

ANNUAL SUMMARY – 2012-2013

Component Reports:

- (1) Portable Seismic Instruments
– The Australian National University
- (2) Reflection Seismic
– Geoscience Australia
- (3) Electromagnetics
– University of Adelaide

ANSIR: Portable Seismic Instruments The Australian National University, 2012 - 2013

Instrumentation

- 200 New generation ANU seismic recorders
- 125 Lennartz LE-3Dlite 3-component 1Hz seismometers
- 50 Trillium Compact broadband sensors (3-component, 120s)
- 40 Mark Products L4C vertical component 1 Hz seismometers
- 47 Mark Products L-28-3D 3-component 4.5 Hz seismometers
- 22 Wilmore IIIA/IIIC vertical component 1-Hz seismometers (nearly obsolete)
- 65 Earth Data PR6-24 portable recorders (10 of which are 6 channel)
- 35 Guralp CMG-3ESP seismometers (about 8 of which are 30s, the remaining are 60s).
- 28 Guralp GMG-40T seismometers (all 30s corner period)
- 5 Streckeisen STS2 seismometers (120s corner period)
- 4 Reftek 72A-02 three channel recorders (nearly obsolete)

Access for Researchers

Access for instrumentation is through application to ANSIR for equipment. This system has worked successfully for the past decade. The user base in 2012-2013 was:

- The Australian National University (ANU)
- Geoscience Australia
- The University of Tasmania
- Macquarie University
- Australian Antarctic Division
- Victoria University of Wellington
- Newmont Mining Corporation

Project Facilitation

- Dr. Nick Rawlinson and Prof. Brian Kennett (ANU) deployed 45 ANU short period instruments (coupled with LE-3Dlites) in northeastern NSW as part of the EAL3 deployment. Instruments were installed in November 2011 and were retrieved in early 2013.
- Dr. Nick Rawlinson (ANU) and Dr. Anya Reading (UTAS) deployed 24 broadband instruments across southern Victoria, northern Tasmania and the Bass Strait Islands in June-August 2011. Each instrument consists of a Guralp CMG-40T coupled to an Earth data recorder. The array was retrieved in May-June 2013.
- Dr. Nick Rawlinson (ANU) and Dr. Y. Yang (Macquarie) deployed 46 new generation ANU seismic recorders (coupled with LE-3Dlites) in northeastern NSW and southeastern Queensland as part of the SQEAL1 deployment. Instruments were installed in November 2012 and are due for retrieval in December 2013.
- Prof. Tim Stern and Dr. Jesse-Lee Dimech (VUW) deployed 10 broadband seismometers (coupled to Guralp 3ESPs) between Mt Taranaki and Mt Ruapehu in the north Island of New Zealand. The equipment was shipped in July 2012, and will be returned at the end of 2013.
- Newmont mining deployed two new generation ANU seismic recorders at one of their

mine sites in the Tanami to record anthropogenic noise. This took place in early November, 2012.

- The Australian Antarctic Division Deployed two new generation ANU seismic recorders in Antarctica to record ice sheet movement. The instruments were sent in September 2012, and will be returned in mid 2013.
- Tanya Fomin (GA) deployed 15 broadband seismometers (coupled to LE3D-lites) to record wide-angle data coincident with the Albany Fraser reflection transects in Western Australia. This experiment took place in May-June 2012.

Current Status

Demand for instrumentation has been high, and is set to increase with throughout the remainder of 2013 and into 2014, with 50 new generation ANU recorders to be deployed in Queensland next month, together with a high resolution array of 20 broadband instruments. Several experiments in Western Australia are slated for next year. However, the complete set of 200 new ANU data loggers will help alleviate pressure on the instrument pool. .

Instruments currently in the field include:

- 46 new generation ANU recorders plus LE-3Dlite seismometers (northern NSW/southern Queensland).
- 15 LE-3Dlite seismometers are still in Tasmania.
- 10 broadband recorders plus Guralp 3ESPs are in New Zealand.
- 2 new generation ANU recorders plus LE3D-lites are in Antarctica.
- 2 new generation ANU recorders plus LE3D-lites are in the Tanami.

Reflection Seismic Component - Geoscience Australia 2012-2013

Capability

- Deep Crustal Reflection Seismic acquisition coordinated and completed by Geoscience Australia under its panel of deed with commercial seismic contractors.
- Advice on reflection seismic survey parameters.
- Processing of reflection seismic data by Geoscience Australia (when capacity is available)

Access for Researchers

Access for reflection seismic services is through application to ANSIR for projects. The user during this reporting period was AngloGold Ashanti

Project Facilitation

Geoscience Australia maintains a panel of deed of standing offer for Onshore Seismic Reflection Acquisition and Related Services with two separate categories: One for shallow and small scale seismic reflection acquisition, imaging from surface to basement, and one for deep crustal and regional scale seismic reflection acquisition, imaging from surface to depths below the Moho. There are currently three companies on this panel, with two covering both categories and one covering shallow seismic only.

Seismologists at Geoscience Australia are currently processing 80km of deep crustal seismic reflection data acquired near Tropicana Gold Mine in June 2012 with funding from Anglo Gold Ashanti. The data (line GA13-T1) will be released together with 591km of deep crustal seismic reflection data acquired over the Albany Fraser region by the Geological Survey of Western Australia in May-June 2012.

ANSIR: Electromagnetics - University of Adelaide 2012-2013

Instrumentation

With the aid of AuScope and AGOS investments:

- 25 broadband MT instruments and 40 low-frequency MT instruments.
- 80 electric field loggers

Access for Researchers

Access for instrumentation is through application to ANSIR for equipment. The user base in 2012-2013 was:

- Geological Survey of Western Australia
- DMITRE, South Australia
- The University of Adelaide
- The University of Western Australia

Project Facilitation

- Dr Stephan Thiel (University of Adelaide) and colleagues used AuScope and AGOS equipment for a monitoring experiment during hydrofracking at Habanero, operated by Geodynamics (November 2012).
- Dr Stephan Thiel (University of Adelaide) and colleagues undertook a survey using long-period MT instruments to map lithospheric structure of the Musgraves and Macdonnell Ranges (June 2013)
- Dr Mike Hatch and PhD student Kent Inverarity at the University of Adelaide used a number of instruments in their research on the groundwater flow at the Mound Springs, South Australia (October – November 2012)
- Professor Mike Dentith (University of Western Australia), in collaboration with the Geological Survey of Western Australia (GSWA), deployed AuScope MT instruments across the Albany-Fraser belt (December 2012 - January 2013);
- Mr Paul Soeffky (PhD student, University of Adelaide) is currently deploying broadband instruments along the Borefield Road, South Australia to map in more detail crustal fluid paths beneath the Stuart Shelf and in particular focusing on Olympic Dam (June – July 2013).

Current Status

Demand for instrumentation has been high, and applied to a variety of tectonic, geothermal, mineral and groundwater problems. Upcoming programs include:

- Mr Tom Hoskins (PhD student, University of Western Australia) will run a long-period MT survey to better define depth to basin across the Darling Fault and Perth Basin.
- The University of Tasmania and the Tasmanian Geological Survey have expressed interest in the broadband MT survey across western Tasmania.
- The University of Adelaide and DMITRE, SA will develop new lithospheric-scale surveys across the Flinders Ranges and Western Gawler Craton.
- Professor Mike Dentith (University of Western Australia), in collaboration with the Geological Survey of Western Australia (GSWA), has a proposal for a long-period MT survey across the SW Fraser Orogen.