



Advancing Exploration

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Diamond focus

Smart use of new pre-competitive data is beginning to have a real impact on mineral exploration in Australia. By **David Upton**

New data from Geoscience Australia and the Geological Survey of Queensland has prompted Anglo American to make a return to local exploration and reverse its previously held view that Australia was less likely than other countries to produce a major discovery.

The pre-competitive work re-rated the potential for Mt Isa look-alikes under the Georgina Basin about 150km south of the historic mining city, leading Anglo to apply for 19 licences over 5700sq.km.

Anglo's decision is one of the biggest wins in recent times for geoscience agencies, which invest tens of millions in pre-competitive data to de-risk areas and encourage private exploration investment.

Junior explorers are also capitalising on pre-competitive data and creating some exciting opportunities.

ASX-listed DevEx Resources earlier this month provided a textbook example that has dealt it into a new wave of diamond exploration in the Kimberley region of Western Australia.

DevEx was known until last November as Uranium Equities. The company is one of the largest land holders in the Alligators River uranium province in the Northern Territory. However, it had drifted since uranium prices went into a long slump after the Fukushima disaster in 2011.

Chairman Tim Goyder shook things up a year ago by bringing in Brendan Bradley, a geologist with a flair for business development who was returning to Australia after spending a large part of his 20-year career overseas, most recently with Kingsgate Consolidated.

Bradley said he had kept an eye on "a heck of a lot of investment" back in Australia by government agencies and academia to map the architecture of the lithosphere, and was keen to find ways for DevEx to apply that knowledge.

He said knowledge of the deep crustal domains and their boundaries could be unrelated to surface geology and still provide leads on the most prospective places to explore.

DevEx has applied this thinking to the search for intrusion-related diamond



Brendan Bradley

deposits in the Kimberley region and developed some ground-breaking ideas about where the next discoveries might be made.

The exploration targeting work is based on the Australian Seismological Reference Model, or AuSREM for short, developed by the Research School of Earth Sciences at ANU and a database compiled by the

Geological Survey of WA on all of the state's diamond occurrences.

The results of the intriguing exercise in putting these databases together is shown in the accompanying map, which DevEx released to the ASX on July 2. The background is the depth to basement and tends to draw the attention. However, the most exciting element of the map is the contouring of the thickness of the lithosphere – the crust and upper part of the mantle directly beneath it.

The remarkable result is that many of the key diamond occurrences in the Kimberley fall onto a common lithospheric contour of about 210km to 215km. This is especially true of the emerging exploration hotspots, including Lithoquest's North Kimberley project, POZ Minerals' Blina project and Lucapa's recent discovery about 45km southeast of the Ellendale mine at Little Spring Creek. The Blina-Ellendale-Little Spring Creek trend also sits on a basement precipice, which suggests a crustal-scale structure.

Bradley said the relationship was "quite startling" and was unaware of anything in the literature that made such a connection between lithospheric thickness and diamond occurrences.

"We don't know yet if the relationship is exactly as it looks, but this dataset allows us to rank our targets," he said.

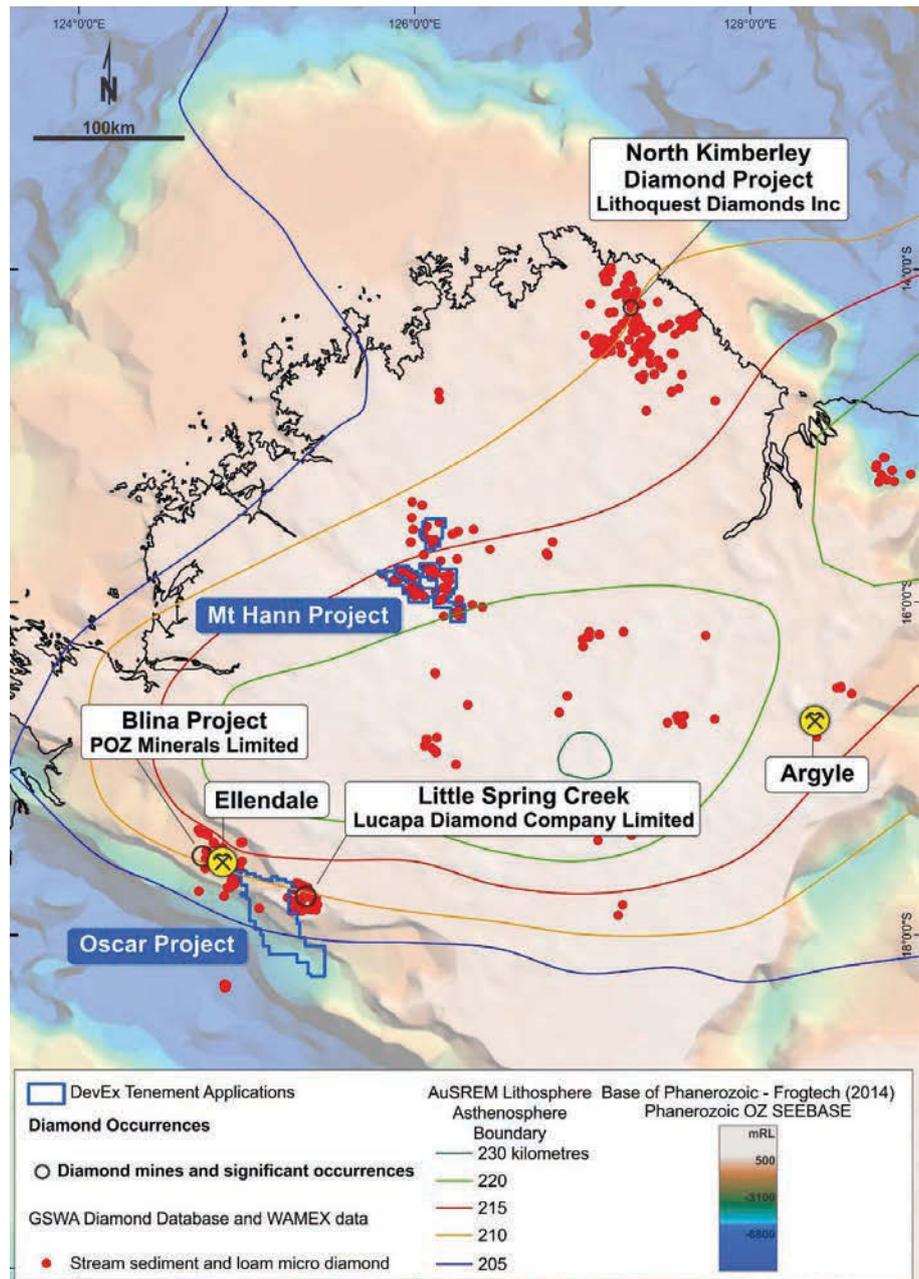
"As an explorer, you are always working to a budget and you have to determine which anomalies are the ones you spend money on."

DevEx has pegged 1600sq.km that stretches between Ellendale and Little Spring Creek and the area immediately south. Known as the Oscar project, it contains four known occurrences of lamproite, which is the host rock for the diamonds at Ellendale and Rio Tinto's Argyle diamond mine.

The company also applied for an area known as Mt Hann, equidistant between Ellendale and Argyle. Mt Hann is one of the most significant unresolved micro-diamond anomalies in Australia. It had been passed over by previous explorers – as indeed had Little Spring Creek – however, DevEx's work shows it is on that highly prospective contour of lithosphere thickness, making it a much more attractive target.

DevEx is bringing other innovations to its search for diamonds. Close study of the lamproites at Ellendale has shown the presence of a mineralogically-zoned system. Individual lamproite pipes can therefore point the way to the olivine lamproites that are more likely to contain diamonds.

The company has also identified that it may be able to explore more easily for lamproites under cover by paying attention to resistive sandstone outcrops that could have been altered and hardened because of their proximity to buried lamproite intrusions.



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These are all innovative concepts that could dramatically improve the odds of diamond discovery, which until now has been mired in centuries-old techniques of stream and sediment sampling.

It also comes at a time when Lucapa has shown that airborne electromagnetic surveys are an important new tool for diamond exploration.

Diamonds are not the only target for the team at DevEx. It has thrown out the rule book that says uranium is the only commodity worth targeting in the Alligators River region and is working up copper and gold targets in this region.

And at the southern end of the Lachlan fold belt in NSW, the company is taking advantage of new pre-competitive data

that has re-rated the potential for porphyry copper and gold.

The key philosophy driving the company is new information or technology, and Bradley sees plenty of both in Australia.

"Our view is Australia is a great playground to be exploring in and making successful discoveries," he said.

"There's a lot of innovation and new science coming out of Australia and new opportunities for explorers."

It is an interesting observation given that Bradley has spent much of his career overseas, and should be a wake-up call to many local explorers who seem slow to pick up the opportunities being generated by Geoscience Australia, the state geological surveys and smart academics such as those at ANU. **AMM**