

Finding another Morning Star

Peter Jackson

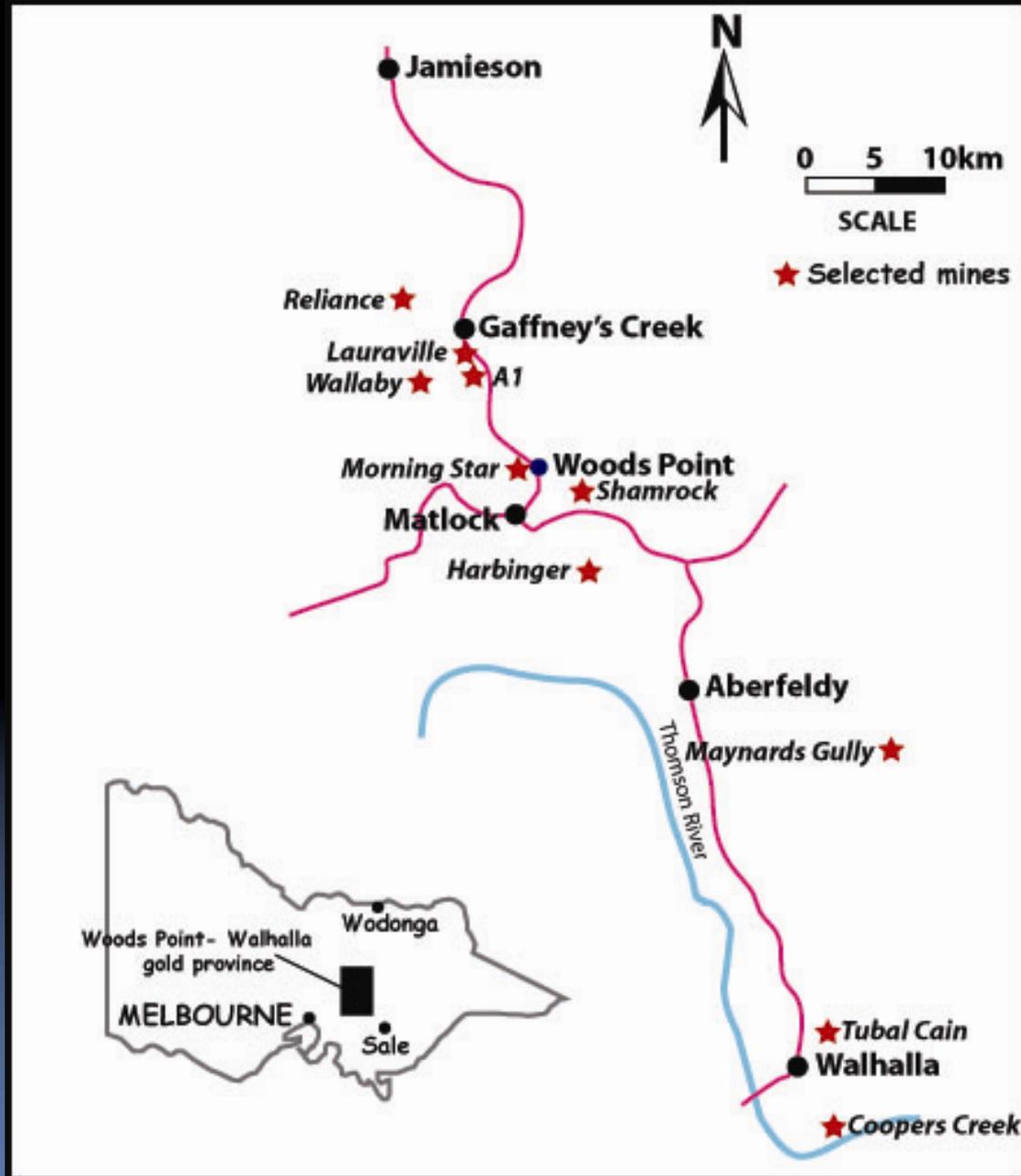
Morning Star Gold NL

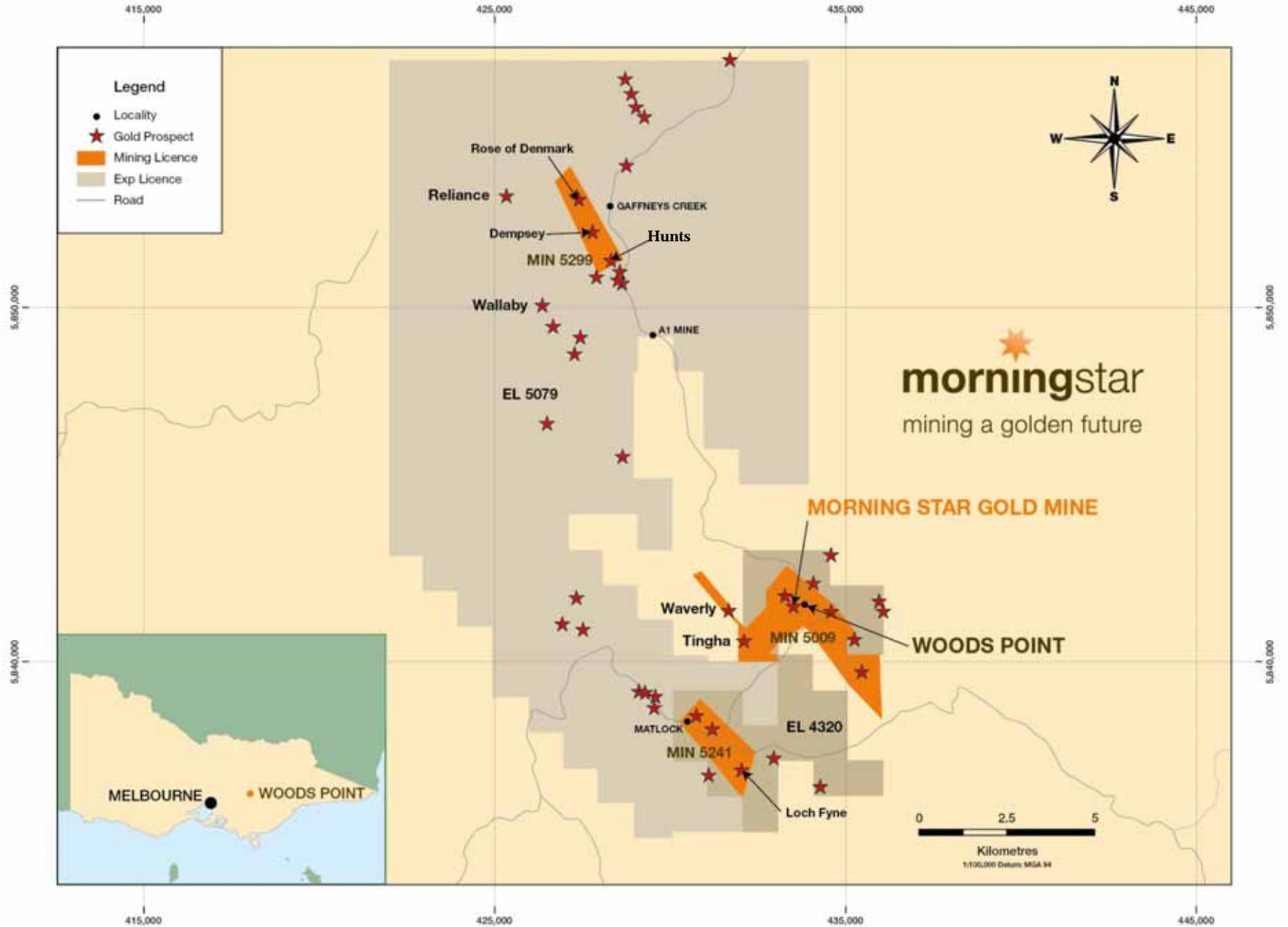


Introduction

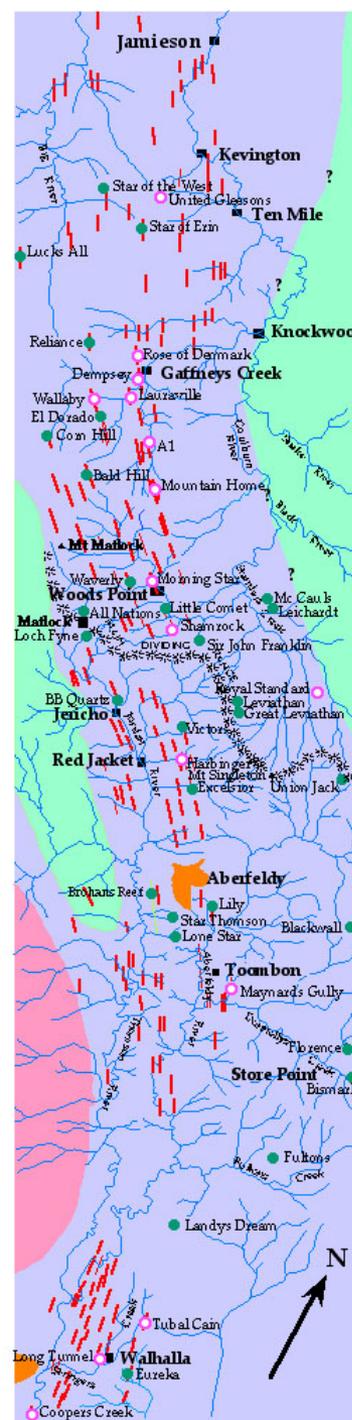
- Morning Star mine → one of >200 mines in the Walhalla -Woods Point gold province
- Mine produced >850,000 oz of gold (1862 – 1960)
- Gold occurs in dyke bulge-hosted quartz reefs
- Dyke bulge is ~450 metres long with a maximum width of 100 metres
- Dyke composition dominantly gabbro
- Bulge formed by multiple intrusions

Location map





Geological map of Walhalla synclinorium (after Junner 1920)



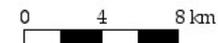
Walhalla - Woods Point

Gold Province

LEGEND

TERTIARY		alkali basalt
DEVONIAN		Baw Baw granodiorite
LOWER DEVONIAN		Walhalla Group sediments
SILURIAN		Jordan River Siltstones
		dykes
		mines
		study areas
		historical towns
		streams

SCALE



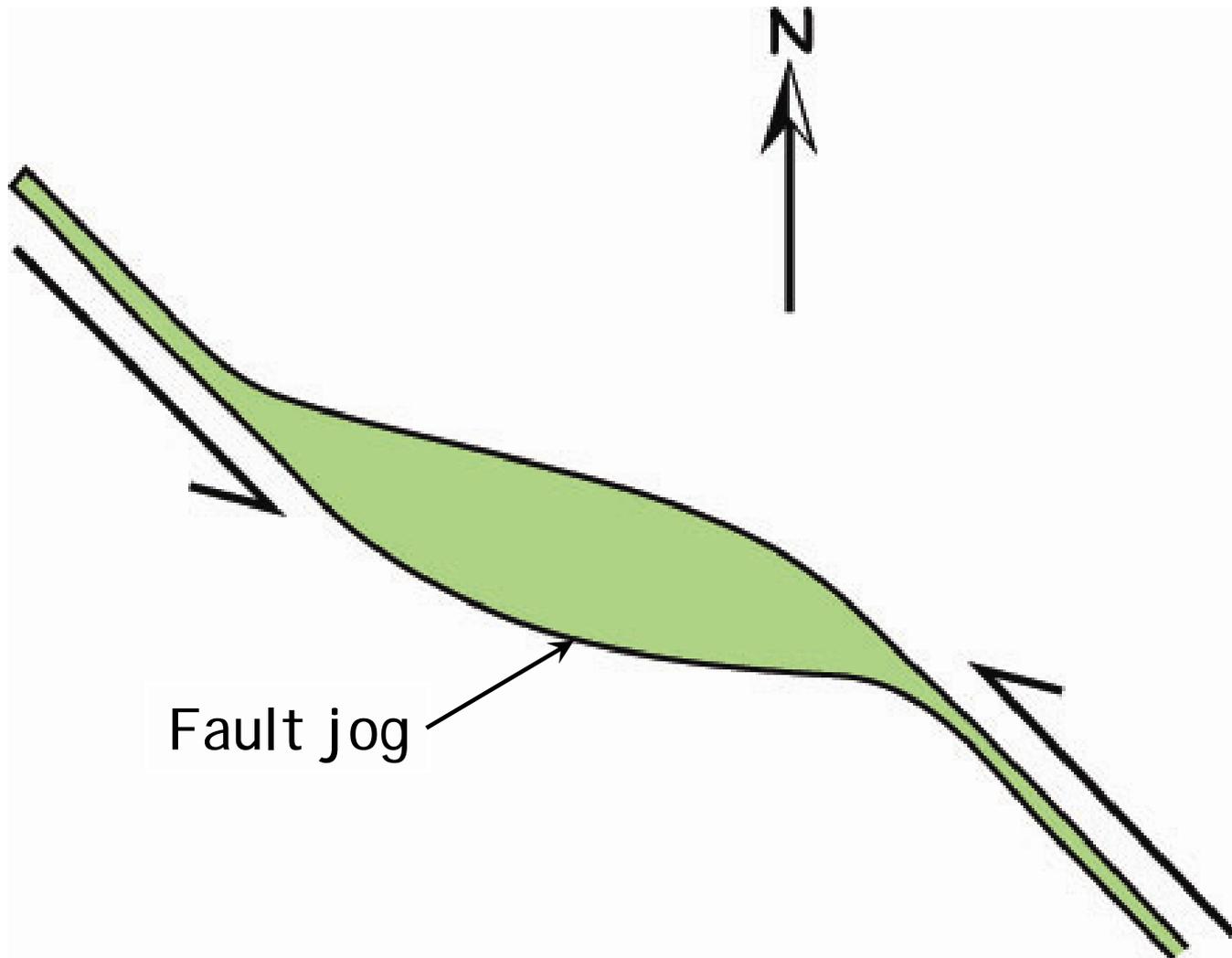
Structural history

- Rocks deformed during Middle to Late Devonian, Tabberabberan Orogeny
- Two sequential stages in the deformation

Stage 1 Compressional → Uplift and folding

Stage 2 Transpressional → lateral faulting
(dyke intrusion)
→ reverse faulting

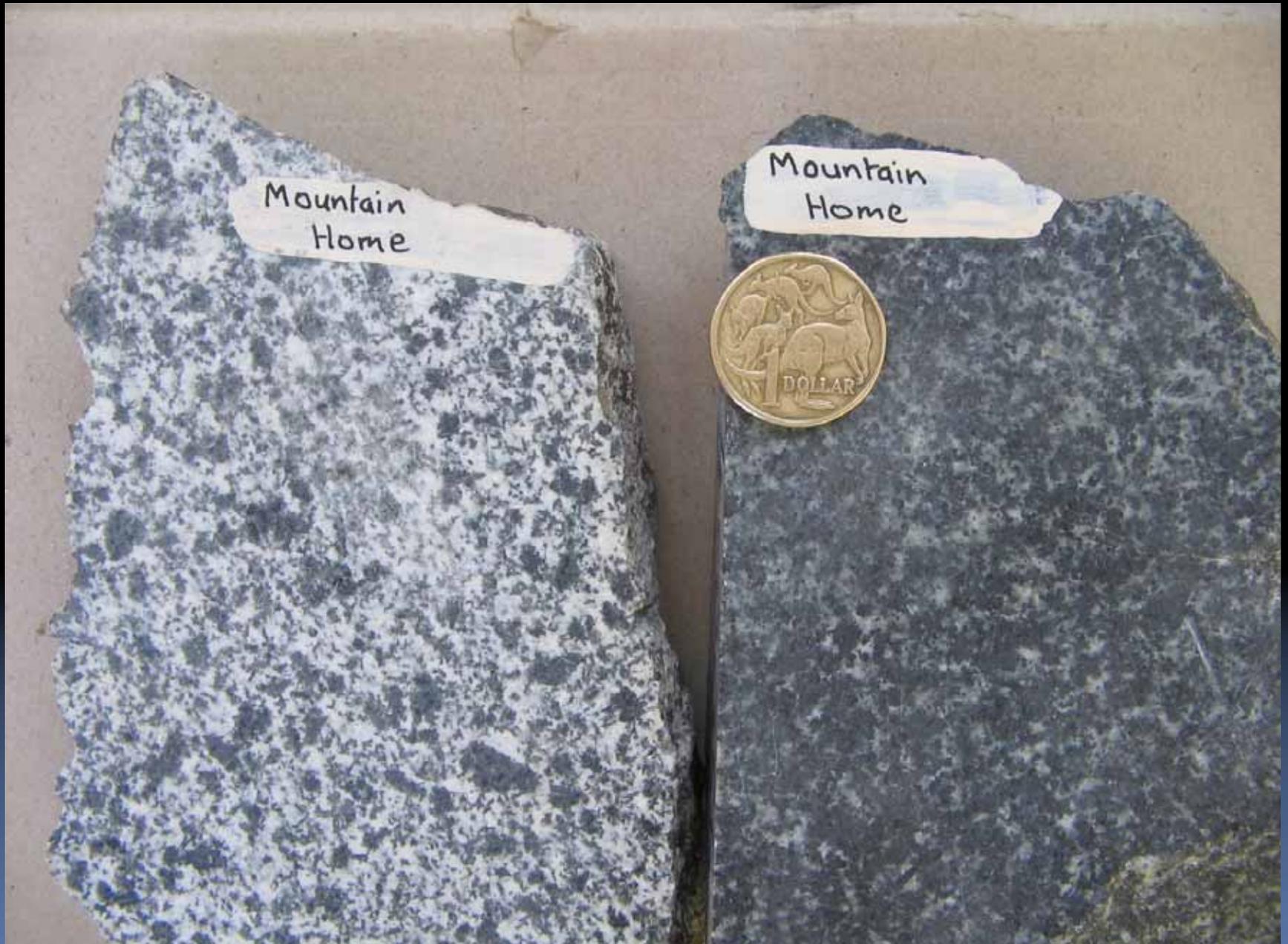
Formation of dyke bulge



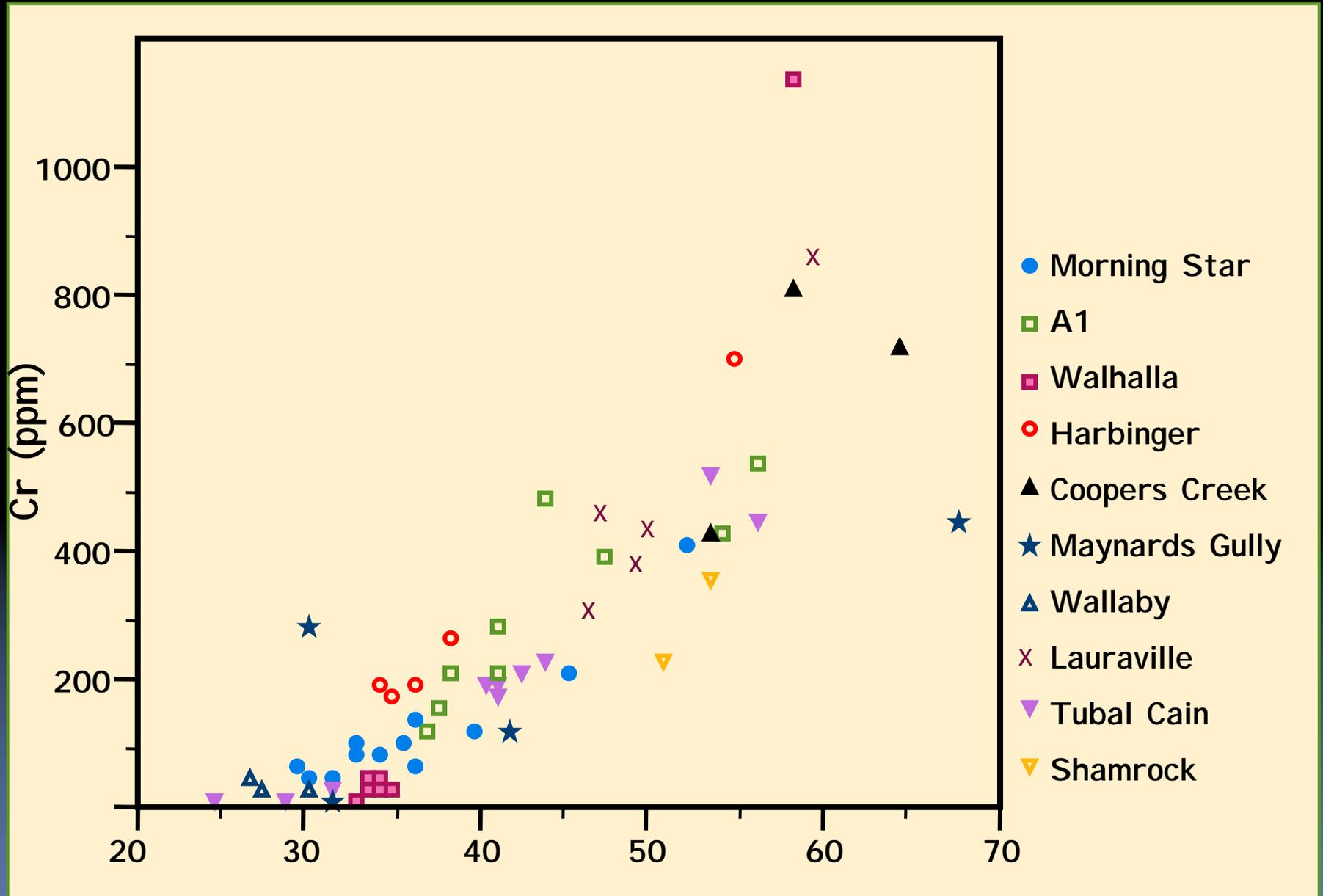
Dykes in the Woods Point dyke swarm

- Sub-parallel to regional strike (few cm to >100m wide)
- Age of dykes Late Middle-Early Upper Devonian (Marsden 1976)
- Compositions
 - hornblende peridotite
 - hornblende pyroxenite
 - hornblende gabbro
 - gabbroic diorite
- Dyke bulges → composite

Contrasting dyke phases, Woods Point



Cr v Mg No. variation diagram for selected Woods Point dykes



Metasomatic alteration

- Deuteric alteration → chlorite, sericite, actinolite, prehnite, carbonates and leucoxene.
Intensity increases with fractionation.
- Alteration enveloping veins → moderate to intense carbonate alteration, advanced sericitisation, weak to strong pyritisation.

Wallrock alteration

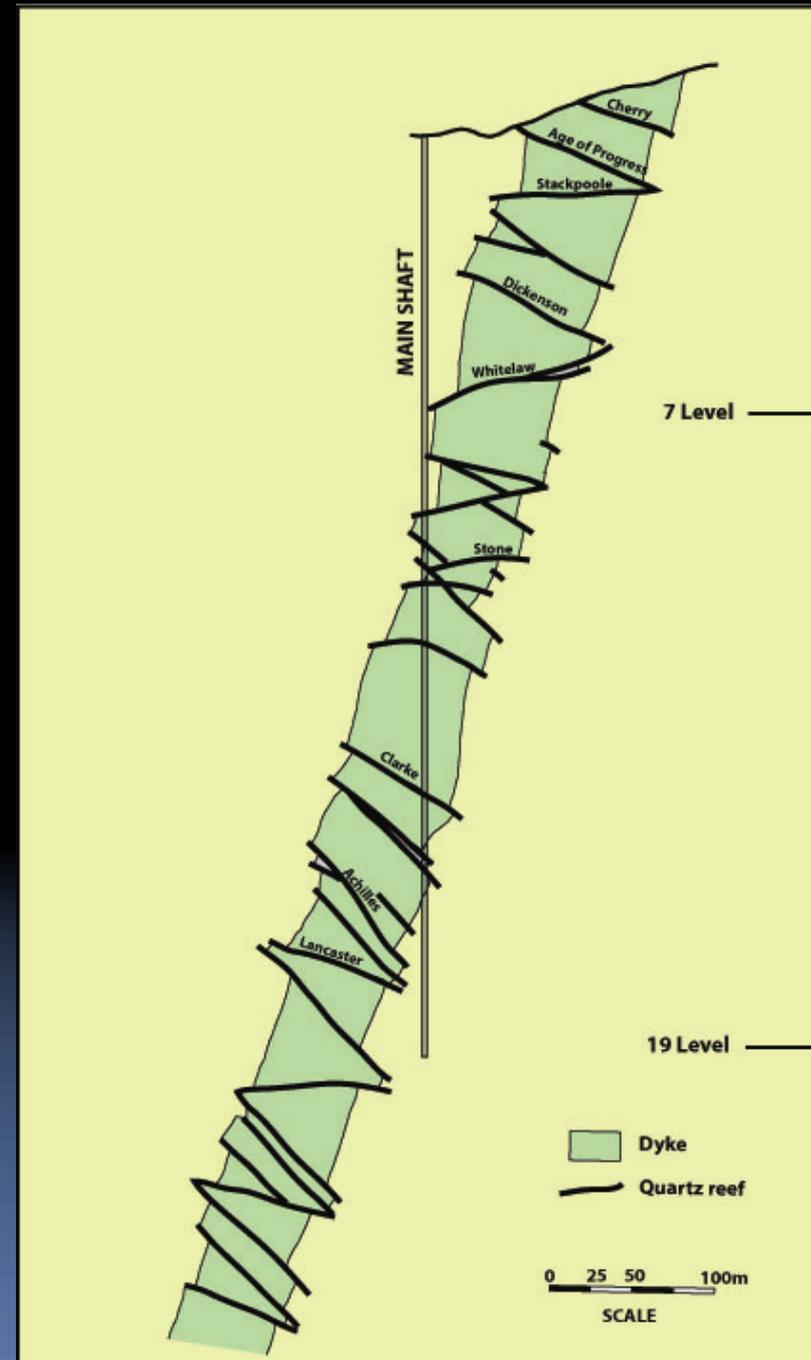


Mineralisation

- Gold → dyke-hosted, quartz-ankerite reefs and along dyke contacts
- Accessories → pyrite, arsenopyrite, boulangerite, tetrahedrite
- One side of the dykes normally preferentially enriched



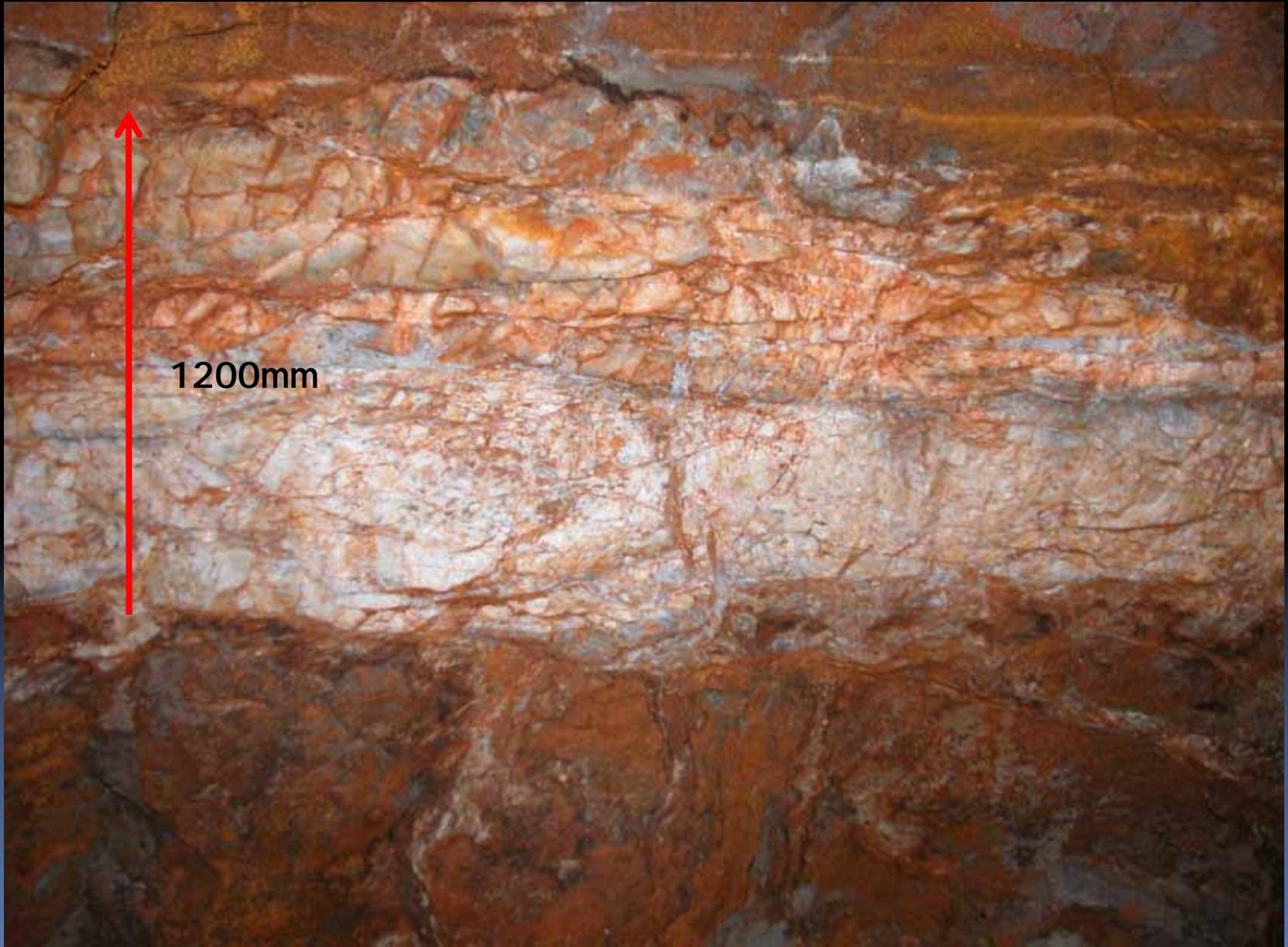
Cross-section through the Morning Star dyke looking NW (modified from McAndrew 1965)



Reef types

- (1) Massive, vuggy quartz reefs
- (2) Laminated reefs
- (3) Stockwork reefs
- (4) Breccia reefs
- (5) Composite reefs

Massive quartz reef



1200mm

Composite laminated/breccia reef, Morning Star



Coarse stockwork transitional to breccia reef



Breccia reef, Morning Star mine



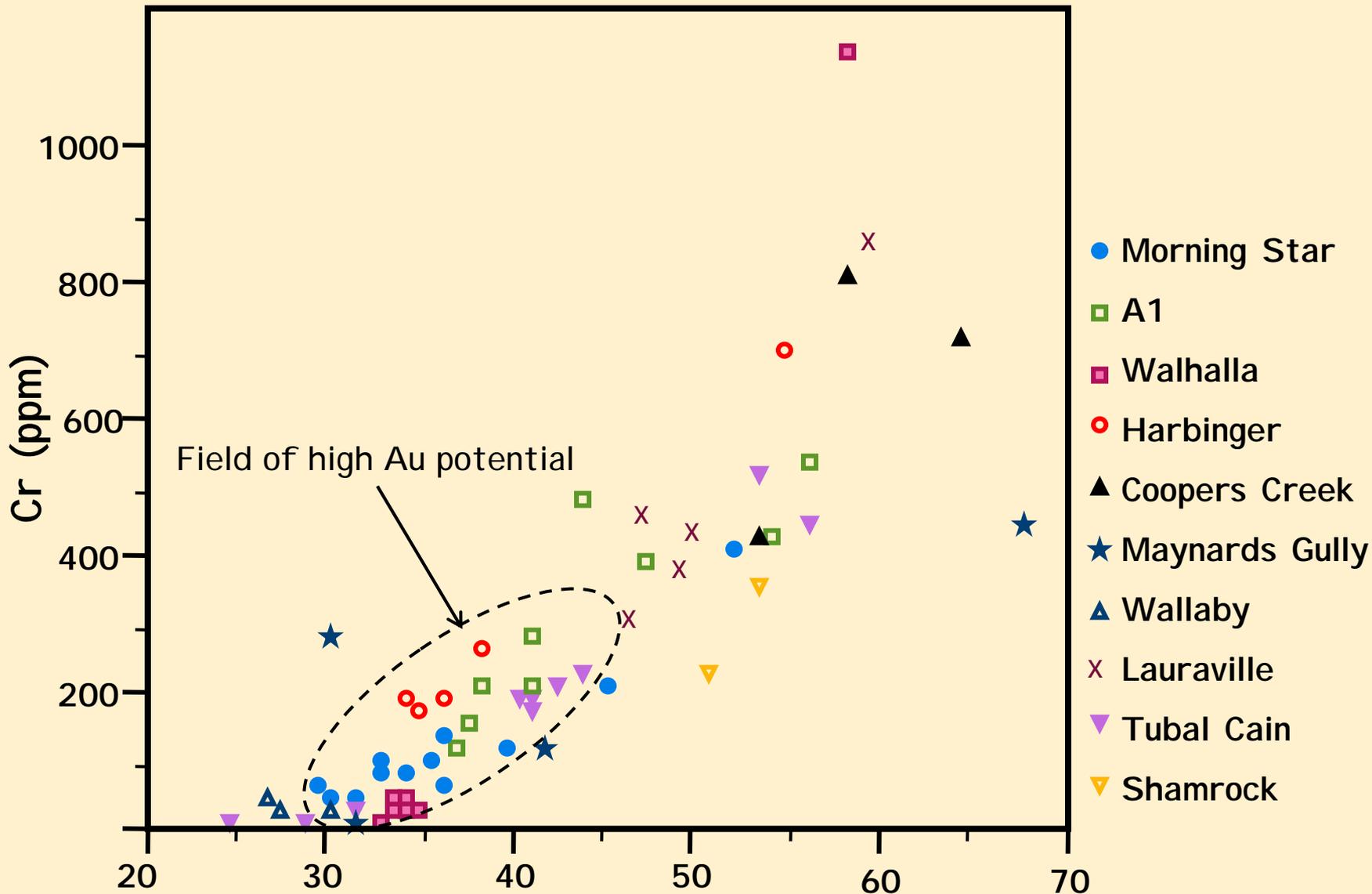
Exploration model

Spatial relationship between Au mineralisation and dykes.

The following features are considered to be favorable in exploring for dyke-hosted gold deposits in the Woods Point dyke swarm

1. Evolved (felsic) dyke compositions
2. Offset or inflection in dyke trend
3. Pyrite halo in surrounding sediments

Cr v Mg No. variation diagram for selected Woods Point dykes

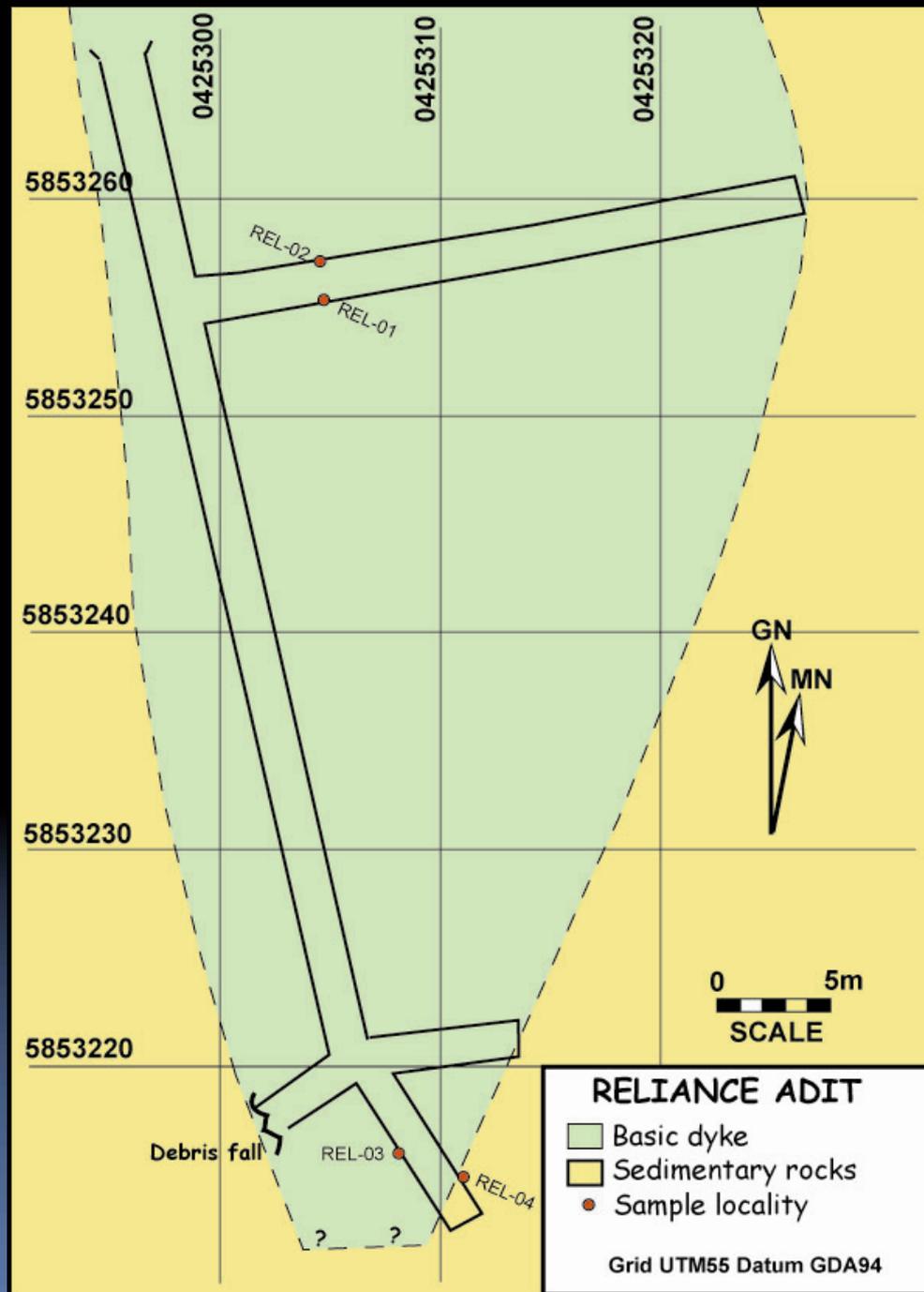


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RELIANCE ADIT

- Basic dyke
- Sedimentary rocks
- Sample locality

Grid UTM55 Datum GDA94

Reliance adit

