

GSWA 225457: Monzogranite, eastern Nornalup Zone, HARMS

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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): 225457
Mineral separation required? Yes or No:
Date submitted:

GEOGRAPHIC AREA/ PROVINCE/ BASIN : southern Western Australia/east Albany–Fraser Orogen	
1:250k SHEET NAME: BALLADONIA	NUMBER: SI51-03
1:100k SHEET NAME: HARMS	NUMBER: 3533
LOCATION METHOD: (GPS: WGS84 / AGD66 / AGD84 / GDA94)	
ZONE: 51	
EASTING: 524961	NORTHING: 6435844
LATITUDE: -32.21372	LONGITUDE: 123.26488

STRATIGRAPHIC UNIT FORMAL NAME *: Esperance Supersuite
STRATIGRAPHIC UNIT INFORMAL NAME:
LITHOLOGY: monzogranite

HOLE ID (if applicable):
DEPTH (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 $^{40}\text{Ar}/^{39}\text{Ar}$ analysis will address?

Evolution of crustal structures of the east AFO - Exhumation history of the Nornalup Zone

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

Cooling age post magmatic crystallization

Mineral target(s) for dating:

Biotite + hornblende

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

Post- c. 1196 Ma

Sample Information

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

A sample of monzogranite was collected from a large whale-back exposure, in the Nornalup Zone, 36 km northwest of Balladonia, WA.

Lithological characteristics (rock description):

Massive, medium-grained, equigranular, biotite-hornblende monzogranite, locally weakly K-feldspar phyric with K-feldspar phenocrysts to 1 cm. Minor pegmatite veins.

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

This sample was also collected for U-Pb zircon and yielded an igneous crystallization age of 1196 ± 8 Ma (Wingate et al., 2019).

Thin section description (if available):

The sample is a fine- to medium-grained, equigranular, biotite–hornblende metasyenogranite, consisting of about 45–50% K-feldspar, 40–45% quartz, <10% plagioclase, 2% biotite, 1% hornblende, <1% magnetite, and minor myrmekite and zircon. K-feldspar is finely microperthitic and forms irregular, anhedral grains up to 2.5 mm in size that exhibit incipient to conspicuous flame perthite. Lobes of myrmekite up to 0.7 mm diameter occur around some K-feldspar margins. Quartz is irregular, anhedral, up to 2 mm in size, and is weakly strained and finely fractured. Plagioclase is anhedral to subhedral, and up to 0.5 mm long. Brown to red biotite forms non-aligned subhedral laths up to 1 mm long. Hornblende is irregular, anhedral, pale green to olive green, and up to 1 mm in size. Magnetite occurs as subhedral equant to elongate grains up to 0.5 mm in size. The granite lacks a tectonic foliation, although polygonal textures within the quartz–feldspar aggregate and the occurrence of flame perthite and trace myrmekite are consistent with moderate metamorphic conditions.

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



Figure 23. Sample site for GSWA 225457.

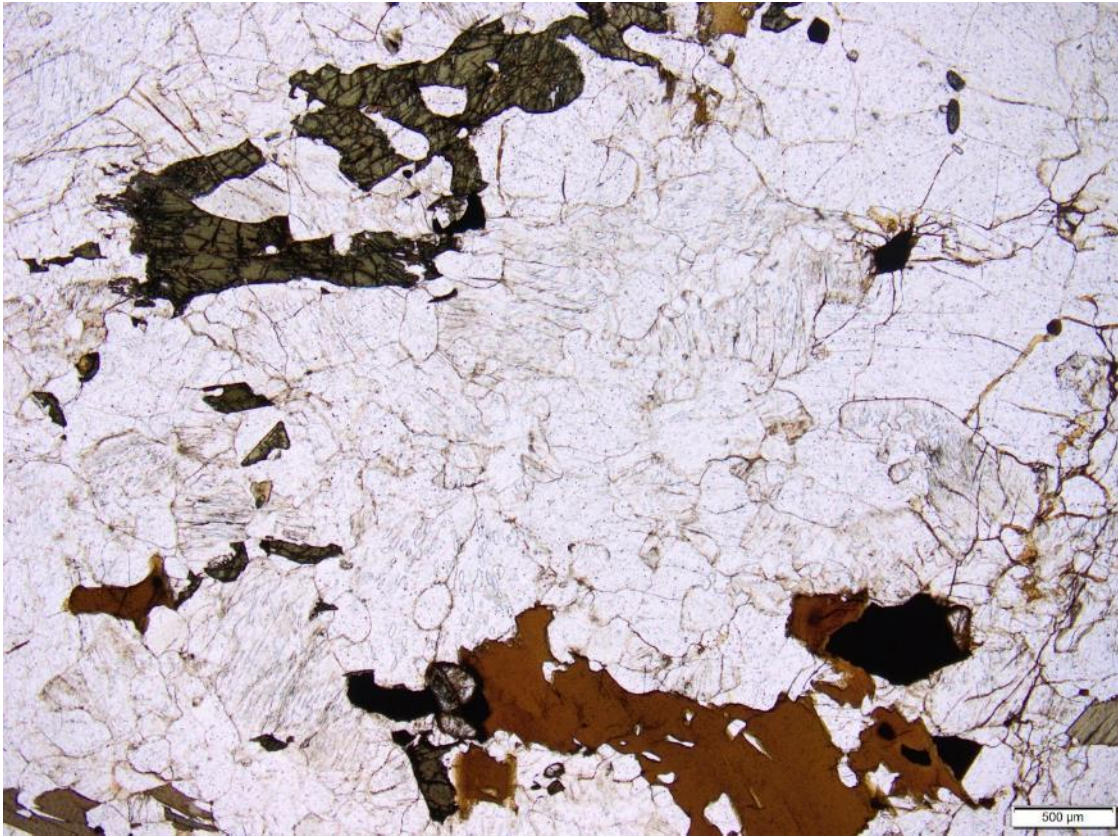


Figure 1. GSWA 225457: biotite-hornblende monzogranite