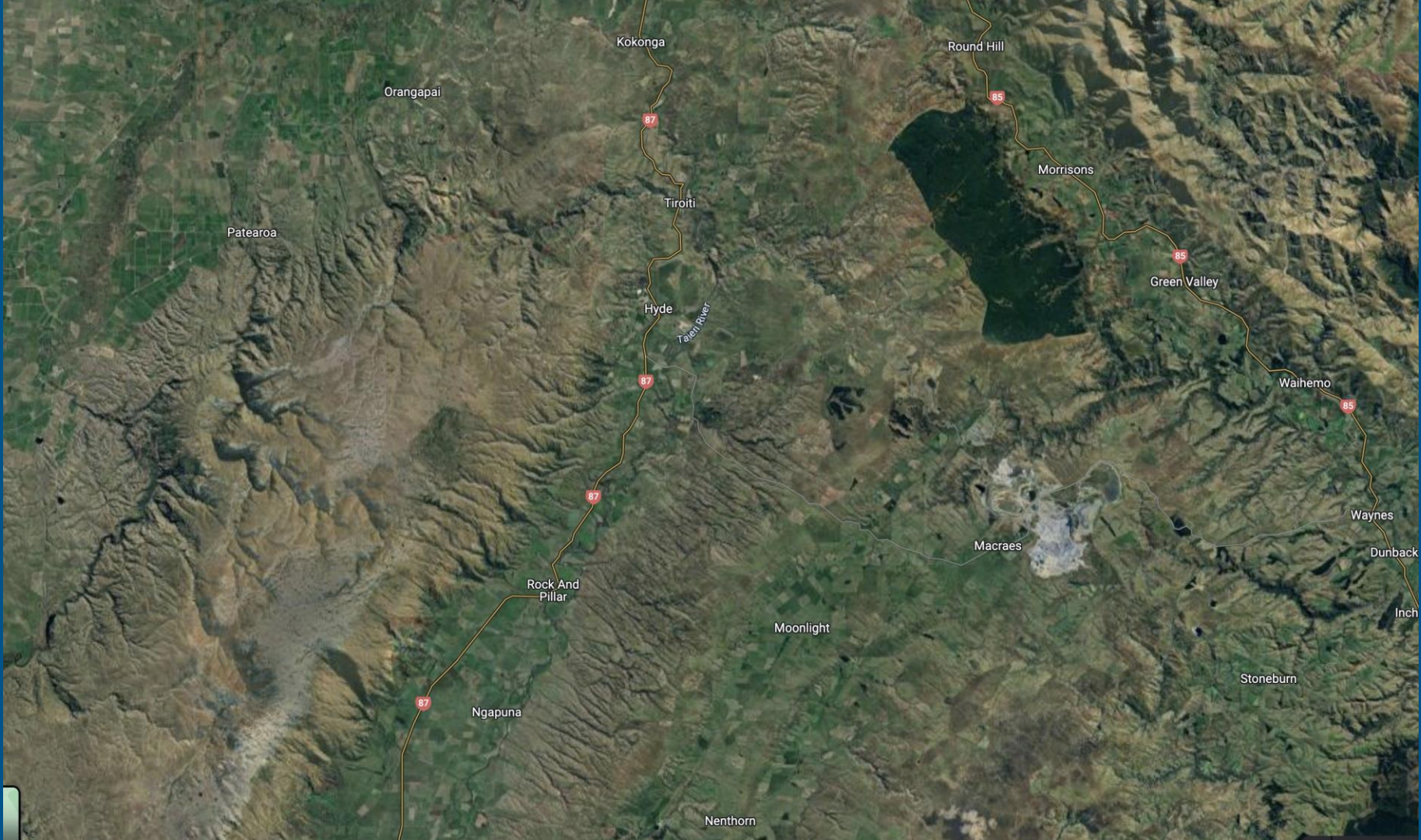
Capburn Fault

© 2019 Google
Image © 2020 CNES / Airbus

Google Earth

2008

Imagery Date: 11/11/2019 45°17'21.32" S 170°13'39.87" E elev 776 m eye alt 2.76 km



Kokonga

Round Hill

Orangapai

Morrison's

Patearoa

Tiroiti

Green Valley

Hyde

Tairāwhiti River

Waihero

87

85

Waynes

Macraes

Dunback

Rock And Pillar

Moonlight

Inch

87

Ngapuna

Stoneburn

Nenthorn