National Argon Map: an AuScope Initiative
$^{40}Ar/^{39}Ar$ Geochronology Laboratory Sample Submission Form

This form must be completed and returned to Marnie Forster (Marnie.Forster@anu.edu.au) before any work can be commenced in the Argon Laboratories.

Person submitting samples: Ian T Graham
Affiliation: UNSW Sydney
Project Title: Hera intrusive events
Sample Number(s) (including IGSN if one exists): 310SA
Mineral separation required? Yes or No: No
Date submitted:

GEOGRAPHIC AREA/ PROVINCE/ BASIN : Lachlan Fold Belt, Cobar basin	
1:250k SHEET NAME: Nymagee Metallogenic	**NUMBER:** SI/55-2
1:100k SHEET NAME:	**NUMBER:**
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94)	
ZONE:	
EASTING:	**NORTHING:**
LATITUDE: -32.110965	**LONGITUDE:** 146.32883

STRATIGRAPHIC UNIT FORMAL NAME *: Lower Amphitheatre Group
STRATIGRAPHIC UNIT INFORMAL NAME:
LITHOLOGY: Fine-grained turbiditic siltstones and sandstones

DRILLHOLE ID (if applicable):
PROSPECT (if applicable):
DEPTH FROM (metres):
DEPTH TO (metres):

* Stratigraphic Unit names can be searched and checked within the Australian Stratigraphic Units Database via the following link: https://asud.ga.gov.au/

Dating Objective

What is the geological question $^{40}Ar/^{39}Ar$ analysis will address?

The age of crystallisation of this intrusive and how this age compares to previously obtained U-Pb titanite and Ar-Ar muscovite ages. The age of these intrusive dykes is completely unknown.

What type of age(s) are expected? (e.g. magmatic crystallisation, metamorphism, fluid alteration/mineralisation, cooling, shearing etc):

Magmatic crystallisation

Mineral target(s) for dating:

K-feldspar (orthoclase)

Estimated $^{40}Ar/^{39}Ar$ age (e.g. Cenozoic, Mesozoic, Paleozoic, Proterozoic, Archean – provide estimated numerical age range if possible):

I would expect them to be in the range of 280-290 Ma.

Sample Information

Location description (e.g. a sample of x was collected from y, z km from abc town):

This sample was collected from a cross-cutting pegmatite dyke some 1.5 metres from the ground level on the 310 Level, South end of the Hera mine, 5 km south of the town of Nymagee.

Lithological characteristics (rock description):

A relatively medium-coarse minimum melt composition (orthoclase-albite-quartz) granite pegmatite.

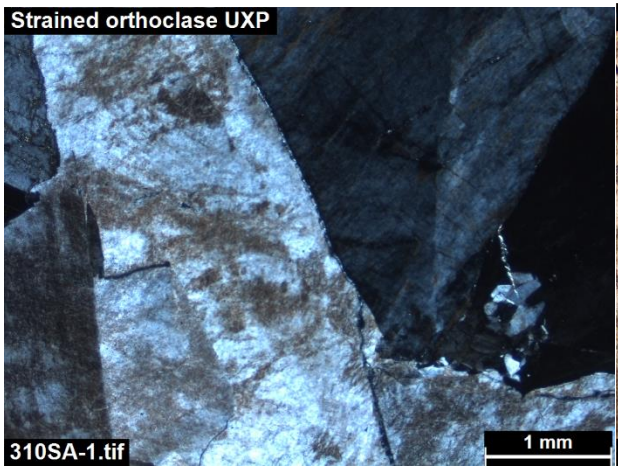
Relative age constraints (pertinent geological relationships with surrounding rock units and any previous geochronology):

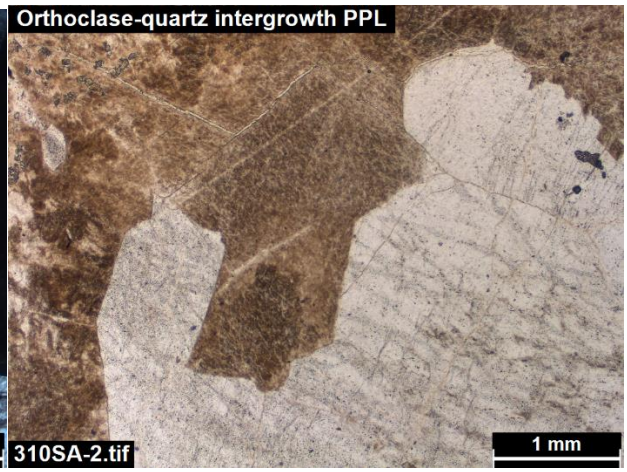
Waltenberg et al (2019) obtained U-Pb titanite ages of 383.4 Ma and 382.5 Ma from cross-cutting quartz veins on levels 460 and 435 vent access respectively. Also, Downes and Phillips (2018) obtained an almost identical preliminary age of 382 Ma for muscovite intergrown with sulfides from the Far West orebody. The host rocks are some 419-407 Ma (MacRae, 1987).

Thin section description (if available):

In thin-section, this sample comprises coarse-grained interlocking grains of untwinned and perthitic K-feldspar (XRD analysis most closely matches orthoclase) with plagioclase (XRD analysis matches albite) and lesser quartz. Clinochlore occurs infilling micro-fractures but only in the albite and quartz (confirmed by SEM imaging and EPMA analysis).

Photograph(s) e.g. field site, hand-specimen, photomicrograph:





Relevant bibliographic references:

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