Aspects of folding and cleavage

S_0

Sericitic axial-plane fabric

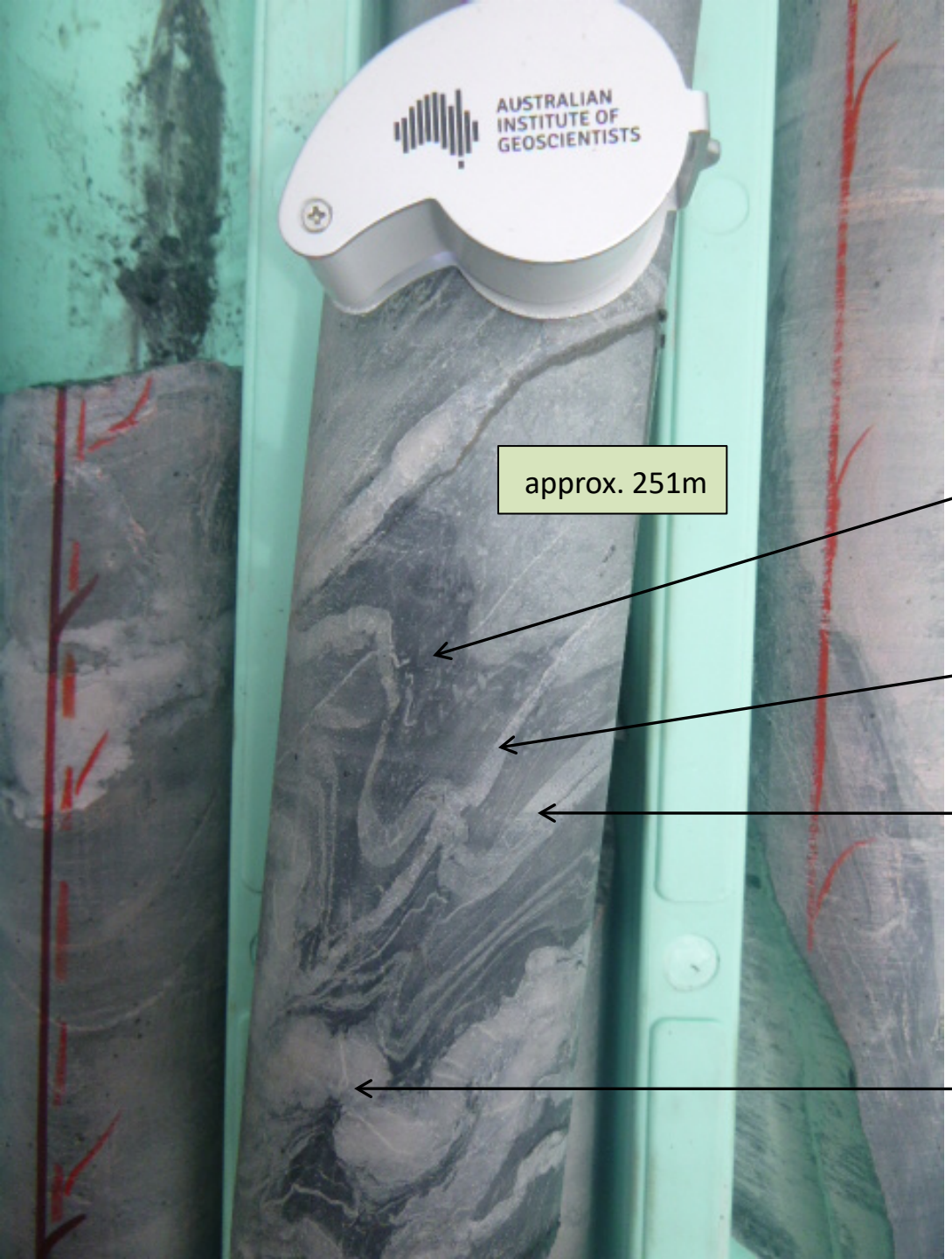
Chloritic veins sub-parallel to sericitic veinlets apparently following axial-plane of fold with reversed vergence

Chloritic vein displaced by chloritic vein following axial plane fabric

Chloritic veins follow axial-planes

Commentary

Yellow-green (sericitic) fabric, not seen below Dylan's reef (circa 89-92m depth), is domainal and maybe a second fabric (S2). It is accompanied by chloritic veining. The evidence of this and chloritic veins axial-plane to a fold of reversed vergence may be consistent with these folds being late kink folds as is common throughout the Mathinna Group.



Commentary

Asymmetric folding of bedding and early quartz veins produces slaty cleavage accompanied by axial-plane quartz tension gashes and fine veinlets of quartz, some of which show congruent microfolds to folds in S_0.

Microfolded axial-plane quartz veinlet; Indicative of late flattening?

Axial plane quartz tension fracture

Folded bedding (S_0); axial plane fabric is the S_1 slaty cleavage conferred by // orientation of micas & fine veinlets of quartz

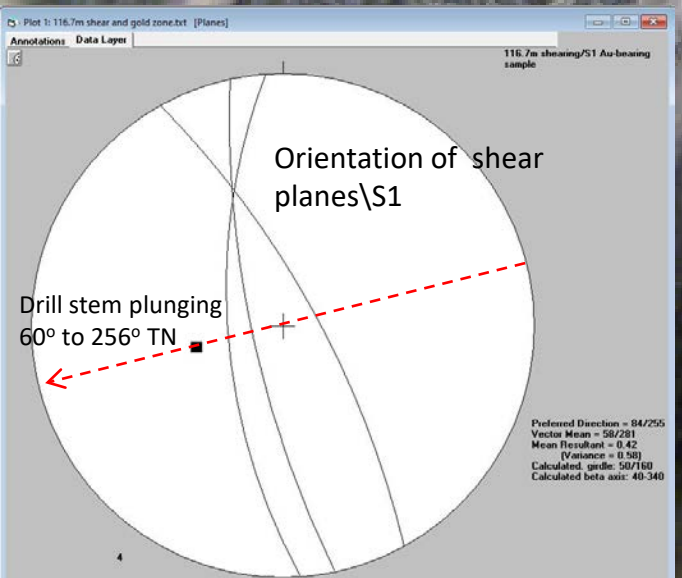
Folded quartz vein with calcareous tension fractures (fine white fractures)

Visible Gold in MDD002

Gold grains in heavily veined sheared black (carbonaceous?) mudstone, area of 116-117m depth.

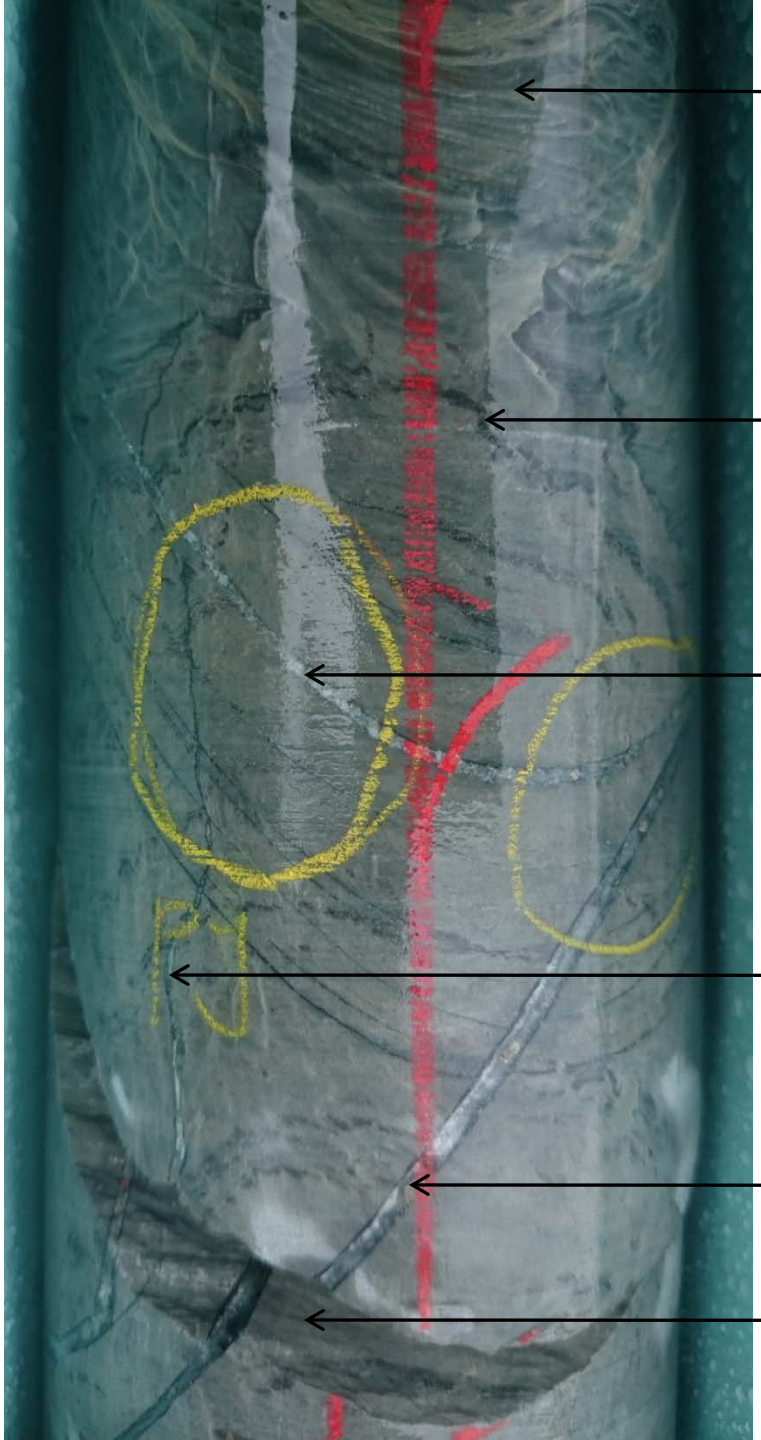
C-S fabric?

Area of gold grains



Vein relationships


Pyrite/arsenopyrite in quartz+calcite +chlorite
vein crosses S1 with no sign of deformation. HQ core.



Bedding

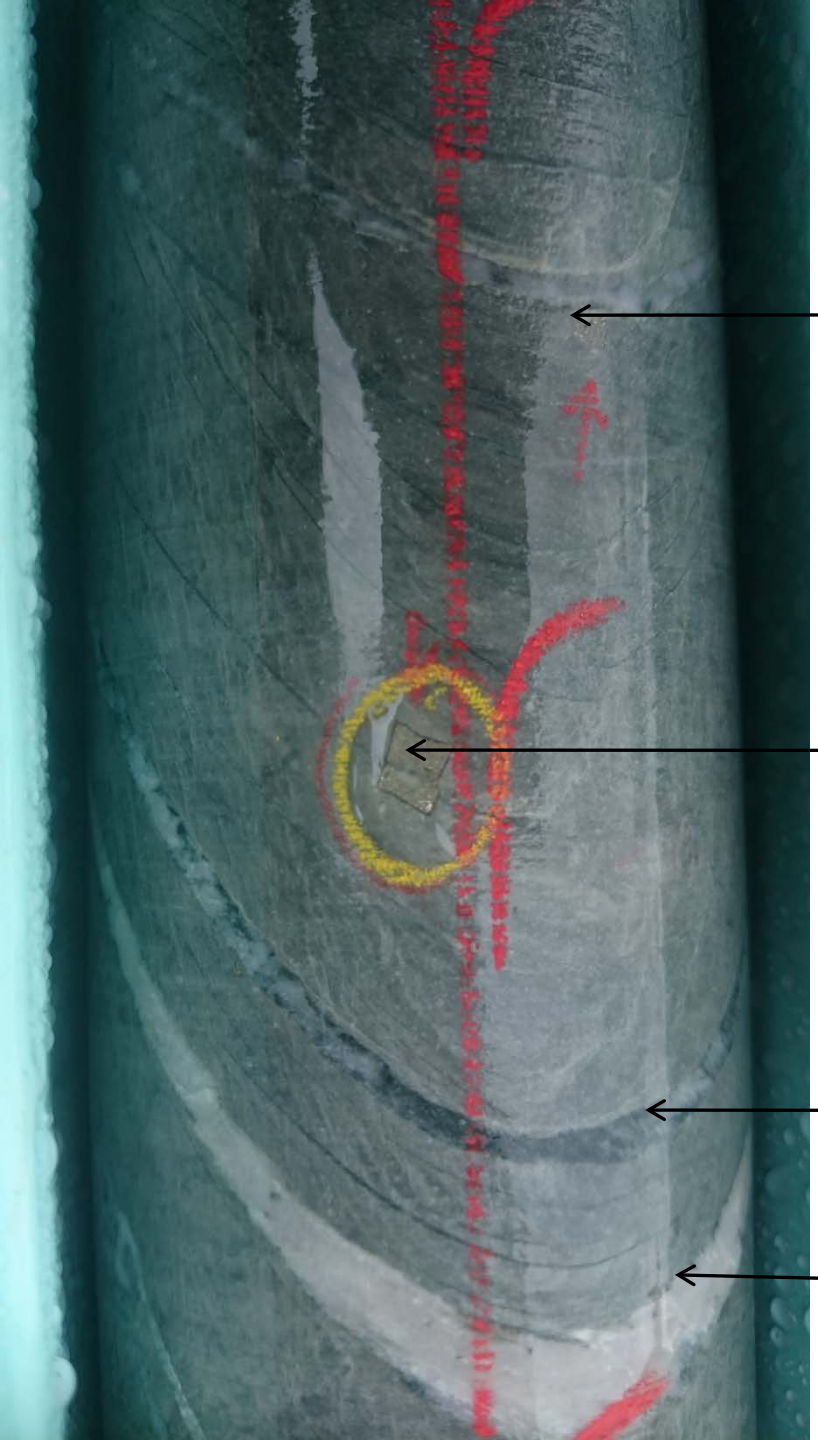
Chloritic vein

Quartz+calcite vein,
+\-pyrite+\-chloritic
selvage. Commonly
parallel to sub-parallel to S1

Chloritic vein developing quartz in
its core

Quartz+calcite vein,
commonly
+pyrite+chloritic selvage

Bedding-cleavage intersection lineation;L1/0

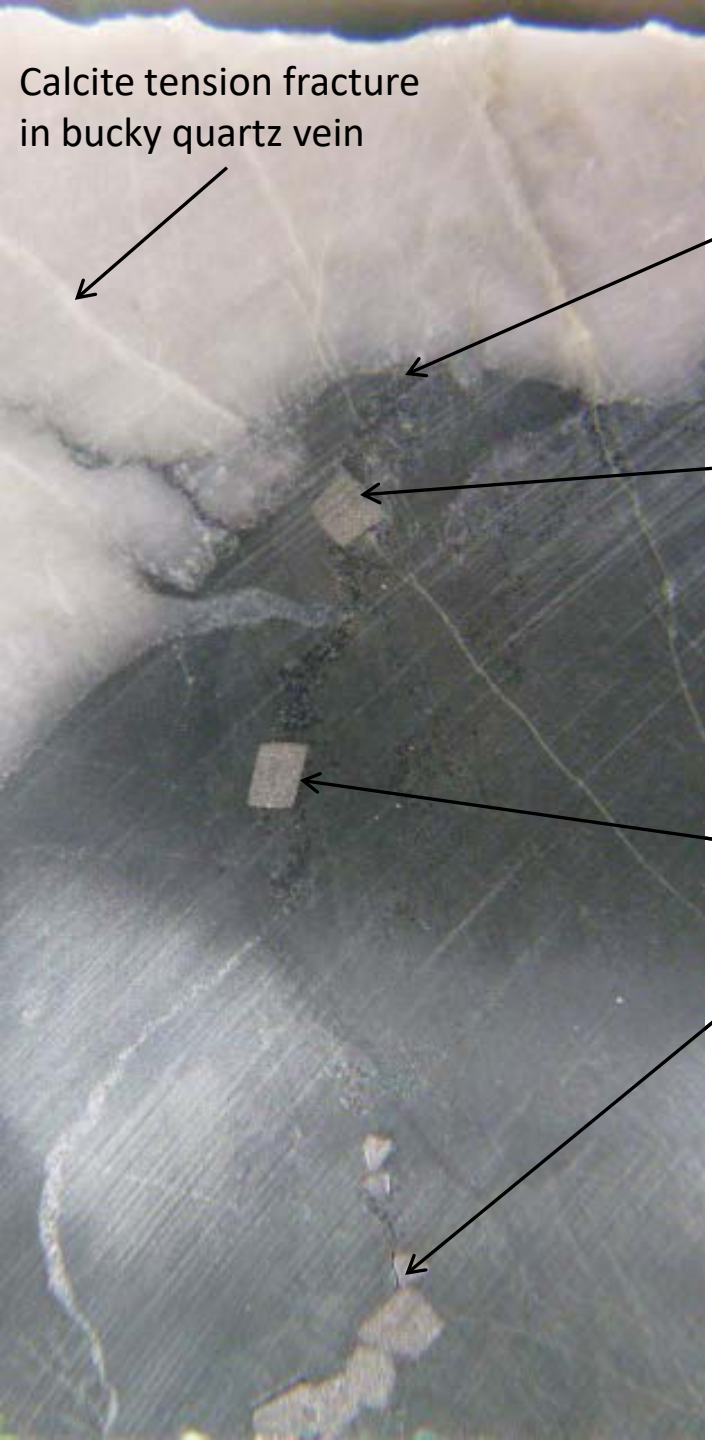


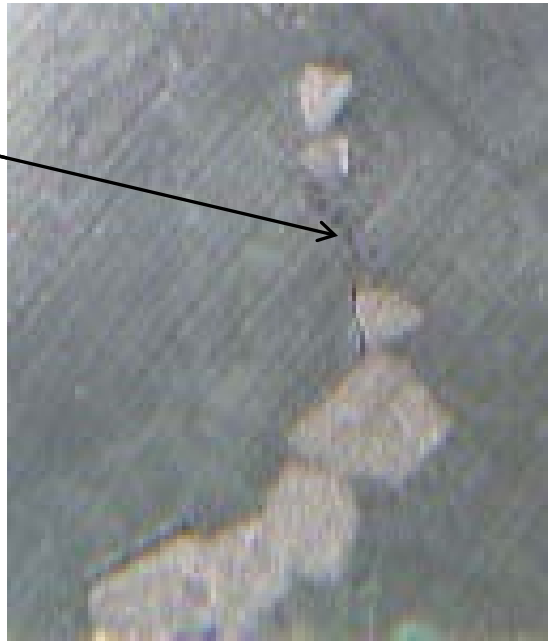
Pyrite+\- arsenopytite in quartz vein with chloritic selvage; these veins may carry calcite

Diagenetic? pyrite cut by fine chlotite+quartz vein; no evidence in core (pressure shadow etc) for deformation of pyrite during the S1 cleavage formation

Quartz+chlorite vein+\-sulphide+\-calcite

Quartz vein, tapered; tension fracture?


Calcite tension fracture
in bucky quartz vein
Bucky quartz vein cuts
What appears to be chloritic
fracture fill
Arsenopyrite cut by hairline
calcite or quartz veinlet
Arsenopyrite formed
in what appears to be
chloritic fracture-fill



Relationships at 319.13m

1) Formation of slaty cleavage (S1) during folding of bedding.

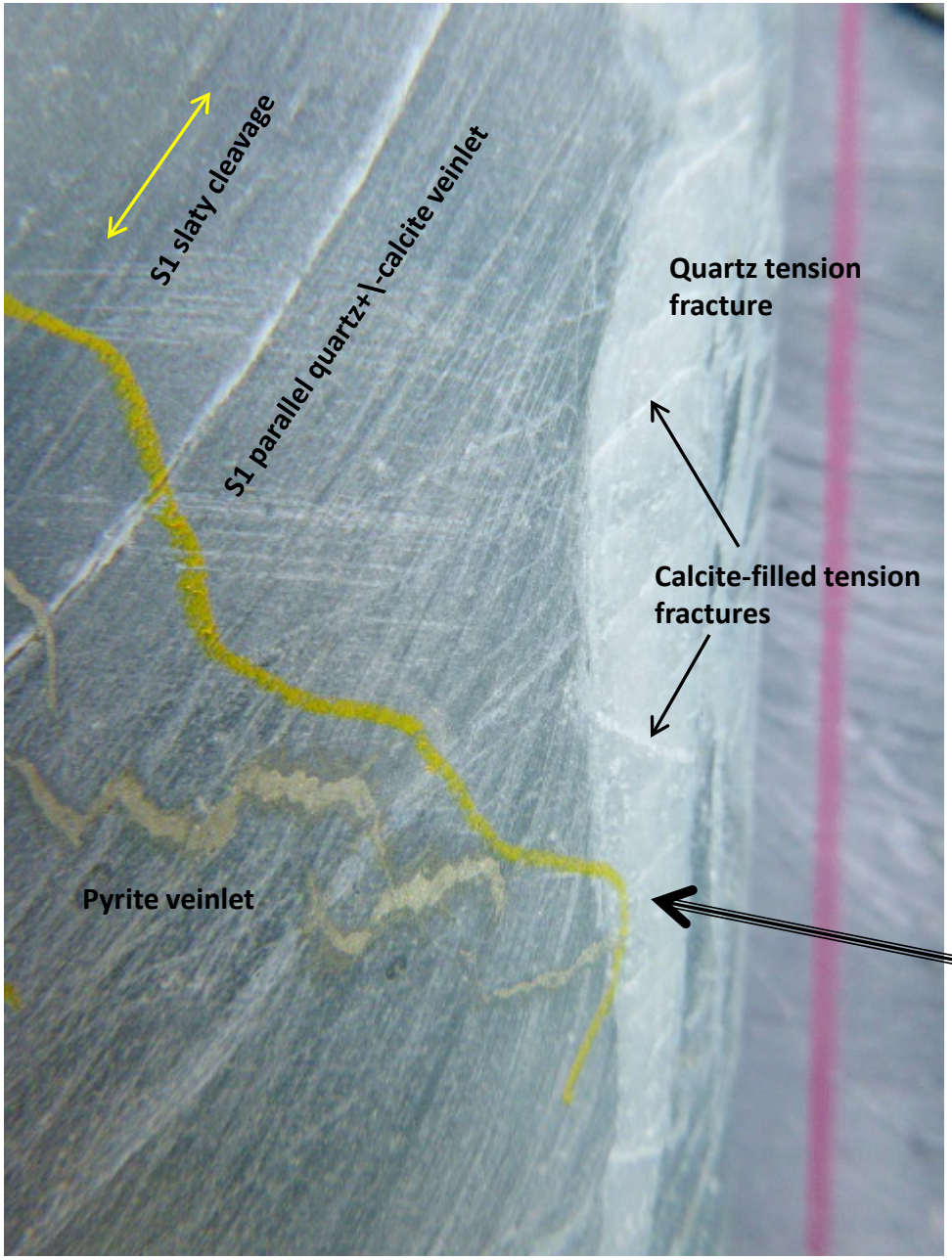
2) Syn-S1 quartz+\-calcite veining.

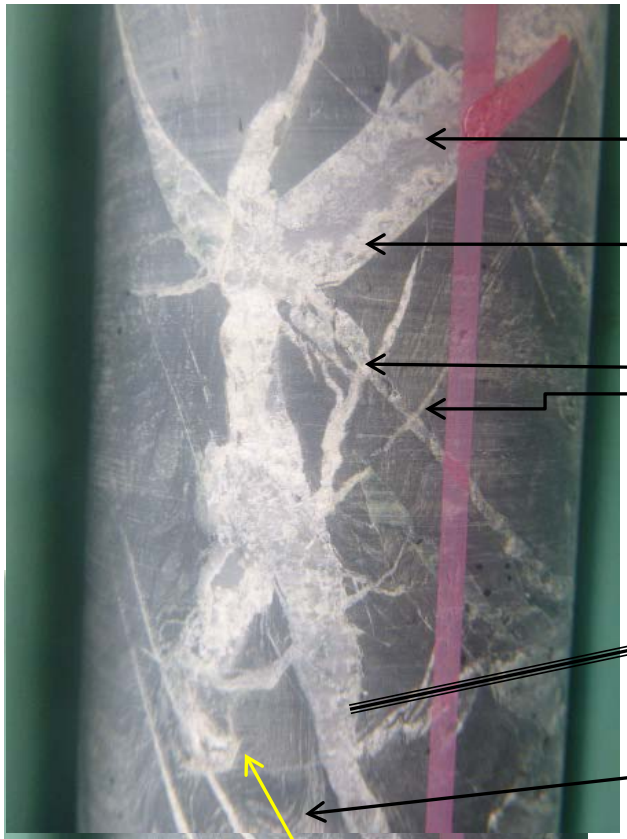
3) Introduction of pyrite veinlet.

4) Flattening across S1 and bucking of pyrite veinlet.

5) Formation of quartz tension fracture and

?6) Deformation of quartz tension fracture to allow calcite fill in consequent tension fractures.

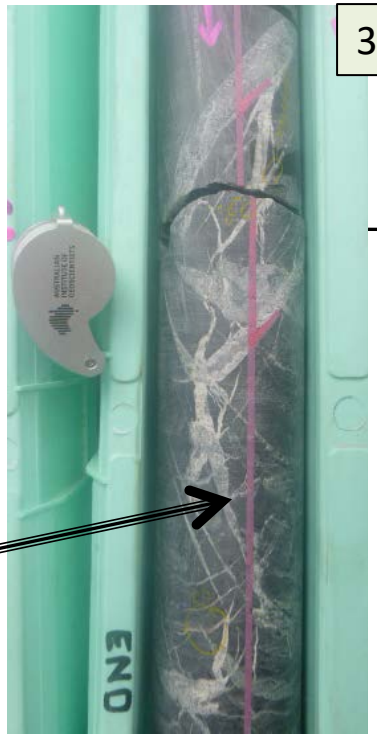




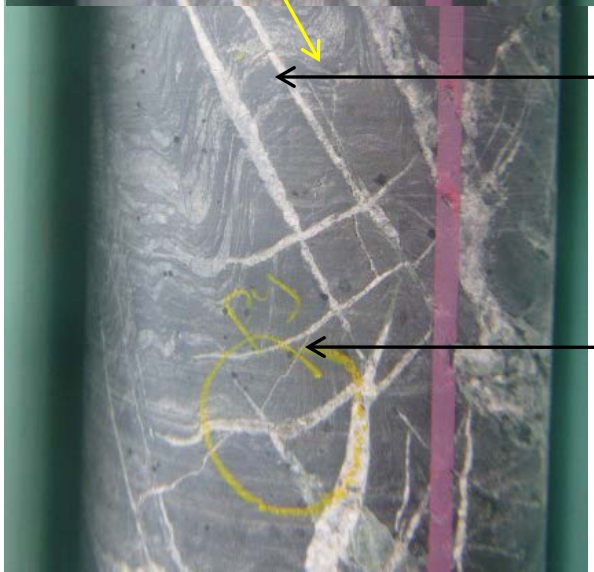
Translucent grey quartz in core of vein

Quartz, dog's tooth form with calcite between grains in margins of vein

Quartz+calcite veins cuts axial-plane quartz+calcite vein



Folded bedding (S0) with axial-plane slaty cleavage (S1, yellow)



Axial plane quartz+calcite veins parallel to axial-plane slaty cleavage (S1)

Pyrite in quartz+calcite, post-S1 vein that shows possible slight buckling; cuts axial-plane vein, is cut by quartz+calcite tension gash

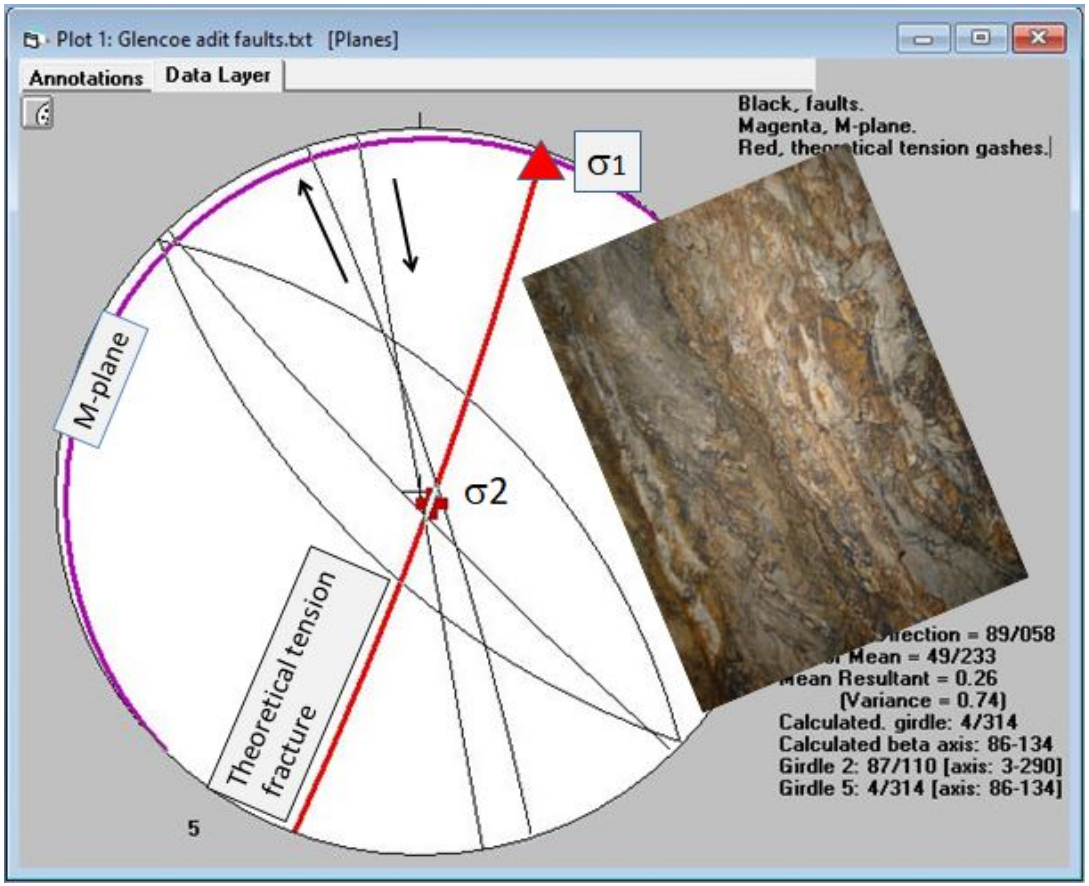
Summary of relationships

1) Folding of bedding; development of axial-plane slaty cleavage ?together? with veins along slaty cleavage.
2) Quartz+calcite+\-pyrite filled tension fractures cut axial-plane veins.
3) Thick quartz+calcite tension fractures develop as multiphase veins (grey quartz core; quartz+calcite margins); at least two phases of this style evident in core.

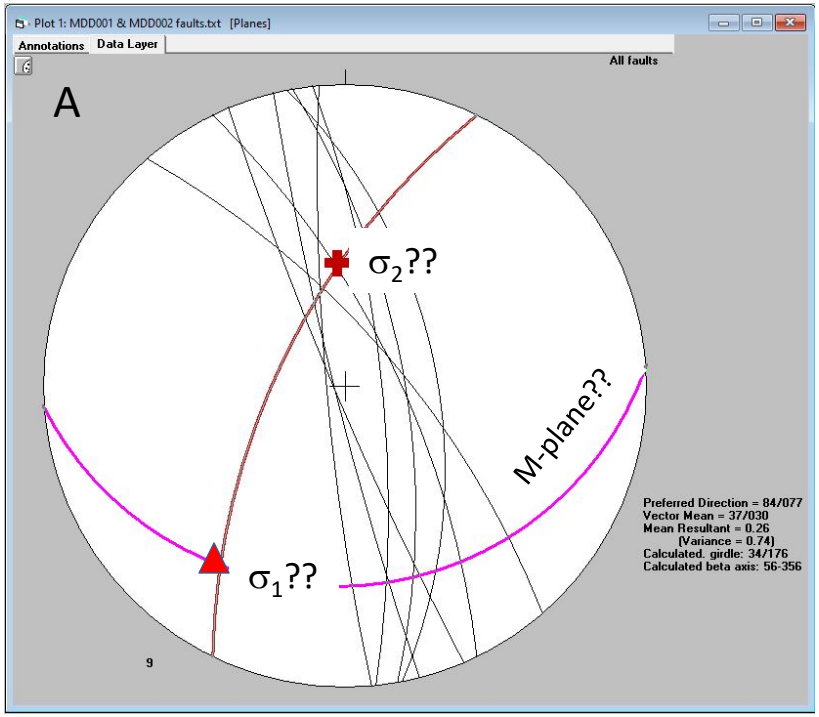
Geometries

Stereonets are equal area, southern hemisphere projection. Measurements of α and β taken with a hand-held semi-circular protractor; dips and dip azimuths measured with Freiburg compass clinometer using bucket of sand for orientation of core. Stereographic nets plotted using Georient 8 by Rod Holcombe.

Although most veins measured are of millimetre to centimetre scale thickness, fractal geometry is a common feature of geological structures and thus small-scale veining may reflect the larger vein system. It is assumed, but not proved, that sulphide mineralisation and gold mineralisation may be related and therefore the orientation of the sulphide-bearing veins may be an indicator of the gold-bearing system. It is noted that the free gold seen at 116.7m in MDD002 lies adjacent to and within a steeply dipping, north-striking array of quartz veins and that arsenopyrite occurs also in this piece of the drill-core.

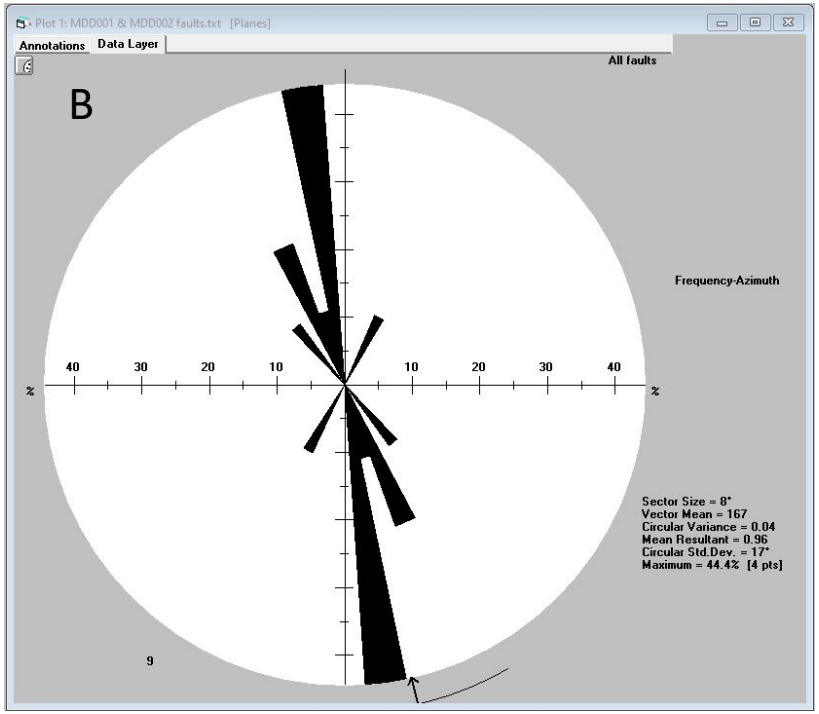


Faulting in crosscut of Glencoe mine. Main fault (Eastern Boundary fault to Mathinna Valley?) strikes NNW and a C-S fabric in the roof of the crosscut indicates dextral slip (inset photograph). Three other NW-striking faults from the adit may be related Riedel R shears. The M-plane is constructed from the poles to these faults. The approximate orientation for the tension fractures related to such a system is shown in red.

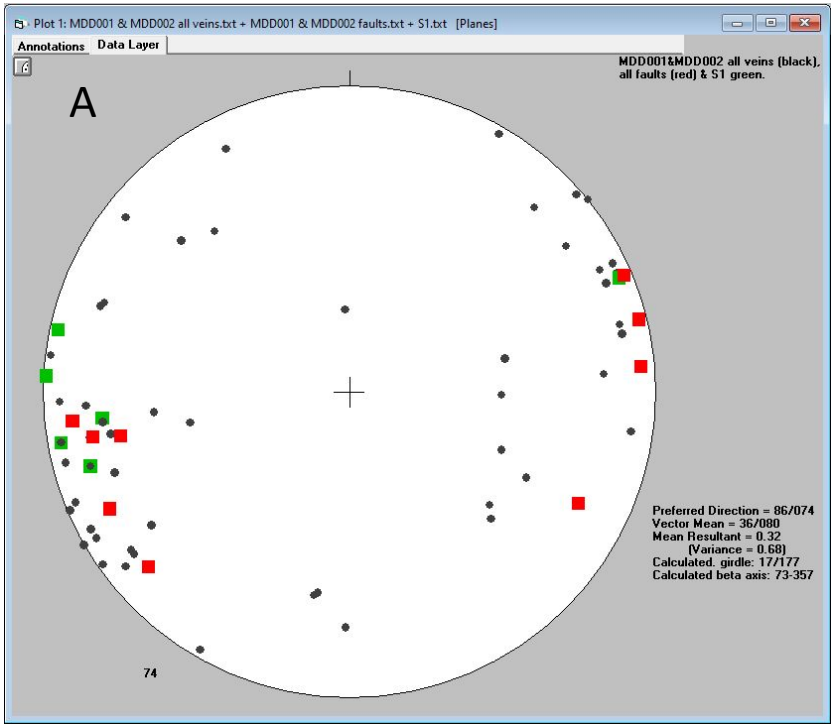


A-cyclographic plot of all faults in MDD001 & 002.

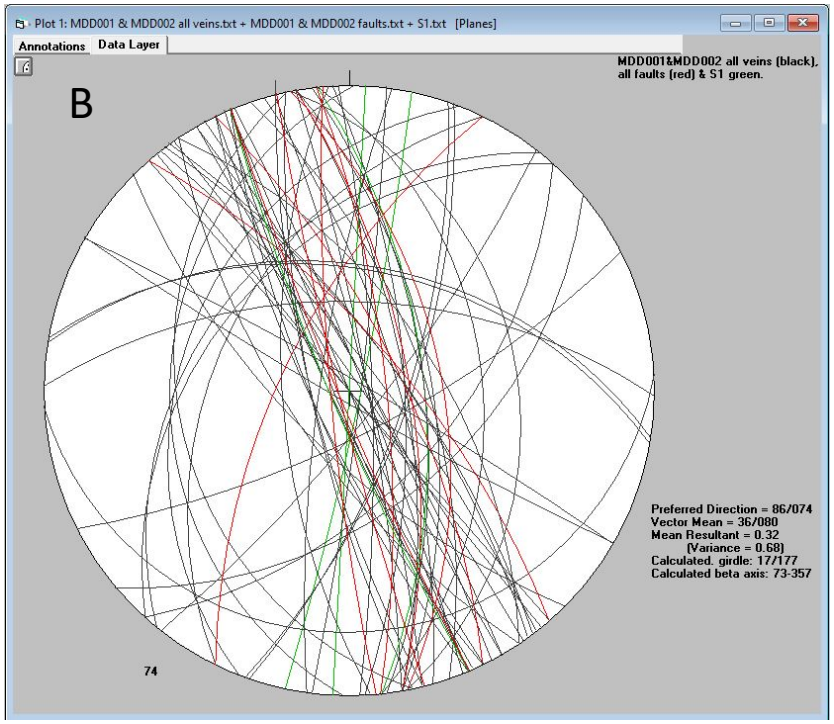
Speculative interpretation: fault in red is in appropriate geometric position for its interpretation as a tensional structure in a dextral oblique-slip Riedel shear array. The statistically derived red cross would be σ_2. The magenta-coloured great circle girdle is the statistically derived M-plane, which contains poles to the faults and σ_1 and σ_3; σ_1 is shown.



B-rose diagram of all faults, MDD001 &MDD002, showing strikes.

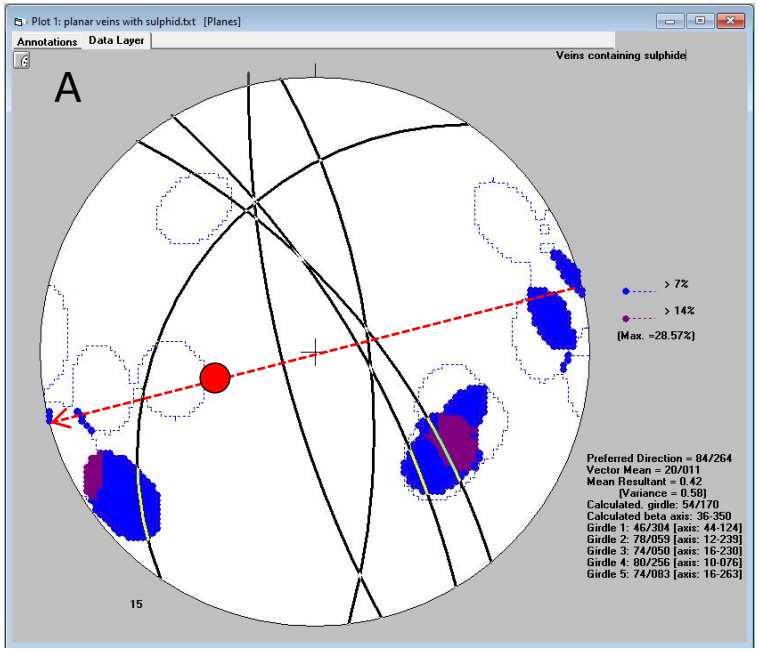


A-poles to all veins (black), faults (red) & S1 cleavage (green).

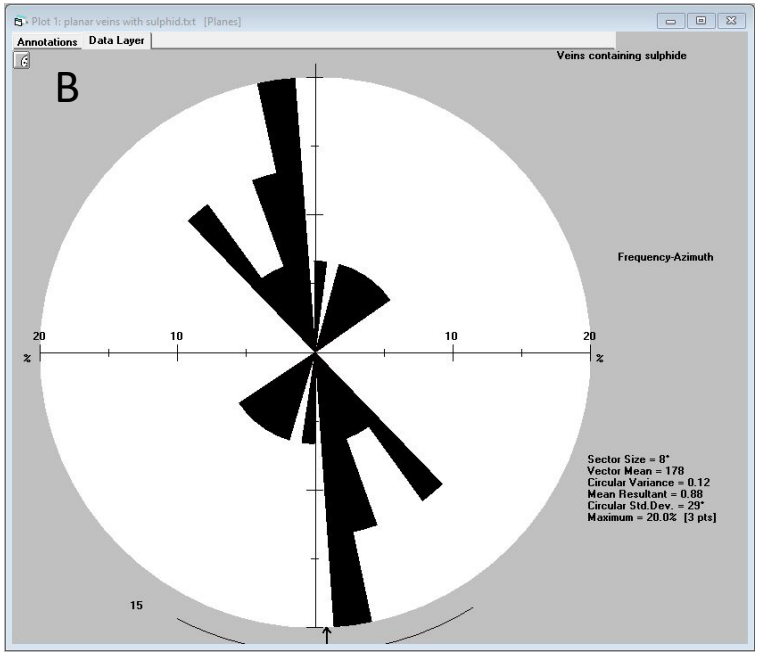


B-cyclographic plot of all veins (black), faults (red) & S1 cleavage (green).

Commentary: S1 strikes north (regional trend in Mathinna Group is 235°-250°) and is followed by faults and numerous generally millimetre-centimetre thickness veins. Limited data from MDD002 indicates a more northerly strike for S1. There is no simple array of veining evident, as clear from the photographs showing some of the relationships between veins. Note that regionally two cleavages are evident in the Mathinna Group and are of similar trend.



A-orientation of all measured quartz veins containing Sulphide; black great circle girdles give summary orientation of veins; broken red line, orientation of MDD002 with red solid circle showing plunge of hole.



B -rose diagram showing strikes of all sulphide-bearing veins.