

National Argon Map: an AuScope Initiative

⁴⁰Ar/³⁹Ar 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: Ms Eleanor Nebel
Affiliation: PhD student, School of Geography, Earth and Atmospheric Sciences, University of Melbourne
Project Title: The timing and source of mineralisation at the Winu Cu-Au deposit, Paterson Province, WA
Sample Number(s) (including IGSN if one exists): EN1 to EN10 EN1=10385866, EN2=10386124, EN3=10685778, EN4=10685918, EN5=10685926, EN6=10709564, EN7=10848493, EN8=EXT1900234, EN9=10957666, EN10=10958296
Mineral separation required? Yes or No: No
Date submitted: March 2021 (handed samples to Mr Hayden Dalton, Noble Gas Lab, Univ of Melbourne)

GEOGRAPHIC AREA/ PROVINCE/ BASIN : Paterson Province, northern Western Australia	
1:250k SHEET NAME: Anketell	NUMBER: SF5102
1:100k SHEET NAME: Weenoo	NUMBER: 3256
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94) GPS: GDA 94	
ZONE: 51 see extra info for details on locations of each drillhole collar	
EASTING: 369462	NORTHING: 7707643
LATITUDE: -20 43' 34.5"	LONGITUDE: 121 44" 46.7"

STRATIGRAPHIC UNIT FORMAL NAME *: O'Callaghans Supersuite; Mount Crofton Suite & O'Callaghans Suite
STRATIGRAPHIC UNIT INFORMAL NAME:
LITHOLOGY: granitic rocks, encountered in drillcore

DRILLHOLE ID (if applicable): RC drillholes WIDI0003, WIDI0004, WIDI0025, WIDI0029, WIDI0065, WIDI0106, WIDI0116, WIDI0111
PROSPECT (if applicable): Winu-Ngapakarra Cu-Au
DEPTH FROM (metres): see attached excel file
DEPTH TO (metres): see attached excel file

* 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 ⁴⁰Ar/³⁹Ar analysis will address?

Timing of granitic magmatism possibly related to Cu-Au mineralization at Winu

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

Cooling ages for magmatic biotites should date emplacement ages of granites

Mineral target(s) for dating:

biotite

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

650-700 Ma

Sample Information

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

10 samples collected from drillcore through granitic rocks encountered below mineralization; Winu is in the Great Sandy Desert ca 100 km NW of Telfer and ca. 350 km SE of Port Hedland

Lithological characteristics (rock description):

Felsic granites, undeformed, high-Na, mildly peraluminous (border I- vs S-type)

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

The granitic rocks intrude ca. 850-900 Ma low-grade metasedimentary rocks of the Yeneena Basin. Based on preliminary U-Pb zircon dates, the Winu intrusives are similar in age to Neoproterozoic granites exposed near the Telfer Au deposit (Mount Crofton Suite & O'Callaghans Suite, Rowins et al 1997, Econ Geol 92, 133-160; Czarnota et al 2009, GA Record 2009/16). A paper (Nebel et al, in prep) will report on the mineralogical, chemical and isotopic composition of the Winu granites, to further explore their relationship to overlying Cu-Au mineralization and possible links to the Telfer granites

Thin section description (if available):

no

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

RC drillchips from granitoids intersected in the Paterson orogen

Relevant bibliographic references:

<https://www.riotinto.com/en/news/releases/2020/Rio-Tinto-reveals-maiden-Resource-at-Winu-and-new-discovery>)

<https://www.mindat.org/loc-406997.html>

<https://www.mining.com/rio-tinto-to-begin-copper-production-at-winu-in-2023/>

Maidment et al 2017 Paterson Orogen geology and metallogeny. In : Phillips GN (ed) Australian Ore Deposit, 864 p (AUSIMM, Melbourne)

<https://www.ga.gov.au/about/projects/resources/paterson>