

National Argon Map: an AuScope Initiative

$^{40}\text{Ar}/^{39}\text{Ar}$ 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: Anthony Reid
Affiliation: Senior Principal Geoscientist, Geological Survey of South Australia
Project Title: Dating of mineralisation-related alteration in the Olympic Cu-Au Province, Gawler Craton
Sample Number(s) (including IGSN if one exists): 2016096
Mineral separation required? Yes or No: Y
Date submitted: 20/03/2020

GEOGRAPHIC AREA/ PROVINCE/ BASIN : Gawler Craton	
1:250k SHEET NAME: OLARY	NUMBER:
1:100k SHEET NAME: Olary	NUMBER:
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94) GDA2020	
ZONE: 52	
EASTING: 438729.72	NORTHING: 6451527.5
LATITUDE: -32.0708435	LONGITUDE: 140.3508372

STRATIGRAPHIC UNIT FORMAL NAME *: Bimbowrie Suite
STRATIGRAPHIC UNIT INFORMAL NAME: NA
LITHOLOGY: two mica granite

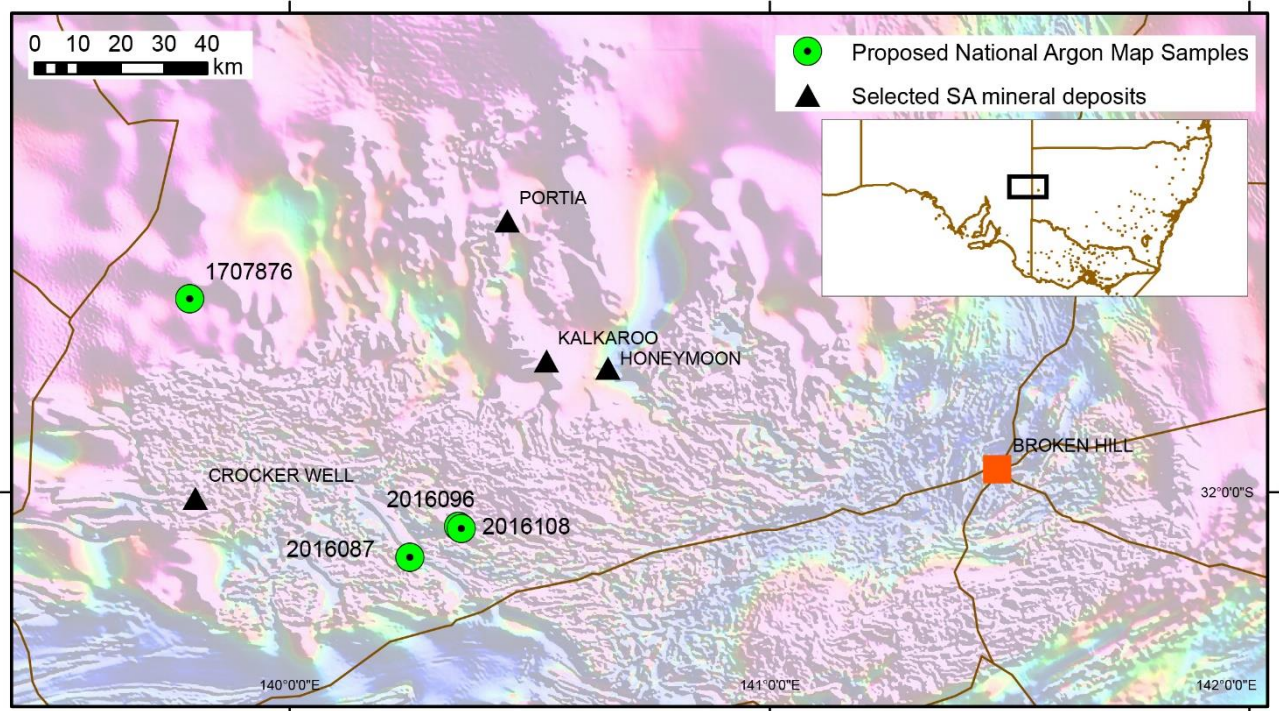
DRILLHOLE ID (if applicable):
PROSPECT (if applicable):
DEPTH FROM (metres):
DEPTH TO (metres):

* 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 $^{40}\text{Ar}/^{39}\text{Ar}$ analysis will address?

The Curnamona Province is host to one of the world's largest mineral deposits at Broken Hill and has prospectivity for IOCG mineral systems as witnessed by deposits such as Kalkaroo and Portia. There is however, very little argon geochronology from the Curnamona Province, in particularly the South Australian portion of the region. The samples selected are from the Bimbowrie region and from a regional drill hole that will assist with gaining baseline information on the thermal evolution of the Curnamona Province.



Location map of Curnamona Province samples. Backgroundlayer is national Total Magnetic Intensity image, Geoscience Australia.

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

Cooling age

Mineral target(s) for dating:

Biotite, muscovite

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

Mesoproterozoic

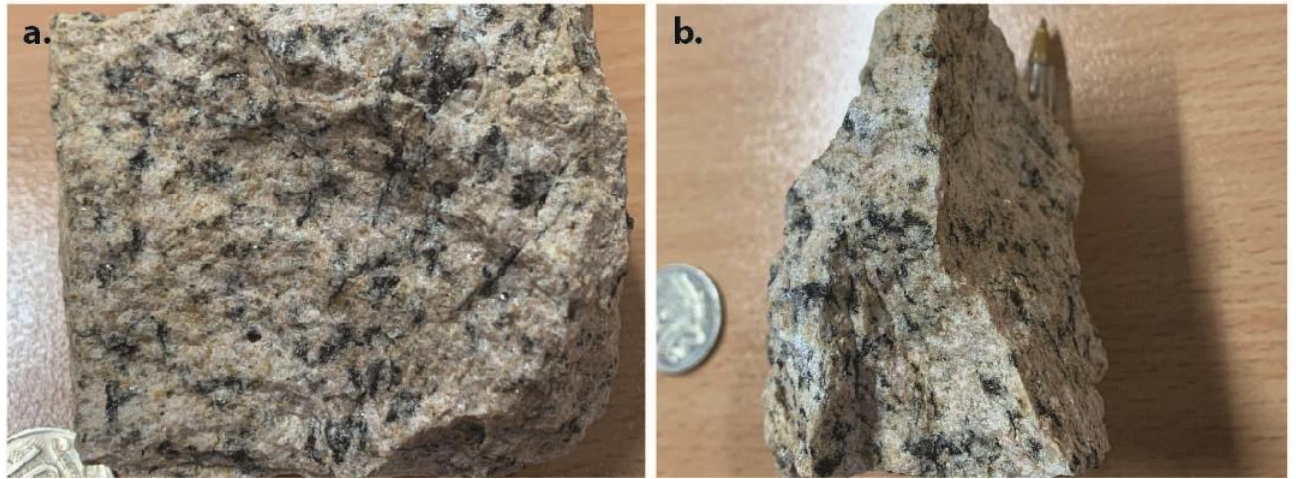
Sample Information

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

Granite within the Bimbowrie region.

Lithological characteristics (rock description):

Sample 2016096 is a weakly foliated two mica granite typical of the Bimbowrie Suite from the Bimbowrie region of the Curnamona Province. The sample is ideal for defining the thermal history of the Curnamona Province as expressed in the Bimbowrie Suite granites. Muscovite and biotite are present and can be analysed. The feldspar in this rock may be K-feldspar however, pervasive sodicalteration is widespread in the Curnamona Province and therefore the feldspar may now be albite-dominated.



Photographs of sample 2016096. a. shows general texture. b. shows the weak foliation of the granite (vertical in the image) defined by alignment of mica and fracture planes within feldspar.

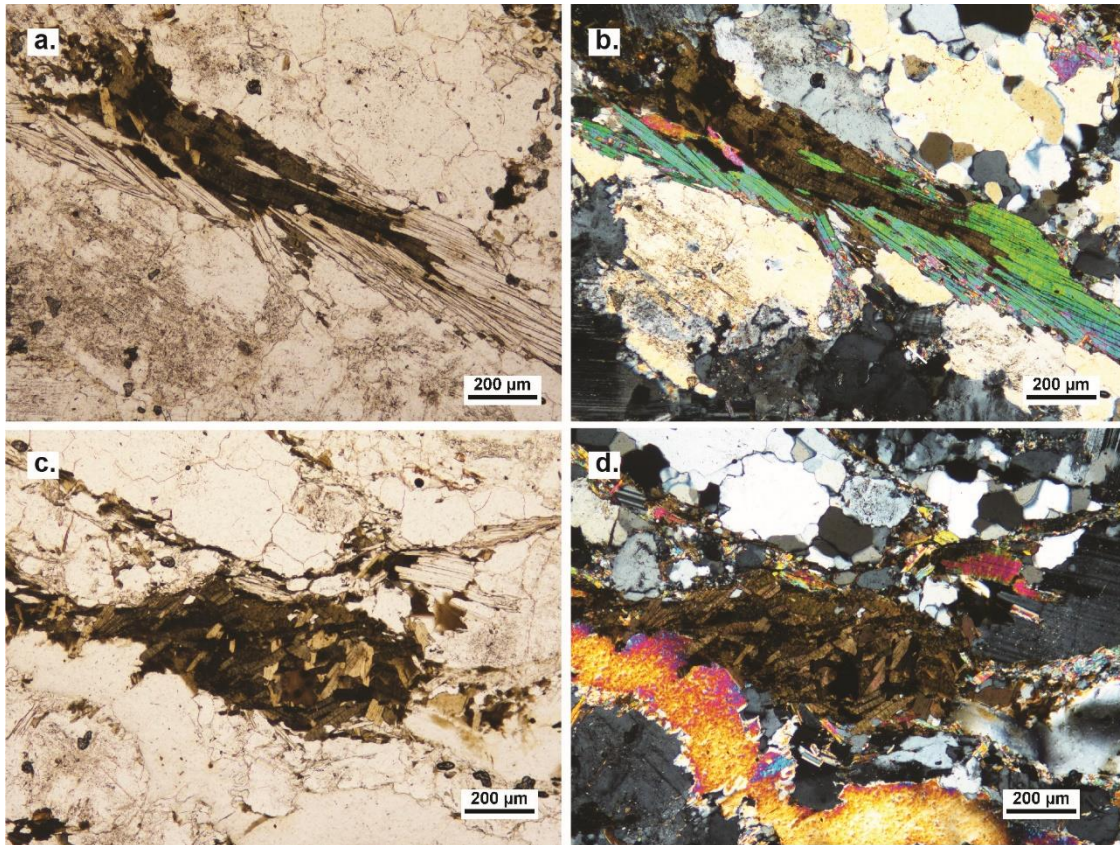
Relative age constraints (pertinent geological relationships with surrounding rock units and any previous geochronology):

This granite has not been dated, however, Bimbowrie Suite granites similar to this were emplaced at c. 1580 Ma.

Thin section description (if available):

The sample has a fabric defined by alternating quartz-feldspar microlithons in which the quartz is dynamically recrystallised and forms subgrains, and more biotite-muscovite rich microlithons. Biotite appears to form aggregates in places as medium grained brown mineral. The muscovite is relatively colourless in plain polarised light. Plagioclase is weakly sericite altered.

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



Photomicrographs of sample 2016096. a. Plain polarised light. b. Cross polars. c. Plain polarised light. d. Cross polars.

Relevant bibliographic references:

N/A