

BETTER HERITAGE INFORMATION SUMMARY OF STATE HERITAGE PLACE

Arkaba Breccia Intrusion Geological Site



Arkaba Breccia Intrusion Geological Site SHP 14791, 2025.

Source: Google Earth 2025

ENTRY IN THE REGISTER

Description or notes with respect to a place entered in the South Australian Heritage Register in accordance with either the *South Australian Heritage Act 1978* or the *Heritage Places Act 1993*.

The South Australian Heritage Council may correct errors or inaccuracies in the Entry in the Register in accordance with s21 of the *Heritage Places Act 1993*.

NAME: Arkaba Creek Diapir, Arkaba Station (original) **PLACE NO.:** 14791
Arkaba Breccia Intrusion Geological Site
(proposed)

ADDRESS: Lot 51 Moralana Gorge Road
Flinders Ranges 5434
CL 6197/397 D80678 A51
Hundred of Moralana

CONFIRMED IN THE SOUTH AUSTRALIAN HERITAGE REGISTER:

9 October 1997

DESIGNATED AS A PLACE OF GEOLOGICAL SIGNIFICANCE:

9 October 1997

S16 CRITERIA SATISFIED UNDER HERITAGE PLACES ACT 1993

(b) it has rare, uncommon or endangered qualities that are of cultural significance

(c) it may yield information that will contribute to an understanding of the State's history, including its natural history

COMMENTARY ON THE LISTING

Additional information provided as a part of the content of the South Australian Heritage Register in accordance with s14(6) of the *Heritage Places Act 1993* 'hold information in association with the Register'.

KNOWN AS: Arkaba Creek Diapir, Arkaba Station [Designated as a place of geological significance] (original)
Arkaba Diapir Geological Site [Designated as a place of geological significance] (proposed)

ADDRESS Adnyamathanha Country

STATEMENT OF HERITAGE SIGNIFICANCE

The Arkaba 'Diapir' forms a distinctive topography of low knobbly ridges and mounds, haphazardly hilly areas (including the Arkaba Hills) and alluvium-blanketed lowlands. The 'Diapir' consists of an intensely mixed chaotic breccia forming an irregularly-shaped domal intrusion into rock ranging in age from Sturtian to Early Cambrian.

Validated 22 February 2000

STATEMENT OF HERITAGE SIGNIFICANCE (Proposed)

The Arkaba Breccia Intrusion Geological Site provides a rare opportunity to research diapiric breccia emplacement where breccia appears to have intruded slowly into the surrounding rocks. The Arkaba Breccia Intrusion Geological Site is comprised of three significant outcrops that have a distinct geology. The outcrops contain diapiric breccia with rare features likely to yield information demonstrating the formation, movement and evolution of the much larger Arkaba Breccia Intrusion mush into surrounding host rock. Developed hypotheses from initial research challenge our current understanding of typical 'diapirs' found as 'salt domes' in the Gulf of Mexico. The Arkaba Breccia Intrusion Geological Site provides exceptional insight into the unusual features demonstrated by the Arkaba Breccia Intrusion and is highly significant for its potential to provide information in the understanding of diapir and diapir-like structures in the State.

The distinct features of the Arkaba Breccia Intrusion have initiated a global understanding of these rare structures and is highly likely to provide further information to better understand the origin of diapirs in South Australia.

STATEMENT OF DESIGNATION (Proposed)

Designated Place of Geological Significance

The Arkaba Breccia Intrusion Geological Site has three distinct outcrops that provide rare insight into the unusual formation of the intrusion and movement of much older breccia into the surrounding host rock. The outcrops demonstrate contacts between intrusive breccia and host rocks that are sharp. The subtlety of host rock alteration along the contact is a distinctive feature of the Flinders breccia intrusions and is well demonstrated here. These breccias are fragile and may be easily damaged by people or large livestock walking on them.

Within the Arkaba Breccia Intrusion Geological Site there is also evidence of copper mineralisation, 'flow banding', unusual chemical processes, and rounded xenoclasts from the surrounding host rock. Several of these features are unusual and demonstrate that the Arkaba Breccia Intrusion differs from other 'diapirs' within the state in its mobility and is likely to provide highly significant insight into South Australia's diapirs.

Elements of Significance:

Elements of heritage significance include:

- Outcrop i, featuring a narrow contact zone between the intrusive breccia and a surrounding, largely unaltered, host rock;
- Outcrop ii, intrusive breccia including copper mineralisation, dolerite xenoclasts and well-developed flow banding;
- Outcrop iii, excellent exposures of the intrusive breccias with complex folding and rounded xenoclasts.

Elements not considered to contribute to significance of place include:

- Human-made objects, trails and roads, vegetation, fencing and signage.

CRITERIA (under section 16 of the Heritage Places Act 1993)***(b) it has rare, uncommon or endangered qualities that are of cultural significance***

It has rare, uncommon or endangered qualities that are of cultural significance because it consists of an intensely mixed chaotic breccia forming an irregularly shaped domal intrusion into rock ranging in age from Sturtian to Early Cambrian. (Criteria statement considered at provisional entry, not reconsidered at confirmation. If proposed criteria statement is approved by the SAHC this will be deleted from this document.)

(b) it has rare, uncommon or endangered qualities that are of cultural significance (Proposed replacement statement)

The Arkaba Breccia Intrusion Geological Site features several culturally significant qualities of the larger Arkaba Breccia Intrusion. Considered as three outcrops, the site contains examples of rare evidence for what is hypothesised to be an unusual and rare method of formation when compared to other intrusions, such as diapirs within the Flinders Ranges.

The majority of the diapirs formed in the Flinders Ranges have long been accepted as following the Gulf of Mexico (GoM) diapir model, which is defined as a vertical intrusion of ductile, low-density salt, that has forced its way upwards by buoyancy into pre-existing and often more brittle rocks.

Research by Geologist Dr. Trevor Mount identified the unusual features demonstrating uncommon mobility of the Arkaba Breccia Intrusion and that it does not adhere to the GoM model. Instead, it formed by fluidised and heated breccia slowly intruding the layers of rock, spreading along weaknesses in the overlying stratigraphy creating a network of structures. The Arkaba Breccia

Intrusion Geological Site was selected as a place that demonstrated several of these features.

Rare and distinctive features of the Arkaba Breccia Intrusion Geological Site include sharp contacts between brecciated diapiric material and the surrounding Tapley Hill Formation, xenoclast-hosted dolerite, breccia 'flow banding', and complex folds and rounded xenoclasts.

The Arkaba Breccia Intrusion Geological Site is, to date, one of a few known examples of this type of intrusion formation within the Flinders Ranges where all 'diapirs' have long been considered to be 'GoM-type plugs driven by low density salt'. Connected to the Arkaba Breccia Intrusion, the Mount Desire Dyke shares several geological similarities, including xenoclastic rocks, though they differ from the mafic dolerite at the Arkaba 'diapir'.

The Arkaba Breccia Intrusion's and by extension the Arkaba Breccia Intrusion's Geological Site's unique geology includes an exceptional example of a slowly invading breccia and is recognised by geologists as significant to South Australia.

Breccias within this area are fragile and soft and may be damaged from walking on them. All three outcrops are very sensitive and require careful research and protection.

(c) it may yield information that will contribute to an understanding of the State's history, including its natural history

This geology may yield information that will contribute to an understanding of the State's natural history. (Criteria statement considered at provisional entry, not reconsidered at confirmation. If proposed criteria statement is approved by the SAHC this will be deleted from this document.)

(c) it may yield information that will contribute to an understanding of the State's history, including its natural history (Proposed replacement statement)

The Arkaba Breccia Intrusion Geological Site is highly significant in determining the origins of the Arkaba Breccia Intrusion and the genesis of similar structures within the State.

The site's clear contacts demonstrate the movement of a ductile breccia through a brittle host rock that, unlike many other diapirs, only alters rock directly associated with the contact, rather than greatly altering and morphing the surrounding geology. It demonstrates a form of intrusion that differs from other structures recognised as 'diapirs' in the Flinders Ranges. As such, the emplacement mechanism proposed for the Arkaba Breccia Intrusion and the features demonstrated at the Arkaba Breccia Intrusion Geological Site has

already provided evidence of high significance and with continued research has a high likelihood of providing evidence that will contribute significantly to furthering our knowledge of diapiric formations in South Australia.

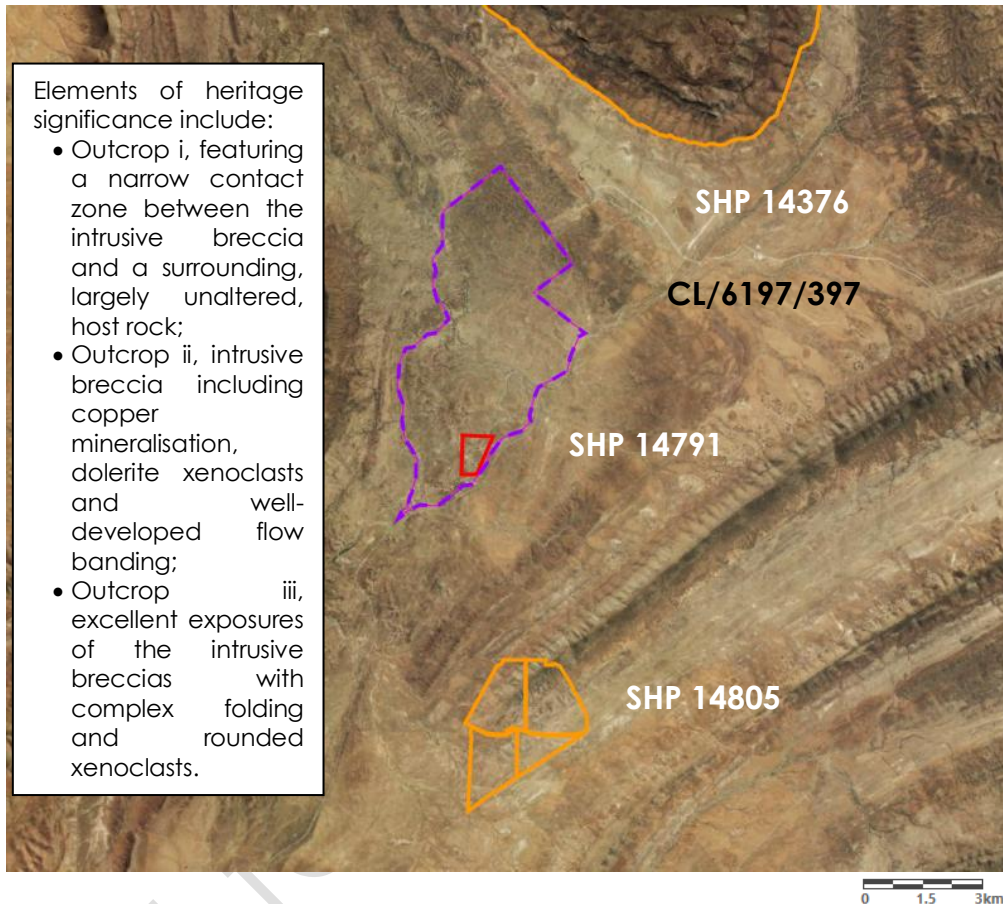
Draft for Consultation

SITE PLAN

Arkaba Breccia Intrusion Geological Site

PLACE NO.: 14791

Flinders Ranges SA 5434



**Arkaba Breccia Intrusion Geological Site, Lot 51 Moralana Gorge Road
Flinders Ranges 5434, Hundred of Moralana
CL 6197/397 D80678 A51**

*Includes: Wilpena Pound Geological Landform, Flinders Ranges National Park (SHP 14376) and Mount Desire Dyke (SHP 14805)

N ↑

LEGEND

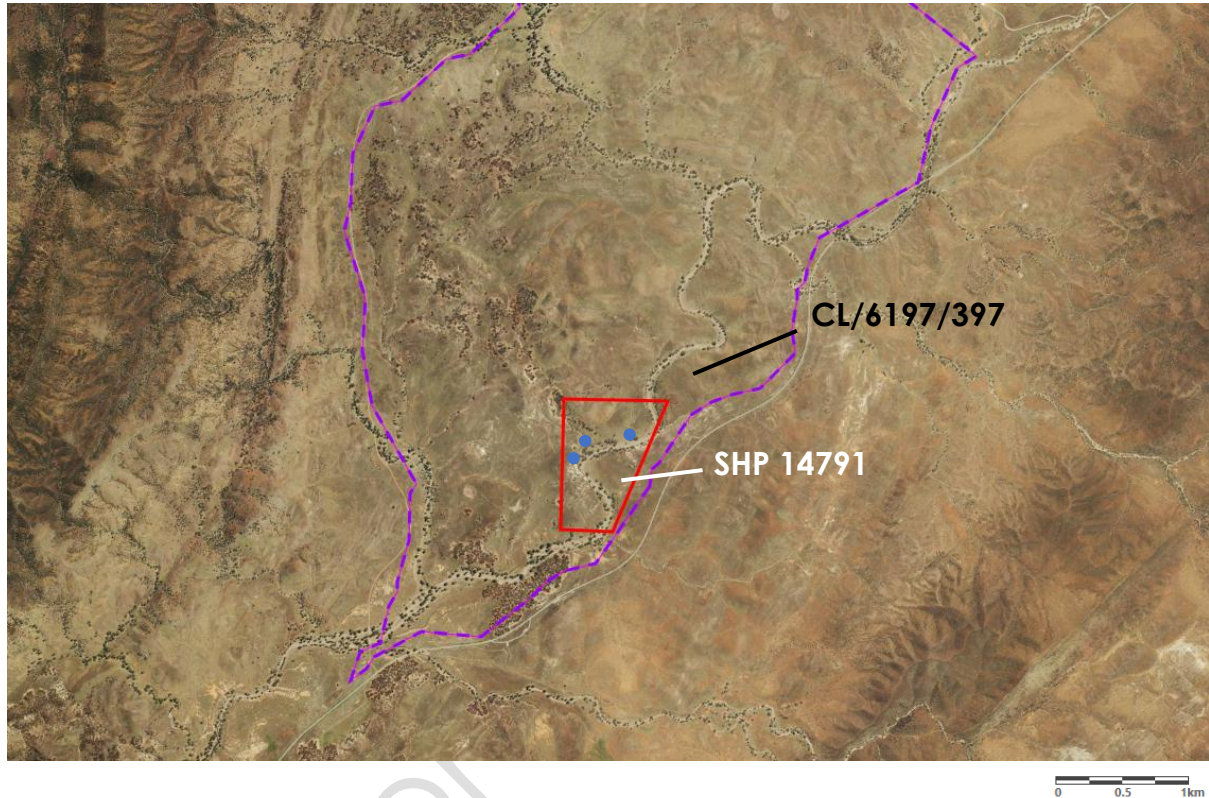
- Parcel boundaries (Indicates extent of Listing)
- Existing State Heritage Place(s)
- Outline of Elements of Significance for State Heritage Place

SITE PLAN - DETAIL

Arkaba Breccia Intrusion Geological Site

PLACE NO.: 14791

Flinders Ranges SA 5434



Arkaba Breccia Intrusion Geological Site, Lot 51 Moralana Gorge Road
Flinders Ranges 5434, Hundred of Moralana
CL 6197/397 D80678 A51

N ↑

LEGEND

- Parcel boundaries (Indicates extent of Listing)
- Outline of Elements of Significance for State Heritage Place
- Outcrop locations

PHYSICAL DESCRIPTION

The Arkaba Breccia Intrusion Geological Site comprises several distinct geological features. The Arkaba Breccia Intrusion¹ which encompasses the site is a large, highly complex and far spanning intrusion with several branching dyke structures.

The formation differs from a conventional diapir in that, rather than piercing directly through the overlying landscape, it appears to have slowly intruded through the layers of rock, following weakness in the overlying stratigraphy creating a network of dyke structures. In this way, the breccia bisects surrounding host rock in a pull-apart geometry rather than the usual morphing, doming and twisting expected of a typical 'diapiric' intrusion as largely based on the Gulf of Mexico (GoM) salt-dome model. A majority of the diapirs formed in the Flinders Ranges have long been accepted as following the GoM diapir model, which is defined as a vertical intrusion of ductile, low-density salt, that has forced its way upwards by buoyancy into pre-existing and often more brittle rocks. Dr. Trevor Mount hypothesises an alternative in which highly mobile, fluidised intrusive breccia are emplaced through existing weaknesses and fractures in the surrounding geology. The Arkaba Breccia Intrusion Geological Site and the associated Mount Desire Dyke Geological Site (SHP 14805) clearly demonstrate this newly developed model exceptionally well.

The main body of the Arkaba Intrusion extends ~15km north-south in the Flinders Ranges just to the South of the Ikara-Flinders Ranges National Park and intrudes through surrounding geology that is aged from the Sturt glaciation (~700-665 Ma) to early Cambrian (~538-485.4 Ma). Generally, the Arkaba Breccia Intrusion can be considered in three segments or main radial arms: the 'Arkaba-Hill Dyke', 'Northern Dyke' and 'Southern Lobe' (Figure 1).²

The Arkaba Breccia Intrusion Geological Site includes just a 0.5km² section of the much larger Arkaba Diapir/Arkaba Breccia Intrusion. It is within the 'Northern Dyke' of the Arkaba Breccia Intrusion. The State Heritage Place is comprised of three separate outcrops along the banks of the Arkaba Creek. Each outcrop is discussed in turn.

Outcrop i

The diapiric breccia present at the site is of the Curdimurka Subgroup, a subdivision of the Callanna Group has a distinct contact with the Sturt glaciation-aged (~700-665 Ma) Tapley Hill Formation (Figure 2). Outcrop i contains examples of the contact zone between of the intrusive breccia with the surrounding host rock, the Tapley Hill Formation, that shows little to no structural and compositional alteration. Here, the siltstones of the Tapley Hill Formation are unaltered until only a few centimetres from the intrusive material. Closer to the breccia, the Tapley Hill Formation may be slightly altered by the intruded breccia material.

Outcrop ii

BHI Summary of State Heritage Place: 14791

Confirmed in the South Australian Heritage Register on 9 October 1997

Draft BHI SSHP for Consultation 18 June to 18 September

The South Australian Heritage Council approved this BHI - SSHP on (tbc)

Features copper mineralisation, dolerite xenoclasts and some well-developed flow banding at contacts with the Tapley Hill Formation. Twenty-five metres to the west of this point is a ten metre clast of dolerite xenoclast with some associated copper mineralisation.

Outcrop iii

Intrusive breccia with a complex internal structure (folding) and partly milled and rounded xenoclasts, likely rounded by the grinding of breccia during emplacement. The excellent exposures of intrusive breccia demonstrate 'chaotic flow folding' with several large xenoclasts. While similar exposures are fairly common for diapirs in the Flinders and Mount Lofty Ranges, the chaotic folding patterns within the breccia are less so. Xenoclasts within the breccia include large metamorphosed dolostones (meta-dolostones), some of which are well-rounded, probably during emplacement.

Elements of Significance:

Elements of heritage significance include:

- Outcrop i, featuring a narrow contact zone between the intrusive breccia and a surrounding, largely unaltered, host rock;
- Outcrop ii, intrusive breccia including copper mineralisation, dolerite xenoclasts and well-developed flow banding;
- Outcrop iii, excellent exposures of the intrusive breccias with complex folding and rounded xenoclasts.

Elements not considered to contribute to significance of place include:

- Human-made objects, trails and roads, vegetation, fencing and signage.

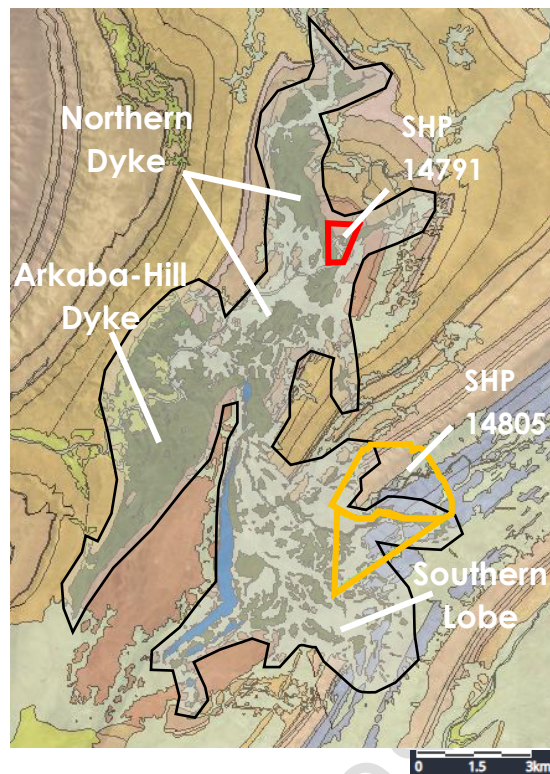


Figure 1. Basic outline of the Arkaba Breccia Intrusion in black. Including Arkaba Breccia Intrusion Geological Site (SHP 14791) and Mount Desire Dyke Geological Site (SHP 14805). 2024.

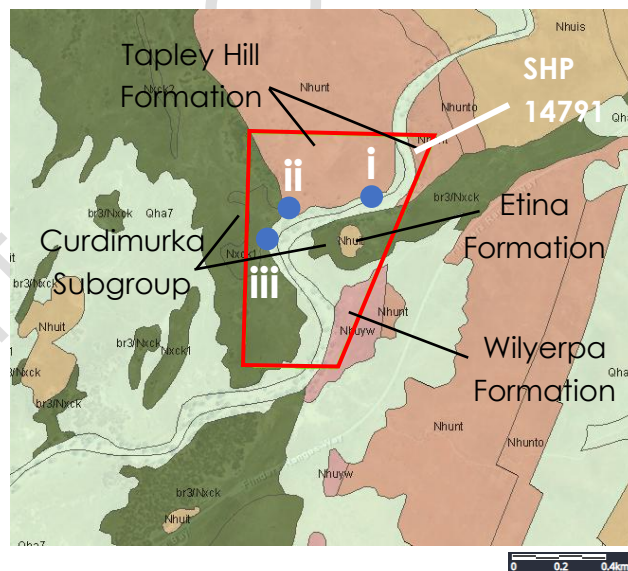


Figure 2. Geology of the Arkaba Breccia Intrusion Geological Site interpreted from SARIG (N.D.). Labelled blue dots denote the three outcrops present in the State Heritage Place. 2024.

HISTORY OF THE PLACE

Diapirs are intrusions of ductile, pressurised material that are forced or enter upwards into pre-existing and often more brittle rocks. The material that comprises a diapir is normally less dense than the surrounding material, causing vertical intrusion through buoyancy. Common forms of diapirs are the result of shales, or low-density evaporites, such as salt, that rise and penetrate layers of host rock along faults or other weaknesses.³ When large enough, this movement causes an uplift of rocks in the surrounding areas, creating a dome-shaped protrusion in the natural terrain. Although rare, the diapir material can, in some locations, eventually become exposed at the surface through erosion.

The majority of diapirs formed in the Flinders Ranges are considered to follow the above process, known as the Gulf of Mexico (GoM) diapir model. However, research and geological mapping of the Arkaba Breccia Intrusion and the Thompson Gap diapir conducted by Dr. Trevor Mount led to his suggestion that some 'diapirs' in the Flinders Ranges were not formed in accordance with the GoM model nor do they have the necessary physical features to qualify as typical diapirs. In these instances, the use of the term 'breccia intrusion' as opposed to 'diapir' was proposed by Mount as being more appropriate.⁴ Each of the three outcrops within the Arkaba Breccia Intrusion Geological Site demonstrate features that refute the GoM's buoyant salt diapir model.

The oldest formation within the Arkaba Breccia Intrusion Geological Site, the Curdimurka Subgroup, is a Willouran (~827-802 Ma) aged subdivision of the Callanna Group and was most likely deposited in a lake or coastal mud or sandflats known as sabkhas.⁵ Over time, several other formations including the Sturt (~700-665 Ma) aged Tapley Hill and Wilyerpa formations, as well as the Elatina ('Marinoan') glaciation (ending ~635 Ma) aged Etina formation were deposited above the Curdimurka Subgroup. The subgroup remained buried until it was pushed upwards millions of years later through diapiric movement.

Rather than the usual upwards piercing of diapiric movement, the Curdimurka Subgroup breccia of the Arkaba Breccia Intrusion appears to have slowly forced through the overlying rocks, taking advantage of zones of weakness or fractures under extreme pressure from the thick overlying geology and from the Delamerian Orogeny⁶ that was occurring at the same time, a massive mountain building event that occurred approximately 500 Ma.⁷

As a result, the host rock was split like jigsaw blocks or drifting continents, away from the initial fracture(s) in the host-rock cover by highly mobile, fluidised hydrothermal breccia.⁸ The sharp, distinct contacts between host rock and intruding breccia are explained by the emplacement of this breccia and allow for potential reconstruction of the previous geological geometry prior to emplacement.

The Mount Desire Dyke is listed in the South Australian Heritage Register as the geology at the site is an excellent example of this splitting process.

Outcrop i

In outcrop i, intrusive breccia of the ~827-802 Ma Curdimurka Subgroup, contacts Sturt glaciation--aged (~700-665 Ma) Tapley Hill Formation host rock. The close contact of host rock to older components of the older intrusive breccia and the splitting of the Tapley Hill Formation by the intrusion to the east suggests that the breccia mass moved through a fault, resulting in its current shape and complexity. Accordingly, the site is significant in understanding the genesis of the larger Arkaba Breccia Intrusion.⁹

Outcrop ii

At outcrop ii, the Curdimurka Subgroup intrusive breccia also contacts with the Tapley Hill Formation. The breccia demonstrates well-developed vertical to sub-vertical flow banding nearly parallel to siltstone bedding of the Tapley Hill Formation.¹⁰ 'Flow banding' refers to banded layers of rock most often associated with magma flow. The dolerite is too altered to determine its origin, however, it is clear that the dolerite was a xenoclast within the breccia intrusion and did not have an igneous origin into the breccia host.¹¹

Outcrop iii

Outcrop iii, host to intrusive breccia with 'chaotic flow folding' and several examples of large xenoclastic meta-dolostones. These are well-rounded and weathered in a manner similar to erosion in rivers and where dolostones that have been altered physically or chemically generally by heat and/or pressure.

The breccia exposures here are currently (2026) considered as fairly common for diapirs in the Flinders and Mount Lofty Ranges, however, any chaotic folding patterns in the breccia are less well reported.

This folding pattern and rounded xenoclasts, along with evidence from outcrops i and ii, suggest that the diapirs formed by flow movement into the surrounding host rock.

Human history

Arkaba Breccia Intrusion Geological Site currently (2026) has no native title claims or determinations over the land. However, extensions of the intrusion intersect with Adnyamathanha Native Title Determinations. The Arkaba Breccia Intrusion Geological Site's location in the Flinders Ranges would suggest significance of the land to the Adnyamathanha People.

Adnyamathanha People lived on the land and possessed a great understanding of the natural landscape and terrain. They had close contact with neighbouring Aboriginal Peoples including for mining and trading ochre. In the 1840s and 1850s,

when colonisation of the Far North commenced, many violent encounters occurred between the colonists and Adnyamathanha People. The Adnyamathanha People were noted as being particularly skilled in their use of the landscape to hide and ambush colonial settlers. While there were deaths on both sides, many more Adnyamathanha People were killed.¹²

By 1853, rations were being distributed to the Adnyamathanha People, who due to the control and degradation of the land caused by European practices found it difficult to find sufficient food. During the Victorian gold rush, some Adnyamathanha People were employed by pastoralists, however, droughts in the 1890s resulted in many pastoralists leaving the land. In the 1930s, a mission was constructed at Nepabunna and many Adnyamathanha People were relocated to live there.¹³

The Adnyamathanha People's determination and cohesion was evident into the 1930s when AP Elkin visited the community. He noted that traditional ceremonies, language and culture remained despite the devastating and lasting effects of colonisation.¹⁴

The name 'Arkaba' was recorded in South Australian Museum records as a corruption of 'akapa' a word meaning 'underground (or hidden) water'.¹⁵ However, it has also been suggested to be recalling the 'Arkabatura people', referred to in 1886 writings by Edward M Curr.¹⁶ In modern day, 'Arkabatura' meaning 'men of Arkaba' has connections to several Aboriginal groups in the Flinders Ranges including but not limited to the Barngarla, Adnyamathanha and Yandliyawara Peoples.

Though it is likely to have been identified prior, the first mention of the 'Arkaba Diapir' was in an abstract published in March 1965.¹⁷ The earliest published mapping of the 'Arkaba Diapir' was in the same year by geologist CR Dalgarno and assistant JE Johnson.¹⁸

The Arkaba Breccia Intrusion (then 'Diapir') was mapped in detail by geologist Dr. Trevor Mount in 1975 for his thesis presented to Adelaide University in 1975. The 1975 thesis was later uploaded in 2021 by The Department for Energy and Mines South Australia as a digital facsimile, accessible through SARIG.

In 1981, the South Australian Division of the Geological Society of Australia recognised the 'Arkaba Diapir' and three outcrops at 'Arkaba Creek' as Geological Monuments, noting their significance.

CHRONOLOGY

Year Event

1 Ga Neoproterozoic begins.

850- Deposition of the Callanna Group/ Curdimurka Subgroup.**800****Ma**

~827- Willouran Age.

802

Ma

~720 Cryogenian Period begins.

Ma Sturt Glaciation occurs (700-665 Ma).

Tapley Hill Formation deposited during this period,¹⁹ before the Elatina ('Marinoan') glaciation which, while the start is poorly understood, is believed to have ended ~635 Ma.

~660- Deposition of Tapley Hill Formation and overlying sedimentary rocks of the Flinders Ranges.²⁰**510****Ma**

~650- Age of the Etina Formation.

635

Ma

635 Cryogenian Period ends with the Elatina ('Marinoan') Glaciation and Ediacaran Period begins, the final period of the Neoproterozoic.

538 Neoproterozoic ends.

Ma

538- Cambrian Period.

485.4

Ma

541- Age of the Hawker Group formations present: Woodendinna Dolomite, ~509 Wirrapowie Limestone, and Mernmerna Formation.

Ma

~500 Delamerian Orogeny. Folding of sedimentary rocks of the Flinders Ranges.**Ma****Likely formation of the Arkaba Breccia Intrusion and the Mount Desire Dyke.**

1981 The 'Arkaba Diapir' and three locations at 'Arkaba Creek' are recognised as Geological Monuments by the SA Division of the Geological Society of Australia.

1990 'Arkaba Diapir Geological Site' registered on the now closed Register of the National Estate.²¹

1995 'Arkaba Diapir' identified in the Flinders Ranges Heritage Survey.

- 1997 10 April, 'Arkaba Creek Diapir, Arkaba Station' provisionally entered into the State Heritage Register and designated as a place of geological significance
9 October confirmed in the State Heritage Register

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Books

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Websites

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SITE DETAILS

Arkaba Breccia Intrusion Geological Site

PLACE NO.: 14791

Flinders Ranges SA 5434

DESCRIPTION OF PLACE:	Portion of the Arkaba Breccia Intrusion.
HISTORIC THEME/S	1 Natural Environment 1.1 Tracing climatic and topographical change
AGE OF FORMATION:	Cambrian ~500Ma
REGISTER STATUS:	Provisional Entry: 10 April 1997 Designation: 10 April 1997 Confirmation: 9 October 1997
CURRENT USE:	Geological site on Crown Land
LOCAL GOVERNMENT AREA:	Pastoral Unincorporated Area
LOCATION:	Street No.: Lot 51 Street Name: Moralana Gorge Road Town/Suburb: Flinders Ranges Post Code: 5434
LAND DESCRIPTION:	Title CL 6197/397 D80678 A51 Reference: Hundred: Hundred of Moralana

REVISIONS

Date	Changes
13 February 2026	SAHC modified template to include an image at the beginning of the document.

¹ Referred to as a 'breccia intrusion' rather than a diapir by leading researcher on the intrusion, Trevor Mount. See Mount, (PhD thesis 1975, pub. 2021), 'Diapirs and diapirism in the Adelaide 'Geosyncline' South Australia', *Report Book 2021/00006*. Department for Energy and Mining, South Australia, Adelaide, p.589.

² Mount, TJ (PhD thesis 1975, pub. 2021), 'Diapirs and diapirism in the Adelaide 'Geosyncline' South Australia'.

³ Burg, J-P (2017), 'Structural Geology - Domes and Basins', Teaching Materials, *Eidgenössische Technische Hochschule Zürich (Federal Institute of Technology, Zurich)*. From: <<https://www.files.ethz.ch/structuralgeology/jpb/files/english/12diapirs.pdf>>.

⁴ Mount, T (2024) Personal Communication; and Mount, TJ (PhD thesis 1975, pub. 2021), 'Diapirs and diapirism in the Adelaide 'Geosyncline' South Australia'.

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⁷ Priess, W (2024), Personal Communication

⁸ Mount, T (2024) Personal Communication

⁹ McBriar EM, Giles, CW and Mooney, MD (1981), 'Geological Monuments in South Australia Part 4', On behalf of the *Geological Monuments Subcommittee of the SA Division of the Geological Society of Australia Incorporated*, pp. 93-101.

¹⁰ Mount, TJ (PhD thesis 1975, pub. 2021), 'Diapirs and diapirism in the Adelaide 'Geosyncline' South Australia'.

¹¹ Mount, TJ (PhD thesis 1975, pub. 2021), 'Diapirs and diapirism in the Adelaide 'Geosyncline' South Australia'; and Mount, T (2024) Personal Communication..

¹² Brock P & Gara, T (2018), 'Colonialism and its aftermath, A history of Aboriginal South Australia', Wakefield Press, South Australia.

¹³ Brock P & Gara, T (2018), 'Colonialism and its aftermath, A history of Aboriginal South Australia'.

¹⁴ Brock P & Gara, T (2018), 'Colonialism and its aftermath, A history of Aboriginal South Australia'.

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