

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.

GSWA 184330: Metadolerite, hanging wall of Jerdacuttup Fault and footwall of Cascade Shear Zone, Munglinup Gneiss, Powell Point, OLDFIELD

Person submitting samples: Raphael Quentin de Gromard
Affiliation: Geological Survey of Western Australia
Project Title: Evolution of crustal structures in an inverted orogen, the east Albany–Fraser Orogen, Western Australia
Sample Number(s) (including IGSN if one exists): 184330
Mineral separation required? Yes or No:
Date submitted:

GEOGRAPHIC AREA/ PROVINCE/ BASIN : southern Western Australia/east Albany–Fraser Orogen	
1:250k SHEET NAME: RAVENSTHORPE	NUMBER: SI51-05
1:100k SHEET NAME: OLDFIELD	NUMBER: 3030
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94)	
ZONE: 51	
EASTING: 274444	NORTHING: 6243890
LATITUDE: -33.92129	LONGITUDE: 120.56007

STRATIGRAPHIC UNIT FORMAL NAME *: Munglinup Gneiss
STRATIGRAPHIC UNIT INFORMAL NAME:
LITHOLOGY: Metadolerite

HOLE ID (if applicable):
DEPTH (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?

Evolution of crustal structures of the east AFO - Exhumation history of the Munglinup Gneiss and evolution of the Jerdacuttup Fault and Cascade Shear Zone.

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

Cooling

Mineral target(s) for dating:

Hornblende

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

Cooling age at c. 1190 or 1160 Ma

Sample Information

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

A metadolerite dyke sample was collected from a headland at Powell Point, 40.5 km east of Hopetoun, WA.

Lithological characteristics (rock description):

Folded mafic dyke that cross-cuts the layering and folding in orthogneiss host. Coarse-grained metadolerite. 2-3 mm plagioclase, pyroxene and amphibole. Small-scale folds plunging southwest within the mafic intrusive are subparallel to the contact of the mafic intrusive with the orthogneiss, which cuts N to NW-trending F2 folds. The mafic intrusive also appears to be folded in a larger-scale S-fold, part of the F3 folding sequence. This would bracket mafic intrusion between F2 and F3. 3D views of F2 folds suggests their axial planes are shallowly dipping to the SW.

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

Three samples from Powell Point were dated by U–Pb zircon:

A monzodiorite yielded a magmatic crystallization age of 2658 ± 21 Ma and a metamorphic age of c. 1150 Ma (GSWA 184127).

A leucosome vein cross cutting F3 folds yielded a 2703 ± 32 Ma crystallization age and a 1185 ± 10 Ma metamorphic age (GSWA 184329).

A leucocratic tonalite gneiss 2660 ± 13 crystallization age and 1195 ± 17 Ma metamorphic age (GSWA 184128).

Thin section description (if available):

Coarse-grained hbl-cpx-pl amphibolite, hbl defines the foliation, only one generation of hbl that appears to replace cpx

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



Figure 1. Sample site of metadolerite dyke GSWA 184330

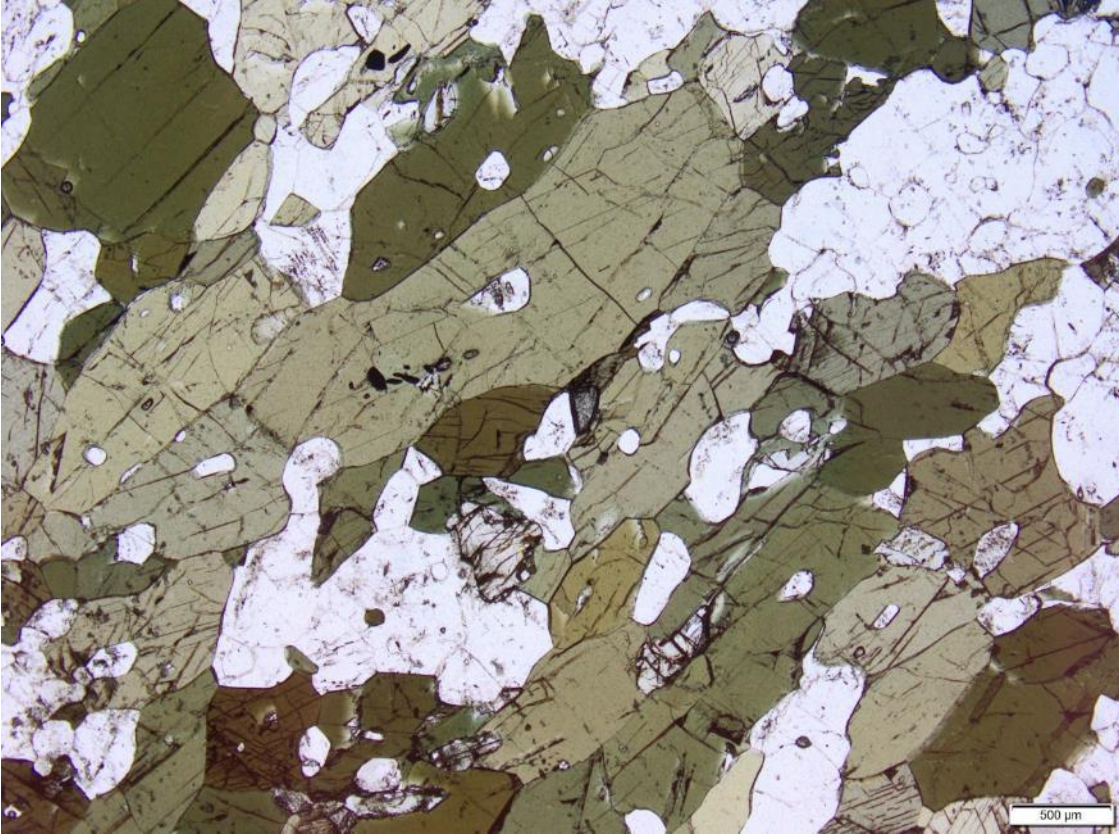


Figure 2. 184330_ Coarse-grained hbl-cpx-pl amphibolite, aligned hbl forms the main foliation - PPL.