

National Argon Map: an AuScope Initiative

$^{40}\text{Ar}/^{39}\text{Ar}$ 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: N1910(a) (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:	LONGITUDE:
34°55'40.17"S	139°12'58.55"E

STRATIGRAPHIC UNIT FORMAL NAME: Kanmantoo Group
STRATIGRAPHIC UNIT INFORMAL NAME: Kanmantoo Group metasediments
LITHOLOGY: Metasediments

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

Dating Objective

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

The Ar-Ar analysis of metamorphosed sediments (migmatized) of the Kanmantoo Group would help in timing the metamorphic event and emplacement ages (if partial resetting occurs), along with timing any subsequent thermal events (if any) that take place.

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

Metamorphism, alteration and cooling ages.

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

Mineral targets include K-Feldspar (11% K) and biotite (9% K).

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

Estimated age for this unit is Early Cambrian (520Ma).

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):

The sample was collected from migmatized metasediments of Kanmantoo Group at Reedy Creek (34°55'40.17"S, 139°12'58.55"E)

Lithological characteristics (rock description):

Migmatite complex, sheeted granite like appearance, presence of mafic dark colored enclaves throughout the area (sedimentary and/or igneous in origin). Mafic sills present.

Thin section description (if available):

Minerals observed: Biotite+ Quartz+ white mica+ some opaques+ albite (simple twinning) + microcline (tartan twinning?); Crystal habit: subhedral to euhedral; Texture: Equigranular

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:

Foden, John, Marlina A Elburg, Jon Dougherty Page, and Andrew Burr. "The timing and duration of the Delamerian Orogeny: Correlation with the Ross Orogen and Implications for Gondwana Assembly." *The Journal of Geology* 114 (2006): 189-210.