

Sample 19 of 20: 247621

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): 247621
Mineral separation required? Yes or No: yes
Date submitted:

GEOGRAPHIC AREA/ PROVINCE/ BASIN : Yeneena Basin	
1:250k SHEET NAME: Paterson Range	NUMBER: SF51-06
1:100k SHEET NAME: Lamil	NUMBER: 3254
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94) GDA94	
ZONE: 51	
EASTING: 390391.04	NORTHING: 7611980.99
LATITUDE: -21.591802	LONGITUDE: 121.94116

STRATIGRAPHIC UNIT FORMAL NAME *: Malu Formation [‡]
STRATIGRAPHIC UNIT INFORMAL NAME:
LITHOLOGY: meta-siltstone

DRILLHOLE ID (if applicable): EIS Encounter Telfer West ETG0007
PROSPECT (if applicable):
DEPTH FROM (metres): 230.85
DEPTH TO (metres): 231.35

[‡]The sample is interpreted to be of Malu Formation on the basis of the published GSWA Interpreted Basement Geology map. The drillhole is located close to the contact of Malu with Puntapunta Formation.

Dating Objective

What is the geological question ⁴⁰Ar/³⁹Ar analysis will address?

Either: What is the age of the muscovite/foiation/metamorphism in this sample? OR What is the age of exhumation/cooling in this sample?

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

Either age of metamorphism to produce the muscovite OR cooling/exhumation.

Mineral target(s) for dating:

Muscovite

Estimated ⁴⁰Ar/³⁹Ar 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):

Located 39 km E of Nifty mine and 30 km NW of Telfer.

Lithological characteristics (rock description):

The sample is a cream-coloured, fine-grained, homogeneous muscovite-bearing meta-siltstone. The rock looks massive in drillcore but does have a foliation that is recognisable in thin section. The muscovite is fine-grained, so mineral separation from this sample could be tricky.

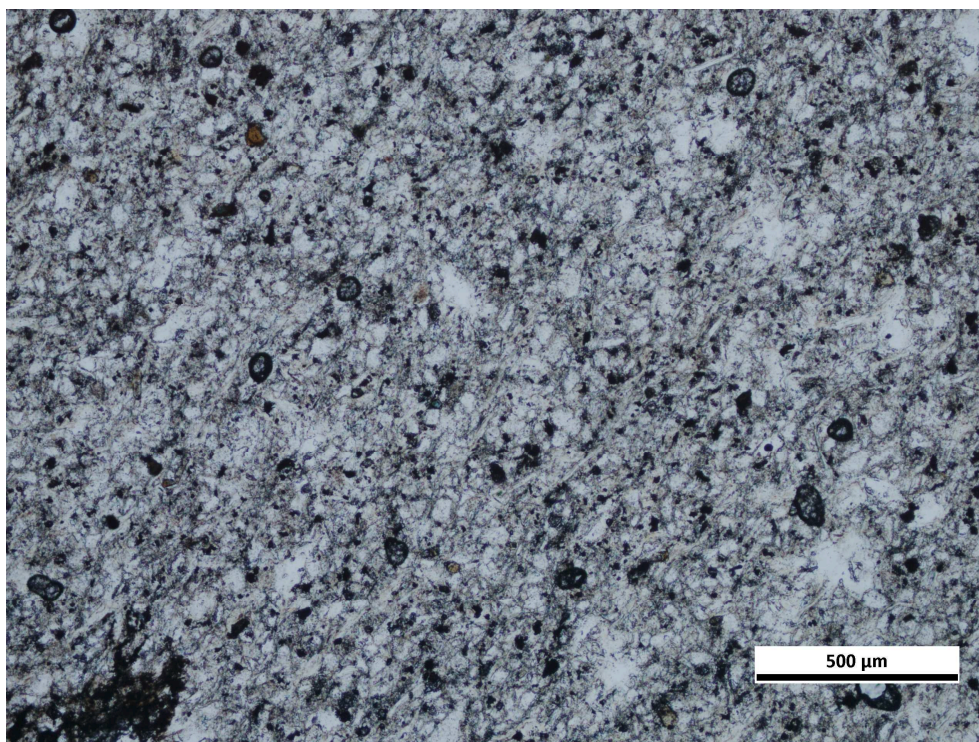
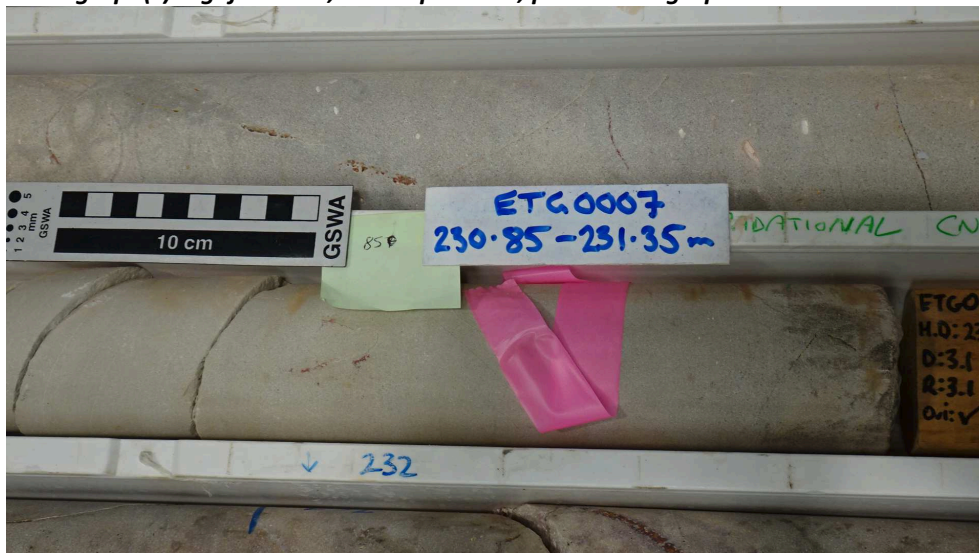
Relative age constraints (pertinent geological relationships with surrounding rock units and any previous geochronology):

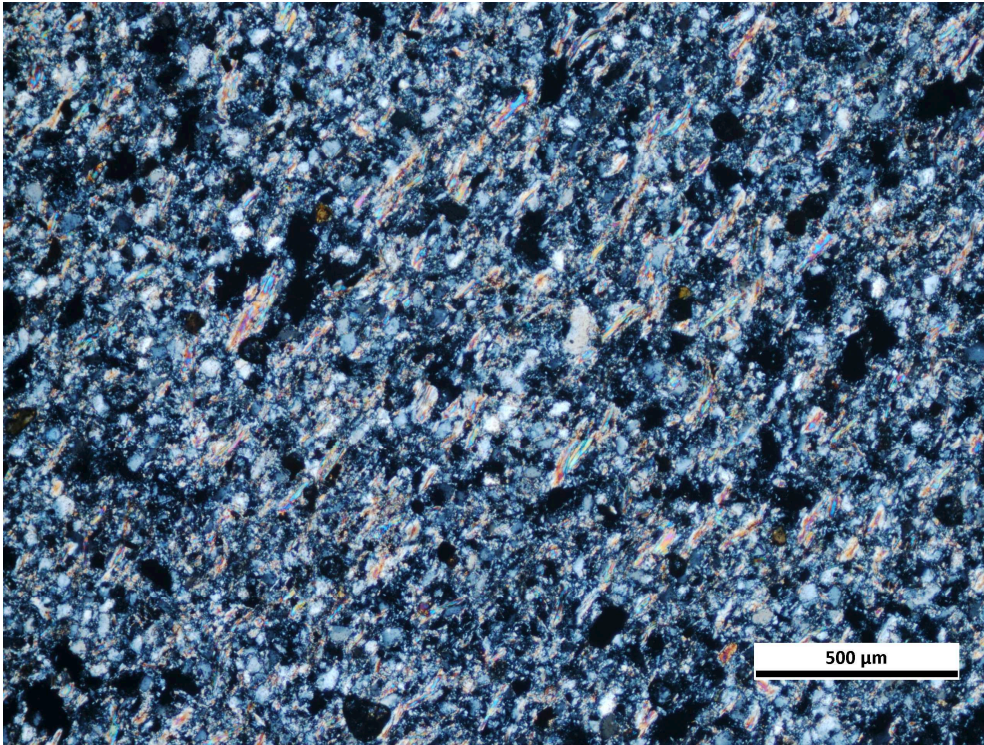
The deformation/foliation/metamorphism age is expected to be Neoproterozoic, corresponding to be one of either the Miles (c. 810 – 650 Ma) or Paterson (c. 550 Ma) Orogenies. Sediments of the Yeneena Basin have a maximum depositional age of c. 831 Ma.

Thin section description (if available):

The sample is a cream-coloured, fine-grained, foliated muscovite-bearing meta-siltstone. The muscovite is fine-grained, so mineral separation from this sample could be tricky.

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





Relevant bibliographic references:

- Gardiner, NJ, Maidment, DW, Kirkland, CL, Bodorkos, S, Smithies, RH and Jeon, H 2018, *Isotopic insight into the Proterozoic crustal evolution of the Rudall Province, Western Australia: Precambrian Research*, v. 313, 31–50.
- Maidment, D, Huston, DL, Maas, R, Czarnota, K, Neumann, N, McIntyre, A and Bagas, L 2008, *The Nifty-Kintyre-Duke Cu-U-Pb-Zn mineralizing events: Links to the evolution of the Yeneena Basin, northwest Paterson Orogen*, in *GSWA 2008 extended abstracts: promoting the prospectivity of Western Australia: Geological Survey of Western Australia: Record 2008/2*, p. 27–29.
- Bagas, L 2004, *The Neoproterozoic Throssell Range and Lamil Groups, northwest Paterson Orogen, Western Australia - a field guide: Geological Survey of Western Australia, Record 2004/15*, 18p.
- Bagas, L and Nelson, DR 2007, *Provenance of Neoproterozoic sedimentary rocks in the northwest Paterson Orogen, Western Australia*, in *Proceedings of the Central Australian Basins Symposium (CABS), Alice Springs, Northern Territory, 16-18 August 2005* edited by TJ Munson, TJ Munson, GJ Ambrose and GJ Ambrose: Northern Territory Geological Survey: Special Publication, p. 1–10.
- Bagas, L 2005, *Geology of the Lamil 1:100 000 sheet: Geological Survey of Western Australia, 1:100 000 Geological Series Explanatory Notes*, 22p.
- Chin, RJ, Hickman, AH and Towner, RR (compilers) 1982, *Paterson Range, Western Australia (2nd edition): Geological Survey of Western Australia, 1:250 000 Geological Series Explanatory Notes*, 27p.