

## Epithermal and Porphyry Au-Cu Deposits in the Mt Carlton – Ravenswood – Pajingo Districts

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### Introduction

This field trip will visit the Mt Carlton – Ravenswood – Pajingo district south of Townsville in NE Queensland, Australia. This district contains many deposits and >20 Moz of identified gold (Fig. 1). This trip will visit the Mt Carlton area, the Ravenswood-Mt Wright area and the Pajingo area, near Charters Towers. The participants will have the opportunity to inspect epithermal and porphyry type deposits with features unusual for such types of deposits.

The Mt Carlton area features the Mt Carlton high-sulfidation epithermal (HS) deposit (open pit mining), the Capsize porphyry prospect and a number of HS and low-sulfidation epithermal (LS) prospects. The Mt Carlton HS deposit is unusual in several aspects: 1) It is a relatively old epithermal deposit formed in early Permian; 2) significant amount of Au is in pyrite lattice; 3) it contains significant Zn and Pb in addition to Au, Ag and Cu; and 4) there is abundant massive dickite alteration and anhydrite casts that are rarely reported from other HS deposits. The structures are well exposed in the pits, providing a chance to see the extensive chop-up of a Paleozoic ore body.

The Ravenswood area contains the Mt Wright breccia-hosted Au deposit and several deep epithermal orebodies near the town of Ravenswood. The early alteration in Mt Wright occurred at high temperatures similar to porphyry deposits and the fluid stable isotopes show dominantly magmatic signatures. The ore textures, however is dominated by breccia with little quartz stockworks. There is metal zonation in Au, Zn, Pb, As and other elements from the deeper to shallower parts of the breccia pipe. Some Ravenswood vein/lode orebodies are unusual in the abundance of pyrrhotite and arsenopyrite indicating reduced conditions. Extensive chlorite alteration occur along some structures/lodes, different from the common dominance of sericitic alteration in the centre of many other epithermal systems.

The Pajingo LS/IS epithermal area features multiple layers of sinter, zonation in silica mineralogy and texture from shallow to deeper positions, typical boiling textures, and a Paleozoic timing (~342-330 Ma).

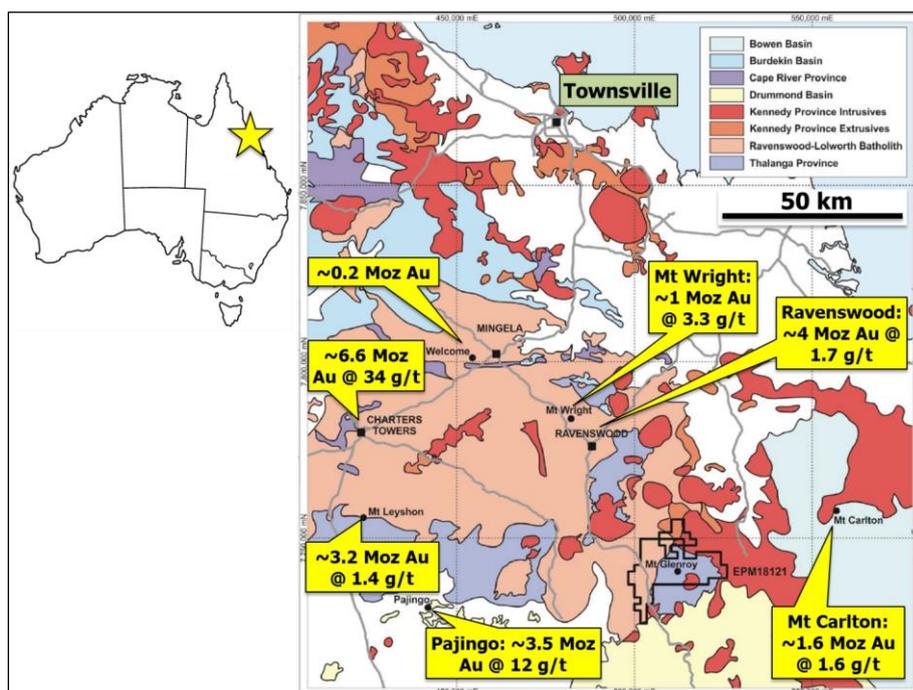


Figure 1 Deposits in the Mt Carlton – Ravenswood – Pajingo district. Note that the Charters Towers deposits are much older than other deposits

## Field Trip Details

<b>Date:</b>	8 -10 June, 2017
<b>Inclusions:</b>	transport, accommodation 9th June, all meals while in the field, field trip guide
<b>Maximum:</b>	11
<b>Field Trip Fee:</b>	\$990.00
<b>Student:</b>	\$495.00 – only one place available

### Notes:

Participants will be responsible for

- Supplying correct safety clothing (PPE)\* for mine visits – long pants, long sleeve shirt, steel cap boots, safety glasses. EGRU can supply hard hats, safety glasses and high visibility vests to all participants if required.
- Supplying water bottle, sunscreen and sun hat.

**\*IMPORTANT:** Participants without the correct PPE will not be able to participate in the field trip as you will not be able to access any of the mine sites.

*Please bring a small bag or backpack for your personal gear, as vehicle space is limited.*

## Preliminary Schedule *(may be revised at the discretion of the field trip leaders)*

<b>Thursday 8 June</b>	Townsville to Mount Carlton Mine	Inductions and mine visit, Return to Townsville at approximately 6 pm
<b>Friday 9 June</b>	Townsville to Ravenswood	Mt Wright mine – inductions and mine visit.
	Ravenswood to Charters Towers	Overnight Charters Towers
<b>Saturday 10 June</b>	Charters Towers to Pajingo Mine	Inductions, mine visit Return to Townsville at approximately 6 pm

## Field Trip Leaders

### Zhaoshan Chang

Zhaoshan Chang is an economic geologist with expertise on skarns, epithermal, porphyry and sediment-hosted Au deposits. He has been the Director of EGRU since 2012 and works closely with the minerals industry on exploration-orientated research projects. Currently, Zhaoshan is the lead researcher on a 3 year collaborative project between the Geological Survey of Queensland and EGRU, aimed at characterising the prospectivity of intrusion related hydrothermal mineral systems in north east Queensland.

### Paul Dirks

Paul is a structural geologist with an interest in geodynamics and the tectonic history of cratonic terrains and adjacent mobile belts, investigating their tectonic evolution and associated mineralisation patterns. His research is strongly field-based with a focus on detailed geological mapping. He is currently researching at the Mt Carlton high sulphidation deposit as part of the collaborative research project on the prospectivity of intrusion related hydrothermal mineral systems in north east Queensland.

### **Isaac Corral**

Isaac studies porphyry-and epithermal Au-Cu mineralisation in convergent margin settings. He has worked extensively in SW Panama and is currently researching the geology and metallogeny of the Northern Bowen Basin as part of the collaborative research project on the prospectivity of intrusion related hydrothermal mineral systems in north east Queensland.

### **Fredrik Sahlstrom**

Fredrik is investigating the geological characteristics and ore forming processes at Mount Carlton using a combination of field and laboratory techniques. His PhD project aims to improve the understanding of epithermal deposits in a regional context, and also to generate exploration tools for the project's industry partners who are actively exploring for further mineralisation in the area.