Delamerian NDI campaign hits its mark: Fe and Cu sulphides, extensive porphyry Cu-style alteration, and a VMS play as well

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November 30, 2021(https://precompetitive-review.com/2021/11/30/)

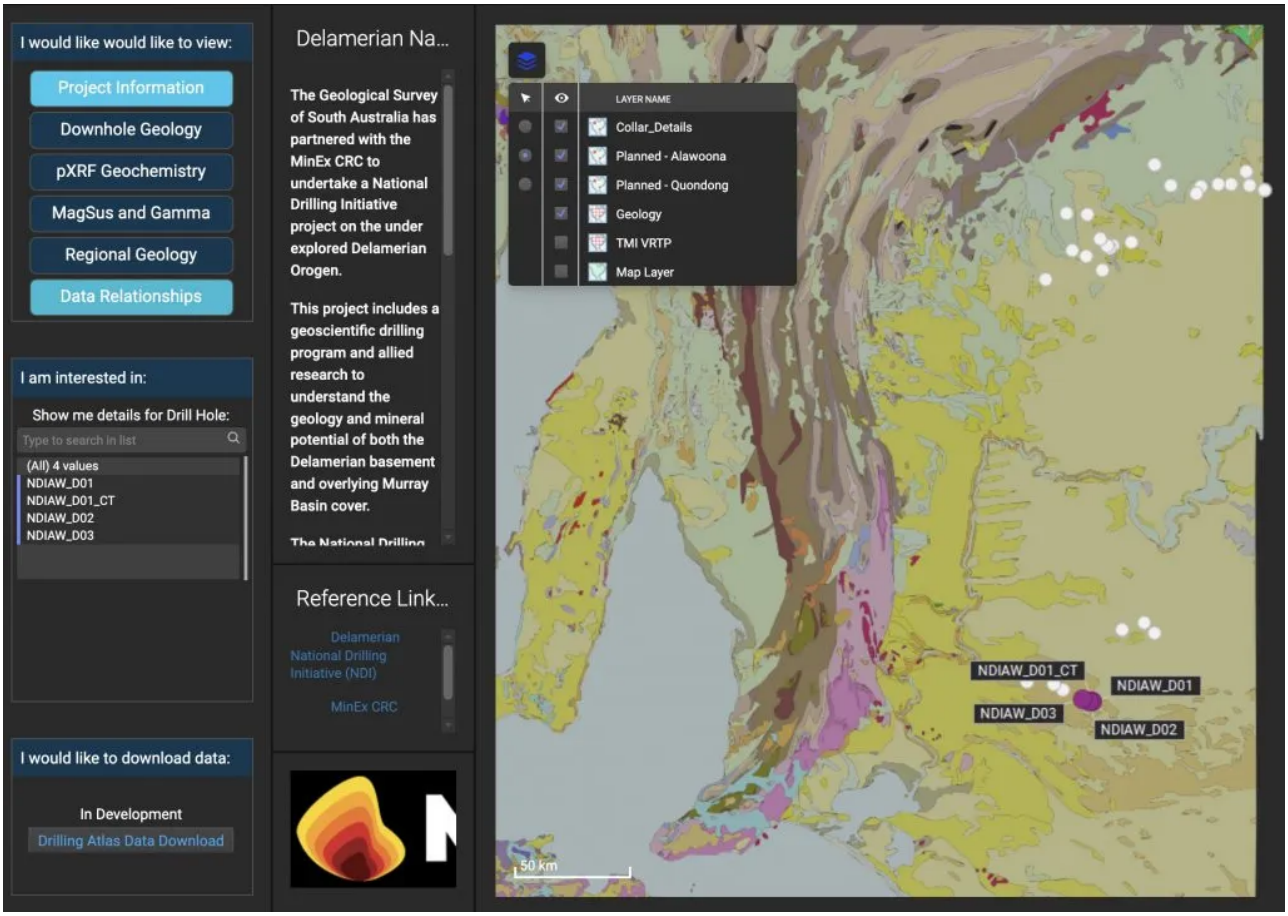
GSSA had plenty to show and tell at its annual Discovery Day conference in Adelaide on 25 November, thanks to outstanding successes with the first leg of its National Drilling Initiative in the Delamerian under the Murray Basin.

A 10-hole diamond drilling campaign is running from August until to the end of the year, with six holes completed to date. MinEx CRC is supervising DDH1 Drilling and also drilling a number of twinned

holes with its Coiled Tube (CT) Rig.

A large amount of data (lithologs, geochem via pXRF, petrophysics) is already available thanks to a lot of hard work in the field and a new SA Drilling Atlas (https://geoscience.sarig.sa.gov.au/spotfire/wp/analysis?file=/Anonymous/Delamerian_Drilling_Atlas_v1-1&waid=nLXNkdWyK0KE8NbQ0ORQ2-2604117978URWf&wavid=0) within SARIG. Results are being posted weeks, and even days, after they happen in the field.

The image below is from the Atlas, showing drill holes completed to date and remaining drill locations, including those in a second leg that begins early in 2022 in the Quondong Vale area about 150 kilometres north of the current Alawoona area.



The objective of drilling in the Alawoona area was to find if, and where, Cambrian-Ordovician volcanic arc rocks are present, possibly linked to the highly prospective Stavely Arc in western Victoria. Regional geophysics certainly suggested a volcanic belt, but we just didn't know. The cover of the Murray Basin had discouraged any serious exploration for at least 20 years and only a handful of holes had ever penetrated the basement.

The NDI drilling has lived up to high hopes: the rocks appeat to be consistent with a volcanic arc, there are iron and copper sulphides, and extensively brecciated and hydrothermally altered granites like you would expect in a porphyry copper mineral system.

The other astonishing aspect of the NDI results is how well they line up with the predicted geology in a new bedrock map prepared last year by GSSA senior geologist Tom Wise, supported by relogging of historic drill core by colleague Stacey Curtis. Drill results are also lining up with Tom's detailed schematic of the tectonic setting.

The tectonic model, along with a prospectivity map (https://precompetitive-review.com/new-delamerian-prospectivity-map/) of the Delamerian by CSIRO's Vasek Metelka, will be invaluable for explorers as they start thinking about their own targeting. Another major component of targeting should be the results of recent MT (https://precompetitive-review.com/gssa-nails-it-in-the-delamerian/) by GSSA's Kate Robertson along a 100 km transect (63 stations at a spacing of just 1.5 km), which steps off from the Nackara Arc into the Quondong Vale NDI area. A recent 2D inversion has firmed up preliminary results showing conductive flares from the mantle to shallow crust.

Subsequent to that work, Geoscience Australia has flown AusAEM over the region (linking to a Frome AEM survey flown in 2012 at spacings of 2.5 km and 5 km). The availability of conductivity at three or four different scales (AusLAMP, the recent MT transect, Frome AEM and AusAEM) raises the tantalising possibility of linking conductors from the mantle all the way through to prospect-scale targets, as Geoscience Australia did so successfully in the East Tennant region to guide the NDI's direct hit of sulphides in NDIBK04.

The Alawoona and Quondong Vale areas have been under a Section 15 order for the past couple of years to keep speculators and land-bankers at bay until the precompetitive work could be undertaken. The SA government will release Alawoona in the next few months.

Tom gave the following summary of the five available drill results at Discovery Day.

D01

D01 was targeting a complex magnetic response, which I interpreted to be related to an upper level pluton, and that looks to be what we've got. So somewhere near the intersection of major structures, it looks to be a bit of a demagnetized zone, and we got altered granite and granodiorites, very enclave rich, which excited some of the guys in the field, and got some nice chlorite, pyrite selvages through there as well.

D01-CT

We twinned (DO1) this with the CT rig. The CT drilled a vertical hole. The DDH1 rig drilled a hole dipping to the east, fairly steeply and the stratigraphy that we logged (in D01-CT) is pretty comparable, within a few metres of each other, allowing for a bit of slop up and down the hole, not too much is really encouraging and backing that up is some of the xRF results … they are showing fairly sharp boundaries, which is great to see.

D02

This is quite an exciting one when it came out of the hole. Severely altered veined and brecciated granite, very much at structural intersections and targeting more of a demagnetised zone, about 1.5 km further west of the first hole. Early indications are there is a fairly sizeable alteration system sat there, at the intersection of a N-S and NNW trending structural set. We got lots of alteration through

this hole, which is really encouraging suggesting there is major fluid flow able to be located on some of these structures, and carrying little bits of sulphide here and there, so bits of pyrite and the odd bit of chalcopyrite. It's really over to you guys to find the sulphides. We found there have been alteration systems and fluid flow events and things like that. There we go, challenge set.

D03

About another 1.5 km further west, really pinpointed to us that we're in the upper crust which is great, that's where we want to be for some these systems. We hit volcanics. I interpreted this to be a magnetic ridge associated with felsic to intermediate-ish volcanics, and that's pretty much what we got. So fairly flat-lying lavas and upper-level sub-volcanic intrusions and feeders. Some of these were structurally shoved around a little bit and localising maybe some flow-top alteration as well as low-angle structures, which was interesting. So dacite and rhyodacite-type lavas and associated sub-volcanic intrusions.

This hole, I had done most of my-depth-to-basement targeting based on the stratigraphy of the Murray Basin itself. I had a guess at the basement being at about 220m. The drillers hit something hard at 220.2m or something like that … it turned out it was a silicified interval of what was probably the Berri Basin, so early Cretaceous I think. A second basin sequence beneath the Murray Basin, which thus far we thought didn't come this far south and stopped 50 to 70 km further north). …. there are interesting silicified gravels and pyrite nodules in there.

D04 (twinned by CT)

Stepping further west again, this hole was targeting a real discrete and elongate residual gravity low, which I interpretated as being a bit of a trough. We see very similar features in western Victoria associated with the Grampians group, being interleaved with bits of the Stavely Arc as it has been shunted up through it. But we didn't know. This was the point to test that hypothesis, nothing like that has been intersected in South Australia at all, and we think we have got a post-Delamerian shedding and erosion or redeposition in a steep-sided graben. So something like that would kind of fit. We've got siltstone and sandstones and conglomerate-ish units so that would kind of make sense with a post-Delamerian uplift and erosion.

D06 (twinned by CT)

As we stepped further west the other side of the highway up to Loxton, we drilled no 6, this was a magnetic ridge, the margin of what I interpret to be a bit of back-arc. This is along strike to the north of the Sherlock VMS-type deposit that was drilled back in the 90s. And we got similar sorts of systems … sheared volcanics and volcaniclastic rocks, we got significant amounts of sulphide, there's quite a lot of pyrite, pyrrhotite and bits of chalcopyrite, and quite deformed. This hole was angled, dipping to the east, expecting that we would get steeply west-dipping fabrics and that's what we think we are seeing in this hole. It reaffirms the interpretation of an inverted graben, which may localize some of these VMS-type systems. Probably in the back-arc to the Stavely zone.

We also twinned this hole with the CT rig … the first bit of basement we turned up, in the first 2 metres, we had a fossil coming out, which was kind of odd and serendipitous and very surprising to see the CT rig preserve chips large enough to preserve something as soft and fragile as this. …. there's an early Ordovician-type, loose age constraint on this, which is really exciting because we didn't any evidence of anything this age thus far in eastern SA. Sitting just below that interval of siltstone we had again similar foliated andesitic volcanics that we saw in the previous hole.

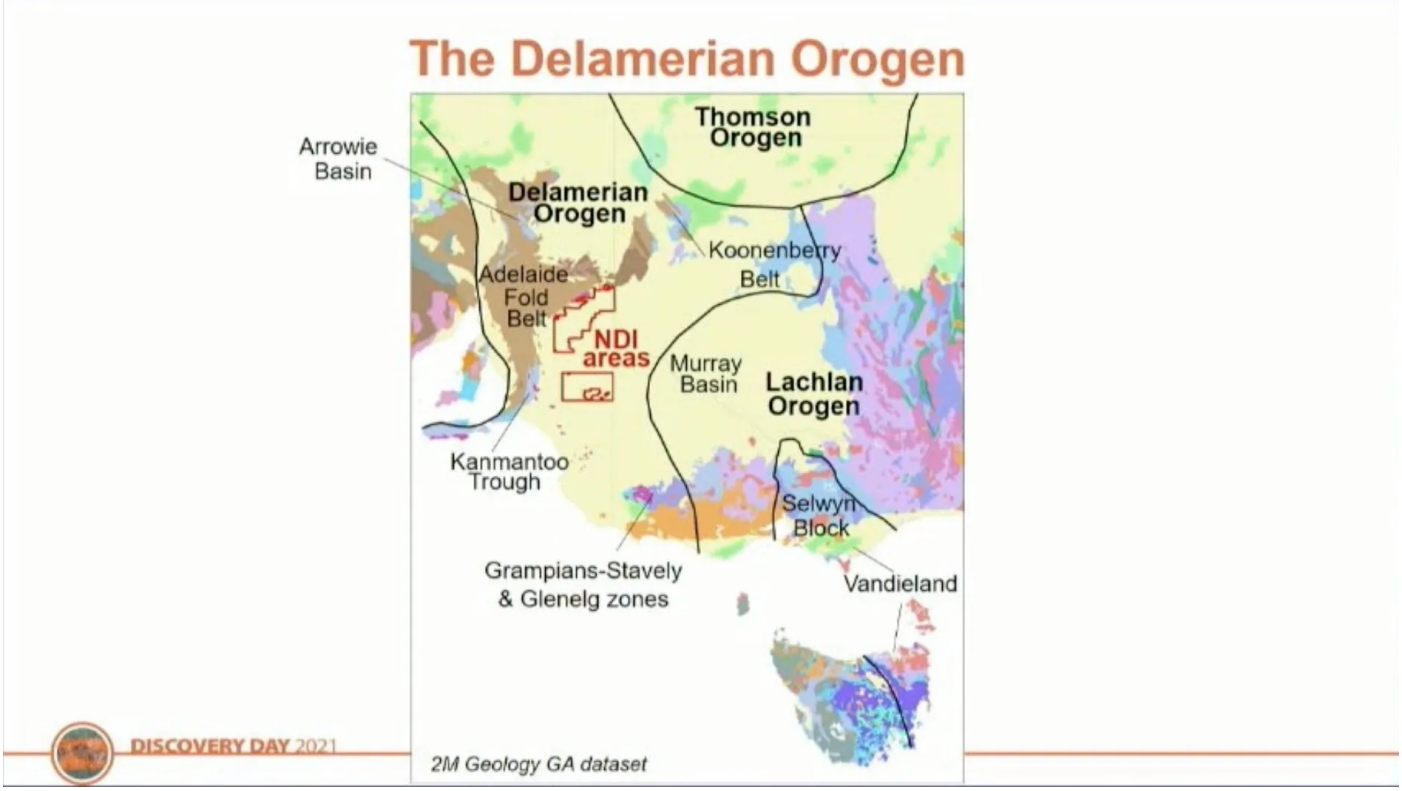
Tom summed up with the following comments:

» The drill results have strengthened the prospectivity for major porphyry copper deposits by finding fluid flow and the right kind of alteration systems (likely to be kilometres in scale) along major structural intersections

» these co-located structural intersections and alteration systems are very similar to South American porphyry systems

» AusLAMP and infill MT shows these structures are have conductivity anomalies coming up from the mantle

» D05 and D06 have expanded the search space for VMS-style mineralisation along discrete belts tracking north from the Sherlock prospect in what appears to be inverted grabens in a back arc setting.



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