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: Dr Kasia Sobczak
Affiliation: University of Queensland, Centre for Natural Gas
Project Title: Testing the Surat Basin two deposition centre hypothesis: Part A Zircon geochronology
Sample Number(s) (including IGSN if one exists): See table below
Mineral separation required? Yes or No: **No**
Date submitted: 29th June 2021

GEOGRAPHIC AREA/ PROVINCE/ BASIN : Surat Basin, QLD	
1:250k SHEET NAME:	**NUMBER:**
1:100k SHEET NAME:	**NUMBER:**
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94)	
ZONE:	
EASTING:	**NORTHING:**
LATITUDE:	**LONGITUDE:**

STRATIGRAPHIC UNIT FORMAL NAME *: Precipice Sandstone and Evergreen Formation
STRATIGRAPHIC UNIT INFORMAL NAME:
LITHOLOGY: Sandstone

DRILLHOLE ID (if applicable): See table below
PROSPECT (if applicable):
DEPTH FROM (metres): See table below
DEPTH TO (metres): See table below

* Stratigraphic Unit names can be searched and checked within the Australian Stratigraphic Units Database via the following link: https://asud.ga.gov.au/

Sample details:

Well	Latitude	Longitude	Sample ID	Depth from [m]	Depth to [m]	Lithology	Stratigr
Chinchilla 4	-26.727304	150.201798	C4-D3	1075.65	1075.05	Medium-grained qtz sst	Evergre
Chinchilla 4	-26.727304	150.201798	C4-D4	1140.65	1140.05	Medium-grained qtz sst	Evergre
Chinchilla 4	-26.727304	150.201798	C4-D5	1189.65	1189.1	Medium- to coarse-grained qtz sst	Precipi
Chinchilla 4	-26.727304	150.201798	C4-D6	1199.45	1198.85	Coarse- to v. coarse-grained qtz sst	Precipi
Chinchilla 4	-26.727304	150.201798	C4-D7	1224.4	1223.9	Medium- to coarse-grained qtz sst	Precipi
Kenya East GW7	-27.029057	150.574431	KEGW7-D1	994.3	993.9	Sandstone	Evergre
Kenya East GW7	-27.029057	150.574431	KEGW7-D3	1139	1138.7	Medium-grained qtz sst	Precipi
Kenya East GW7	-27.029057	150.574431	KEGW7-D7	1226	1225.7	Medium- to coarse-grained qtz sst	Precipi
Moonie 34	-27.763965	148.749365	M34-D2	1777.8	1777.45	Coarse- to v. coarse-grained qtz sst	Precipi
Taroom 17	-25.789062	148.749365	T17-D1	295.6	295	Fine- to medium-grained qtz sst	Evergre
Taroom 17	-25.789062	148.749365	T17-D5	432.75	432.2	Medium-grained qtz sst	Precipi

West Moonie 1	-27.830269	149.958100	AKA JK2	2258.77	2258.57	Medium-grained qtz sst	Precipi
West Moonie 1	-27.830269	149.958100	AKA JK3	2269.47	2269.27	Pebbly sst	Precipi
West Moonie 1	-27.830269	149.958100	AKA JK4	2298.3	2298.1	Coarse-grained qtz sst	Precipi

Dating Objective

What is the geological question $^{40}Ar/^{39}Ar$ analysis will address?

What are the sediment sources of the Precipice Sandstone (Ar-Ar mica dating will complement U-Pb detrital zircon dating) and what is the thermal history of the provenance region?

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

Magmatic crystallisation, retrograde metamorphism and cooling ages all may be present since detrital grains are analysed. The ages will correspond to the sediment source terranes.

Mineral target(s) for dating:

Muscovite (14 samples) and biotite (1 sample – KEGW7-D3)

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

Mesozoic (older than Early Jurassic) and Paleozoic ages are expected.

Sample Information

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

Chinchilla 4: -26.727304, 150.201798
Kenya East GW7: -27.029057, 150.574431
Moonie 34: -27.763965, 150.241112
Taroom 17: -25.789062, 148.749365
West Moonie 1: -27.830269, 149.958100

Lithological characteristics (rock description): See table above

Relative age constraints (pertinent geological relationships with surrounding rock units and any previous geochronology): The sampled sedimentary rocks are Lower Jurassic (e.g., Exon, 1976; Green, 1996)

Thin section description (if available):

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

Relevant bibliographic references:

Exon, N.F. 1976. Geology of the Surat Basin in Queensland. Australian Government Publishing Service 166.
Green, P. 1996. Stratigraphic relationships between latest Triassic-Early Cretaceous basins of Queensland, Geological Society of Australia Abstracts. Geological Society of Australia.