



Future Infrastructure for the Australian Continent

AuScope announced in December 2009 that we have lodged a bid to enhance the current AuScope program with infrastructure under an EIF bid for an “Australian Geophysical Observing System” to create and develop new capabilities for monitoring the physical state of the accessible crust. An [overview of this EIF bid](#) can be found at the AuScope website. Announcement of the success or otherwise is expected in coming months.

Notwithstanding this application, the AuScope Board has plans to commission a collaborative initiative to develop a clearer picture of future infrastructure needs in the earth and geospatial sciences. The specific objective will be to develop a plan and business case that can be used to seek future infrastructure funding. To achieve this, a steering committee is to be formed in consultation with the National Committee for Earth Science to develop this picture and the committee will be charged with consulting widely across the earth and geospatial science community. A framework for this work will be developed in the next month; including the search for an independent leader in earth or geospatial science to facilitate the initiative.

For more information contact [Bob Haydon \(rhaydon@unimelb.edu.au\)](mailto:Bob.Haydon@unimelb.edu.au) or [Mike Sandiford \(mikes@unimelb.edu.au\)](mailto:Mike.Sandiford@unimelb.edu.au).

Bob Haydon
CEO, AuScope Ltd

AuScope Grid and Interoperability Program Director Robert Woodcock

The **AuScope Portal** version 2.4 has been released, offering a new workflow for the NVCL services, further usability updates and increased data providers. Further versions of the Portal have been established for the Geodesy Community in Australia (“Geodesy Workflow”) and CSIRO Minerals Down Under Flagship.

AuScope Grid has continued its work with the **Australian Geological Surveys** to deploy the Spatial Information Services Stack (SISS) to deliver their Mineral Occurrence (Earth Resource) data – additional surveys have deployed SISS and now all bar 2 have deployed.

The new project – **Australian Spatial Research Data Commons** started with all staff employed. The CSIRO team responsible for AuScope Grid received support for this new project to further advance the software infrastructure developed under AuScope Grid and SISS in support of interoperable data delivery in disciplines beyond the Geoscience. This project funded by the Australian National Data Services (ANDS), will allow CSIRO to ramp up its development effort and support other groups to make their data interoperable. This is a major opportunity to get the SISS deployed into many organisations and support greater, improved access to data. This will support cross-disciplinary research with the AuScope Grid infrastructure in important areas like Groundwater, Climate, Geothermal and Environmental fields.



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National Virtual Core Library Program Director Jon Huntington

The **North Territory Geological Survey (NTGS)** NVCL node is now operational in Darwin and also featured in displays at the recent annual AGES symposium in Alice Springs attended by some 285 industry delegates from 81 Organisations. The NVCL community welcomes Belinda Smith, NTGS’s new NVCL HyLogging geologist, who was on hand in Alice to answer delegate’s questions, ably assisted by Melissa Quigley from the CSIRO HyLogging team. Lew Whitbourn and Jon Huntington have both visited Darwin to commission the new instrument and train staff who are now gathering momentum, logging cores and already generating some industry interest. The image log on the right is from the LBD1 hole at Lindemans Bore and has attracted considerable interest.

The **GSQ NVCL node in Brisbane** recently played host to a group of local and international geologists from Vale who came to learn more of the opportunities offered by the HyLogging concept. GSQ are now closely engaged with several industry players offering logging of a variety of holes. Several papers are in preparation for presentation at the Australian Earth Science Convention in Canberra in July authored by Geological Survey and CSIRO geologists.

In WA in March the local chapter of the Geological Society of Australia hosted a one-day symposium on “Rapid Geochemistry and Mineralogy for Exploration”, with a NVCL paper by Lena Hancock (GSWA’s HyLogging geologist) followed by a very well attended tour of the HyLogging and Core Library facilities at Carlisle. The GSWA node is currently scanning petroleum core from the Canning Basin and Mineral Cores acquired under the GSWA’s (EIS) Exploration Incentive Scheme industry assisted drilling program.

The NVCL will be hosting a **2-day topical symposium as part of the Australian Earth Science Convention** in Canberra in July, with a series of papers on July 8th and 9th by local Survey and other geologists on NVCL results from around the country, as well as overseas spectroscopic experts, including papers on planetary spectroscopy. Travel assistance is available for aspiring young career scientists, one from each earth science department in Australia, wishing to attend. Please contact [Jon Huntington](mailto:Jon.Huntington@unimelb.edu.au) to express interest. If you want to learn more of what the NVCL is doing to open up Australian geology, bookmark this date in your diaries.

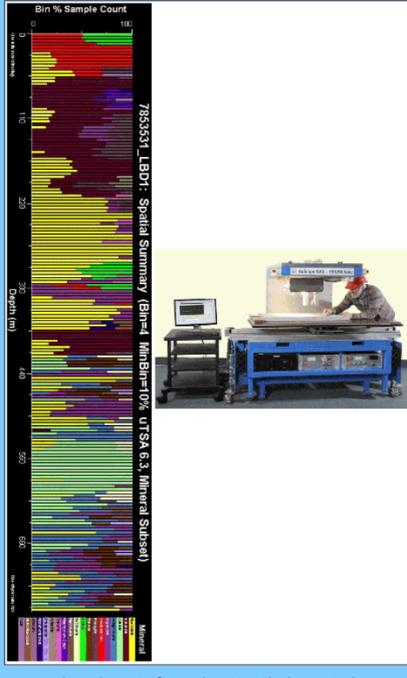
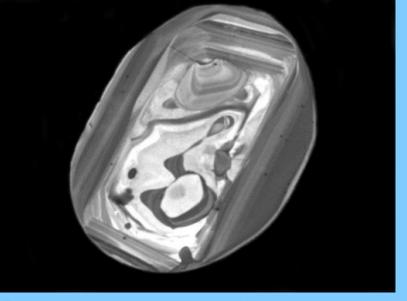


Image log above is from the LBD1 hole at Lindemans Bore and to the right, Jon Huntington demonstrates on one of the a HyLoggers installed at State Surveys

Earth Composition and Evolution Program Director Bruce Schaefer

The Cameca 1280 ion probe has been installed at UWA and is fully operational as are the other three facilities: (JDL) Centre of Mass Spectrometry at UWA/Curtin for undertaking high precision geochronology through access to SHRIMP ion probes and mass spectrometers; thermochronology facilities at the University of Melbourne; and the TerraneChron® facility at Macquarie University for in-situ analysis of zircon.

The access agreements have been signed off and are available so if researchers want to use any of the facilities they should contact the following: Cameca Ion Probe - for general access to **AMMRF facilities**, and the **Cameca** specifically and the 1280 Manager is [John Cliff \(john.cliff@uwa.edu.au\)](mailto:John.Cliff@uwa.edu.au). **Terrane Chron**, **John de Laeter Centre** and **Thermochron**.

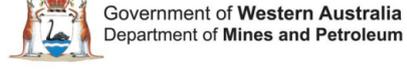


Zircon grain is approximately 200 µm wide.

Earth Imaging and Structure Program Director Brian Kennett

A new reflection transect will commence next week in northwestern Australia. Extending over 580 km and linking from the **Pilbara to the northern Yilgarn** crossing the Capricorn Orogen the reflection line, jointly funded by AuScope and the Geological Survey of Western Australia, will probe the deep connections between the two ancient cratons.

Meanwhile the data from the **Delamerian reflection transect** from Western Victoria into South Australia carried out in late November 2009 has revealed strong crustal thickening to the west and an unexpected pattern of mantle reflections.



AuScope and the Geological Survey of Western Australia, will probe the deep connections between the two ancient cratons in a jointly funded project.

Earth Simulation, Analysis and Modelling (SAM) Program Director Louis Moresi

Software

Escript is a python-based programming tool for mathematical modelling based on non-linear, time-dependent partial differential equations. It has successfully been used in a broad spectrum of applications including Earth mantle convection, earthquakes, porous media flow, reactive transport, plate subduction, and tsunamis. The new **escript release 3.1** is now available for download. The new version now provides lazy evaluation to reduce compute time and memory usage for complex material laws, a first version of algebraic multi-grid and a new beginners guide **The Cookbook**. Moreover, many bugs have been fixed, and efficiency and robustness has been improved.

The **Underworld development team** is pleased to announce the release of **Underworld-1.4.1**. The significant changes in this release include changes to the XML user interface, multigrid solver for Stokes Flow, Superconvergent Patch Recovery (SPR) Method for strain-rate field recovery, significant checkpointing improvements (hdf5 format is now standard) and a testing framework has been enabled. The **Underworld-1.4.1 release** can be downloaded. In addition, **Underworld-1.4 “cluster modules”** have been set up on several Australian clusters.

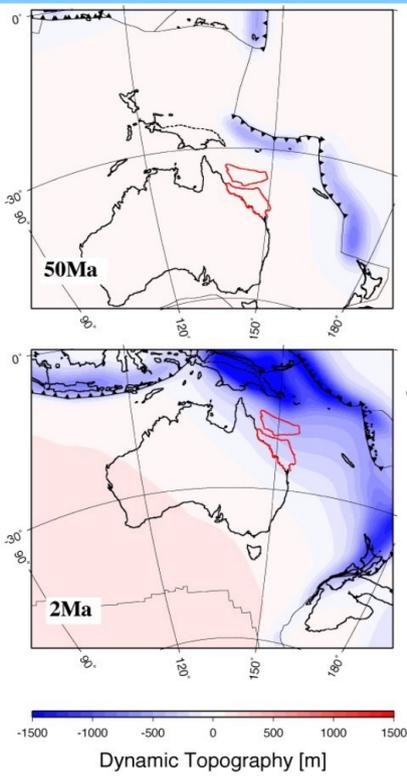
Hardware

The new **3D Laboratory for Immersive Visualisation Environments (3D LIVE)** at Monash University is now installed and operational. The facility consists of both a 3D stereo display plus real-time motion tracking, the combination of which will provide a virtual reality (VR) workspace allowing real-time interaction with 3D data volumes. A formal launch of the facility is planned for June, and will also be an opportunity for all components of AuScope SAM and AuScope Grid to showcase their software and infrastructure. The **latest updates** on the facility are available online.

Breakthrough Science

In a paper in the January 2010 issue of *Geology* [doi: 10.1130/G30217.1], Lydia DiCaprio, Dietmar Müller and Mike Gurnis used a workflow developed as part of the **AuScope Simulation And Modelling (SAM) Tectonics and Geodynamics Project**, to unravel how the interplay of mantle convection, plate motions and global sea level fluctuations can lead to coral reef demise. Australia is home to the Great Barrier Reef, the world’s largest coral reef. What is less well known is that the continental shelves northeast of Australia, also host a number of drowned coral reefs. The question is: why did they drown given the enormous growth potential of reefs?

In addition, **A/Prof Patrice Rey** and **Prof Dietmar Müller** have published a letter in **Nature Geoscience** [doi:10.1038/ngeo825] which presents a model for the separation of New Zealand from the Australian continent. The tectonic forces have also been observed to be currently active on the west coast of South America. The model was constructed using the state of the art **GPlates** software developed by the **EarthByte Group** and the **Ellipsis** program, which was developed in conjunction with Monash University and APAC (Australian Partnership for Advanced Computing).



Images from a high-resolution regional geodynamic model, coupled to a global model, which tracks the rate of dynamically driven subsidence beneath the northeastern marginal plateaus of the Great Barrier Reef (DiCaprio et al. 2010. doi: 10.1130/G30217).

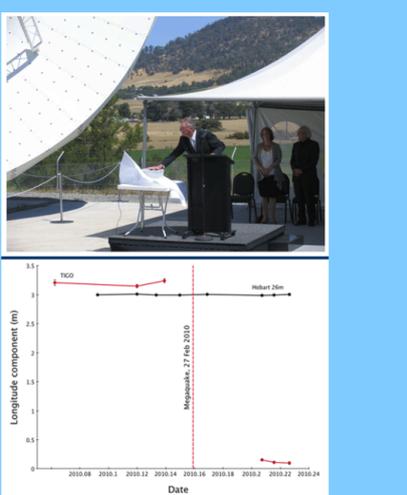
Geospatial Framework and Earth Dynamics Program Director Gary Johnston

The first of the **3 AuScope VLBI telescopes** was launched on 9 February at Mt Pleasant Observatory, Tasmania. His Excellency The Honourable Peter Underwood AC Governor of Tasmania successfully officially launched the 12m VLBI Telescope at a ceremony attended by participants from the (6th) General Meeting of the International VLBI Service and local and interstate guests. VLBI Project Manager Dr Jim Lovell acted as MC for the event with UTAS Vice-Chancellor, Professor Daryl Le Grew, AuScope CEO, Dr Bob Haydon, and the Chair, International VLBI Service for Geodesy and Astrometry, Professor Harald Schuh giving formal addresses. Media coverage of the event and copies of the speeches can be found on the AuScope website.

Recent observations with the new infrastructure

The big 26m at Tasmania and the new **12m at Mt Pleasant Observing Station, Tasmania**, both with TIGO (Transportable Integrated Geodetic Observatory), Kokee Park (Hawaii) and Westford (Massachusetts) on 5 days over 2 weeks. These supplemented the usual observations for the International VLBI Service (IVS), providing almost daily observations over the 2 week period.

The aim was to determine a new position for TIGO (it shifted by more than 3m following the Chile quake) but also to look for continued smaller movements (the post-seismic movements) as everything settled down again.



Top: His Excellency The Honourable Peter Underwood AC Governor of Tasmania the button to launch the new 12m telescope. Below: Plot showing changes in longitude of our 26m telescope at Hobart and TIGO in Chile (data provided by Oleg Titov, GA). You can clearly see the ~3m jump westward.

This update will be issued every three months to the Australian geoscience research community, keeping you up to date with the latest developments and progress of each of the six AuScope infrastructure components. Please forward the update to anyone in the wider research community who would be interested in finding out more about the investment in earth science infrastructure in Australia.