

Precompetitive Review

A unique and dedicated source of news and insights on Australian precompetitive geoscience for mineral exploration



Knowledge of the northern Gawler Craton will take a leap forward over the next six months as analysis is released of precious basement samples from a National Drilling Initiative (NDI) campaign by the Geological Survey of SA and MinEx CRC.

Preliminary field data for rock chip and core is now available on the [NDI Northern Gawler Dashboard](#). This will soon be followed by HyLogger results and SHRIMP U-Pb geochronology and Nd isotope studies by the end of 2025.

Studies are also focusing on metamorphic rocks sampled by two holes drilled within a major shear zone between the Mabel Creek Ridge and the Nawa Domain.

GSSA is simultaneously conducting geochronology of basement rocks and solid geology interpretation of the Nawa Domain, led by GSSA Senior Geologist Jack Percival as part of the [South Australia Discovery Mapping project](#).

The NDI campaign of seven holes coincides with an increase in industry interest in the northern Gawler, most notably an 8,700 sq.km project area granted to Anglo American in December along the northwestern margin of the Craton.

The Anglo American project is just to northwest of the Section 15 area gazetted by the SA Government for the NDI campaign. However, Anglo is exploring within the Nawa Domain, which is one of the Gawler Craton crustal blocks targeted by the NDI.

The northern Gawler has been explored intermittently for IOCGs, but there is a big question mark about whether Olympic Dam-type exploration models apply beyond the Karari Shear Zone, which runs through the southern end of the Section 15 area.

Previous studies have suggested the Gawler Craton north of the Karari Shear Zone could have more affinity with Mt Isa and/or the Aileron provinces than the Olympic IOCG Domain.

These studies include a [regional study of geochronology](#) in 2022, a MinEx CRC-backed [study of the Mt Woods Domain](#) in 2023 and [another MinEx CRC-backed study](#) in 2023 that identified the northern Gawler had younger Cu-mineralising events than Olympic Dam.

The NDI campaign completed seven holes with the RoXplorer CT 500 coiled tube drill rig, five of which intersected basement. The deepest hole was 483 metres, which included 46 metres of basement. Cover

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depths ranged from 307 metres to 437 metres, demonstrating the suitability of the innovative RoXplorer CT Drilling System for working in remote and challenging terrains with shallow cover.

Sampling and investigation of the overlying Eromanga and Arckaringa Basins are also main objectives of the campaign.

GSSA's Senior Geologist Claire Wade told Precompetitive Review the downhole gamma and HyLogger data had been particularly helpful with logging the holes because some significant mineralogical changes and transitions between units had not been evident visually.

Claire said the basement lithologies sampled by the NDI were largely felsic and metamorphosed to a high grade, which made it difficult to determine if the protoliths were igneous or sedimentary. Petrology, geochronology and isotope studies should resolve this question.

"The basement rocks are predominantly quartz-biotite-feldspar gneisses, with some richer in garnet and others richer in magnetite. We typically see quite a high grade of metamorphism, while the samples from the two holes within the shear zone had seen a lot more deformation. We're targeting some of the metamorphic minerals from these holes to help determine the timing of movement on that shear zone."

The NDI campaigns are stratigraphic in nature and don't set out to hit mineralisation, even though that was famously the case with NDIBK004 at East Tennant in 2020.

Claire said the Northern Gawler samples did retrieve some sulphides in the form of pyrite, which along with quartz veining and the high degree of metamorphism, suggested that there had been a history of hydrothermal fluids.

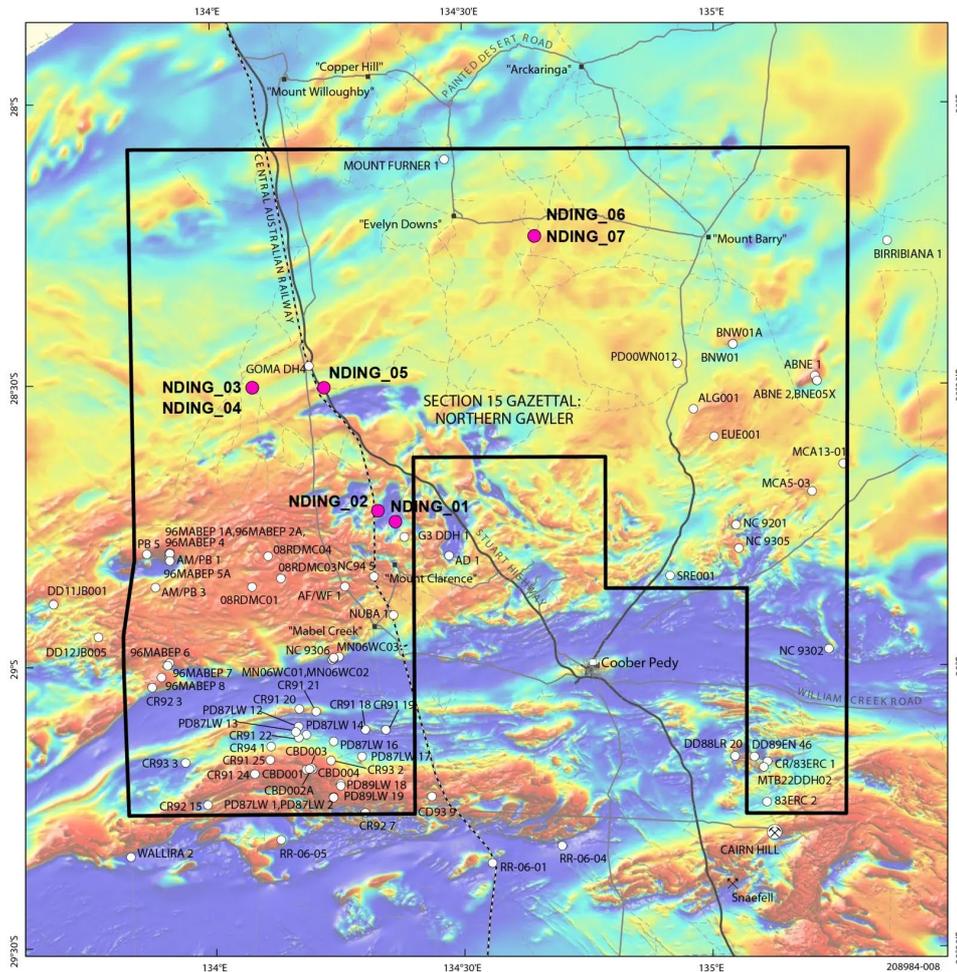
Another interesting feature is a diamictite (a very poorly sorted sedimentary layer) at the contact between the Gawler Craton and the base of the Arckaringa Basin. Claire said this unit contains clasts from the basement as well as some well-travelled glacial erratics.

A workshop for MinEx CRC and GSSA researchers on the Northern Gawler NDI project was held at the Tonsley Core Library in Adelaide last month. A workshop for industry is due in December to coincide with GSSA's annual Discovery Day.

Following image: NDI drill hole locations within the Section 15 area gazetted for the campaign.

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Current as at 25 June 2025

- Section 15 Gazetted
- Drilled holes
- Basement-intersecting drillholes

Total Magnetic Intensity (nTesla)



Topographic information

- Major mine
- Mining project
- Locality
- Homestead
- Highway
- Secondary road
- Vehicular track
- Railway



Government of South Australia
Department for Energy and Mining

NORTHERN GAWLER NDI
DRILLING PROGRAM
TOTAL MAGNETIC INTENSITY