



NW Mineral Province Deposit Atlas

Chapter 7: Eloise Cu-Au deposit

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Exercise 1 – PAPER!

- Aim – produce a quick and dirty interpretation and locate the three deposits in this area
- Materials
 - Colour E-shaded VD – weak linear colour stretch
 - Colour E-shaded VD – histogram equalised stretch
 - Transparent overlay and a sharpie
- Time 10-15 minutes

Chapter 7: Eloise Deposit Atlas

NW Mineral Province Deposit Atlas

As part of the NW Mineral Province New Discovery Program, the BRC is compiling an atlas of many of the major deposits in the Northwest Mineral Province. Outputs from this project will serve as a resource for explorers to improve their capability to recognise the signatures and haloes of major deposit types in the region, and to provide material which is complementary to the core collections being assembled in the Mount Isa Core Library.

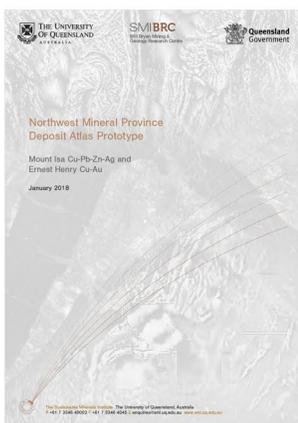
Chapter 1 - Introduction

Chapter 2 - Mount Isa

Chapter 3 - Ernest Henry

Chapter 4 - Selwyn Region

Chapter 5 - Cannington, Peggmont and Maronan



Osborne - Kulthor Deposits

Osborne and Kulthor Cu-Au Deposits

PREAMBLE

This chapter describes the Osborne and Kulthor copper-gold deposits. The Osborne deposit was discovered in the late 1980's and brought into production in 1995. Production is currently scheduled to cease in 2019.

The Kulthor deposit, located 2.3km to the WSW of the Osborne deposit, was first drilled during a brownfield exploration program in 1991, with a portion of the resource mined from 2012 to 2015.

LOCATION

Geological Domain
Kurudala-Selwyn Domain, as defined in the Mount Isa Structural Domain Map from the 2010 NWGMP GIS (Figures 6.1, 6.2).

Co-ordinates
Osborne: Lat: 22°05' 34" S, Long: 140° 34' 23" E
MGA Zone 54: 455,900 E, 7,556,800 N
Kulthor: Lat: 22° 05' 52" S, Long: 140° 33' 02" E
MGA Zone 54: 453,700 E, 7,556,300 N

The Osborne Mine Grid north is oriented towards the Northwest (319.2° true).

NATURE OF MINES

Mined Commodities
Copper and gold have been produced from the Osborne deposit since commissioning of the concentrator in June 1995, following the commencement of mining in 1994.

The Kulthor deposit was mined from 2012 to 2015 with ore processed at the Osborne plant to produce copper and gold in concentrate.

Mining Methods & Depths of Mining
The Osborne project commenced mining in August 1994 as an open pit operation to approximately 110m depth, with subsequent underground mining commencing in February 1996.

Underground mining is by open panel stopping in the flat lying lenses and shole sublevel bench retreat in the moderately to steeply dipping mineralisation (Tullimans et al., 2001). After underground mining to approximately 1200m depth, underground extraction no longer occurs, and an open pit cut-back project commenced in September 2015, with ore expected to be processed until mid-2019.

Mineralised Bodies—Osborne
The Osborne deposit comprises two dominant mineralised bodies located in the Western Domain (1S, 1SS, 2M, 2S orebodies), and two smaller orebodies in the Eastern Domain (2N, 3E) (Figure 6.3). The Western and Eastern Domains are interpreted as separated by the poorly-defined Awesome Fault.

Orebodies 1 and 2 (1S, 1SS, 2M, 2S) comprise moderate to steeply dipping mineralised sheets, with dimensions as follows:
- 1 Orebody is approximately 1100m long x 350m wide x 20m thick
- 2 Orebody is approximately 700m long x 250m wide x 20m thick

The Western Zone 3E orebody is a smaller flat-lying lensoid orebody and is approximately 300m long x 100m wide x 20m thick.

Mineralised Bodies—Kulthor
The Kulthor deposit comprises a steeply dipping tabular zone with several high grade shoots contained within a broader 0.1-0.5% Cu-Equiv halo. The mineralised zone has a strike length of at least 900m by 700m deep

Chapter 6

Northwest Mineral Province Deposit Atlas

Eloise Deposit – Geoscience Analyst

Geoscience ANALYST 2.72 - C:\Users\uqnfox2\Documents\Atlas\Eloise\Eloise Geoscience Analyst Public\Eloise Geoscience Analyst\Eloise_Updated.geoh5

File Edit Utilities Panels Views Add-on Modules Help

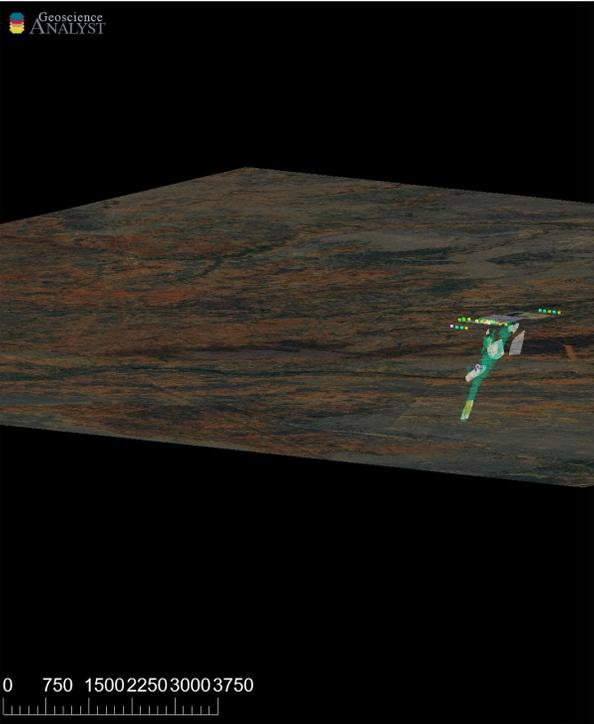
Objects

Search in tree... (Ctrl+F)

Name

- ▼ Workspace
 - ▼ DTM
 - > Eloise_area_DTM_tr
 - ▼ Eloise Drill Data
 - > TIMA Mineral Maps
 - > TruScan DrillHole Geoche...
 - ▼ Eloise Ore Lenses
 - > _Copper Grade Shells
 - > 40 Lode
 - > 42 Lodes
 - > Chloe
 - > Eloise Deeps
 - > Eloise Deeps II
 - > Elrose Levuka
 - > Emerson
 - > Macy
 - > Middle West
 - > Sheila
 - ▼ Geochemistry
 - > Surface Chemistry
 - ▼ Geology
 - > Plan Maps
 - > Section Lines Baker 1996

Viewport



0 750 1500 2250 3000 3750

Workspace Object Cells Vertices

Project : Eloise_Updated.geoh5 Comments

Contributors : Rick
uqrvalen
uqnfox2

Geoscience ANALYST 2.72 - C:\Users\uqnfox2\Documents\Atlas\Eloise\Eloise Geoscience Analyst Public\Eloise Geoscience Analyst\Eloise_Updated.geoh5

File Edit Utilities Panels Views Add-on Modules Help

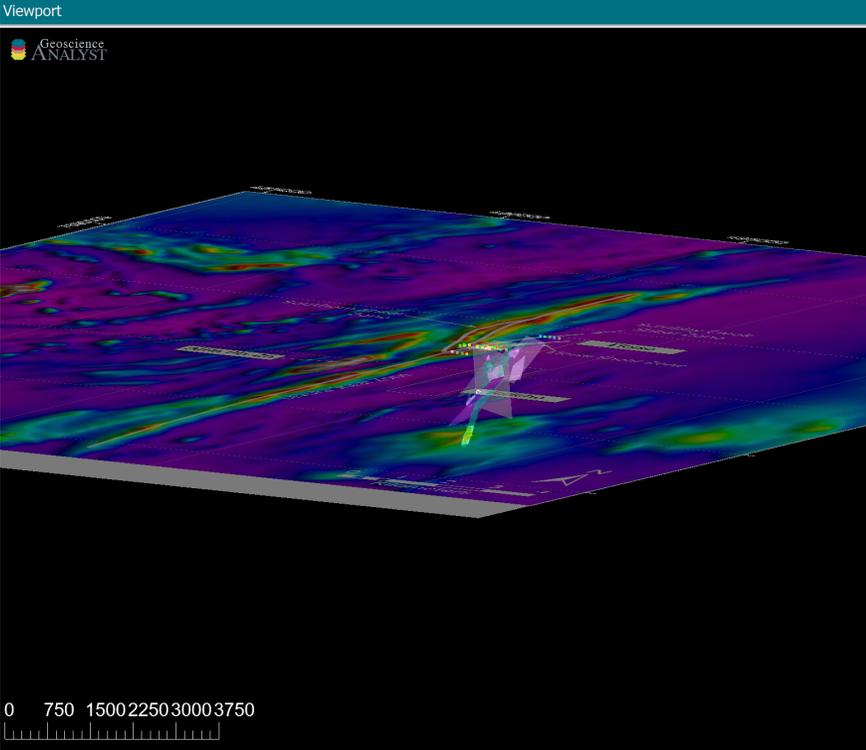
Objects

Search in tree... (Ctrl+F)

Name

- ▼ Geophysics
 - > AEM_Depth_slices
 - ▼ Aeromagnetics
 - CoRTP_RVD
 - CoRTP_wkstr
 - Eloise RTP_Annotated
 - Magnetics RTP
 - MIM RTP_1VD
 - > Exploration Geophysics B...
 - > Gravity
 - > Mag UBC Inversion
- > Imagery
- > Jericho_Altia
- ▼ Structures
 - > Chloe_Fault_Trans
 - > Deeps Fault_Z54
 - > Delphin Fault_Z54
 - > Hurley Fault_Z54
 - > Levuka_Z54
 - > Lunney Fault_Z54
 - > Median North_Z54
 - > Median South_Z54
 - > Middle Fault_Z54

Viewport



0 750 1500 2250 3000 3750

Workspace Structures Object Cells Vertices

Type : Container Group Comments

Objects : 12

Extents : X: 496967.54 498478.83
Y: 7681573.02 to 7683781.90

Name

Eloise Deposit – Brief History

- Mid-1980 to early-1990's • Discovery by BHP Minerals (1986) based on aeromagnetic targeting and follow-up ground geophysical investigation through cover sequence
- Mid-1990's • Eloise sold to Amalg Resources in 1994 for \$13.25 million followed by development of underground decline (1995) and first ore produced in 1996
- Early-2000's • Production as of Dec 2002 of 3 Mt @ 4.19 % Cu and 1 g/t Au. In 2003, Amalg Resources renamed Breakaway Resources Limited
- Mid-2000's • Eloise sold by Breakaway Resources Limited to Barmenco Pty Ltd (now FMR Investments Pty Ltd) and operated until care and maintenance in 2008
- Mid-2000's to present • Eloise reopened in 2011 and still owned and operated by FMR Investments Pty Ltd. A total pre-mining resource of 10 Mt @ 3.2 % Cu and 0.7 g/t Au

Eloise Deposit – Workshop Exercises

Eloise Deposit – Workshop Exercises

Exercise 2: Eloise shoot plunge

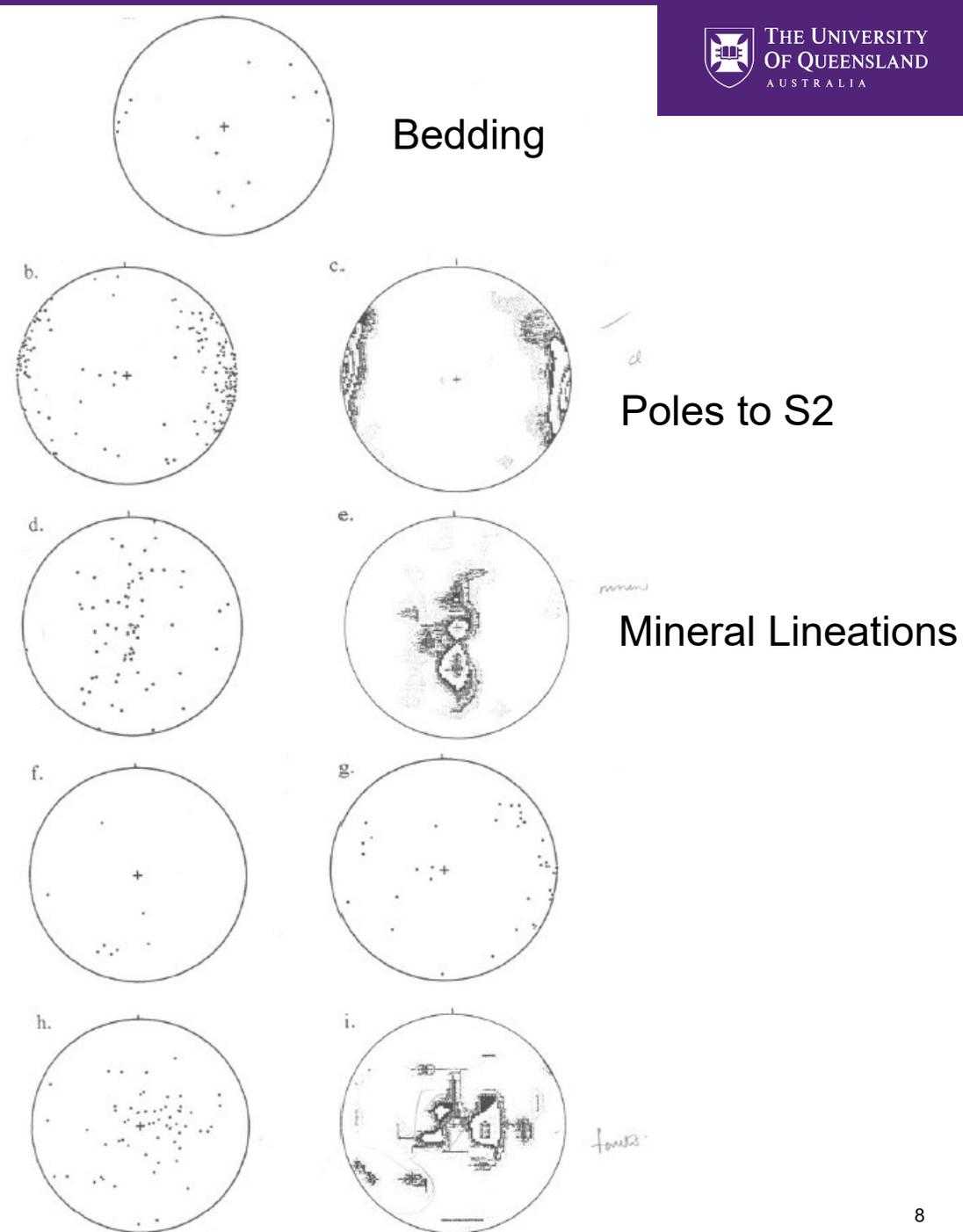
- i) Using data in the GA file, look at the shoot geometries, structures, and geological datasets around the main Eloise “shoot”
- ii) What are the possible explanations for this shoot?

Baker, 1994

Figure 4.1: Structural orientation data (true N, Schmidt equal area net; data source compiled from Appendix 2 and Laing, 1990b).

- a. Poles to bedding S_0 (\cdot n=8); F^0_2 fold axes (+ n=6).
- b. Poles to cleavage S_2 (all data, shallow to moderate dips correspond to D_3 hinge zone; n=181).
- c. Contoured poles to cleavage S_2 (contour interval 1%/1% area).
- d. Mineral lineations L_m (n=76). L_m represents a combination of L^2_2 , reactivated L^2_2 during D_3 shear and metasomatically altered L^2_2 .
- e. Contoured mineral lineations L_m (contour interval 1%/1% area).
- f. Poles to axial planes S_k (n=8).
- g. Poles to S_2 cleavage in F_3 hinge zone (n=33).
- h. Poles to Stage III to V mesoscopic faults (n=62).
- i. Contoured poles to mesoscopic faults (contour interval 1%/1% area).

The moderate west dipping fault planes are associated with the Median Fault.



Baker, 1994

- Macroscopic Boudinage – ie the shoot is a boudin neck (no macroscopic evidence)
- Intersection of stage II veins and bedding (no macroscopic evidence)
- Intersection of lode shear zones and contact between meta-arkose and quartz-biotite schist (preferred explanation)

Eloise Deposit – Workshop Exercises

Exercise 3: A geochemical data set from the Geochemistry Tool Kit (Hannan et al. 2018) is provided in the Geoscience Analyst file. Based on a 2009 Xstrata orientation soil survey

- i) Using Geoscience Analyst plot the position of these samples and use the rendering settings to show target element concentrations
- ii) Does the data show anomalous values consistent with the style of mineralisation?
- iii) What are the limitations of the dataset and how could this be improved?

GTK Geochemistry files

AQR – Aqua regia -5mm soil fraction ICPMS finish

- Try plotting Ag, Cu, Bi, Ni (and others if you want)

GORE – proprietary soil gas method (see GTK App A – provided)

- Try plotting carbon disulphide, propane

MSG – Metal Soil Gas (see GTK App A – provided)

- Try plotting Cu, Zn (and others if you want)

Please see your doctor if you think GORE and MSG might be right for you.

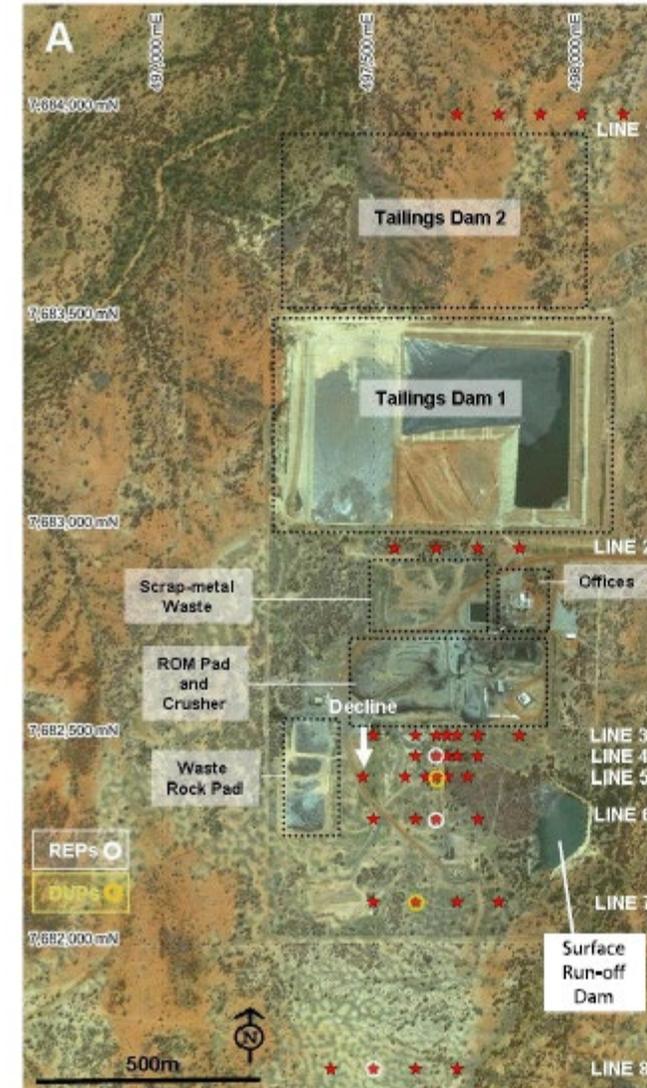


Figure 6.29. Eloise orientation soil samples in relation to mine infrastructure; QA samples indicated by circles (from Lilly et al., 2010, modified).

Eloise Deposit – Workshop Exercises

Exercise 4: Preliminary data has been provided from TruScan™ XRF scanning of four drill holes from Eloise

- i) Plot the location of these drill holes in Geoscience Analyst
- ii) Use the rendering settings to show the distribution of key elements indicative of lithology, alteration and mineralisation
- iii) Refer to the down hole TruScan™ plots in the Atlas (Fig. 7.17) – what steps would you take to validate this preliminary dataset?



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CREATE CHANGE

Thank you

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