

Sample 7 of 20: 115614

Person submitting samples: Dave Kelsey
Affiliation: Geological Survey of Western Australia
Project Title: Tectonism and Exhumation of the Paterson Orogen and East Pilbara Craton margin
Sample Number(s) (including IGSN if one exists): 115614
Mineral separation required? Yes or No: yes
Date submitted:

GEOGRAPHIC AREA/ PROVINCE/ BASIN : Rudall Province	
1:250k SHEET NAME: Rudall	NUMBER: SF51-10
1:100k SHEET NAME: Connaughton	NUMBER: 3452
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94) GDA94	
ZONE: 51	
EASTING: 461187.00	NORTHING: 7498125.09
LATITUDE: -22.62335000	LONGITUDE: 122.62231000

STRATIGRAPHIC UNIT FORMAL NAME *:
STRATIGRAPHIC UNIT INFORMAL NAME: Tabletop Zone granitic unit
LITHOLOGY: muscovite-bearing quartzofeldspathic mylonite

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 $^{40}\text{Ar}/^{39}\text{Ar}$ analysis will address?

What is the cooling/exhumation age from this sample?

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

Cooling/exhumation.

Mineral target(s) for dating:

Muscovite

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

Mid- to Late-Neoproterozoic

Sample Information

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

WAROX database (field observations) site *RHS115614*.

Lithological characteristics (rock description):

Muscovite & Fe–Ti oxide bearing quartzofeldspathic mylonite to protomylonite; medium-grained.

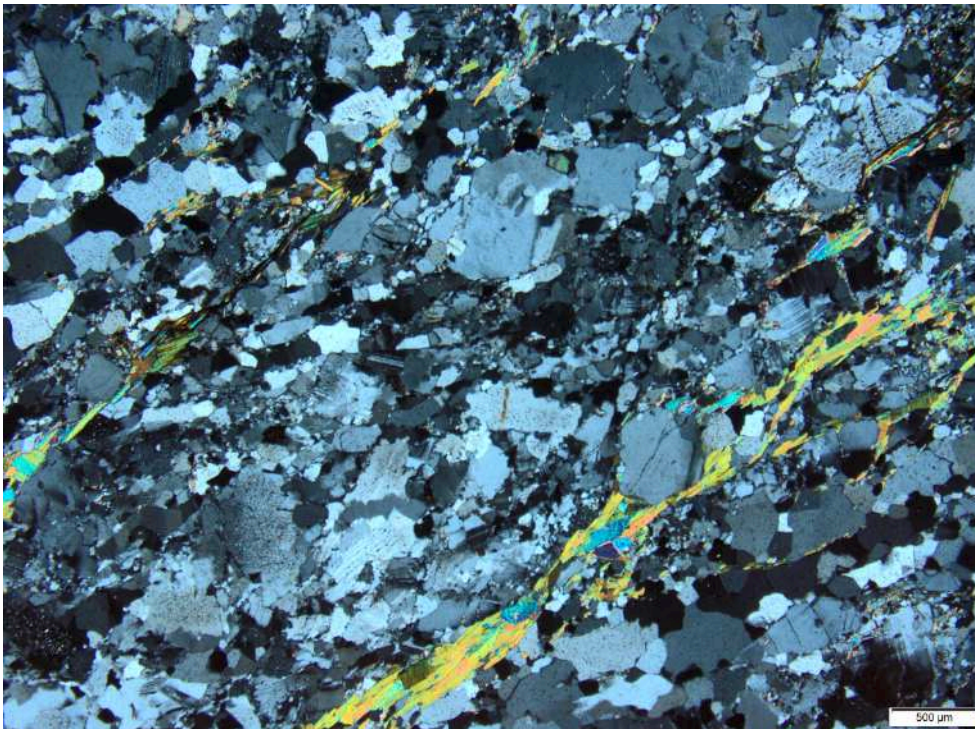
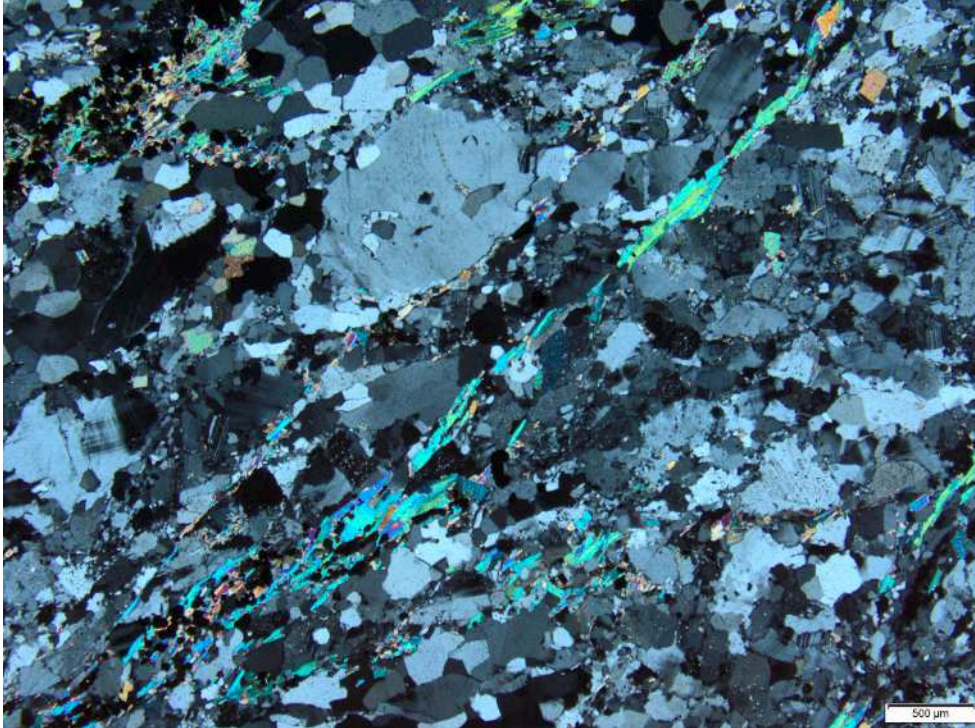
Relative age constraints (pertinent geological relationships with surrounding rock units and any previous geochronology):

Magmatic ages for granitic rocks in the Tabletop Zone are c. 1590 Ma. Cooling/exhumation age is expected to be Neoproterozoic, corresponding to the Miles (c. 810 – 650 Ma) or Paterson (c. 550 Ma) Orogenies.

Thin section description (if available):

Quartz- and feldspar-rich rock containing muscovite and Fe–Ti oxide. Quartz and feldspar have a seriate–interlobate shape covering orders of magnitude grain size differences. Thin foliae of much finer-grained quartz and feldspar anastomose through the sample, amongst coarser, more porphyroclastic quartz and feldspar, and typically occur where muscovite is (or vice versa). Very high birefringent (high 3rd to 4th at least) mineral grains occur fairly commonly and always occurs away from muscovite foliae. Muscovite has subhedral to euhedral shape and defines a strong foliation. The foliation is strong enough locally to be protomylonite.

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



Relevant bibliographic references:

Bagas, L, Williams, IR and Hickman, AH 2000, Rudall, Western Australia: Geological Survey of Western Australia, 1:250 000 Geological Series Explanatory Notes, 50p.

Bagas, L and Smithies, RH 1998, Geology of the Connaughton 1:100 000 sheet: Geological Survey of Western Australia, 1:100 000 Geological Series Explanatory Notes, 38p.

Smithies, RH and Bagas, L 1997, *The Tabletop Terrane of the Proterozoic Rudall Complex: Preliminary notes on the geology, granitoid geochemistry and tectonic implications*, in *Geological Survey of Western Australia Annual Review 1996–97: Geological Survey of Western Australia*, p. 89–94.

Tucker, NM, Morrissey, LJ, Payne, JL and Szpunar, M 2018, *Genesis of the Archean–Paleoproterozoic Tabletop Domain, Rudall Province, and its endemic relationship to the West Australian Craton: Australian Journal of Earth Sciences*, v. 65, no. 6, p. 739–768, doi:10.1080/08120099.2018.1479307.