National Argon Map: an AuScope Initiative
$^{40}Ar/^{39}Ar$ 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: Roland Maas
Affiliation: School of Geography, Earth and Athmospheric Sciences, Univ. of Melbourne
Project Title: *Timing of Devonian granitic magmatism across the northern part of the mid/lower crustal Selwyn Block, western Lachlan Fold Belt*
Sample Number(s) (including IGSN if one exists): EG12 (Murmungee Granodiorite)
Mineral separation required? Yes or No: no
Date submitted: March 2021

GEOGRAPHIC AREA/ PROVINCE/ BASIN : western Lachlan Fold Belt	
1:250k SHEET NAME: Wangaratta 1:250000 geological map	**NUMBER:** 29392
1:100k SHEET NAME: Beechworth 1:50000 geological map	**NUMBER:** 8225
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94)	
ZONE: 55	
EASTING:	**NORTHING:**
LATITUDE: -36.442	**LONGITUDE:146.636**

STRATIGRAPHIC UNIT FORMAL NAME *: Murmungee Granodiorite (GSV granite number 199)
STRATIGRAPHIC UNIT INFORMAL NAME: same
LITHOLOGY: granite

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 $^{40}Ar/^{39}Ar$ 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 and avoids some problems encountered in U-Pb zircon dating.

Mineral target(s) for dating:

Biotite

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

Existing radiometric dating of granites in the Pilot Range (K-Ar biotite 369±15 to 385±6, Richards and Singleton, 1981, McKenzie et al 1984; Rb-Sr biotite 383±4, McDonald 1988) indicates late Devonian emplacement ages. Somewhat older ages (386-391 Ma) are implied by recent LA-ICPMS zircon dating of five granite units (Grange, 2017). Molybdenite mineralization in the Everton Grd yielded a Re-Os age of 379.6±1.9 Ma (D Huston, pers comm 2016). ArAr biotite dating of Golden Ball Granite and three other Pilot Range granitic units is expected to help clarify the timing of granite emplacement and its relationship to Mo mineralisation.

Sample Information

Location description (e.g. a sample of x was collected from y, z km from abc town): Sample EG12 is from the collection of the former Dept. of Geology, La Trobe University, Melbourne. With outcrop of Murmungee Grd being almost non-existent, this sample was taken from drillcore details of core ?. The drillsite is located at the centre of the near-circular (7x8 km) topographic feature formed by the intrusion's contact zone

Lithological characteristics (rock description):

Well-preserved medium-grained granite. Murmungee Grd is classified as I-type (White and Chappell, 1988) but is considerably more mafic and has lower 87Sr/86Sr than the members of the Beechworth Granite Suite (e.g. Rossiter, 2003).

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

The Murmungee Grd (ca. 50 km^2) forms shallow subcrop beneath the Murmungee Basin which is formed by a circular rim of erosion-resistant contact rocks in Lower Ordovician Pinnak Sandstone surrounding the more eroded intrusive rocks (see Beechworth 1:50000 map).

Thin section description (if available):

n/a

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

n/a

Relevant bibliographic references:

Maher, S, Vandenberg, AHM, McDonald, PA and Sapurmas, P, 1997 The geology and prospectivity of the Wangaratta 1:250000 map sheet area. Victorian Initiative for Minerals and Petroleum Report 46

McDonald, P, 1988 The geology and geophysics of the Murmungee Basin granodiorite and surrounding granites Beechworth, NE Victoria. Unpubl. Honours thesis, La Trobe University

McKenzie, DA, Nott, RJ and Bolger, PF, 1984 Radiometric age determinations.
Geological Survey Report 74. Department of Minerals & Energy, Victoria.

Richards, JR and Singleton, OP, 1981 Palaeozoic Victoria, Australia: igneous rocks ages
and their interpretation. Journal of the Geological Society of Australia, 28, 395-421

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

Vandenberg, AHM et al, 2000 The Tasman Fold Belt System in Victoria. Geological Survey of Victoria, Special Publication

Welch SI, Higgins DV & Callaway GA, 2011 Surface Geology of Victoria 1:250,000 geological maps.
Department of Primary Industries, Victoria: Geological Survey of Victoria

White AJR and Chappell, BW 1988 Granites. In: Douglas, JG and Ferguson, JA (eds) Geology of Victoria, 427-430. Geological Society of Australia