GSWA 225476: Interlayered psammitic and pelitic gneiss, Malcolm Metamorphics, hanging wall of the Daringdella Shear Zone, footwall of the Rodona Shear Zone, MALCOLM

Person submitting samples: Raphael Quentin de Gromard
Affiliation: Geological Survey of Western Australia
Project Title: Evolution of crustal structures in an inverted orogen, the east Albany–Fraser Orogen, Western Australia
Sample Number(s) (including IGSN if one exists): 225476
Mineral separation required? Yes or No:
Date submitted:

GEOGRAPHIC AREA/ PROVINCE/ BASIN : southern Western Australia/east Albany–Fraser Orogen	
1:250k SHEET NAME: MALCOLM	**NUMBER:** SI51-07
1:100k SHEET NAME: MALCOLM	**NUMBER:** 3630
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94)	
ZONE: 51	
EASTING: -33.87763	**NORTHING:** 558214
LATITUDE: 123.62947	**LONGITUDE:** 6251234

STRATIGRAPHIC UNIT FORMAL NAME *: Malcolm Metamorphics
STRATIGRAPHIC UNIT INFORMAL NAME:
LITHOLOGY: psammitic and pelitic gneiss; interlayered

HOLE ID (if applicable):
PECT (if applicable):
H FROM (metres):
H 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 $^{40}Ar/^{39}Ar$ analysis will address?

Evolution of crustal structures of the east AFO - Exhumation history of the Rodona Shear Zone

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

Cooling

Mineral target(s) for dating:

Hornblende + biotite

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

Hornblende and possible also biotite should yield Ar/Ar cooling ages younger than c. 1315 Ma U-Pb zircon metamorphic ages. Alternatively, younger than c. 1180 monazite metamorphic age.

Sample Information

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

An interlayered psammitic and pelitic gneiss sample was collected from an exposure by the Southern Ocean at Point Malcolm, 160 km east of Esperance, WA.

Lithological characteristics (rock description):

Isoclinally folded, sheared, interlayered pelitic and psammitic gneiss, interlayered with epidotised metabasalt and cut by pegmatite veins up to 5 m wide. Same sequence as Point Malcolm but here

more sheared and strongly folded. Dextral and a component of reverse southeast side up sense of shear evident from folding and asymmetric boudins of pegmatite.

Relative age constraints (pertinent geological relationships with surrounding rock units and any previous geochronology):
Two psammitic schist samples collected 9 and 15 km northeast of GSWA 225476 yielded U-Pb zircon metamorphic ages of 1308 ± 8 and 1315 ± 22 Ma respectively (GSWA 194869, 194867).
These samples also yielded U-Pb monazite metamorphic ages of 1335 ± 11 and 1183 ± 7 Ma (194869) and 1313 ± 6 and 1178 ± 10 Ma (194867).

Thin section description (if available):

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

Figure 31. Strongly folded and sheared interlayered psammitic and pelitic gneiss and pegmatite veins. Hammer head points north.

Figure 32. 225476a_Hb-Bi dextral fabric, sygmoidal hbl porphyroclast – PPL

Figure 33. 225476a_dextral Hbl fish wrapped by Bi-ttn fabric, Ep inclusions in Hbl and in matrix - PPL