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): EG06 (Beechworth Granite)
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: -36.371	**LONGITUDE:** 146.653

STRATIGRAPHIC UNIT FORMAL NAME *: Beechworth Granite (GSV granite number 195)
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 EG06 was collected from roadside outcrops along the Beechworth-Wangaratta Rd (C315), ca. 200 m west of the intersection with Robinson Rd (3.5 km west from the centre of Beechworth)

Lithological characteristics (rock description):

Well-preserved medium-grained granite. Beechworth Granite is classified as I-type (White and Chappell, 1988) and part of the Beechworth Suite (e.g. Rossiter, 2003). It is a felsic, relatively reduced granite (Rossiter, 2003)

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

The Beechworth Granite (ca. 250 km^2) is the dominant granite phase in the Pilot Range (see Beechworth 1:50000 map). Intrusive contacts with Lower Ordovician Pinnak Sandstone (Adaminaby Group) of the Tabberabbera Zone (see Wangaratta 1:250000 geol. map) are mapped on all sides of the granite pluton; a zone of contact metamorphism is shown in the map of Welch et al (2011)

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