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

This form must be fully completed before any work can be submitted to the Laboratory.

Person submitting samples: Naina (PhD student- MinEx CRC), ANU.
Project Title: Cambro-Ordovician magmatism and deformation at the eastern margin of Gondwana, South Australia: Insights into tectonic processes and mineral potential
Sample Number: N1908 (2 samples)
Date submitted:

GEOGRAPHIC AREA/ PROVINCE/ BASIN:	
1:250k SHEET NAME: Adelaide	**NUMBER:** S15409
1:100k SHEET NAME: Mannum	**NUMBER:** 6728
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94) WGS84	
ZONE:	
EASTING:	**NORTHING:**
LATITUDE: 34°53'35.17''S	**LONGITUDE:** 139°21'9.16''E

STRATIGRAPHIC UNIT FORMAL NAME: Mannum Granite
STRATIGRAPHIC UNIT INFORMAL NAME: Mannum Granite
LITHOLOGY: Granite, A-type

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

Dating Objective

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

The Ar-Ar analysis of K-rich minerals from this granite would help in constructing a thermal history for this granite. Different minerals may provide different ages.

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

Intrusion, metamorphic and cooling ages.

Mineral target(s) for dating (provide approximate K content if known):

Biotite (9%K) and K-Feldspar (11%K).

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

Estimated age for this granite is 480Ma.

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

Sample Information

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

Sample was collected from Mannum Quarry (34°53’35.17’’S, 139°21’9.16’’E) near the town of Mannum.

Lithological characteristics (rock description):

Mannum granite is medium to coarse-grained, biotite rich with sparse white mica and orange K-feldspar phenocrysts. The granite has miarolitic cavities with sulphide precipitates and the outcrop displays swarms of mafic enclaves enveloping sulphides and K-Feldspars.

Thin section description (if available): The sample consists of Quartz+White mica+ Biotite+ Plagioclase+ Opaque minerals+ K-Feldspar (microcline). Microcline has inclusions of Quartz and Plagioclase. Opaques have inclusionsof white mica and biotite. The texture of the sample is phaneritic.

Photograph(s) e.g. field site, hand-specimen, photomicrograph: Below is a outcrop view highlighting the dyke intruding Mannum Granite. This image was captured during my PhD field trip in June 2019.

Relevant bibliographic references:

Turner, S., & Foden, J. (1996). Magma mingling in late-Delamerian A-type granites at Mannum, South Australia. Mineralogy and Petrology, 56, 147-169.

Pankhurst, M J, R H Vernon, S P Turner, B F Schaefer, and J D Foden. "Contrasting Sr and Nd isotopic behaviour during magma mingling: new insights from the Mannum A-type granite." Lithos (Elsevier) 126 (July 2011): 135-146.