

## Mount Garnet – Wolfram Camp - Chillagoe Field Trip

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### Introduction

Extensive Permo-Carboniferous felsic igneous intrusive activity is intimately associated with the largest mineralising epoch in north eastern Queensland. This event resulted in significant endowments in Au, Cu, Zn and Sn with, variously, appreciable Pb, Ag, W, Sb, Bi and Mo. Mineralisation styles include porphyry-related Au (Cu-Ag-Mo), epithermal Au (Ag), vein- and greisen-associated Sn (W, Mo, Cu, Ag, Bi) and skarn-related deposits of Zn and Cu (Pb-Ag-Au) and Sn. In particular, Sn, Au and Cu formed the backbone of a burgeoning, albeit fitful, mining industry which commenced in the late-1800's and continues, still somewhat fitfully, today.

Three sites, all with production histories dating back to the late-1800's, have been selected to illustrate, variously, relationships between mineralisation, host rocks, controlling structures and paragenesis. These are:

- Mt Garnet Zn-rich skarn deposit,
- Wolfram Camp W (Mo) deposit – hosted by greisenised granite, and
- Chillagoe district porphyry- and skarn-hosted Au-Cu (Mo) Red Dome and Mungana deposits and several skarn-associated Zn-rich and Cu-rich deposits, including the Redcap group of deposits and the King Vol deposit.

Presentations will be given by tour leaders and site geologists, with core displays and field inspections including, where possible, inspection of exposures in open pit and underground workings. There will be a focus on the Chillagoe district deposits.



*Red Dome, Chillagoe – photo courtesy of Auctus Minerals*

## Field Trip Details

<b>Date:</b>	8 -11 June, 2017
<b>Inclusions:</b>	transport, accommodation, most meals while in the field, field trip guide
<b>Maximum:</b>	11
<b>Field Trip Fee:</b>	\$1300.00
<b>Student:</b>	\$ 650.00 – 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 Garnet	Depart Townsville at 7.00AM and travel to Mt Garnet (approx 450km) via Hervey Range and Greenvale. Brief stops at Greenvale (about half way) to stretch the legs, and view exposure of Early Ordovician Balcooma Metavolcanics, host to several significant VMS Zn-rich and Cu-rich deposits. Arrive Mt Garnet at 1 PM for lunch, inductions, presentations, and core inspection. Overnight Mt Garnet.
<b>Friday 9 June</b>	Mount Garnet	Mt Garnet - surface, ore dumps and open pit inspections. Travel to Wolfram Camp via Atherton (approx 185km). Arrive Wolfram Camp for lunch, inductions, presentations, surface, open pit and core inspections
	Wolfram Camp to Chillagoe	Overnight Chillagoe
<b>Saturday 10 June</b>	Chillagoe	Chillagoe inductions, presentations and core inspections in the morning, site visits (Red Dome and Mungana) in the afternoon. Overnight Chillagoe.
<b>Sunday 11 June</b>	Chillagoe	Site visit to Redcap in the morning. Depart Chillagoe 11.00AM and travel to Townsville via Atherton and Palmerston Highway (512km) with brief respites in Atherton for lunch and stretch the legs in Cardwell. Arrive Townsville approximately 6 PM.

## Field Trip Leaders

### Ian Morrison

Ian is an exploration geologist with 37 years experience, working mostly in the eastern states of Australia, the Northern Territory and, in recent years, the Pilbara region of Western Australia. Following graduation from the

Ballarat School of Mines in 1980, he cut his teeth on the porphyry-skarn tin deposits in Tasmania and NSW before moving to Townsville in 1983 to commence part-time post-graduate MSc studies.

For the next 17 years, Ian worked, variously, on grass-roots exploration campaigns and ore definition drilling programmes, principally in the Eastern Fold Belt of the Mt Isa Inlier (Mesoproterozoic IOCG), Drummond Basin of NE Queensland (Permo-Carboniferous epithermal gold), Eastern Highlands of Victoria (Silurian VMS deposits) and in the Pine Creek Geosyncline in the Northern Territory (Proterozoic ?mesothermal gold).

In late-1999, Ian joined Kagara Ltd as Exploration Manager when the company floated on the ASX with a focus on defining Zn-rich resources in NE Queensland. Over the next 12 years he was involved in definition drilling of previously discovered deposits in the Chillagoe, Mt Garnet, Balcooma and Charters Towers districts resulting in the delineation of significant Late Carboniferous-age porphyry- and skarn-hosted Cu-Au mineralisation at Red Dome and Mungana, and Zn (Cu-Pb) skarn mineralisation at Mungana, King Vol, Redcap and Montevideo, all in the Chillagoe district, and the Mt Garnet Zn (Cu) skarn deposit. The Mt Garnet and Mungana Zn-rich skarn orebodies deposits were successfully developed. Early Ordovician VMS deposits in the Balcooma and Charters Towers districts were also defined and mined.

### **Yanbo Cheng**

Yanbo Cheng's interests include tin and tungsten mineralization, petrogenesis of granitic rocks, fertility of ore-related igneous rocks and genesis of the "Critical Metal" ores. He also specialises in microanalysis of minerals (texture, composition and isotope) to reveal the mineralization and magmatism process by using LA-ICP-MS, EMPA, SEM-CL and SHRIMP. Currently he is researching the geology and metallogeny of the Sn-W polymetallic ores in Northern Queensland, which is a part of the major research project funded by the Geological Survey of Queensland.

### **Peter Illig**

Peter is working on 4 skarn deposits in the Chillagoe mining district focusing on structure, skarn zonation, timing and magmatic controls on Au-Cu and Zn mineralization. This project is helping industry (Auctus Resources) better constrain future drill targeting and assisting GSQ understand magmatic conditions (e.g. fO<sub>2</sub>) which produced Au-Cu and Zn which contrasts to much of the Herberton district metallogeny (Sn, W).

### **Kairan Liu**

Kairan is studying the magma degassing processes and mineralization of the Wolfram Camp Mine by examining the time sequence of various geological units, and by documenting the formation conditions and the nature of fluid in the research area. The study will contribute to the understanding of mineralisation in the Herberton - WCM - Watershed W-Sn region as well as magma-related hydrothermal processes in general.