National Argon Map: an AuScope initiative

Data Acquisition Project Proposal

This form should be completed and returned to Geoff Fraser (Geoff.Fraser@ga.gov.au) for consideration by the National Argon Map Oversight Panel

Project Proponent

Name: Ralph Bottrill
Affiliation and position: Mineralogist/Petrologist, Mineral Resources Tasmania
Collaborators: G Cumming, J Everard, A McNeill
Project Title: Dating the Temma iron deposits
Geographic Region: Temma, NW Tasmania
Geological Province or Tectonic Unit: Rocky Cape Group (mid-late Proterozoic)

How will these samples benefit the National Argon Map?

This will help with the geochronology of the magnetite deposits and their host rocks, in an area of complex Proterozoic to Cainozoic geology but with very little geochronology.

Brief Project Description:

These iron deposits are a group of complex magnetite-siderite-stilpnomelane-grunerite-garnet rocks occurring as fault slivers within siltstones of the mid-late Proterozoic Rocky Cape Group. One has been mined in recent years. They currently have no isotopic dating, and the sequences have few datable intrusive igneous rocks, or fossils. Dating of K-rich stilpnomelane in the ore deposits will help constrain the age of these deposits, currently thought to be anywhere between the mid Proterozoic and Late Devonian. There are also some sparse lamprophyric/kimberlitic dykes with phlogopite which could also be dated to help provide a minimum age for the deposits. The Nelson Bay River mine (NBR, currently on care and maintenance) is the largest deposit and is shown on the attached figure, and we have a number of samples available.

Approximate number of samples proposed for $^{40}Ar/^{39}Ar$ analyses:

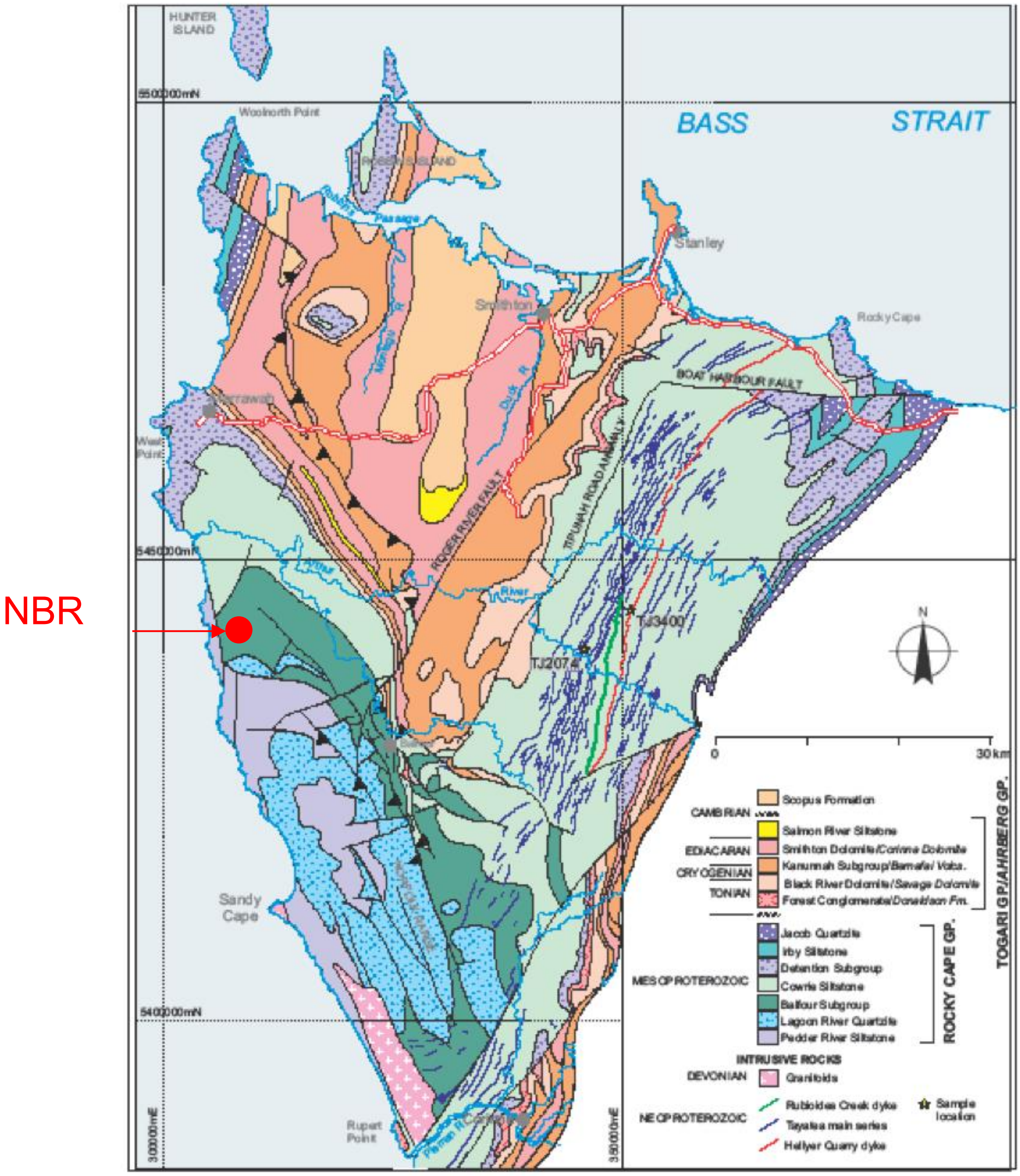
Two.

Lithologies and minerals proposed for $^{40}Ar/^{39}Ar$ analyses:

1. *Stilpnomelane-rich iron formation,*
2. *Phlogopite-olivine lamprophyre dyke.*

Do you have a preferred ^{40}Ar-^{39}Ar laboratory? (ANU, Curtin, UQ, UMelb):

Not really, though we have worked with the UMelb labs several times before.


NBR
HUNTER ISLAND
5500000mN
Woolnorth Point
BASS
STRAIT
Stanley
Smithton
Rocky Cape
BOAT HARBOUR FAULT
West Point
ROGER RIVER FAULT
TIPUNAH ROAD ANOMALY
5450000mN
TJ3400
TJ2074
N
0
30 km
Sandy Cape
5400000mN
300000mE
350000mE
Rupert Point
Scopus Formation
CAMBRIAN
Salmon River Siltstone
EDIACARAN
Smithton Dolomite/Corinna Dolomite
Kanunnah Subgroup/Bernafai Volcs.
CRYOGENIAN
Black River Dolomite/Savage Dolomite
TONIAN
Forest Conglomerate/Donaldson Fm.
TOGARI GP/AHRBERG GP.
Jacob Quartzite
Irby Siltstone
Detention Subgroup
MESOPROTEROZOIC
Cowrie Siltstone
Balfour Subgroup
Lagoon River Quartzite
Pedder River Siltstone
ROCKY CAPE GP.
INTRUSIVE ROCKS
DEVONIAN
Granitoids
NEOPROTEROZOIC
Rubioides Creek dyke
Tayatea main series
Hellyer Quarry dyke
Sample location

Guidelines and Criteria

Project Proposals for funding support as part of the AuScope National Argon Map initiative will be assessed on the following criteria.

Australian: Samples must come from Australia (this may include Australian offshore regions)

Non-confidential: $^{40}Ar/^{39}Ar$ data must be made publicly-available (ie non-confidential)

Impact: to what extent new $^{40}Ar/^{39}Ar$ data from the proposed samples will contribute to geographic data coverage, or address key geological questions

Feasibility: whether the nature of the work is tractable via $^{40}Ar/^{39}Ar$ geochronology and the scale of the proposal is realistic within the time frame of the National Argon Map initiative (January 2020 – June 2021)?

Appropriate sample material: whether the proposed samples are (i) appropriate for $^{40}Ar/^{39}Ar$ analyses, and (ii) available within the time-frames of the National Argon Map initiative?

Oversight Panel

Dr Geoff Fraser, Geoscience Australia
Professor Zheng-Xiang Li,
Dr Anthony Reid, Geological Survey of South Australia
Peter Rea, MIM/Glencore
Dr Catherine Spaggiari, Geological Survey of Western Australia
Dr David Giles, MinEx CRC
Dr Marnie Forster (observer role as Project Coordinator)

Expectations

AuScope funding will cover the costs of sample irradiation and isotopic analyses.

Project Proponents will be responsible for:

- Provision of appropriate sample material. This includes mineral separation, which can be arranged at the relevant $^{40}Ar/^{39}Ar$ laboratories (in many cases this is preferred), but costs of mineral separation will be borne by the project proponent. The relevant laboratory reserves the right not to analyse material if it is deemed unsuitable for $^{40}Ar/^{39}Ar$ analysis.
- Provision of appropriate sample information. A sample submission template will be provided. Information in these sample submission sheets will form the basis of data delivery/publication, and the oversight committee or relevant laboratory reserves the right not to proceed with analyses unless and until appropriate sample details are provided. This includes description and geological context for each sample.
- Leading the preparation of reports and/or publications to deliver $^{40}Ar/^{39}Ar$ results into the public domain within the duration of the National Argon Map initiative (January 2020 – June 2021).
- Project Proponents will be expected to communicate directly with the relevant $^{40}Ar/^{39}Ar$ laboratory once a project has been accepted by the Oversight Committee, in order to clarify project expectations, arrange sample delivery, discuss results, collaborate on reporting and data delivery etc.

Participating Ar Laboratories will be responsible for:

- Providing advice to project proponents regarding suitable sample material and feasibility of proposed work
- Irradiation of sample material
- $^{40}Ar/^{39}Ar$ isotopic analyses
- Delivery of data tables, and analytical metadata to project proponents

Queries regarding possible projects as part of the National Argon Map initiative can be directed to Marnie Forster (Marnie.Forster@anu.edu.au) or Geoff Fraser (Geoff.Fraser@ga.gov.au)