

# 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.

### Samples from the Top Up Rise prospect, basement to Canning Basin, Lasseter Shear Zone

#### Amphibolite 228606

<b>Person submitting samples:</b> Catherine Spaggiari / Dave Kelsey
<b>Affiliation:</b> Geological Survey of Western Australia
<b>Project Title:</b> Project Manager / Senior Geologist
<b>Sample Number(s) (including IGSN if one exists):</b> 228606
<b>Mineral separation required? Yes or No:</b> Yes
<b>Date submitted:</b> May 2020

<b>GEOGRAPHIC AREA/ PROVINCE/ BASIN :</b> Kiwirkurra Community / West Arunta Orogen	
<b>1:250k SHEET NAME:</b> Wilson	<b>NUMBER:</b> SF 52-9
<b>1:100k SHEET NAME:</b> Top Up Rise	<b>NUMBER:</b> 4352
<b>LOCATION METHOD: (GPS: GDA94)</b>	
<b>ZONE:</b> 52	
<b>EASTING:</b> 337513	<b>NORTHING:</b> 7499769
<b>LATITUDE:</b> -22.60116	<b>LONGITUDE:</b> 127.41922

<b>STRATIGRAPHIC UNIT FORMAL NAME *:</b> No formal names as yet for the Top up Rise samples
<b>STRATIGRAPHIC UNIT INFORMAL NAME:</b> TBC, based on new U-Pb data in progress and geochemistry.
<b>LITHOLOGY:</b> Amphibolite derived from intrusive rock

<b>DRILLHOLE ID (if applicable):</b> TUR13DD001
<b>PROSPECT (if applicable):</b> Top Up Rise
<b>DEPTH FROM (metres):</b> 241.40
<b>DEPTH TO (metres):</b> 241.60

\* 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 ages of metamorphism and deformation events; to compare to the Mundrabilla Shear Zone samples

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

Age of metamorphism related to amphibole growth and foliation development. Hornblende is aligned within the foliation.

**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):**

Younger than c. 1870 Ma; possibly c. 1610 Ma, or younger.

#### Sample Information

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

Top up Rise samples come from the Top up Rise prospect drillcores, which were drilled approximately 41 km northwest of Kiwirkurra, in the Gibson Desert. These rocks lie beneath the Canning Basin, and no other information about them is available.

**Lithological characteristics (rock description):**

Medium-grained amphibolite with well-developed foliation. There is some subtle compositional layering at the several cm-scale, parallel to the foliation, defined by variations in the abundance of plagioclase versus hornblende. Some parts of the rock are biotite-bearing, and rare garnet occurs locally.

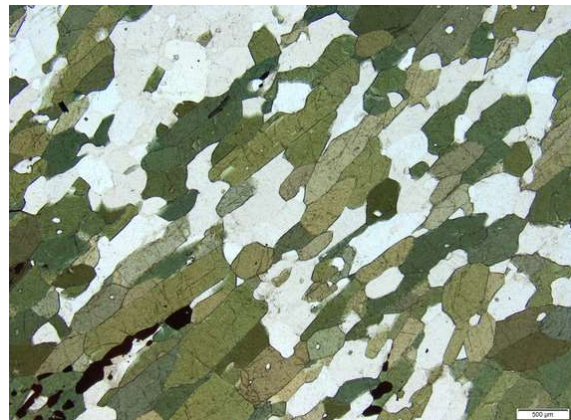
**Relative age constraints (pertinent geological relationships with surrounding rock units and any previous geochronology):**

SHRIMP U-Pb dating is in progress. Preliminary data indicates  $1880 \pm 5$  Ma and  $1872 \pm 5$  Ma for magmatic crystallization of a granite protolith to granite gneiss, and c. 1610 Ma for high grade metamorphism.

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

Very fresh and moderately foliated olive-brown to dark green to blue-green amphibole + plagioclase + quartz + Fe-Ti amphibolite. Amphibole and plagioclase define the foliation. Fe-Ti oxide grains occur throughout the sample but tend to define discontinuous 'lenses' (the individual Fe-Ti oxide grains are spaced apart). Patches free of amphibole occur locally.

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



**Relevant bibliographic references:**

**Top up Rise prospect:**

Nothing published as yet. There is a company report on the drillcores:  
Border Exploration, 2013, Geological Survey of Western Australia, Statutory mineral exploration report A099481, 29p.

**Relevant information:**

JA Hollis, CL Kirkland, CV Spaggiari, IM Tyler, PW Haines, MTD Wingate, EA Belousova, and RC Murphy, 2013, Zircon U-Pb-Hf isotope evidence for links between the Warumpi and Aileron Provinces, West Arunta Region: Geological Survey of Western Australia Record 2013/9, 30p.

Spaggiari, CV, Haines, PW, Tyler, IM, Allen, HJ, de Souza Kovacs, N and Maidment, D 2016, Webb, WA Sheet SF 52-10 (2nd edition): Geological Survey of Western Australia, 1:250 000 Geological Series.

Haines, PW, de Souza Kovacs, N, Spaggiari, CV, Eacott, G, Allen, HJ, Tyler, IM, Maidment, DW, and Murdie, RE 2018, MacDonald, WA Sheet SF 52-14 (2nd edition): Geological Survey of Western Australia, 1:250 000 Geological Series