

Australia's minerals go on



Hard core: Data from existing core libraries such as this will soon be available online

Matthew Brace reports on the world's first virtual mineralogy library

Explorers will soon have a new knowledge source at their fingertips to help them tackle the challenge of finding new mineral resources.

The AuScope National Virtual Core Library (NVCL) is a research network, which offers users a detailed and high-resolution portrait of the composition and more specifically the mineralogy of the top 2km of the Australian continent.

Core libraries have existed for many years but they have not been utilised to anywhere near this degree. The NVCL, which is part of the AuScope National GeoTransects Programme, has the goal of progressively building a novel high-resolution image of earth materials and properties, and facilitating world-class geoscience research.

The NVCL will contain both mineralogical and image content describing geology of the core contained in these libraries. It will significantly increase the value of existing core libraries by scanning hundreds of thousands of core

samples using CSIRO's robotic, automated spectroscopic machines (or HyLoggers™) and then publicising the detailed mineralogical data derived from that process.

This reveals new geological knowledge that is not readily evident to the naked eye.

According to the Programme Director, CSIRO Exploration & Mining's Chief Research Scientist, Dr Jon Huntington, "never before has such a comprehensive and accessible mineralogy map of Australia been available".

"Most government core libraries and company core 'farms' are large repositories for rocks and core samples that people can visit and examine but no-one has taken it to the next stage of developing a wholesale value-adding process to use those core assets, certainly not using hyperspectral techniques to derive mineralogy. Neither has anyone put the results online for all to use either for research or more practical exploration activities," he said.

"One goal of the NVCL is to encourage people to use knowledge from the past to drive ideas, exploration concepts and understanding, leading to future exploration and new resources."

Library content

The raw data for the library is based on the rich legacy of drill cores already held in roughly 18 core libraries or informal core repositories in the seven State and Territory Geological Surveys.

Thousands of cores - some recent, some many years old - are already stored in these libraries and are publicly available. They have been drilled by State Governments or donated by private companies.

The new virtual online library will offer users the chance to examine detailed mineralogical results remotely before deciding to spend money on a formal visit to physically inspect the core.

View from AuScope

The CEO of AuScope, Dr Bob Haydon, says the release of the first scanned results this year will be a major achievement.

“The NVCL is truly unique in its capacity to capture a range of important data from drill core. When established and populated with a range of data from drill core from the various States and Territories, the NVCL will provide remote access to ‘view’ drill core in a traditional sense but with the enormous benefit of viewing and displaying mineralogical data that will significantly enhance the ability of geoscientists to interpret drill core.

It’s the remote access to core that is so important and over time will be a viable alternative to physically storing and retrieving trays of drill core.

Any new technology that can publicise Australia’s geology and its potential to host undiscovered resources resulting in increased investment is very important and so there is financial benefit. However the NVCL also opens new opportunities for fundamental and applied scientific research that may have wide application in understanding of our earth resources and therefore have broad community benefit as well.”

The hyperspectral infrastructure is made up of seven HyLoggers, one in each of the State and Territory Geological Surveys. Each HyLogger consists of sensitive visible and infrared spectrometers, a very high-resolution digital camera, a laser profilometer, a robotic x/y table, power supplies, lighting, control software, and a control and data management computer.

The HyLogging™ systems are being built with funds from CSIRO and the National Collaborative Research Infrastructure Strategy (NCRIS). The Geological Surveys will own the HyLoggers, maintain them and provide operational staff as their co-investment in this project.

Wealthy data bank

The sheer mass of information to be scanned and published is remarkable. According to the team, the project is producing roughly 3MB of processed data per metre of core scanned (the raw data also has to be stored).

“If a State Geological Survey manages to scan 100,000 metres in a year that would be 300,000MB or 300GB, and that’s just one Survey,” said Dr Huntington.

“This might amount to 4 terabytes over the life of the current NVCL project. Moving this amount of material around on the internet is not trivial. Not everyone has internet speeds we in CSIRO are used to so we have to be clever and offer alternative strategies to publish and deliver data. We are developing these as we proceed.”

Open for business

Explorers will be able to start viewing scanned results from about mid-2009.

Dr Huntington explained that the NVCL team is building an Oracle database, a version of which will be provided to each State Geological Survey to implement.

“The AuScope Grid will access those databases, extract data and publish simplified versions to the internet for all to examine. Full resolution copies of the data will be available from the Survey NVCL contacts called ‘custodians’ and maybe some of it over the internet,” he said.

According to Executive Director - Minerals and Energy – for the Department of Primary Industries and Resources of South Australia, Dr Paul Heithersay, NVCL “allows for a totally new way to interrogate geological data from core. It has shown us, for example, that alteration zones can be much larger than previously recognised. It also allows for geologists to scan core remotely so that a visit to the core library is more targeted and cost effective”.

“The state governments make a very significant investment in storing and maintaining core for the use of explorers. I see this as adding a lot more value to an important asset,” he said.

The view from Queensland is equally positive. Acting Manager of the Geoscience Information Unit at the Geological Survey of Queensland, Ian Withnall, told **earthmatters** that NVCL’s role in providing a better understanding of mineralising and alteration processes in a mineral province should “lower the risk associated with mineral exploration and increase the chance of discovery by both those companies already active and those that we would like to attract”.

“Discovering a resource not only provides direct royalties to a government but provides employment and wealth that flows through the community and sustains our economy,” he said.

Explorers wishing to get research access should begin by contacting the NVCL custodian in the relevant Geological Survey.

Building a legacy

The publicly-funded NVCL will be built progressively as more and more core sample data are added over the coming years from government and private sources.

A rough estimate puts the total length of core scattered around the country’s warehouses and libraries at roughly 8 million metres. Even discarding core which has decayed over the years, the amount of work involved in scanning this resource is vast, which is why the HyLoggers will be active for many years to come.

Prioritisation of cores to be scanned will be made on the basis of creating representative transects through important metallogenic provinces and mineral deposits, and to support research being undertaken in other AuScope components.

Donations of scanned cores from the private sector are also invited and will augment the value of the growing database of earth composition knowledge for future generations.

Acknowledgement

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Dr Jon Huntington
+61 2 9490 8839
jon.huntington@csiro.au

Demonstration website
<http://nvcl.csiro.au>
www.auscope.org.au