

Geophysics in the Surveys



News

Update on geophysical survey progress from Geoscience Australia and the Geological Surveys of Western Australia, South Australia, Northern Territory, Queensland, New South Wales, Victoria and Tasmania (information current on 8 May 2017)

Further information on these surveys is available from Murray Richardson at GA via email at Murray.Richardson@ga.gov.au or telephone on (02) 6249 9229.

Table 1. Airborne magnetic and radiometric surveys

Survey name	Client	Project management	Contractor	Start flying	Line km	Spacing AGL Dir	Area (km ²)	End flying	Final data to GA	Locality diagram (Preview)	GADDS release
Murloocoppie	GSSA	GA	MAGSPEC Airborne Surveys	11 Feb 2017	109 560	200 m 60 m EW	19 540	TBA	Contract executed by GA 12 Jan 2017. The survey is 86% complete to 8 May 2017	183: Aug 2016 p. 34	TBA
Warrina	GSSA	GA	MAGSPEC Airborne Surveys	11 Feb 2017	135 628	200 m 60 m EW	24 140	TBA	Contract executed by GA 12 Jan 2017. The survey is 82% complete to 8 May 2017	183: Aug 2016 p. 34	TBA
Andamooka	GSSA	GA	Sander Geophysics	23 Feb 2017	81 396	200 m 60 m EW	14 560	TBA	Contract executed by GA 17 Jan 2017. The survey is 70% complete to 8 May 2017	183: Aug 2016 p. 34	TBA
Barton	GSSA	GA	Thomson Aviation	22 Jan 2017	111 758	200 m 60 m EW	20 560	TBA	Contract executed by GA 12 Jan 2017. The survey is 99% complete to 8 May 2017.	183: Aug 2016 p. 34	TBA
Fowler	GSSA	GA	Thomson Aviation	18 Feb 2017	95 009	200 m 60 m EW	17 360	TBA	Contract executed by GA 12 January 2017. The survey is 80% complete to 8 May 2017.	183: Aug 2016 p. 34	TBA
Torrens	GSSA	GA	Sander Geophysics	4 Mar 2017	79 990	200 m 60 m EW	14 800	TBA	Contract executed by GA 17 Jan 2017. The survey is 67% complete to 8 May 2017.	183: Aug 2016 p. 34	TBA
Coonabarabran	GSNSW	GA	UTS Geophysics	15 May 2017	50 827	250 m 60 m EW	11 000	TBA	TBA	184: Oct 2016 p. 23	The survey mobilised on 10 May 2017
Tasmanian Tiers	MRT	GA	TBA	TBA	Up to an estimated 66 000	200 m 60 m NS or EW	11 000	TBA	TBA	TBA	National Collaborative Framework Agreement between GA and MRT was expected to be executed in Apr 2017. The survey has been deferred to occur between Oct 2017 and Mar 2018
Isa Region	GSQ	GA	TBA	TBA	Estimated 120 000	100 m 50 m EW	11 000	TBA	TBA	Figure 1, this issue	The Quotation Request closed on 2 May 2017

TBA, to be advised.

Table 2. Gravity surveys

Survey name	Client	Project management	Contractor	Start survey	No. of stations	Station spacing (km)	Area (km ²)	End survey	Final data to GA	Locality diagram (Preview)	GADDs release
Stavelly	GSV	GA	Atlas Geophysics	3 Dec 2016	Approx. 3465	200 m station interval along 14 traverses	TBA	5 Jan 2017	23 Feb 2017	The proposed survey covers parts of the Horsham, Hamilton, Ballarat and Colac Standard 1:250 000 map sheets. The survey is to collect gravity stations spaced 200 m apart on 14 separate road traverses.	TBA
East Kimberley Airborne Gravity Survey	GSWA	GA	Sander Geophysics	8 Oct 2016	38 000 line km	2500 m line spacing	82 690	3 Dec 2016	14 Jan 2017	184: Oct 2016 p. 24	23 Feb 2017
Coompana – PACE area	GSSA	GA	Atlas Geophysics	30 Jan 2017	13 801	Regular grid of 2, 1 and 0.5 km	100 000	4 Mar 2017	24 Mar for preliminary final data	183: Aug 2016 p. 34	TBA
Tanami-Kimberley	GSWA	GA	TBA	TBA	Up to 50 000	2500 m line spacing	110 000	TBA	TBA	187: Apr 2017 p. 22	Contract being drafted by GA with the preferred supplier
Kidson Sub-basin	GSWA	GA	TBA	TBA	Up to 70 000	2500 m line spacing	155 000	TBA	TBA	TBA	The proposed survey area covers the Anketell, Joanna Spring, Dummer, Paterson Range, Sahara, Percival, Helena, Rudall, Tabletop, Ural, Wilson, Runton, Morris and Ryan standard 1:250 k map sheet areas
South Nicholson	GA	GA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	The proposed survey area covers parts of the Mount Drummond, Ranken and Avon Downs Standard 1:250 k map sheet areas	GA and NTGS are in discussion to refine the survey extents

TBA, to be advised.

Table 3. AEM surveys

Survey name	Client	Project management	Contractor	Start flying	Line km	Spacing AGL Dir	Area (km ²)	End flying	Final data to GA	Locality diagram (Preview)	GADDs release
Musgraves – PACE Area	GSSA	GA	CGG Aviation	18 Aug 2016	8489	2 km; E-W lines	16 371	The survey completed flying on 17 Sep 2016	Expected on 24 Nov 2016	179: Dec 2015 p. 23	Released on the GA website on 19 Apr 2017
Musgraves – CSIRO Area	GSSA	GA	SkyTEM Australia	15 Sep 2016	7182	2 km; E-W lines	14 320	The survey completed flying on 13 Oct 2016	Expected early Dec 2016	179: Dec 2015 p. 23	Preliminary final data were supplied to GA in Jan 2017
Isa Region	GSQ	GA	Geotech Airborne	8 Aug 2016	15 692	2 km; E-W	33 200	The survey completed flying on 4 Nov 2016	TBA	182: Jun 2016 p. 23	Preliminary final data were supplied to GA on 12 Jan 2017
AusAEM (Year 1)	GA	GA	TBA	TBA	<50 000	20 km with areas of infill	TBA	TBA	TBA	186: Feb 2017 p. 18	The Quotation Request closed on 15 May 2017
Ord-Keep River	GA	GA	TBA	Apr 2017	6146	Variable	TBA	TBA	TBA	TBA	The contract was executed by GA on 25 Nov. The survey mobilised on 15 May 2017
Surat-Galilee Basins QLD	GA	GA	TBA	TBA	4477	Variable	TBA	TBA	TBA	Figures 2-4, this issue	The Quotation Request was released on 11 May 2017 and closed on 24 May 2017
Stuart Corridor, NT	GA	GA	TBA	TBA	8626	Variable	TBA	TBA	TBA	Figure 5-8, this issue	The Quotation Request was released on 11 May 2017 and closed on 24 May 2017

TBA, to be advised.

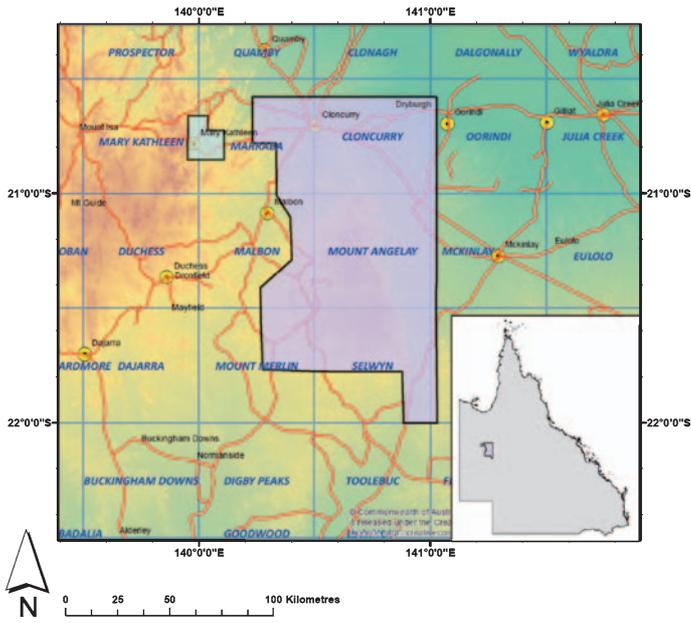


Figure 1. Location of the Isa Region airborne magnetic and radiometric survey.

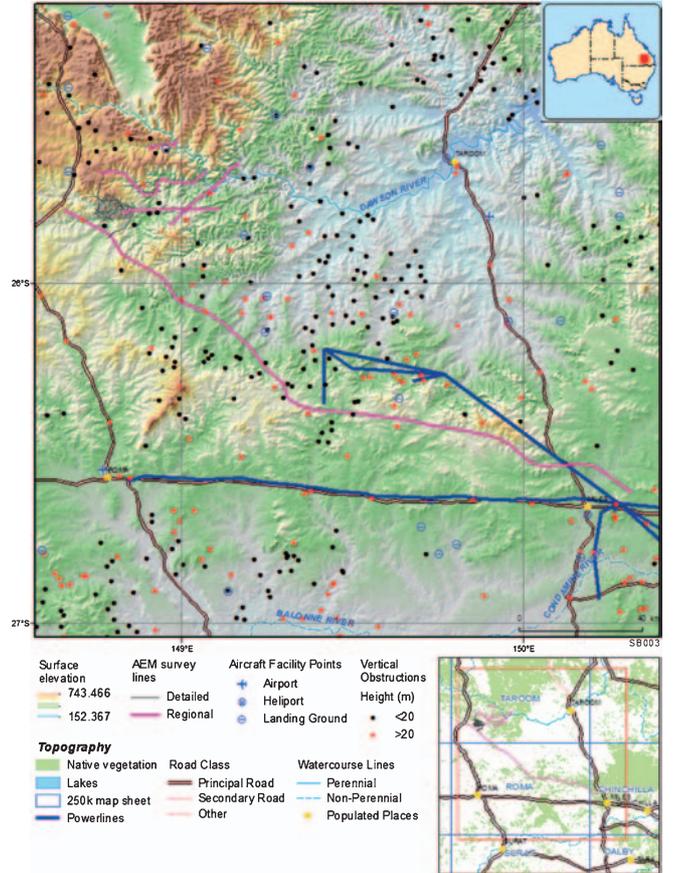


Figure 3. Location of the Surat-Galilee Basins AEM survey Area 2/3.

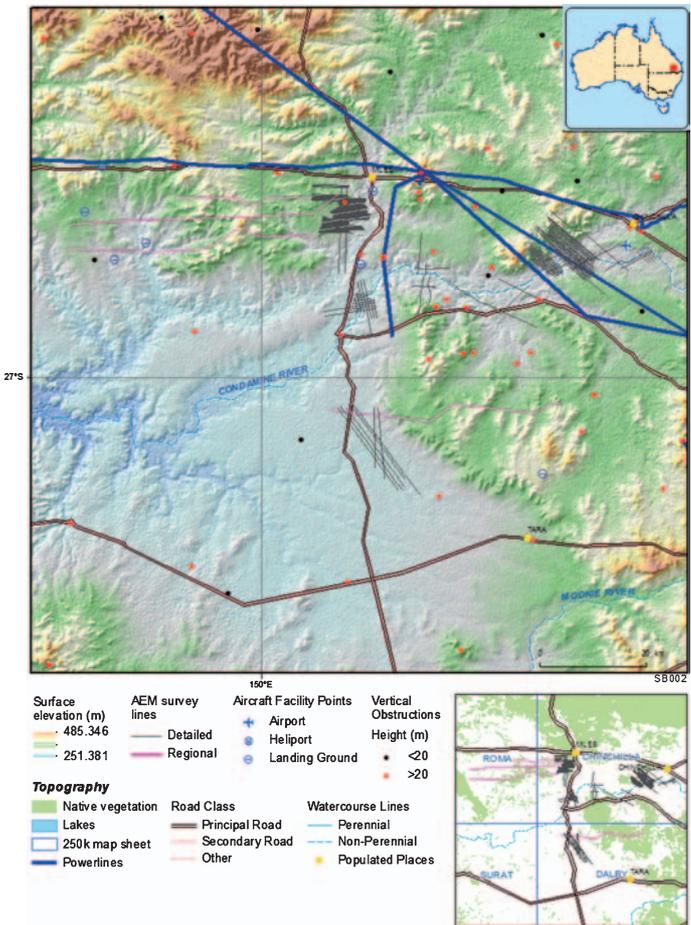


Figure 2. Location of the Surat-Galilee Basins AEM survey Area 1/3.

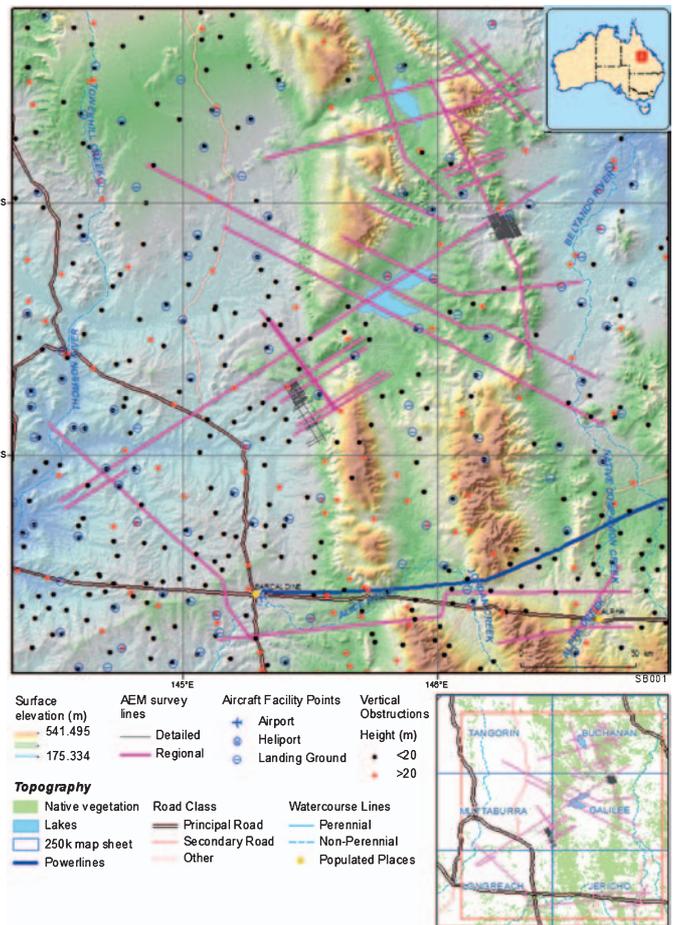


Figure 4. Location of the Surat-Galilee Basins AEM survey Area 3/3.

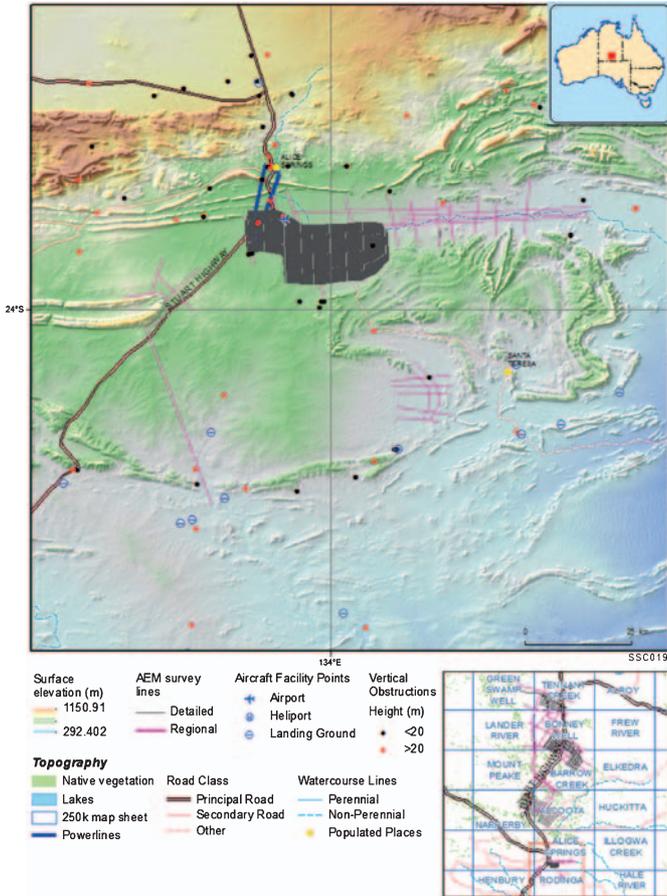


Figure 5. Location of the Stuart Corridor AEM survey Area 1/4.

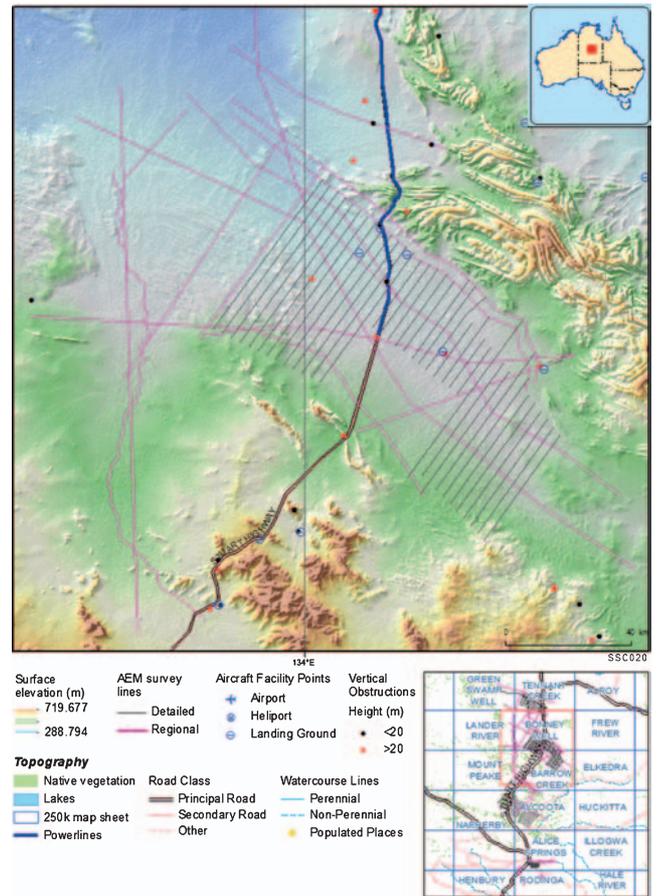


Figure 7. Location of the Stuart Corridor AEM survey Area 3/4.

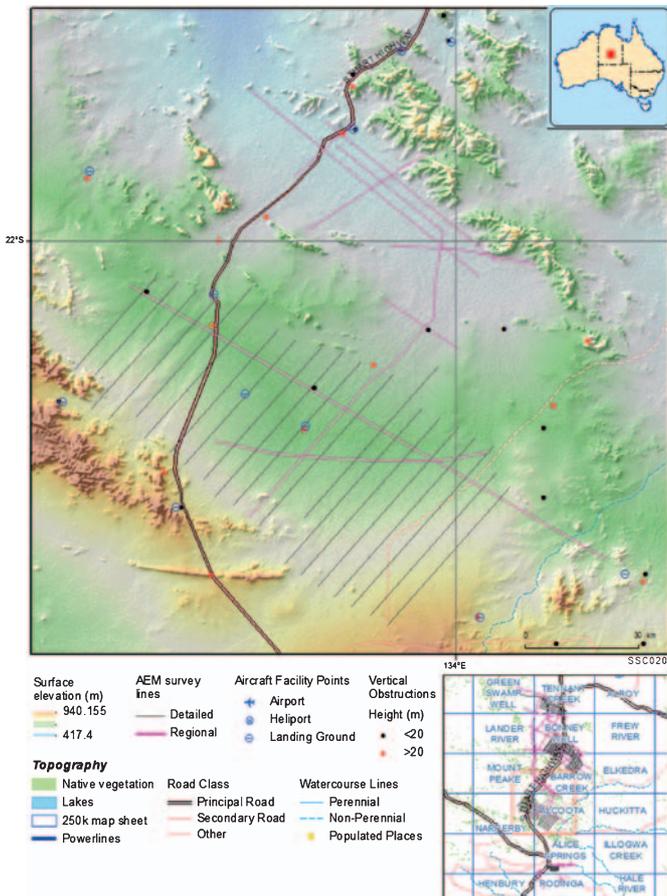


Figure 6. Location of the Stuart Corridor AEM survey Area 2/4.

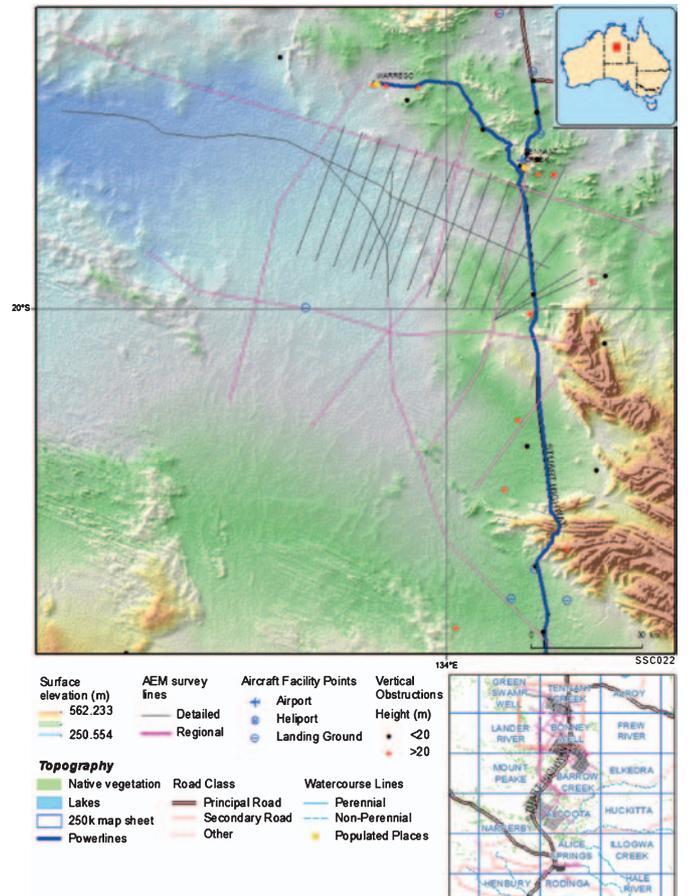


Figure 8. Location of the Stuart Corridor AEM survey Area 4/4.



Geological Survey of South Australia: the PACE Copper Coompana gravity survey

The Coompana gravity survey, part of the Far West Discovery Program of the PACE Copper Initiative, was acquired by Atlas Geophysics between 23 January 2017 and 4 March 2017. The survey is comprised of 15 498 gravity readings (13 792 individual stations) acquired on regular grid patterns at 500 m, 1 km, and 2 km scales (Figure 1). The survey extends from the Western Australian border to well into the Gawler Craton. The survey was conducted using two R44 helicopters. Three Scintrex CG5 gravity meters were used, as well as the Leica Geosystems GPS1200 system for post-processed kinematic (PPK) centimetre level positional accuracy.

The Coompana gravity survey provides an exciting new insight into the buried basement geology of the Coompana Province. As 300–500 m of sedimentary

cover blankets the Precambrian geology, this detailed gravity survey is key in understanding the hidden structure and compositional variations of the region. Whilst major density highs and lows appear to be due to differing compositions within the basement, vertical gradient images reveal possible palaeochannels or drainage features thought to be associated with the cover-basement unconformity. A low density response from the enigmatic Coompana Anomaly (previously defined by magnetics, e.g. Wise et al., 2015) compared with high amplitude density responses associated with similarly magnetized satellite bodies add to the intrigue of this frontier region.

The data have not yet been incorporated into the statewide gravity image, however the survey is available to download via

SARIG. Simply navigate to SARIG, and click on the ‘Spatial Search’ option. Select ‘Geophysical data’ from the dropdown menu and ‘Draw Area’ before drawing a box around the Coompana area. Then click on ‘Advanced search’ and follow the prompts to download the gravity ASCII data (or grid). The survey has been designated as 2017A1 in the SA Geodata database.

Reference

Wise, T.M., Pawley, M.J., and Dutch, R.A., 2015, Preliminary interpretation from the Coompana aeromagnetic survey: *MESA Journal*, **79**, 22–30.

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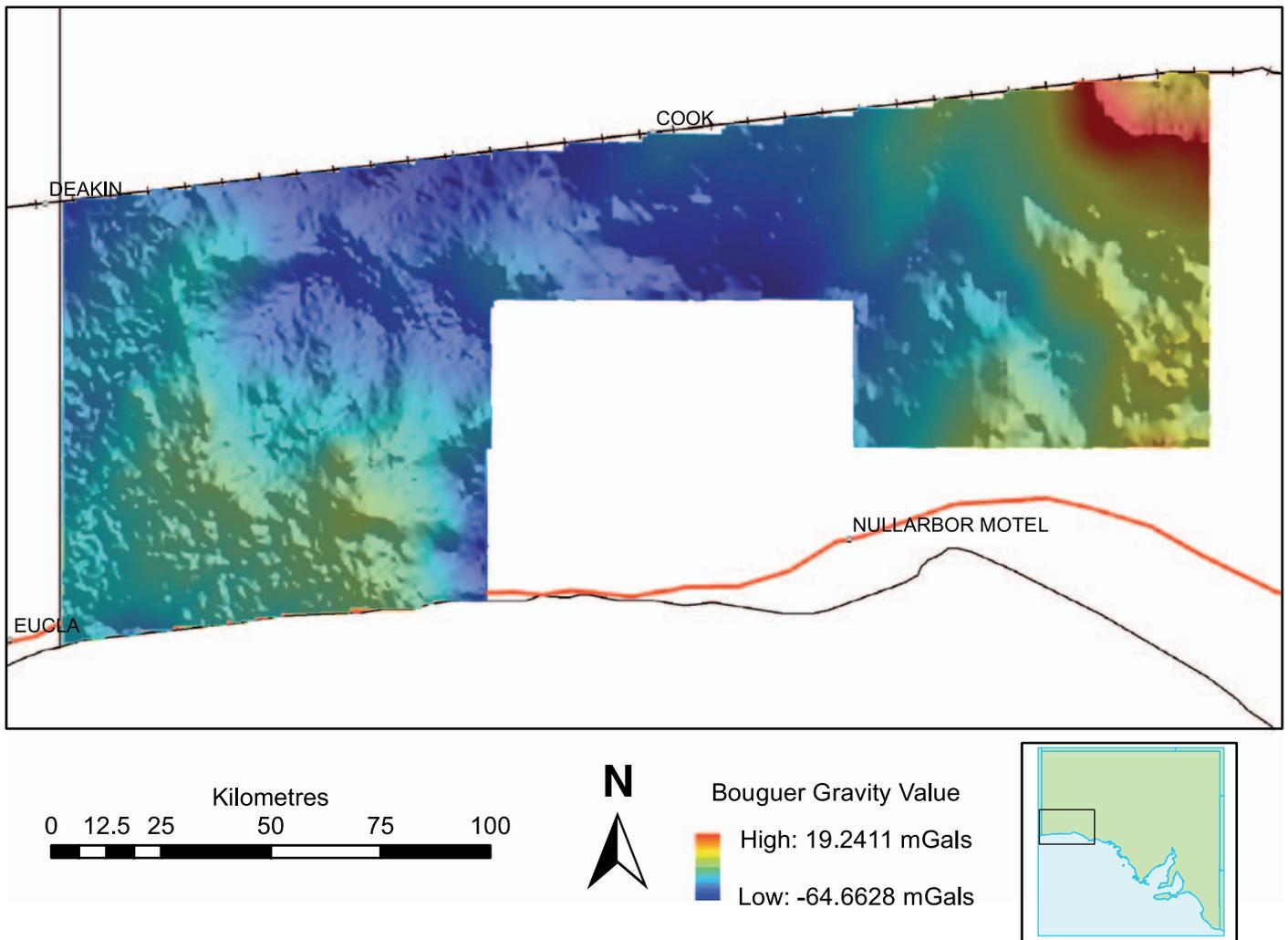


Figure 1. The PACE Copper Coompana gravity survey.

Geological Survey of Queensland: new geophysical data sets available for North-West Queensland

With the final year of the Future Resources Program nearing completion new pre-competitive geophysical datasets collected under the Mount Isa Geophysics Initiative have been recently released (Figure 1).

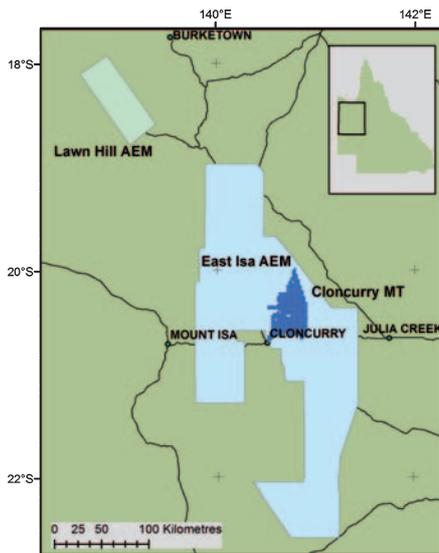


Figure 1. Location of newly released GSQ datasets.

Data for the East Isa regional airborne electromagnetic (AEM) survey was released in April 2017. The VTEM Plus survey covers a large region of

outcropping and shallowly buried prospective Mount Isa Eastern Succession geology. A total of approximately 15 700 line kilometres was collected at a variable line spacing of between 2 and 2.5 km. The Lawn Hill AEM survey was released in May. This survey followed on from the East Isa AEM survey and totalled 1681 line km of 2 km spaced VTEM Plus data.

Data from these surveys will provide explorers in the region with new information on both the distribution and thickness of cover sequences that obscure the basement geology and the Proterozoic basement geology and structure. The data may aid with the definition of new areas of resource prospectivity in the highly endowed Mount Isa region.

The digital data for both AEM surveys is available online from QDEX Data and includes electromagnetic and magnetic databases, conductivity imaging products and multi-plots (Figure 2), as well as the gridded geophysical products, the contractor-supplied logistics report and ancillary data (VTEM waveform etc.).

Data has also recently been published from the Cloncurry Magnetotelluric Survey, which was conducted over the prospective geology to the north of Cloncurry, surrounding Ernest Henry. The

survey of approximately 500 stations with a gridded station spacing of 2 km was designed to improve the understanding of the nature of the basement structure, the interaction between the intrusive and extrusive units, and to assess the nature of the Gidyea Suture Zone imaged on the 2007 IG1 seismic line. 3D inversion and modelling is ongoing for this dataset with products expected to be released late 2017.

The final product of the Mount Isa Geophysics Initiative will be a high resolution 100 m airborne magnetic and radiometric survey in the Cloncurry area. This tender process for this survey is currently being finalised and flying will commence soon.

The geophysics team at GSQ is continuing to add more open-file data to the growing QDEX Data system. This system houses large geoscientific datasets including airborne geophysical data, hyperspectral data, seismic data, wireline log data and geochemistry. New data will be published online at <http://qdexdata.dnrm.qld.gov.au/> as soon as it becomes available.

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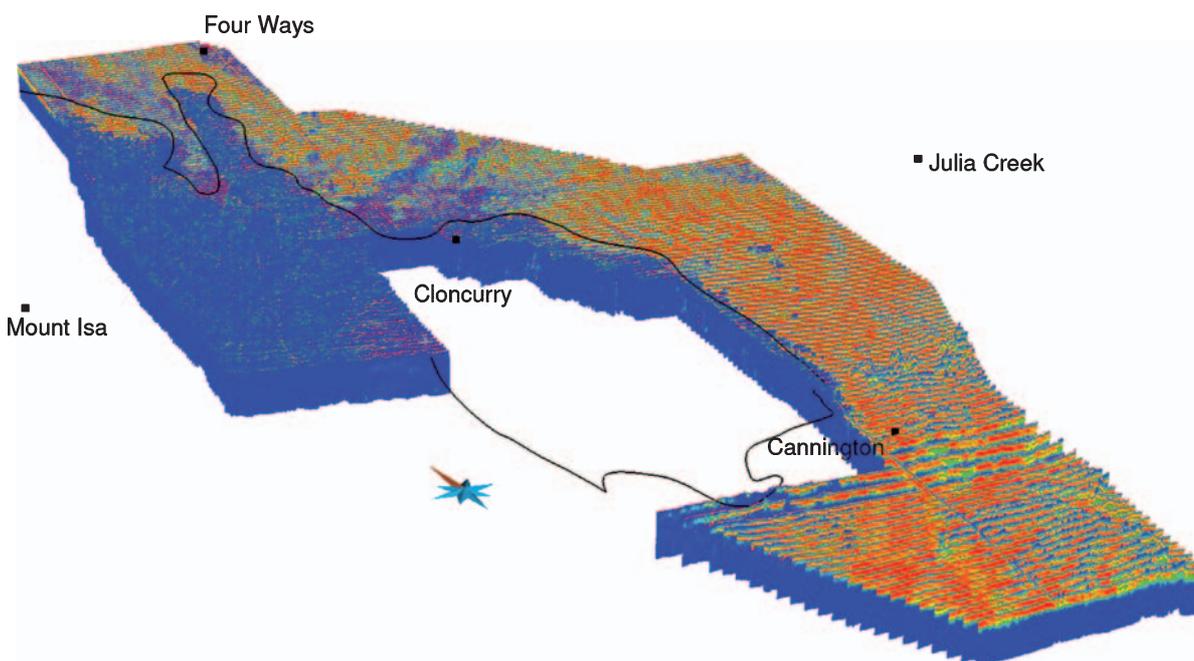


Figure 2. 3D view of East Isa AEM CDI sections viewed from SW perspective.



Geological Survey of Victoria: Victorian Gas Program and ground gravity data for the Stavely Project

Victorian Gas Program

The Victorian Government has allocated \$42.5 million over four years in the State Budget 2017/18 to deliver the Victorian Gas Program.

The Victorian Gas Program will run from 2017 to mid-2020. It will deliver a comprehensive program of geoscience and environmental studies and related activities, including resource planning and regulatory improvements for onshore conventional gas, offshore gas and underground gas storage.

The program will look closely at Victoria's gas prospectivity and the issues associated with gas exploration and development to inform future decisions by the Victorian Government.

The program has three major components:

- Onshore conventional gas – geoscience and environmental studies. This program will deliver extensive scientific, technical and environmental information on the risks, benefits and impacts of onshore conventional gas as outlined in *Preview* 187. The work will initially focus on the area considered by the Geological Survey of Victoria to be most prospective for conventional gas in the Otway geological basin, between Port Campbell and Warrnambool.
- Offshore gas geoscience program. The offshore gas geoscience program will support the commercial exploration for further offshore gas discoveries in Victorian waters. This work will acquire new geoscientific information to identify areas off the Victorian coast, specifically the Otway coast, that are likely to be prospective for offshore gas. The offshore gas geoscience program will improve the understanding of gas prospectivity under Victorian waters at a sub-basin scale through geophysical surveys (e.g. airborne gravity gradiometry surveying).
- Underground gas storage investigations. This program will focus on the onshore Otway geological basin and investigate the potential for further underground gas storage sites. The program incorporates analysis and modelling of geoscientific information to assess the potential of known subsurface geological structures for underground gas storage, including rock



Figure 1. Location of the Stavely Project ground gravity traverses.

characterisation studies (e.g. porosity, permeability). The program will also assess the economic potential of these geological formations.

All study results will be made publicly available. For more information on the Victorian Gas Program visit <http://earthresources.vic.gov.au/earth-resources/victorias-earth-resources/petroleum/victorian-gas-program> or contact Paul McDonald, Director, Geological Survey of Victoria at vgp@ecodev.vic.gov.au

Stavely Project – ground gravity traverses

The Stavely Project is a collaborative geoscience research project between Geoscience Australia and the Victorian Department of Economic Development, Jobs, Transport and Resources (DEDJTR, represented by the Geological Survey of Victoria). The aim of the Stavely Project is to improve the understanding of the regional geological architecture and mineral prospectivity of western Victoria, in particular the Cambrian-aged Stavely Arc.

A total of 3562 new ground gravity measurements were acquired by Atlas

Geophysics at a station spacing of 200 m along 19 traverses in western Victoria in December 2016 (Figure 1). This acquisition program represents the Stavely Project - ground gravity traverses 2016 survey. Data were acquired along 724 km of road reserves across the Stavely Project area. The new gravity data will be used by the Geological Survey of Victoria to improve the geological understanding in key areas of the region and refine a digital three dimensional (3D) geological model for the Stavely Project area.

A report describing the survey, including appended digital gravity data, survey summary and operations report, is available from DEDJTR's Earth Resources website (<http://earthresources.vic.gov.au/earth-resources>). The digital data are also available for download from Geoscience Australia's Geophysical Archive Data Delivery System (GADDS; www.ga.gov.au/gadds).

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