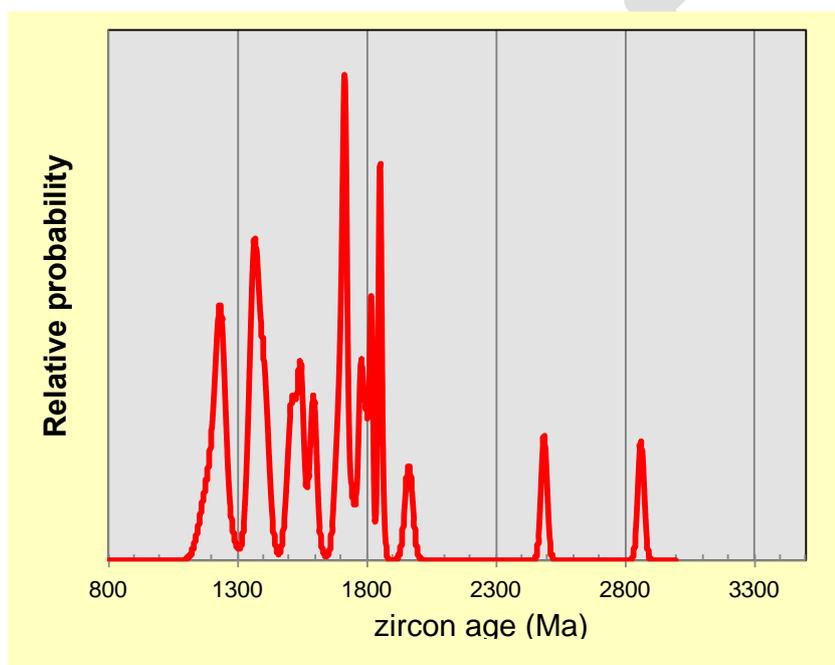


Mineral Resources Tasmania

Laboratory Report
LJN2019-025

GEOCHRONOLOGY STUDIES, SAVAGE RIVER AREA



An unpublished Mineral Resources Tasmania Report for:

MRT

By: R S Bottrill, S Meffre

Date: 26 September 2022

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SUMMARY

Eleven samples from The Savage map sheet were analysed by LA-ICPMS on zircons to determine ages by U/Pb geochronology. The preliminary data is summarised here.

INTRODUCTION

Dating of the complex Late Proterozoic to early Cambrian geological sequences on the Savage River map sheet has, to now, been rather sparse and inconclusive, especially in the Arthur Metamorphic complex (AMC). Eleven rock samples from this area, mostly collected by G Cumming and R Bottrill, were submitted for further geochronology, by U/Pb isotope dating by LAICPMS analysis of zircon separates. Details are shown in Table 1.

Table 1: Sample details.

Reg No.	Location	Unit	Description
G408151	Savage River	Keith Schist	
C110297	Savage River	Keith Schist	Laminated siltstone ("Oonah")
C109169	Savage River	Keith Schist	Quartz-muscovite schist ("Oonah")
G407285	Savage River	Armstrong Ck schist	
G407286	Savage River	Armstrong Ck schist	
G407287	Savage River	Armstrong Ck schist	
G407288	Savage River	Armstrong Ck schist	
C110211	Savage River	E Wall schists	MHA Mafic
G407281	Savage River	E Wall schists	
G407282	Savage River	E Wall schists	
G407271	Savage River	E Wall schists	chlorite schist

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METHODS

The rocks were subsampled, crushed and panned to produce zircon rich heavy concentrates. These were handpicked, mounted in epoxy blocks, polished and analysed by LA-ICPMS (see appendix 1).

GEOLOGY

The deposits lie in the Arthur Metamorphic Complex (AMC), or Arthur Lineament, a linear tectonic zone about ten kilometres wide and 110 km long, running from near the Heemskirk granite on the west coast to near Wynyard on the north coast (Seymour et al., 2006). The AMC consists of moderately to highly metamorphosed igneous and sedimentary rocks of late Proterozoic age, including dolostones, metabasites, psammites and pelites (Turner et al., 1998; Holm and Berry, 2002; Bottrill & Taheri, 2007). Holm and Berry (2002) conducted a detailed structural analysis of the lineament and concluded that it is of Early Cambrian age, and exhibits multiple deformational events, including tight folding and thrusting. The central unit is the Bowry Formation, which contains most of the mafic and carbonate rock units and the magnetite mineralisation, and is considered allochthonous by Holm and Berry (2002). Flanking units appear to be transitional into the Rocky Cape Group, Ahrberg Group and Oonah Formation (Turner and Bottrill, 2001; Holm and Berry, 2002).

The rocks are mostly greenschist facies but hornblende and glaucophane-bearing amphibolites occur in the Bowry Group, indicating that they were affected by both high pressure (blueschist facies) and high temperature (amphibolite facies) tectonic events, but are largely retrogressed (Turner and Bottrill, 2001; Bottrill & Taheri, 2007).

Mineralisation in this belt includes magnetite, copper, gold and magnesite (Bottrill & Taheri, 2006; Bottrill, 2014; Bottrill & Taheri, 2007). The primary metallic mineral deposits (especially iron and copper) and magnesite deposits in the area are mostly in, or associated with, magnetite-rich iron formations and carbonate bodies within metamorphosed igneous and sedimentary rocks of the Bowry Formation and correlates (Seymour et al., 2006; Bottrill & Taheri, 2006). The most significant mineralisation is the Savage River group of magnetite deposits, probably carbonate-replacement or skarn-style deposits (Webster, et al, 2017; Bottrill, 2014; Bottrill & Taheri, 2007).

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Relatively little dating has been undertaken on rocks from this very complex area, especially the Arthur Metamorphic complex. An early date (Turner et al, 1998) was interpreted as being for a granitoid, and dated at 777 Ma. Several more samples were studied and dated for this present study, and showed a broad range of geochemistry, but two groups of ages (Bottrill et al. in prep). One group of albitites has a mafic-like Zr/Ti ratio and is about 774+/-12 Ma, similar to a dolerite intruding the sequence (774+/-12 Ma). The other group of albitites has a much higher Zr/Ti and a broad range of ages (1000-1800Ma) similar to metasediments in the sequence, and indicate a detrital source. There are also some younger, finer zircons with rare euhedral (metamorphic?) grains (510±15Ma), consistent with monazite dates in the magnetite ores.

RESULTS

Reg No	Done?	Unit	UTas No.	UTas Project
G408151	Yes	Keith Schist	2019-G-200	IP005
C110297	Yes	Keith Schist	2019-G-201	IP005
C109169	Yes	Keith Schist	2019-G-202	IP005
G407285	insufficient	Armstrong Ck schist	2019-G-203	IP005
G407286	Yes	Armstrong Ck schist	2019-G-204	IP005
G407287	Yes	Armstrong Ck schist	2019-G-205	IP005
G407288	Yes	Armstrong Ck schist	2019-G-206	IP005
C110211	insufficient	E Wall schists	2019-G-207	IP005
G407281	Yes	E Wall schists	2019-G-208	IP005
G407282	Yes	E Wall schists	2019-G-209	IP005
G407271	Yes	E Wall schists	2019-G-230	IP005
C113322	Yes	Keith Schist	2019-G-200	IP005

RESULTS

The geochronology results are uploaded to RM8 as file LJN2019-025 (TRIM D19/37476/1) and will later be uploaded into the TIGER database as the

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Geochronology database system is developed. Summary charts are shown in Appendix 1.

The results will be interpreted more fully in another report (Cumming et al in prep).

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Webster, A., Braniff ,V. and Bottrill, R.S., 2017. Savage River magnetite deposits.
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DRAFT

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Appendix 1: Geochronology Report

Client: G Cumming & R. Bottrill
Sample Source: Savage R district
MRT Job Number: LJN2019-025
Analysis: Geochronology
Methods: LA-ICPMS: U/Pb on Zircons

Reg No	Done?	Unit	UTas No.	UTas Project
G408151	Yes	Keith Schist	2019-G-200	IP005
C110297	Yes	Keith Schist	2019-G-201	IP005
C109169	Yes	Keith Schist	2019-G-202	IP005
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G407282	insufficient	E Wall schists	2019-G-209	IP005
G407271	insufficient	E Wall schists	2019-G-230	IP005

The data file is stored in TRIM under LJN2020-025, with reference No D19/37476/1
The age distributions are shown below.

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FIGURES-PROBABILITY PLOTS



Figure 1. Probability plots of U-Pb ICPMS ages of detrital zircons from the Armstrong Creek Schist.

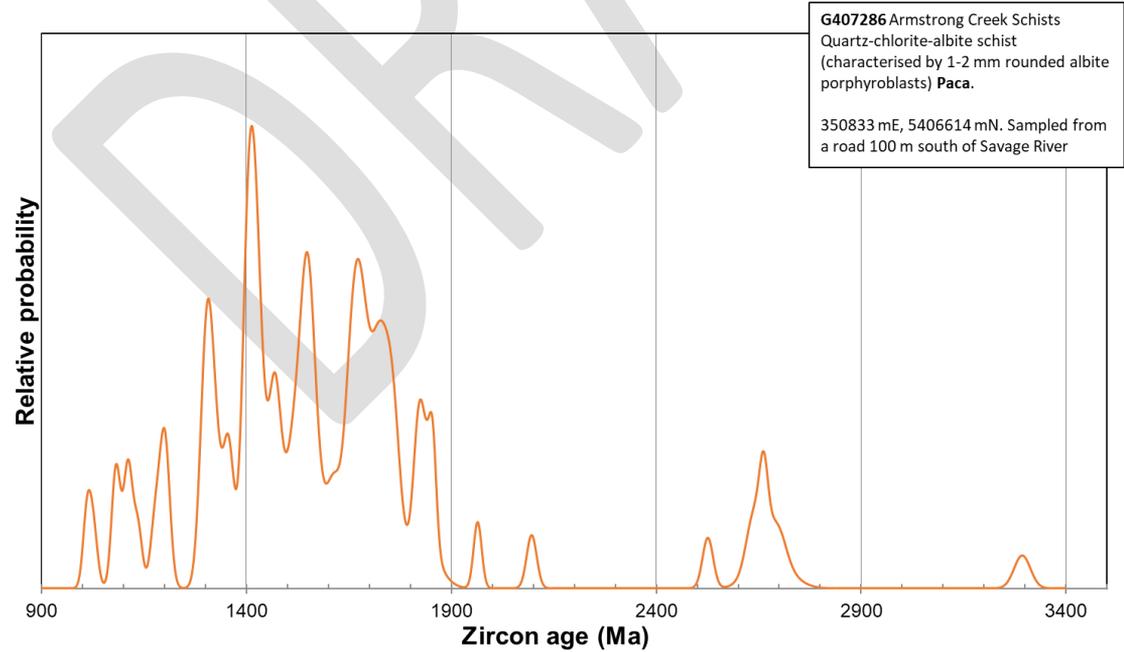


Figure 2. Probability plots of U-Pb ICPMS ages of detrital zircons from the Armstrong Creek Schist.

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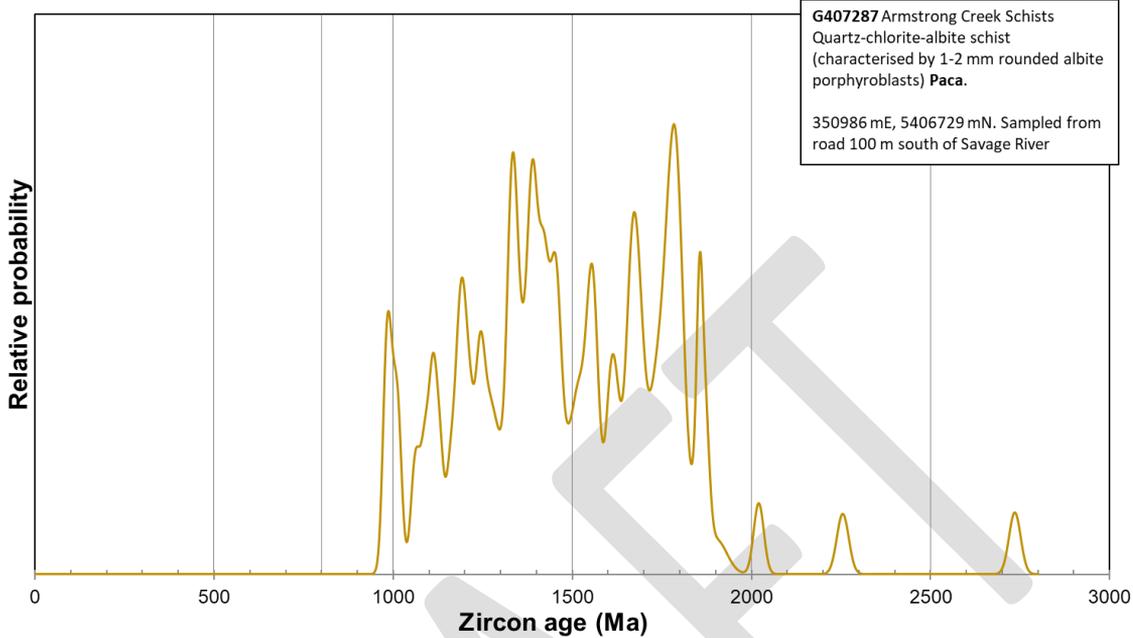


Figure 3. Probability plots of U-Pb ICPMS ages of detrital zircons from the Armstrong Creek Schist.

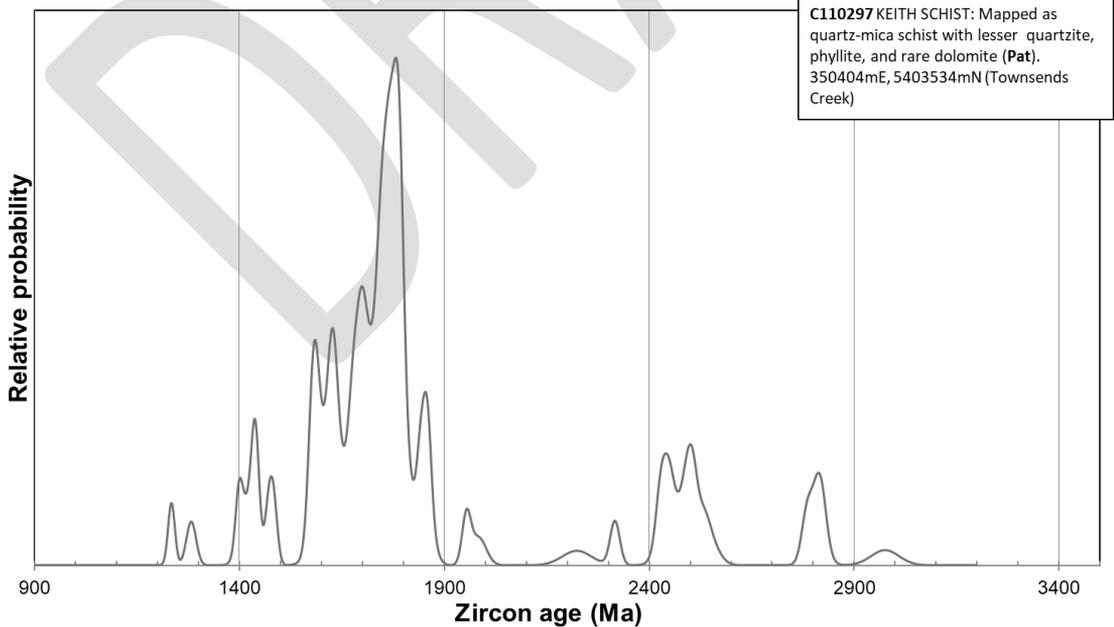


Figure 4. Probability plots of U-Pb ICPMS ages of detrital zircons from the Keith Schist.

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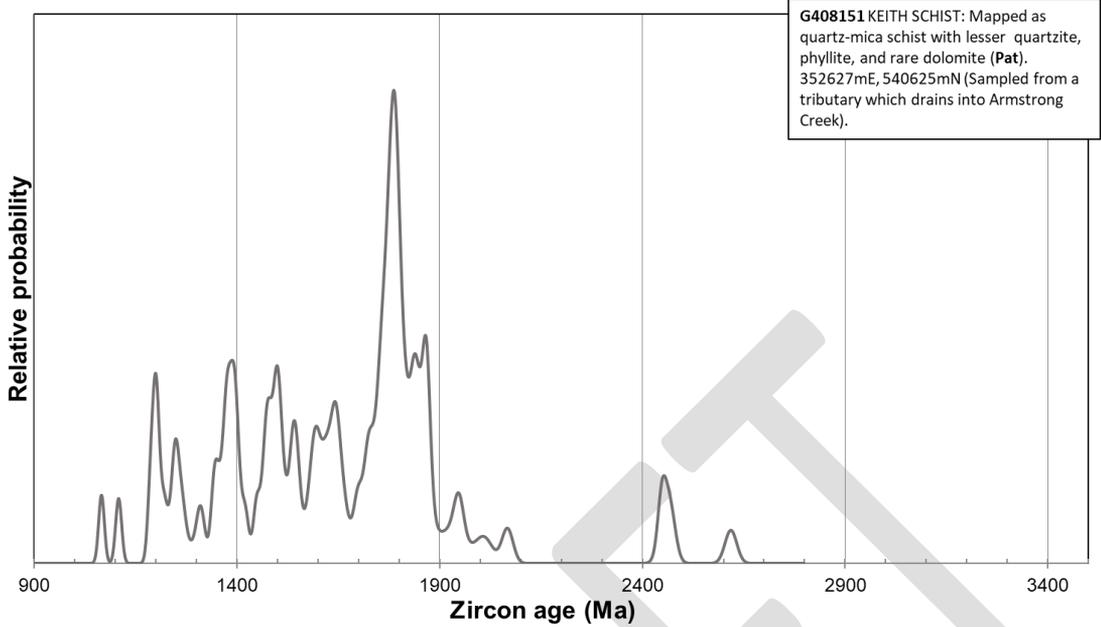


Figure 5. Probability plots of U-Pb ICPMS ages of detrital zircons from the Keith Schist.

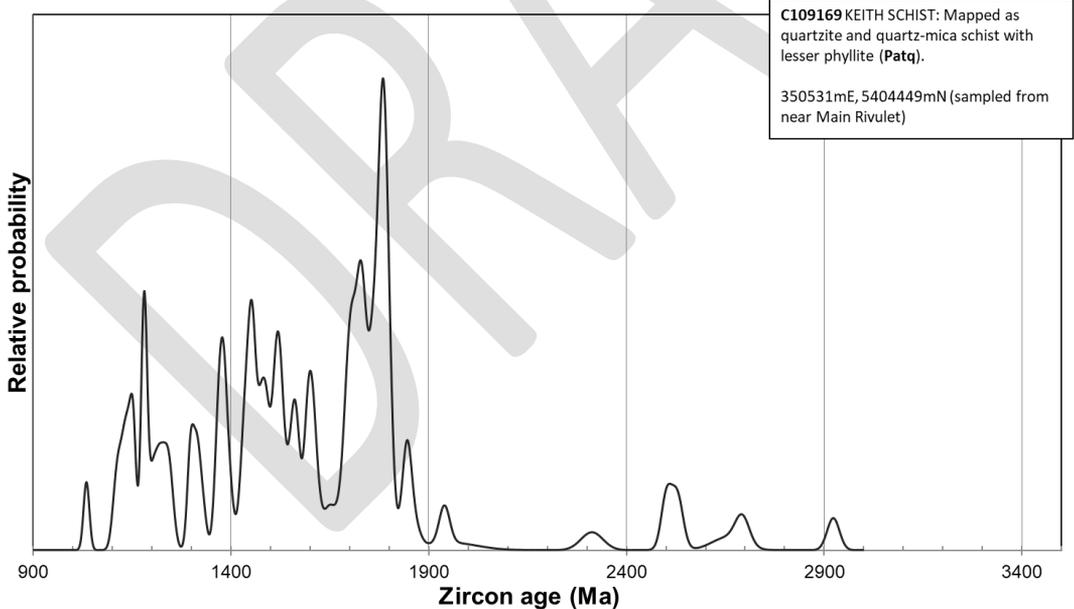


Figure 6. Probability plots of U-Pb ICPMS ages of detrital zircons from the Keith Schist.