

# 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](mailto:Marnie.Forster@anu.edu.au)) before any work can be commenced in the Argon Laboratories.

<b>Person submitting samples:</b> Roland Maas
<b>Affiliation:</b> School of Geography, Earth and Atmospheric Sciences, Univ. of Melbourne
<b>Project Title:</b> <i>Timing of Devonian granitic magmatism across the northern part of the mid/lower crustal Selwyn Block, western Lachlan Fold Belt</i>
<b>Sample Number(s) (including IGSN if one exists):</b> PHG, Pyramid Hill Granite
<b>Mineral separation required? Yes or No:</b> no
<b>Date submitted:</b> March 2021

<b>GEOGRAPHIC AREA/ PROVINCE/ BASIN :</b> western Lachlan Fold Belt	
<b>1:250k SHEET NAME:</b> Bendigo	<b>NUMBER:</b> GSV Cat. NO. 29416
<b>1:100k SHEET NAME:</b> Mitiamo	<b>NUMBER:</b> topo 7725
<b>LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94)</b>	
<b>ZONE:</b> 55	
<b>EASTING:</b>	<b>NORTHING:</b>
<b>LATITUDE:</b> -36.05918	<b>LONGITUDE:</b> 144.1420

<b>STRATIGRAPHIC UNIT FORMAL NAME *:</b> Pyramid Hill Granite (GSV granite number 295)
<b>STRATIGRAPHIC UNIT INFORMAL NAME:</b> same
<b>LITHOLOGY:</b> S-type granite

<b>DRILLHOLE ID (if applicable):</b>
<b>PROSPECT (if applicable):</b>
<b>DEPTH FROM (metres):</b>
<b>DEPTH TO (metres):</b>

\* 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?**

Detailed timing of Devonian granitic magmatism in northern part of Bendigo, Melbourne and Tabberabbera Zones

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

Mica cooling age, approximates magmatic crystallization. Expected to overcome problems with low zircon yield and radiation damage encountered during recent U-Pb zircon dating (Shrimpton, 2020). Will allow comparison with  $^{40}\text{Ar}$ - $^{39}\text{Ar}$  ages of  $365\pm 3$  Ma for magmatic biotite, muscovite and K-feldspar with the Lake Boga Granite, an intrusion of similar composition and size ca 60 km NW of Pyramid Hill

**Mineral target(s) for dating:**

Biotite

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

Published K-Ar and Rb-Sr mineral ages for the Pyramid Hill Granite vary from  $361\pm 3$  to  $372\pm 6$  Ma (Richards and Singleton, 1981; McKenzie et al., 1984). Recent U-Pb dating of zircons yield a weighted average of  $371.8\pm 3.9$  Ma (Shrimpton, 2020).

### Sample Information

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

Sample collected by M Shrimpton (2019) at Mawsons Quarry just east of Pyramid Hill (a small town 80 km north of Bendigo). This large active quarry exposes two textural types, medium- and fine-grained granite

***Lithological characteristics (rock description):***

Fresh medium-grained S-type granite (with garnet) from active quarry

***Relative age constraints (pertinent geological relationships with surrounding rock units and any previous geochronology):*** Pyramid Hill Granite (and the nearby Terrick Terrick Granite informally included within Pyramid Hill Granite, Rossiter, 2003) has an outcrop area of ~10x20 km, with additional subcrop below thin Neogene and Quaternary deposits. Intrusive contacts with lower Ordovician Castlemaine Supergroup metasedimentary rocks are known nearby.

***Thin section description (if available):***

n/a

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

n/a

***Relevant bibliographic references:***

Edwards, J and Slater, KR, 2001 Bendigo 1:250000 geological map. Geological Survey of Victoria

Edwards, J, Slater, KR and McHaffie, IW, 2001 Bendigo 1:250000 map area geological report. Victorian Initiative for Minerals and Petroleum Resources 72, Dept of Natural Resources and Environment

Rossiter, AG, 2003 Granitic rocks of the Lachlan Fold Belt in Victoria. In: WD Birch (ed) Geology of Victoria, Geological Association of Victoria Special Publication 23, 217-237

Shrimpton, M, 2020 Deep crustal architecture in south-east Australia. Unpubl. MSc thesis, University of Melbourne