

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: Ian T Graham
Affiliation: UNSW Sydney
Project Title: Age of basaltic intrusions within the Sydney Basin, NSW
Sample Number(s) (including IGSN if one exists): KHP02
Mineral separation required? Yes or No: yes
Date submitted:

GEOGRAPHIC AREA/ PROVINCE/ BASIN : Sydney Basin	
1:250k SHEET NAME: Ulladulla	NUMBER: SI/56-13
1:100k SHEET NAME:	NUMBER:
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94)	
ZONE: 56 H	
EASTING: 297301	NORTHING: 6128567
LATITUDE: -34.965180381	LONGITUDE: 150.779813823

STRATIGRAPHIC UNIT FORMAL NAME *: Contemporaneous with Wandrawandian siltstone
STRATIGRAPHIC UNIT INFORMAL NAME:
LITHOLOGY: Micro-dolerite sill

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 magmatic age of crystallisation of the sill and is it Mid-Permian (~ 265 Ma) in age. Also, how does this relate to the age of other dykes/sills within the Sydney Basin.

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:

Plagioclase separate.

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

Should be Middle Permian, around 265 Ma.

Sample Information

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

Sample was collected from the micro-dolerite sill from Kinghorn Point (3.6 Km south of Culburra Beach).

Lithological characteristics (rock description):

This is a subporphyritic micro-dolerite with larger plagioclase crystals in a finer-grained groundmass.

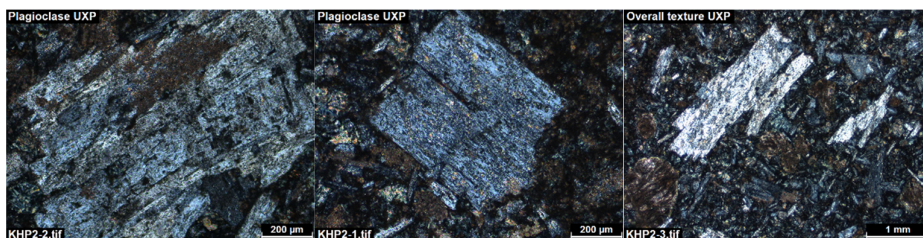
Relative age constraints (pertinent geological relationships with surrounding rock units and any previous geochronology):

Micro-dolerite sill and dyke complex intrudes the Wandrawandian siltstone, and has peperite on the contact.

Thin section description (if available):

This is a subporphyritic micro-dolerite with larger plagioclase crystals in a finer-grained groundmass.

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



Relevant bibliographic references:

Abu Shamma, S., 2018. Analysis of Basaltic Dykes and their Xenolith Assemblages from the Gerroa-Kiama Region, New South Wales. Honours thesis (unpublished), University of New South Wales.

Alcorn, C.J., 2016. Zircon geochronology and geochemistry of xenoliths in a Jurassic dyke at Bombo, NSW, Australia: Evidence of deep crustal structure under the Sydney Basin. BSc (Hons) thesis, University of Wollongong (unpublished).

Belica, M.E., Tohver, E., Pisarevsky, S.A., Jourdan, F., Denyszyn, S., and George, A.D., 2017. Middle Permian paleomagnetism of the Sydney Basin, Eastern Gondwana: Testing Pangea models and the timing of the end of the Kiaman Reverse Superchron. *Tectonophysics*, 699: 178-198.

Carr, P.F., 1984. The Late Permian shoshonitic province of the southern Sydney Basin. PhD thesis, Department of Geology, University of Wollongong. Wollongong (unpublished). 1-417.

Campbell, L.R, Conaghan, P. J. & Flood R. H. 2001. Flow-field and palaeogeographic reconstruction of volcanic activity in the Permian Gerringong volcanic complex, southern Sydney Basin, Australia. *Australian Journal of Earth Sciences* 48, 357–375.

Harper, L.F., 1905. The geology of the Gerringong District. *Records of the Geological Survey of New South Wales* 8 (2): 94-107.

Johnson, R.W., Knutson, J., and Taylor, S.R. (eds) (1989). *Intraplate volcanism in eastern Australia and New Zealand*. Cambridge University press.

Offler, R., Zwingmann, H., Foden, J., Sutherland, F.L., and Graham, I.T., 2019. Age and composition of dykes emplaced before and during the opening of the Tasman Sea – source implications. Australian Journal of Earth Sciences 66 (8): 1129-1144.

Wellman, P., and McDougall, I., 1974a. Cainozoic igneous activity in eastern Australia. Tectonophysics 23: 49-65.

Wellman, P., and McDougall, I., 1974b. Potassium-argon ages on the Cainozoic volcanic rocks of New South Wales. Journal of the Geological Society of Australia, 21: 247-272.