AUSCOPE EMAIL UPDATE NO.6 – SEPTEMBER 2010

The Minister for Industry Innovation, Science and Research, Senator Kim Carr announced the success of **AuScope's EIF bid** for $23million to establish the **Australian Geophysical Observing System (AGOS).** AuScope was the only national organisation to get EIF support in the recent round.

AGOS is designed to augment existing NCRIS AuScope infrastructure with new capability that focuses particularly on emerging geophysical energy issues. This infrastructure will add new capabilities through the first national subsurface observatory, designed to allow geoscience researchers to conduct experiments to monitor the physical state of the Australian continent at depths of up to 5 km.

It will build the integrated infrastructure that facilitates maximum scientific return from the massive geo-engineering projects that are now being considered – such as deep geothermal drilling – in effect building the platform for treating these as mega geophysical science experiments.

AuScope has embarked upon a planning process to identify future earth science infrastructure requirements over the next decade (AuScope II). In order to commence the process, a well-attended information session was held at the AESC on 7 July. **The Steering committee for AuScope II** chaired by Professor Peter Flood, consists of the following people:

Mike Sandiford - University of Melbourne, **Graham Carr** - CSIRO, **Nick Rawlinson** - ANU, **Andy Barnicoat** - Geoscience Australia, **Bruce Simons** - GeoScience Victoria, **John Dawson** - Geoscience Australia, **Simon Turner** - Macquarie University, **Tim Baker** - Geological Survey PIRSA, **Malcolm Sambridge** - ANU, **Steve MacIntosh** - Rio Tinto and **Bob Haydon** - AuScope.

This committee will be working with representatives from organisations across the country over the next 3 months to develop this plan.

Auscope's recent participation in the **AESC 2010** was successful with the AuScope Topical Symposium and the NVCL two day Symposium very well received with a healthy attendance at all sessions.

Bob Haydon
CEO, AuScope Ltd

AuScope Grid and Interoperability Program Director Robert Woodcock

The **AuScope Portal version 2.6** has been released which focused on adding additional service instances, further usability updates and mechanisms to discover "coverage" data services. Further versions of the Portal have been established for the Bureau of Metorology and Geoscience Australia for their **"Virtual Exploration Geophysics Laboratory".**

The AuScope Grid project is aiming for a beta release of its core infrastructure the Spatial Information Services Stack (SISS) by October followed by a formal v1 release by December 2010. Deployments are continuing with the Australian Geological Surveys to deploy SISS to deliver their Mineral Occurrence (Earth Resource) and NVCL data.

The **Australian Spatial Research Data Commons** has been making solid progress. 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),** is allowing CSIRO to ramp up its development effort and support other groups (beyond the geosciences) 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.

National Virtual Core Library Program Director Jon Huntington

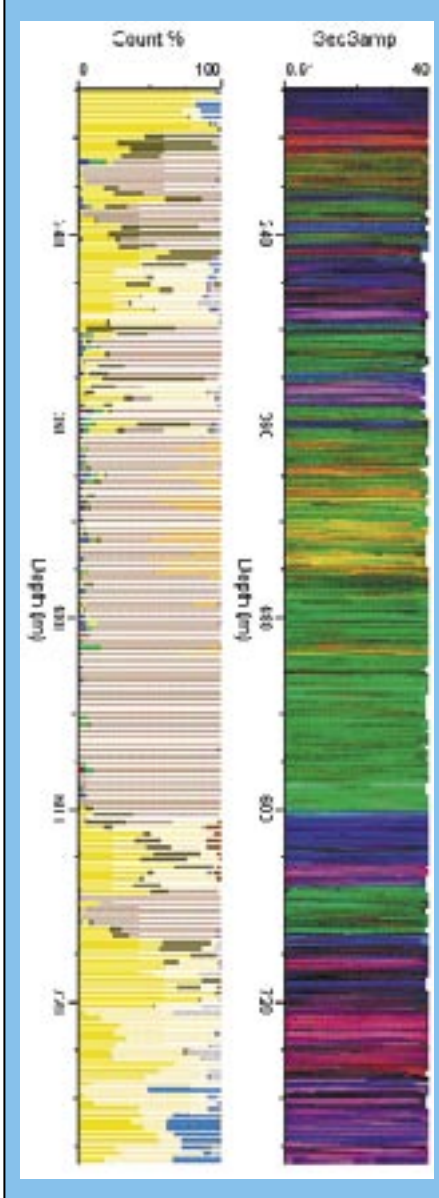
The NVCL component held its first highly successful symposium and workshop on July 8 and 9th during the **Australian Earth Science Convention** in Canberra, along with a TSG-Core software workshop. The meeting was attended by over 60 specialists, students and early career scientists and featured some 34 papers, including six overseas presentations. Abstracts are available for viewing on the AuScope website and full audio and PDF presentations will shortly be available from the AuScope NVCL website. The symposium included an important paper on the validation of HyLogging results with examples from all nodes. It was demonstrated that the results could not only be validated and justified via methods such as thin section petrography, x-ray diffraction and electron microprobe, but also has thrown up many unexpected results.

Since the start of the **operational phase of the NVCL** over 200,000 metres have been logged by the six operational nodes in WA, NT, SA, Qld, NSW and Tasmania. In South Australia information and summaries of their node's data can be reached via the following links in Internet Explorer: choose Map Data and then expand Drill holes, Wells and Sampling in the layer control on the right hand side. From there make Visible and Active the item headed Drill holes with HyLogger data. Once the map of drill holes is displayed zoom into your area of interest using the left hand panel controls and finally using the '?' button left mouse click on a drill hole of interest for a table of results to appear in a new window. From there a PDF of results can be accessed by choosing the active (blue) links.

A new spectral band compositing mode in the TSG-Core software (illustrated below above the normal mineral interpretation plot) has been developed and offers a very powerful way to visualise mineralogical domains in drill core. This will be available after further testing in a future release.

The upgraded HyLogger-3 prototype, that uniquely includes co-registered thermal infrared spectra, is operational in the lab and will be rolled out between now and Christmas.

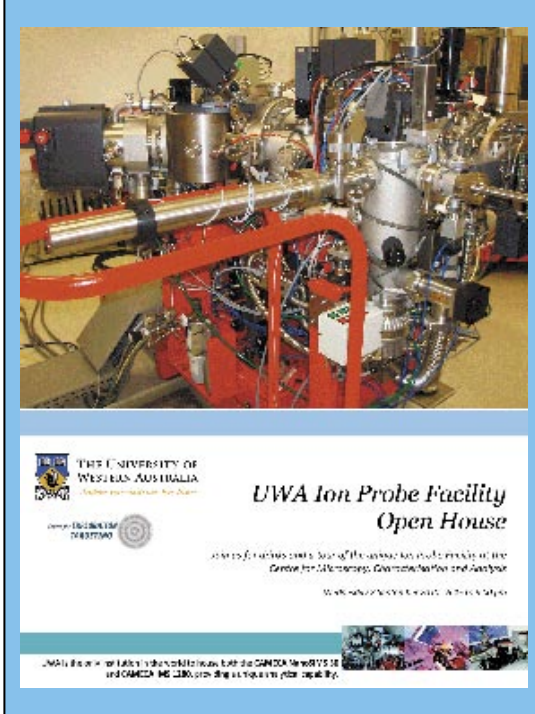
Please contact the local node custodian in each State or Territory for further access information or **jon.huntington@csiro.au.**



Earth Composition and Evolution Program Director Bruce Schaefer

The IMS 1280 at the University of Western Australia is in its second year of operation. Although its first year was plagued with typical startup problems, the instrument has settled down and is acquiring high-quality data on a routine basis. Much of the uptime in the first year was devoted to developing isotope standards and developing analyses that are atypical for SIMS instruments. The instrument is also starting to produce publications and the first paper is in review for publication in the journal Geology and several others are nearing submission. Because the instrument is likely to be oversubscribed, an international advisory committee has been formed to rank research proposals based on scientific merit. Starting next year, access to the IMS 1280 will be obtained through successful applications answering calls for proposals. The first such call will occur in a few weeks and it is anticipated that three such calls will occur on a yearly basis with up to 75% of the instrument time devoted to the successful applicants with the remainder devoted to training and further development work.

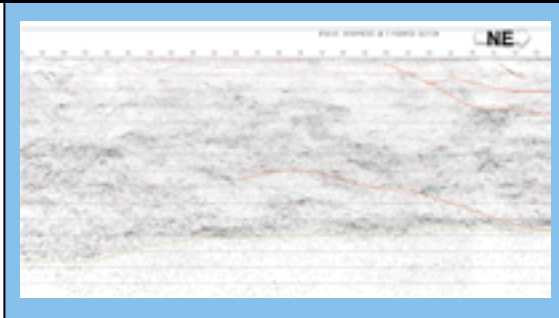
UWA are hosting an 'Open House' on Wednesday 8 September 2010, 6:45 to 8.00 pm, for delegates attending the **5th International Archean Symposium.** It will involve refreshments and a tour of the unique Ion Probe Facility at the Centre for Microscopy, Characterisation and Analysis. UWA is the only institution in the world to house both the CAMECA NanoSIMS 50and CAMECA IMS 1280, providing a unique analytical capability for Australian researchers. There are only 40 places on this tour so o register visit the Centre for Exploration Targeting booth at 5IAS or send an email to **admin-cmca@uwa.edu.au.**



Earth Imaging and Structure Program Director Brian Kennett

The **AuScope Transect Program** continued with the Capricorn reflection transect extending from the Pilbara Craton to the Northern Yilgarn carried out in May. The field stacks look good – the target date for full processing is February 2011. Processing for the 2009 Delamarian transect was completed by June and interpretation is underway with a further workshop in September in Melbourne. Presentations of the results of the GOMA transect will be made in Adelaide in late November.

Earth Imaging is supporting full MT coverage along the Capricorn line, and there are some funds still available which will be put to passive seismic in Western Australia.



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

From February to August 2010 a workflow has been developed to link the **GPlates plate reconstruction software to the mantle convection code Terra** [Bunge and Baumgardner, 1995]. This effort was initiated via a German Science Foundation-funded Mercator visiting professor fellowship to Dietmar Müller to work with Hans-Peter Bunge's geodynamics group at the Ludwig-Maximilians University, Munich. The coupling of the two softwares builds upon GPlates functionality that was initially developed to link GPlates to the CitcomS mantle convection software developed via the US NSF-funded Computational infrastructure for geodynamics (Gurnis et al., in review). Connecting plate kinematic and geodynamic models allows the testing of alternative tectonic absolute reference frames, an exploration of the origin of today's mantle structure and the linking of mantle convection to the evolution of sedimentary basins and continental interiors.

Top right: Figure 1. a) Earth's Geoid. b)-d) Model geoids constructed from combined plate kinematic-mantle convection model runs using three alternative absolute plate motion models. A comparison between and model and observed geoids is a simple and powerful way to discriminate between alternative published absolute plate reference frames, as they differ through the inferred history of subduction. e) 3D representation of the mantle's temperature field through time generated by Terra [Schuberth et al., 2009].

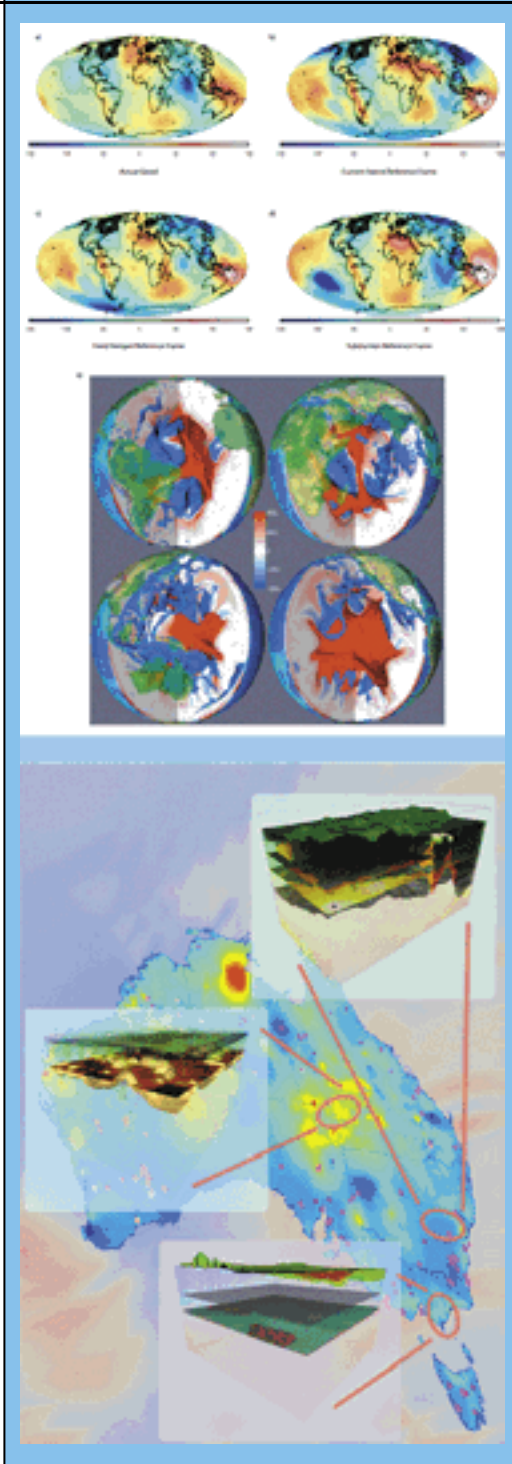
Bunge, H.-P. and Baumgardner, J.R., 1995, Computers in Physics, 9, No 2, 207-215.

Gurnis, M., Turner, M., DiCaprio, L., Spasojevic, S., Müller, R. D., Boyden, J. A., Seton, M., Manea, V. C., Bower, D. J. and Zahirovic, S. (in review). Global plate reconstructions with continuously closing plates, Geochemistry, Geophysics, Geosystems.

Schuberth, B., H. Bunge, G. Steinle-Neumann, C. Moder, and J. Oeser (2009), Thermal versus elastic heterogeneity in high-resolution mantle circulation models with pyrolite composition: High plume excess temperatures in the lowermost mantle, Geochem. Geophys. Geosys, 10.

AuScope Simulation, Analysis & Modelling provides tooling that extends our understanding of heat flow of the Australian continent. The map shown is the Austherm07 temperature profile at 5km depth ("Australian radiogenic granite and sedimentary basin geothermal hot rock potential map", Geosciences Australia). The AuScope infrastructure Underworld developed by Professor Louis Moresi and Steve Quenette et al. at Monash University, is used to produce three dimensional heat flow on a basin-by-basin basis, using best available architecture models.

Below right: The basins shown are the Latrobe valley basin (GeoScience Victoria), the Sydney-Gunnedah basin (Cara Danis and Craig O'Neill et al. at Macquarie University), and the Cooper basin (Geoscience Australia).



Geospatial Framework and Earth Dynamics Program Director Gary Johnston

Construction of the three AuScope VLBI antennas is now complete. Final efforts now revolve around ensuring the telescope operate at design specifications, including any remedial repairs / alterations for which the suppliers is responsible under the procurement contracts. At Hobart, work has been concentrating on completing the commissioning of the telescope and its software, receiver, digitising and recording systems. These systems are being copied and tested at Hobart before being shipped to the other sites for installation. It is now expected that full operations of the telescope array will occur late 2010.

Conferences

AuScope has featured at **AESC, PESA-ASEG, SEISMIX 2010 and MeRC eXPO.** AuScope will also feature at the GeoComputing 2010 and **eResearch Australasia 2010.**

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.

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If you would like to be included on the mailing list to receive this update please send an email to the address above.