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Fieldnotes

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Department of Mines, Industry Regulation and Safety

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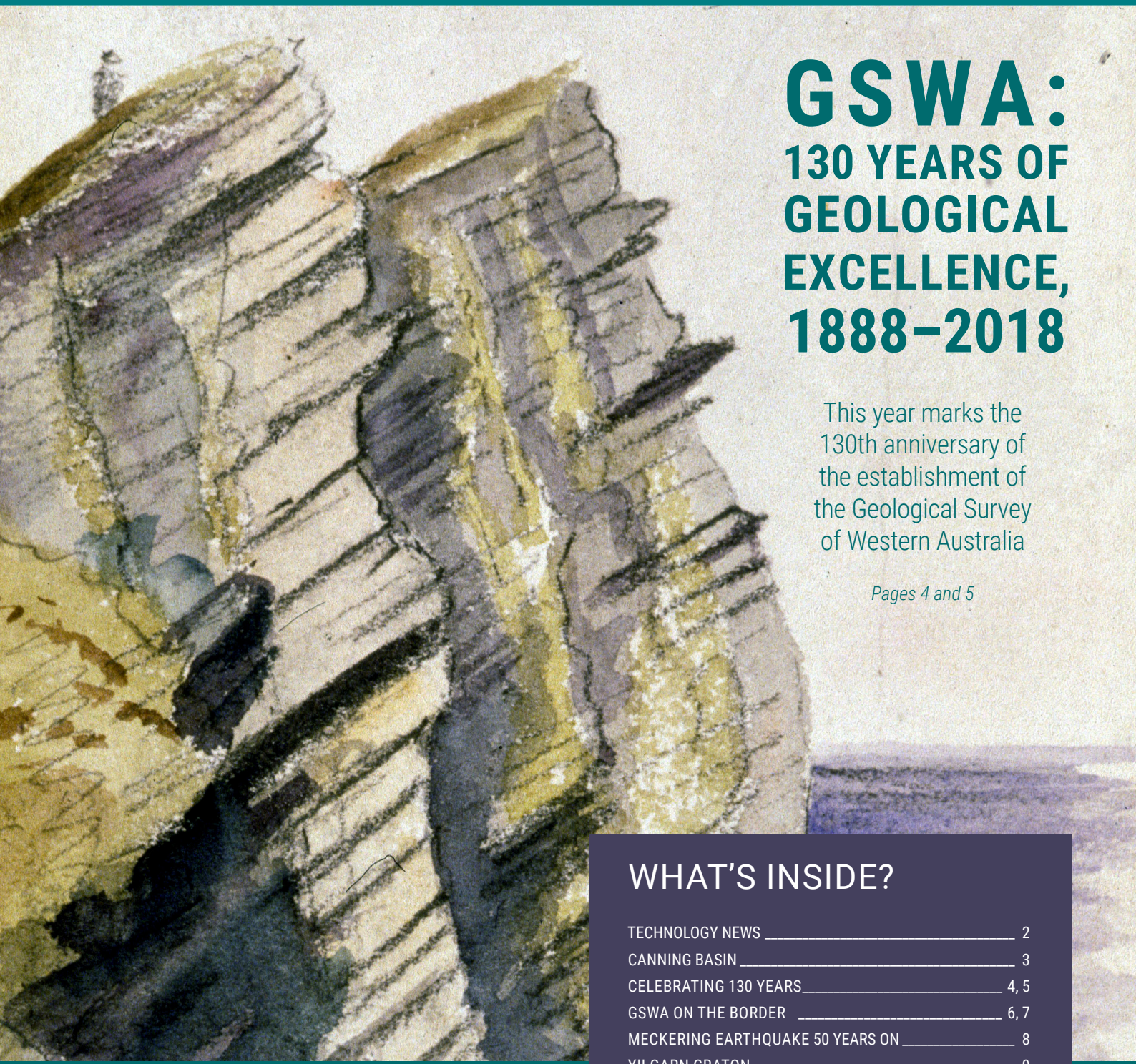
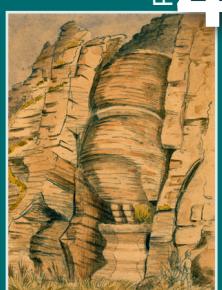


GSWA: 130 YEARS OF GEOLOGICAL EXCELLENCE, 1888–2018

This year marks the 130th anniversary of the establishment of the Geological Survey of Western Australia

Pages 4 and 5



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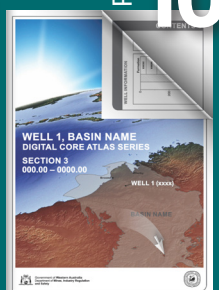

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WHAT'S INSIDE?

Geological Survey of Western Australia

TENGRAPH Web features explained

TENGRAPH Web was released in 2017 and has over 200 daily users. During peak times, between 50 and 70 users are logged on to the system. Its success can be credited to the benefits it has brought to the Department of Mines, Industry Regulation and Safety (DMIRS), and anyone with land and mining interests in Western Australia.

The system clearly shows the location and status of mining and petroleum tenements. With minimum clicks, the display is changed into a land, mineral deposit, native title or petroleum title themed map. Additionally, the map display is enhanced by overlaying Landgate aerial imagery, topography or geology map mosaics.

The new mining tenement quick appraisal report provides users with more options and additional information presented in an easier-to-read format. With the Cadastre for the entire State refreshed by Landgate every three months, including townsite data, the information is more current than the old system. Running a quick appraisal report is an essential tool for accurately identifying land users affecting an area of interest.

TENGRAPH Web users like the ability to use the mouse for changing the map scale and panning seamlessly around Western Australia. The right mouse button selection **'What's Here'** is also popular. The most frequently used TENGRAPH tools and searches are conveniently located in the **'I want to...'** and the **'Results'** menus (Figs 1, 2).

Mining tenement managers are finding the new TENGRAPH a powerful tool for analysing mining tenement information and the various land types affecting them. They like the flexibility that allows them to control the type of information displayed on their map.

TENGRAPH Web is a valuable GIS system that assists DMIRS with:

- planning and identifying affected stakeholders for the proposed Eastern Goldfields seismic survey
- assessing proposed ground disturbances within mining tenements and exporting objects into Google Earth
- Section 16(3) Mining Act clearances for Crown Land proposals
- determining mining tenement applications
- importing shapefiles
- creating maps.

DMIRS is mindful that many longtime users might find it hard to move away from the familiar older TENGRAPH system, but those who have changed find the new system has accelerated their processes, and they no longer need to revert to the old TENGRAPH.

To assist with transitioning to the new TENGRAPH Web system, regular training courses are scheduled (www.dmp.wa.gov.au/training). Demonstration videos, and Help documents are available from the website (www.dmp.wa.gov.au/tgghelp) and the system has plenty of intuitive tips embedded.

Work has started on the upgrade of the system's software, infrastructure and databases, which will allow faster access to TENGRAPH Web on a variety of devices and internet browsers.

For more information, contact Richard Morris (richard.morris@dmirs.wa.gov.au).

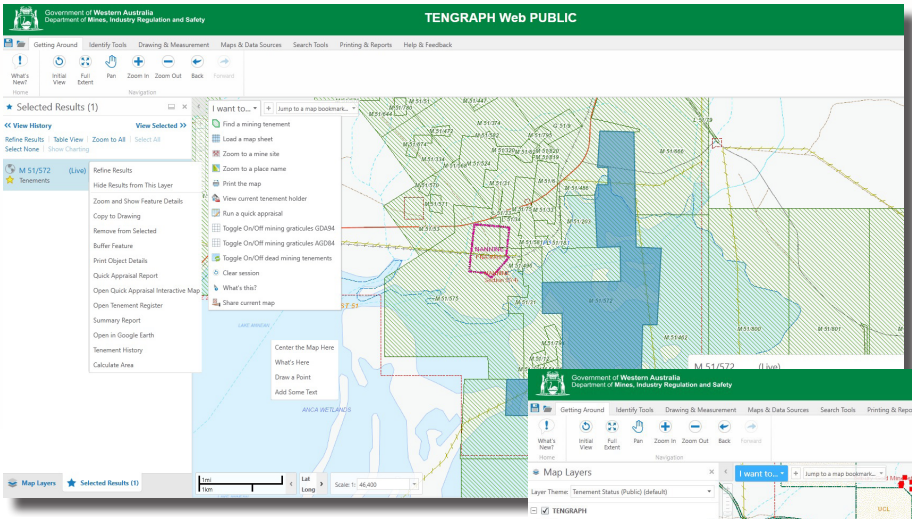


Figure 1. Tenement Status Screen showing the 'I want to...', Results and Context menus

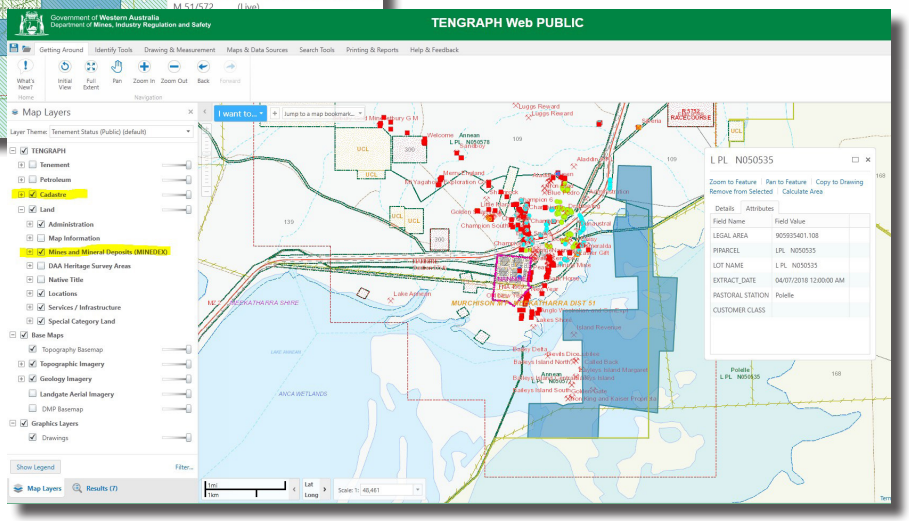


Figure 2. The same locality with the Cadastre, Mineral Deposit and Minesite display turned on

Kidson Sub-basin deep crustal seismic survey

EXPLORATION INCENTIVE SCHEME

The Kidson Sub-basin deep crustal seismic survey is Australia's longest single continuously recorded onshore seismic line with a total length of 872 km. The operations were conducted along the road that links the Kiwirrkurra community in the east to Marble Bar in the west, as shown in Figure 1. The survey was a joint initiative by the Department of Mines, Industry Regulation and Safety's (DMIRS) Geological Survey of Western Australia (GSWA) and Geoscience Australia (GA) to identify the deep geological structures of the region and boost investment in resource exploration in Western Australia. The $4.75 million survey was co-funded by the Commonwealth Government's Exploring for the Future program and the Western Australian Exploration Incentive Scheme (EIS).

Prior to the survey, this vast area was poorly covered by seismic data, compared to other parts of the Canning Basin, and is one of the least geologically understood in onshore Australia. Therefore, the main objectives of the survey are to:

- establish the subsurface geology of the Kidson Sub-basin and other components of the southern Canning Basin, including the extent and nature of sub-basin boundaries and troughs
- identify regional faults, folds and other structural elements
- image the structure of the basement below and adjacent to the southern Canning Basin, including the extent of major tectonic units such as the Centralian Superbasin, the west Arunta Orogen, the Paterson Orogen and the Pilbara Craton, and the nature of their boundaries.

DMIRS was closely involved in the management of cultural heritage, land access and stakeholder engagement, which was a crucial part of the survey, particularly with the remote Kiwirrkurra, Kunawarritji and Punmu Aboriginal communities. Other relevant entities include registered native title body corporates, registered native title claimants, native title representative bodies, pastoral leasees, Local and State Governments and registered holders of mining and petroleum pipeline tenure interests.

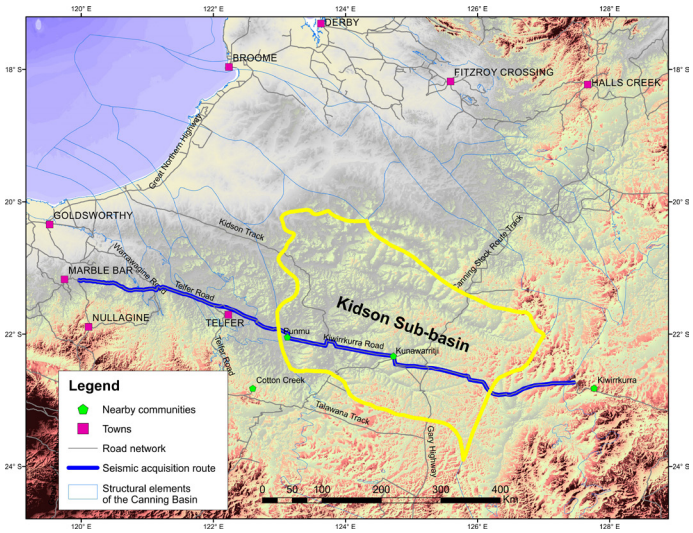


Figure 1. Location of the Kidson Sub-basin seismic survey (bold blue line). Extent of Kidson Sub-basin shown by yellow line

GA, which has been acquiring seismic data (in its own right and through subcontractors) for over 50 years, managed the survey's operational activities. Other responsibilities undertaken by GA include the project tendering process, data quality assurance and control. The survey included three vibrator (vibroseis) trucks and accompanying backup vehicles with a crew of about 40 personnel in the field (Fig. 2). It took 52 days to complete.

The raw data acquired by the survey will be processed, and GA plans to release the results at the Australian Petroleum Production and Exploration Association's (APPEA) annual Oil and Gas conference in Brisbane in May 2019.

For more information, contact Alex Zhan (alex.zhan@dmirs.wa.gov.au).

Figure 2. The fleet of vibroseis trucks conducting the Kidson Sub-basin seismic survey with the GSWA team in the foreground visiting the survey operations

GSWA: 130 years of geological excellence, 1888–2018

This year marks the 130th anniversary of the establishment of the Geological Survey of Western Australia (GSWA). This endeavour was initially resisted by members of the Legislative Council, who '…denied scientific men had contributed in any way to the important mineral discoveries which had made the fortunes of the other colonies' and wondered '…what good had any geologist ever done to Western Australia?' But the role played by the geological observations and maps of ET Hardman in the Kimberley gold discoveries and subsequent rush eventually led the Council to approve the establishment of a new, permanent Geological Department with a subsidy of £1000.

The permanent* position of Government Geologist was taken up in January 1888 by HP Woodward. Since then, there have been 12 Government Geologists (inset box opposite), and the position's formal name was changed to Director of the Geological Survey during Joe Lord's tenure.

Over the years, the men invested with this responsibility have ensured that GSWA remains faithful to the 'dual objectives of practical, field-based research and the provision of solid, unbiased geoscientific advice to government, industry and the public' (Phil Playford, GSWA Memoir 3). Whether with camels and horses or a fleet of modern-day 4WD vehicles, fieldwork has been a staple of GSWA since its very beginning. Mapping of the State has evolved from regional expeditions looking for 'riches' in the early days of the Colony to systematic mapping at 1:250 000 (completed in 1979) or 1:100 000 scale. The focus is now shifting from rectilinear map sheets to mapping of tectonic units or to address specific geological questions.

*Three Government Geologists — Ferdinand von Sommer, HY Lyell Brown, and ET Hardman — had served from 1847 to 1886

Starting in the 1990s, digital technology has greatly impacted the way GSWA compiles and produces maps and manuscripts, as well as how it delivers data and information. A far cry from the days of theodolites, plane-tables and glass-plate negatives, modern fieldwork makes use of tablet PCs that allow the immediate capture of field observations in a GIS environment, where the data can be assessed against remote sensing imagery. Drones are now used to map otherwise inaccessible outcrops or those containing geological objects too large for the geologist to map in the field but not large enough to be resolved in aerial and satellite imagery or geophysical datasets. This imagery provides the 'bigger picture' while keeping the very fine detail.

Accelerating technological advances have not only changed the way we work, but have greatly enhanced the contribution of GSWA geologists to unravelling the geological framework of the State, particularly in the last half century. The introduction of modern aerial photography and aeromagnetic images in the 1970s and 1980s, the routine use of geochronology and geochemistry from the 1990s, the acquisition of seismic profiles and passive seismic data as well as the introduction of isotope geochemistry in the last 20 years are culminating in the development of 3D and 4D geomodels that provide an integrated view of the tectonic evolution of Western Australia.

Datasets acquired by GSWA (often in collaboration with other national and state institutions) have grown in quantity and size over time, as have the number and volume of legislation-mandated exploration reports from the minerals and petroleum industry. To be true to its mission of being the lead agency for the provision of geological information in the State, in the late 1990s GSWA embarked on a two-fold program: legacy data capture

via a scanning and digitizing program, and the development of novel ways to distribute information via digital platforms. As a result, customers can now access well over 6000 publications via the eBookshop and download large digital datasets from the Data and Software Centre. GeoVIEW.WA was developed as an online GIS-based mapping tool that allows simultaneous viewing and querying of multiple datasets; a freely available standalone equivalent, GeoMap.WA, and the WA Geology mapping app offer the same functionality. The quality of GSWA's databases and systems has been consistently recognized with high ranking in the international Fraser Institute Annual Survey of Mining Companies.

GSWA's delivery of data and information does not stop at the digital doorstep. The core libraries built in Kalgoorlie and Perth house about 1400 km of drillcore, a physical asset designed to assist exploration activity in the State. Access to physical drillcore is complemented by the acquisition of HyLogger spectral scans delivered via GeoVIEW.WA and the National Virtual Core Library. Digital core atlases are a new and innovative product that offers an interactive display of multiple datasets overlain and linked to images of individual core trays. Additional drillcore is regularly acquired through the Exploration Incentive Scheme (EIS), a State Government initiative managed by GSWA. Started in April 2009, the EIS programs of drilling promotion, geophysical data acquisition and 3D prospectivity mapping are designed to add vitality to the State's mineral and petroleum exploration industry.

The life of GSWA has not been without challenges. Structural changes (e.g. the loss of the Hydrogeology section in 1996), the migration of geologists to better paid jobs in times of industry boom in the nickel and mining boom of the 1970s and 2000s, and funding insecurity have all been weathered through the dedication and commitment of GSWA's directors and staff, as well as the love of GSWA's geologists for the rocks in their immense backyard, and their loyalty to a beloved organization.

At the helm

Harry Page Woodward	1888–1895
Andrew Gibb Maitland	1896–1926
Torrington Blatchford	1926–1934
Frank G Forman	1934–1945
HA 'Matt' Ellis	1945–1961
JH 'Joe' Lord	1961–1980
Alec Trendall	1980–1986
Phil E Playford	1986–1992
Pietro Guj	1992–1997
David F Blight	1997–2000
Tim J Griffin	2000–2010
Rick Rogerson	2010–2018
Jeff H Haworth	2018–present

All paintings (including front page) are by Government Geologist ET Hardman and are based on sketches from his 1883–84 Kimberley expedition fieldbooks

From the Musgrave to the Tanami

EXPLORATION INCENTIVE SCHEME

For more than a decade, the Geological Survey of Western Australia (GSWA) has been improving understanding of the Proterozoic geology and the mineral and petroleum exploration potential of the underexplored, greenfields region in the remote desert country lying to the south of the Kimberley, along the border with the Northern Territory (NT) (Fig. 1). This has been largely funded by the Exploration Incentive Scheme (EIS), an initiative of the Western Australian (WA) Government. It has involved new geological mapping and the publication of first edition 1:100 000 geological series maps covering much of the Granites–Tanami Orogen, and second edition 1:250 000 geological series maps covering the west Arunta Orogen, and parts of the Murraba and Amadeus Basins. It has seen the compilation of new digital geology and regolith–landform layers, together with the acquisition of airborne magnetics and radiometrics, ground and airborne gravity data (in collaboration with Geoscience Australia), geochronology and isotope studies, and whole-rock and soil geochemistry.

Figure 1. Location map

GSWA acknowledges Central Desert Native Title Services Limited, the Ngaanyatjarra Council and the local traditional owners in the Ngururrpa area, and at the Kiwirrkurra Community for their help and support, and for allowing access to their lands for the purpose of scientific research.

Tanami–Arunta GIS digital package

The 2018 update of the Tanami–Arunta Geological Information Series digital package has been released. New geoscience data and products in this update include an updated Bouguer gravity image with new data for the Tanami 2017 survey (Fig. 2), the second edition of the MACDONALD 1:250 000 geological series map (Fig. 3), together with GSWA Record 2018/3 and the accompanying hard copy and digital 1:250 000 regolith–landform map of the Ngururrpa soil survey area (Fig. 4). There are also extracts from recently compiled and released diamond exploration data files (see GSWA Report 179), and from FrogTech Geoscience's 2017 Canning Basin SEEBASE study, published by GSWA.

Regolith chemistry of the Ngururrpa area

The Ngururrpa area, which includes parts of the Proterozoic Granites–Tanami and west Arunta Orogens, the Murraba Basin, and the Paleozoic to Mesozoic Canning Basin, is largely covered by sandplain with less than 14% outcrop, which is dominated by quartz-rich siliciclastic sedimentary rocks.

The silt and clay fraction of 637 regolith samples has been analysed for 63 elements. Bedrock control on regolith chemistry

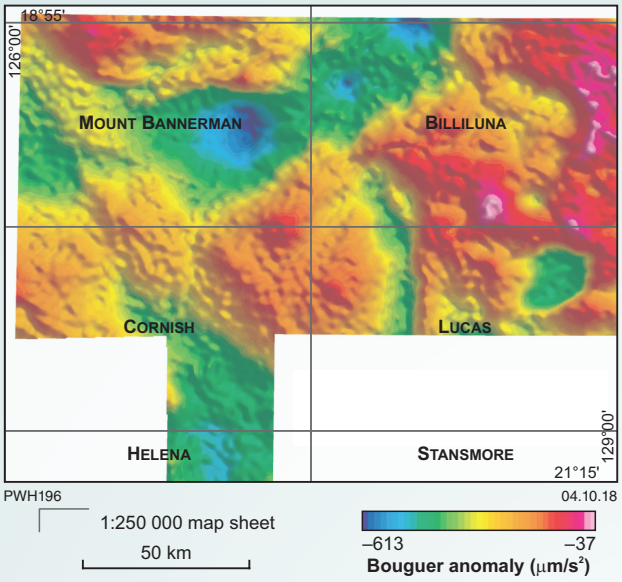


Figure 2. Tanami Bouguer gravity survey

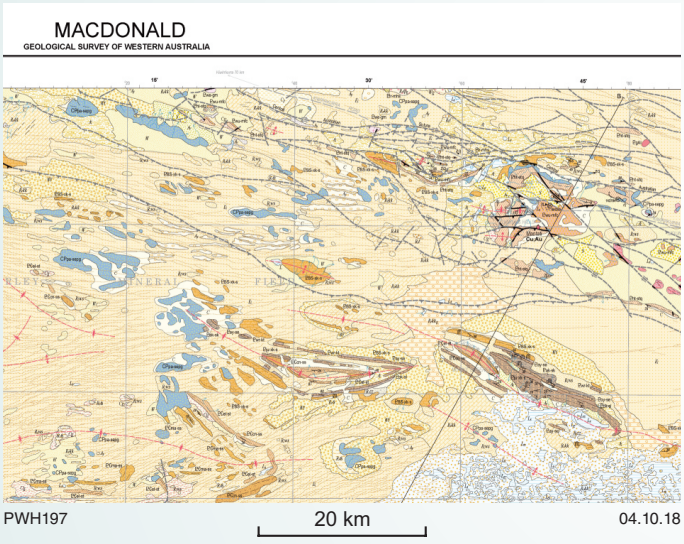


Figure 3. Portion of the second edition MACDONALD geological map

is limited to a few units in the Canning Basin. The most marked contrast in chemistry is shown by regolith from lacustrine areas, sandplain, and ferruginized sheetwash. Higher concentrations of Au in the fine fraction (reaching a maximum of 63 ppb) are located on or near the Granites–Tanami Orogen in the north of the project area. Regolith fine-fraction and spinifex chemistry have been assessed to determine if two regional-scale faults acted as fluid conduits. One fault is shown to be a fluid conduit to possible buried sediment-hosted exhalative (SEDEX)-style mineralization. This is consistent with the higher Zn content of regolith in an area of bedrock explored adjacent to the Ngururrpa area for exhalative-style base metal mineralization.

New MACDONALD 1:250 000 scale geological map

The second edition of MACDONALD was released in June 2018. The majority of MACDONALD bedrock is Amadeus Basin, or Amadeus Basin onlapped by thin Permian Paterson Formation marking the eastern edge of the Canning Basin. Basement to the Amadeus Basin, comprising the Paleoproterozoic

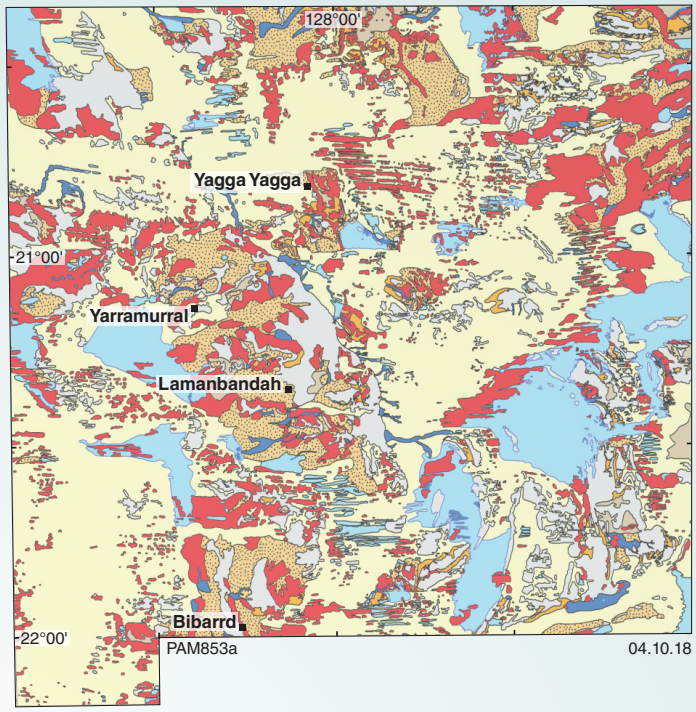


Figure 4. Simplified regolith–landform map of the Ngururrpa area

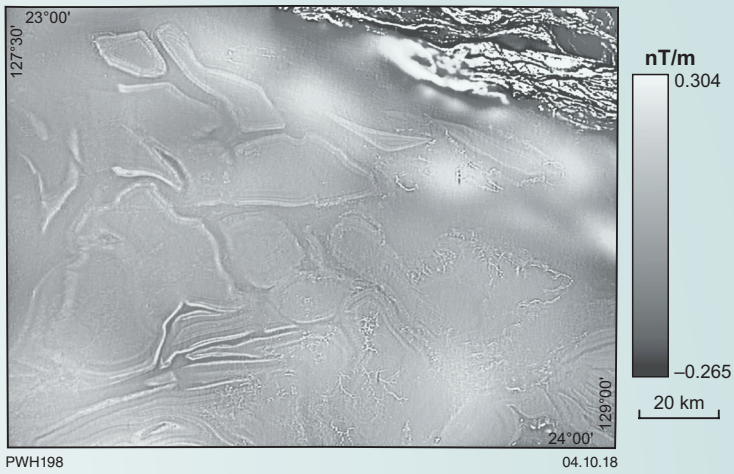


Figure 5. First vertical derivative aeromagnetic image of MACDONALD

metasedimentary rocks, volcanic rocks, granitic rocks, and high-grade metamorphic rocks of the Aileron and Warumpi Provinces of the Arunta Orogen are patchily exposed in the northeast corner of the map sheet area. Cenozoic cover, most extensively as dune fields and saline playa systems like Lake Macdonald, are widespread across the area.

Good-quality aeromagnetic, radiometric and gravity data assisted mapping in inaccessible parts of the map sheet, and the delineation of structural trends under cover. The magnetic susceptibility of certain horizons within the Amadeus Basin succession allow the clear expression of fold patterns on first vertical derivative aeromagnetic images (Fig. 5). The irregular fold patterns are likely due to salt tectonics (a widespread salt horizon is present near the base of the succession) initiated by loading during deposition, and exacerbated during the Petermann and Alice Springs Orogenies.

Amadeus Basin

The Amadeus Basin, a component of the former Centralian Superbasin, is a thick sedimentary succession of Neoproterozoic to Paleozoic rocks deposited in various shallow marine, evaporitic, fluvial and glacial settings. While most of the basin is within the NT, about a quarter extends west into WA where the main body lies between the older Musgrave Province to the south and the Arunta Orogen to the north, with fault-bounded outliers of the basin preserved within the latter.

Recent revisions to the stratigraphy of the WA Amadeus Basin (GSWA Record 2014/11) show that the Neoproterozoic to early Cambrian succession is more complete than previously thought and similar to that of the NT part of the basin, but younger Paleozoic components are largely absent. The stratigraphic terminology has been revised in favour of the more familiar NT succession, where possible.

The Amadeus Basin was sequentially deformed by the late Neoproterozoic to early Cambrian Petermann Orogeny and mid- to late Paleozoic Alice Springs Orogeny. The former is the more important event at the western end of the basin which contains thick syntectonic deltaic and fluvial successions sourced from the uplifted Musgrave Province to the south (GSWA Record 2015/8).

Neoproterozoic hydrocarbon source rocks are known from multiple levels in the NT part of the basin, and one Neoproterozoic gasfield is in production near Alice Springs. Similar potential is likely in WA, while the northwestern part of the basin is currently being explored for base metals and diamonds.

Murraba Basin

The Murraba Basin is another component of the Centralian Superbasin straddling the NT–WA border between the Arunta Orogen in the south and the Granites–Tanami Orogen, Tanami Basin and Birrindudu Basin in the north. A recent reconnaissance review of the basin (GSWA Record 2017/4) indicates the succession is similar to the western Amadeus Basin, although the full stratigraphy is not exposed and must be inferred beneath regolith from geophysics. The similarities in stratigraphy and geological history suggest similar prospectivity for hydrocarbons and mineral deposits, although the area remains essentially unexplored for either.

For more information contact, Peter Haines (peter.haines@dmirs.wa.gov.au) or Ian Tyler (ian.tyler@dmirs.wa.gov.au).

Forty seconds that changed lives

The earthquake that struck Meckering on 14 October 1968 lingers in memories as a defining event for this Wheatbelt town in Western Australia. To mark the 50th anniversary, the Geological Survey of Western Australia (GSWA) has released a commemorative publication, **Understanding the Meckering earthquake: Western Australia, 14 October 1968**.

Initially estimated at magnitude 6.9 on the Richter scale, the Meckering earthquake is one of the largest recorded seismic events to have rocked Western Australia. The earthquake generated a scarp 37 km long and up to 2 m high (Fig. 1a). Shaking intensities up to VIII on the Modified Mercalli (MM) scale were estimated close to the epicentre, and much of Meckering township was badly damaged. Transcontinental links, such as rail lines and roads, were cut off (Fig. 1b). Some buildings in Perth were significantly damaged, and shaking intensities of MM III were recorded 500–600 km away in Esperance and Meekatharra.

GSWA Bulletin 126 (Gordon and Lewis, 1980) provided a comprehensive account of the Meckering earthquake and the nearby Calingiri earthquake of March 1970. In this new publication, written with the general reader in mind, historical information about the earthquake has been summarized and updated by placing it in a broader plate tectonic context and relating it to the long-term seismic record. The geology of the earthquake is discussed with reference to current seismological analysis, including published and unpublished information from Geoscience Australia (Fig. 2). This includes a revised location for the epicentre of the main shock, and a 2016 revision of the earthquake's magnitude to M_W 6.5*.

This 26-page, A5 book features historical photos, a geological map identifying the fault traces, and explanations of how earthquakes happen. The book's release coincides with a day of commemorations planned by the Meckering Action Group (Inc.) on 14 October 2018 in the town of Meckering. Visit <https://meckering50yrson.com.au> for more information.

Understanding the Meckering earthquake: Western Australia, 14 October 1968 is available as a free downloadable PDF from <www.dmp.wa.gov.au/ebookshop>.

For more information, contact Stephen White (stephen.white@dmirs.wa.gov.au).

Figure 1. The Meckering Fault and its surface expression: a) view northeast of the fault scarp where it crossed an arterial route (probably Great Eastern Highway); b) distorted standard- and narrow-gauge rail lines

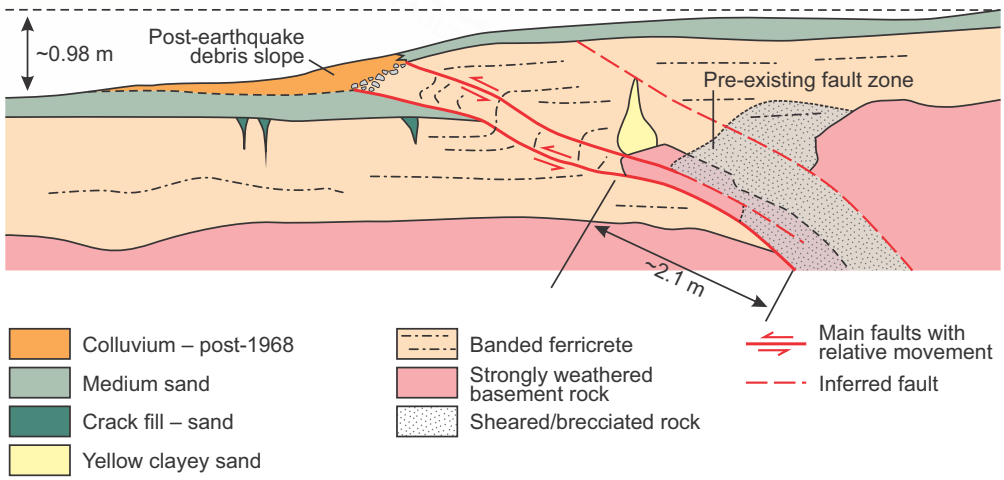


Figure 2. Sketch interpreting the Meckering fault in a trench excavated immediately south of the Great Eastern Highway (adapted from Clark et al. 2011: Geoscience Australia, Record 2011/11)

* M_W – moment magnitude now preferred over Richter Scale

Geochemistry of Archean granitic rocks

A dataset of 202 new whole-rock geochemical analyses of granitic rocks has been added to existing data to better constrain the geological evolution of the poorly understood South West Terrane of the Archean Yilgarn Craton. The granitic rocks are divided into four groups according to their K_2O/Na_2O (sodic if <1, potassic if >1) and Sr/Y (high = >1, low = <1) ratios (Fig. 1), which are primarily a reflection of source composition and depth of melting, respectively. Variations in other trace element characteristics and in whole-rock initial $^{206}Pb/^{204}Pb$ are also considered, and regional variations in all of these parameters are used to gain insight into the composition and architecture of the lower crust. Extraction of felsic magma, leaving a dense garnet-rich crustal residuum imparts distinctively high-Sr/Y, La/Yb, Gd/Yb characteristics on those magmas. Variation in these proxies for melting-pressure (Fig. 2) shows no spatial relationship with a high-density (gravity) anomaly (Fig. 1) identified in the lower crust of the southern and western parts of the South West Terrane. This anomaly does not appear to be directly related to Archean felsic magmatism, but more likely relates to the Proterozoic evolution of the Yilgarn Craton margins or Phanerozoic events at the margins of the West Australian Craton.

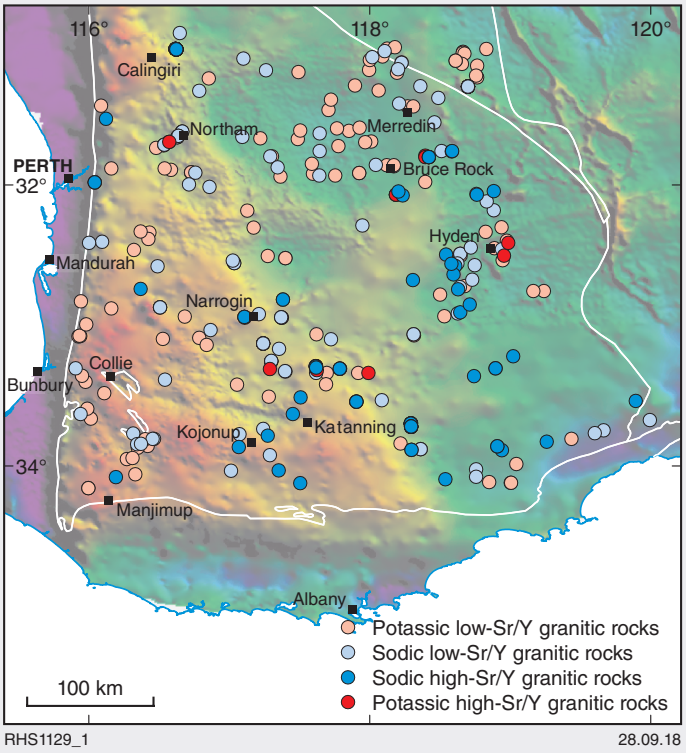


Figure 1. Distribution of sodic and potassic high- and low-Sr/Y granitic rocks in the South West Terrane. Warm colours represent a strong gravity response

Geographical distribution of the main granite groups defines a northeast trend that truncates the north-northwesterly trend of the eastern boundary of the South West Terrane (Fig. 1). An expanded dataset for the entire Yilgarn Craton shows that the same trends extend across much of the craton, including into the western part of the Eastern Goldfields Superterrane, across inferred Yilgarn Craton terrane boundaries and major visible structural trends (Fig. 2). In particular, sodic high-Sr/Y granitic rocks with Gd/Yb >5, derived from the deepest levels of (basement) crustal melting within the craton, occur in two distinct northeasterly trending zones extending across the craton, separated by a zone that shows no evidence for similarly deep crustal melting in the Archean. These large-scale geochemical trends probably relate to basement domains that existed before the younger (post-2.73 Ga) terrane boundaries were imposed.

GSWA Record 2018/10 Geochemistry of Archean granitic rocks in the South West Terrane of the Yilgarn Craton is available as a free downloadable PDF from <www.dmp.wa.gov.au/ebookshop>.

For more information, contact Hugh Smithies (hugh.smithies@dmirs.wa.gov.au).

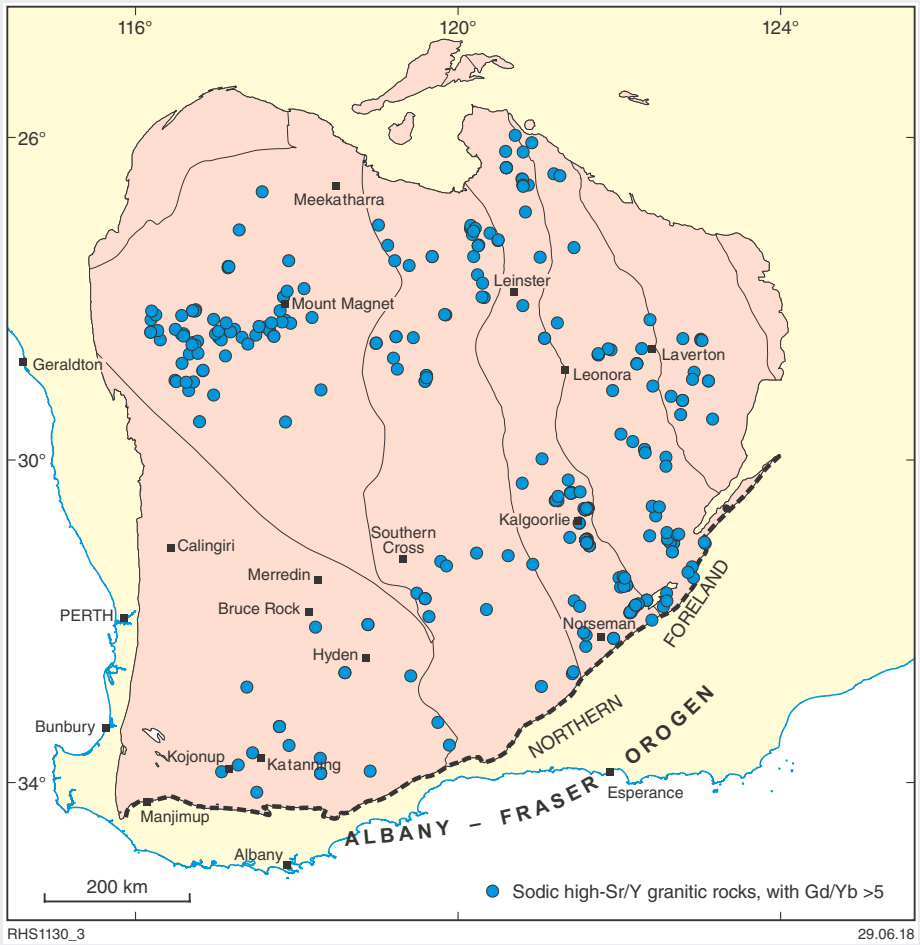


Figure 2. Sodic high-Sr/Y granitic rocks with Gd/Yb >5 in the Yilgarn Craton. Heavy dotted line marks the northern boundary of the Albany–Fraser Orogen

Book review

The ‘Black Monolith’ resurfaces

This Report, known as ‘The Black Monolith’ and recently republished as GSWA Report 185, collates a number of detailed mapping programs carried out by BHP in the Hamersley province on their tenement holdings at Mining Area C, Mudlark Well and Weeli Wolli, between 1994 and 2001. The mapping covers some 590 km^2 at scales ranging from 1:5 000 to 1:20 000. Data and interpretations of the stratigraphy, structure and tectonic evolution of the area constitute one of the most comprehensive reports on this economically important region.

The work is a summary of the stratigraphy of the Mount Bruce Supergroup, in this area, from the upper part of the Fortescue Group to the top of the overlying Hamersley Group. It describes the mineralization and structure of the region and outlines the main controlling factors on the tectonic evolution of the Hamersley Basin within the context of the regional ideas at the time of writing.

‘The Black Monolith’ has been widely cited by those working on the world-class iron ore deposits of the Hamersley Basin, and remains an important record of the geology of the Hamersley province that deserves to be placed in the public domain.

GSWA Report 185 The mapped stratigraphy and structure of the mining area C region, Hamersley province is available as a free downloadable PDF from <www.dmp.wa.gov.au/ebookshop>.

For more information, contact Heather Howard (heather.howard@dmirs.wa.gov.au).

Asymmetric intrafolial folding modified by bounding flexural slip, Ophthalmia Orogeny, E Deposit, looking east

New product

Digital Core Atlas — Theia 1

The Digital Core Atlas Series was developed during the Canning Basin Collaborative Core Analysis Project, a partnership between Geological Survey of Western Australia (GSWA), Geoscience Australia (GA) and petroleum exploration companies. The Theia 1 Digital Core Atlas is the second in this series which was created to store and display core analysis data. The Theia 1 petroleum exploration well was drilled by Finder Exploration on the Broome Platform in the Canning Basin. This well recovered 777.95 m of continuous core through Upper–Middle Ordovician strata. This version of the Digital Core Atlas also incorporates HyLogger spectral data.

Key features of the Digital Core Atlas include:

- interactive, user-friendly design
- a centralized location for all data collected from the core in a single well
- photos of the entire cored section
- UV photos of the entire cored section
- the location of every sample identified on the core photos
- interactive pop-ups at sample locations displaying the sample results
- interactive summary sheets of all samples collected and their results
- access to all original data spreadsheets, reports and photos
- mineralogical information for the entire core generated by the HyLogger.

Availablility

- View and download at <www.wapims.dmp.wa.gov.au/wapims> and search ‘well name’
- Order USB online at <www.dmp.wa.gov.au/ebookshop>
- Visit First Floor Counter, Mineral House, 100 Plain Street, East Perth

For more information, contact Leon Normore (leon.normore@dmirs.wa.gov.au).

Airborne gravity program: 30 September 2018 update

EXPLORATION INCENTIVE SCHEME

Data downloads

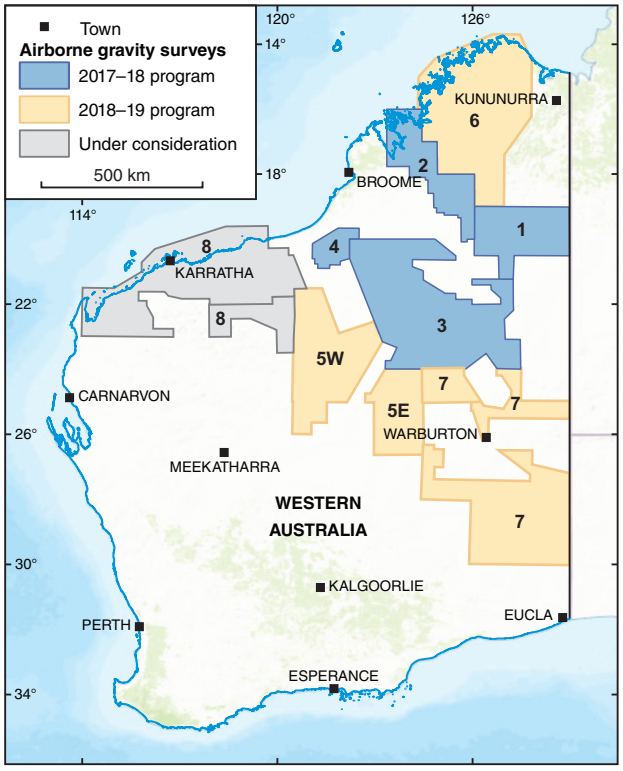
Located data — Geophysical Archive Data Delivery System <www.ga.gov.au/gadds>.

Grids and images — search in GeoVIEW.WA under Government Surveys layers.

Subscribe to the eNewsletter for alerts of preliminary and final data release dates. Go to <www.dmp.wa.gov.au/gswaenewsletter>.

Survey outline shapefiles are available online at <www.dmp.wa.gov.au/geophysics>.

For more information, contact David Howard (david.howard@dmirs.wa.gov.au).



All surveys at 2.5 km line spacing

ID	Area/Name	Line dirn.	Size (km)	Status	Start	End	Release
1	Tanami 2017	N-S	26 000	Released	15-06-17	13-08-17	12 Apr-18
2	NE Canning 2017	N-S	24 000	Released	17-08-17	15-11-17	12 Apr-18
3	Kidson 2017	N-S	70 000	Processing	21-07-17	03-05-18	(Oct-18)*
4	Kidson extension 2018	E-W	5 500	Processing	02-04-18	18-04-18	(Oct-18)*
	• Kidson whole-area preliminary Bouguer anomaly grid and image released						19-Jul-18
5	Little Sandy Desert 2018	N-S	52 000	Processing	23-04-18	01-09-18	(Dec-18)
	• LSD West Block preliminary release of interim Bouguer anomaly grid and image						20-Sep-18
6	Kimberley Basin 2018	N-S	61 000	Processing	04-06-18	14-07-18	(Dec-18)
7	Warburton – Great Victoria Desert 2018	E-W N-S	62 000	Survey 99%	14-07-18	(Oct-18)	(Dec-18)
8	Pilbara — under consideration	E-W N-S	58 000 11 000	Tender assessment	AusTender no. GA2018/2320 Closed 25 Sep 2018		

* Preliminary data as Bouguer anomaly grids and images available for part-area Kidson survey

Dates in parentheses are estimates.

GSWA in the Goldfields

The Joe Lord Core Library will be the venue for **GSWA in the Goldfields** to be held on Thursday 15 November 2018. There will be presentations from 2 to 4.30 pm with an introduction and welcome by Ian Tyler, Director, Geoscience, GSWA.

The following core will be on display:

- LD82625 — an EIS co-funded drillcore from the Invincible deposit (St Ives; Goldfields)
- Recently donated core from Black Swan showing well-preserved textural features of ultramafic rocks
- Typical occurrences of lamprophyres, sanukitoids and sanukitoid-like volcanic rocks of the Black Flag Group

Raglan Drilling Geology Lecture Series — Hannans Club, 44 Brookman St, Kalgoorlie, 5.30 pm for 6 pm start

Presentations

- A new look at lamprophyres and sanukitoids (~hornblende-plagioclase porphyries) and their relationship to the Black Flag Group and gold prospectivity ***by Hugh Smithies (GSWA)***
- The Eastern Goldfields High-Resolution Seismic Survey: what, where, when and why ***by Klaus Gessner (GSWA)***

To register for this **FREE** event, email <deenikka.preedy@dmirs.wa.gov.au>.

Product releases

ISSN 1834-2272 ISBN 978-1-74168-834-4

• PRODUCTS RELEASED •

GABANINTHA 1:100 000 Geological Series map

Record 2018/8 Geology, resources and exploration potential of the Ellendale diamond project, West Kimberley, Western Australia
by Boxer, G and Rockett, G

Record 2018/13 (U–Th)/He dating of ferruginous duricrust, Boddington gold mine, Western Australia
by MA Wells, M Danišík and BIA McInnes

FREE DATABASE AND SYSTEMS TRAINING

Find out how to access geoscience data online and understand our systems at these **FREE** training courses. Systems include:

- WAMEX
- GeoVIEW.WA
- GeoMap.WA
- TENGRAPH Web
- Data and Software Centre
- Mineral drillholes and geochemistry databases
- Department website

PERTH SESSIONS

The Perth training has been divided into separate sessions: one for **mining companies/geologists** (morning), and one for **prospectors** (afternoon).

- **Thursday 8 November**

KALGOORLIE

The Kalgoorlie training is open to **anyone** (full day).

- **Friday 16 November**

Follows **GSWA in the Goldfields** event on 15 November.

Register

To register, send an email to <publications@dmirs.wa.gov.au>. Include your details with the name, location and date of the training you wish to attend. For the Perth sessions, please indicate whether you wish to attend the prospector or mining/geologist training.

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Australia goes it alone
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current price $50 – **discounted price $25**


Bulletin 146 The geology of Shark Bay
current price $70 – **discounted price $25**


Discovery trails to early Earth
current price $25 – **discounted price $15**


Geology and landforms of the Perth Region
current price $22 – **discounted price $11**


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MRB 19 Kaolin in Western Australia – **FREE**


MRB 20 Bentonite, attapulgite, and common clays in Western Australia – **FREE**


MRB 21 Silica resources of Western Australia – **FREE**


MRB 22 Tantalum in Western Australia – **FREE**


MRB 23 Dimension stone in Western Australia (includes plate 1) Volume 1 – **FREE**


MRB 24 Dimension stone in Western Australia (includes plate 1) Volume 2 – **FREE**


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Western Australia atlas of mineral deposits and petroleum fields 2017 – **FREE**

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Maps, USB data packages, and selected premium publications are available to purchase as hard copies via the online cart on the eBookshop at <www.dmp.wa.gov.au/ebookshop>. Alternatively, these products can be purchased from the Information Centre, First Floor, Mineral House, 100 Plain Street, East Perth, WA 6004, Australia, Phone: +61 8 9222 3459; Fax: +61 8 9222 3444.
Records, Reports, Bulletins and non-series books cannot be purchased in hard copy but are all available as PDFs to view, and as a free download.