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WAMEX search tool gets a makeover

Access to Mineral Exploration Reports (WAMEX)

In October 2013 the Department of Mines and Petroleum (DMP) completed the redevelopment of the WAMEX search tool. The search tool now has both textual and reliable spatial searching options. It has a new look and feel, allows quicker searching, and easier access to view and download reports.

The Western Australian mineral exploration (WAMEX) database contains more than 71 000 reports on exploration carried out on mineral tenements in Western Australia. Access to these reports is via the WAMEX search tool, which is used extensively both nationally and internationally.

The WAMEX web page (<www.dmp.wa.gov.au/wamex>) receives more than 25 000 visits per year.

Access to the WAMEX search tool is via the online spatial viewing application, GeoVIEW.WA. If accessed from the WAMEX web page, GeoVIEW.WA will open to a view which has been preconfigured to display relevant layers of information including live and dead tenements, 1:250 000 map index, and the WAMEX report outlines. To perform a WAMEX search, open the 'I want to...' dropdown and select 'WAMEX search'. Either a textual or spatial search, or a combination of both, can be undertaken.

Since its release in September last year, the new GeoVIEW.WA is increasingly being used as the preferred point of access for all state exploration and geoscientific information. If you are already viewing other spatial data in GeoVIEW.WA open the 'I want to...' dropdown and select 'WAMEX search' to access WAMEX reports.

Key enhancements

Some key enhancements of the WAMEX search tool upgrade include:

1. An enhanced spatial search (using all the features of GeoVIEW.WA)
   The previous WAMEX search tool had limited spatial searching capability. The new WAMEX search allows entry of spatial coordinates to define a rectangular search area in either unprojected (latitudes and longitudes) or projected (GDA eastings and northings) coordinate systems. There is also the ability to define a rectangle on the map as the search area. Users can also search using a current live or pending tenement, and return a list of open-file reports, that have a shape (polygon) associated with them

2. Multiple text search criteria can be selected
   Users can search on a number of parameters, such as project names, operators, and commodities. Depending on the search criteria entered, this will allow regional searches or more detailed local searches

3. Date released to open-file search
   Users can now search on a specific date range when the report was released to open file.

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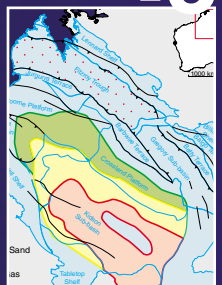

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What's inside?

WAMEX gets a makeover

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Map

The inclusion of the WAMEX search tool into GeoVIEW.WA provides users the ability to display over 100 layers of geoscience information, with complete control over which layers are displayed. This enables more accurate definition of a search area, as well as viewing other exploration information at the same time, e.g. geophysical surveys or GSWA geochemistry.

Viewing results

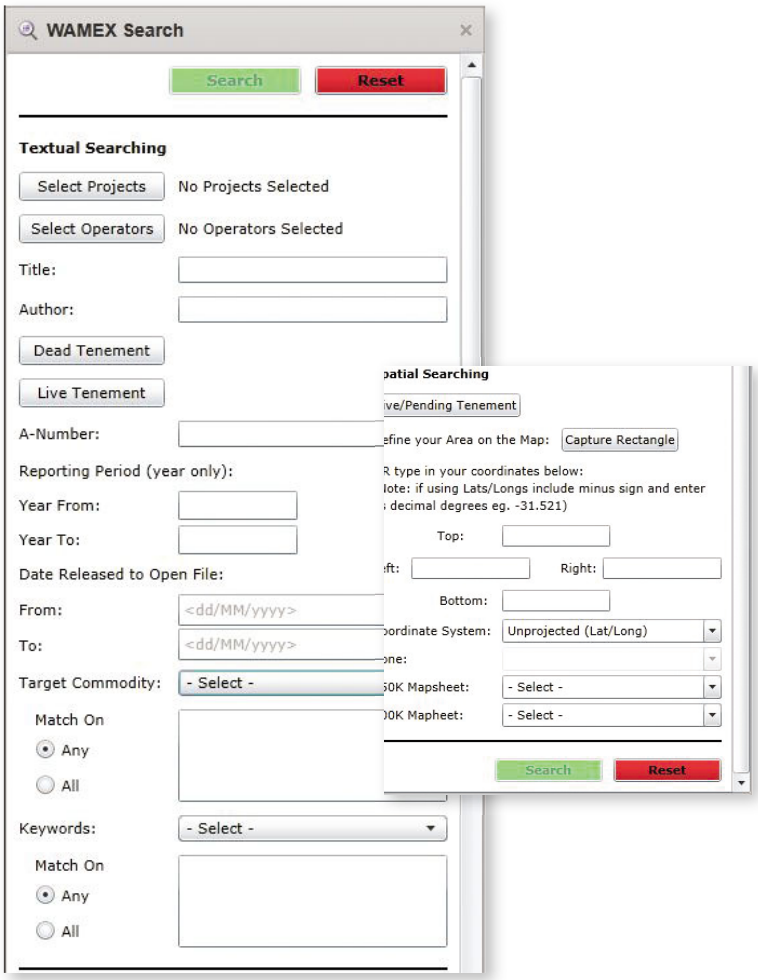
When the search results are returned and displayed in a table format, it is possible to save these results in CSV file format, which can then be exported and viewed in MS Excel.

Within the displayed results are direct links to the mineral exploration report and its abstract. Reports can then be viewed online, downloaded or printed.

It is anticipated that regular users of the WAMEX search tool will find this redevelopment and its incorporation into GeoVIEW.WA a more useful tool, particularly its ability to carry out spatial searches. For those already familiar with GeoVIEW.WA, this feature will be a new and welcome inclusion.

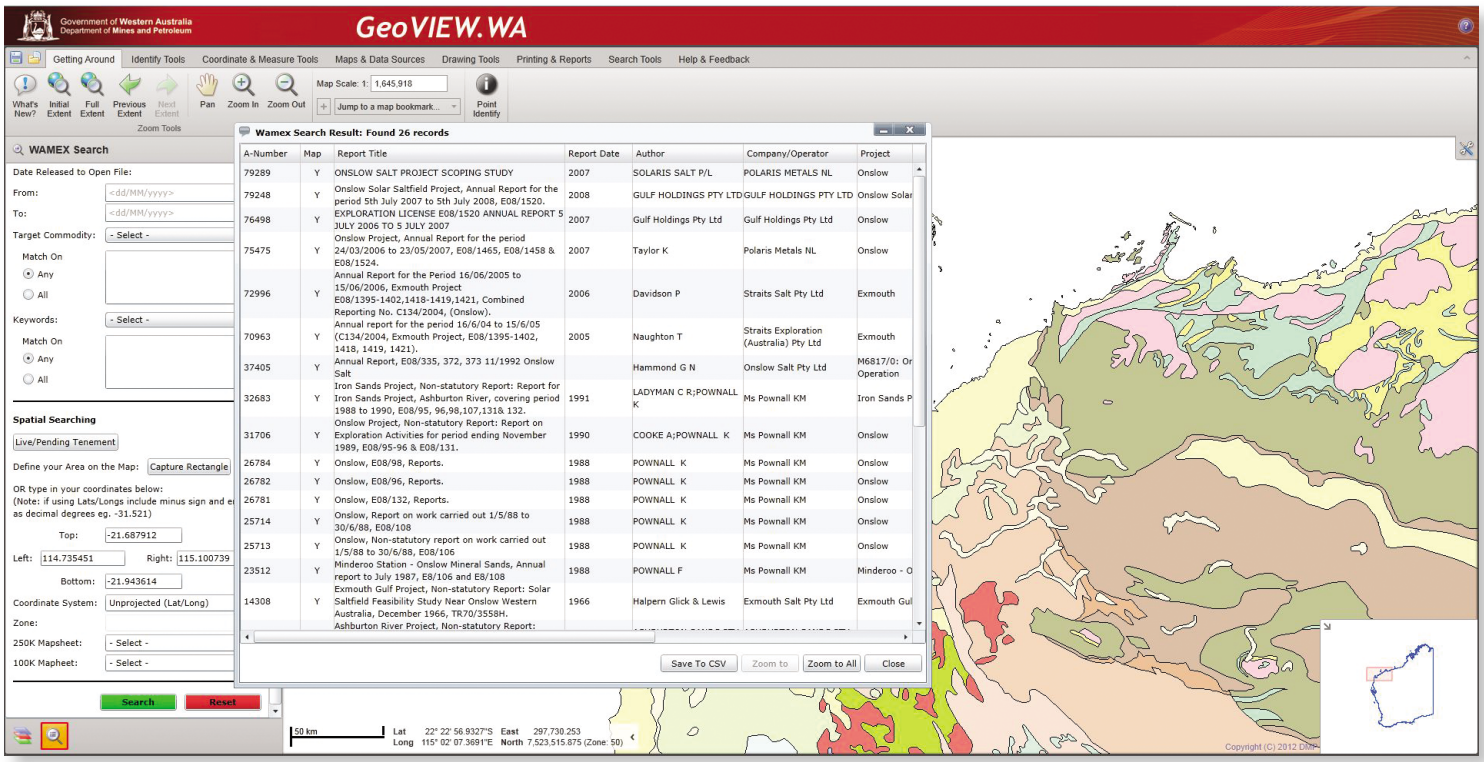
Training

Hands-on training sessions on GSWA databases including GeoVEW.WA and WAMEX are run regularly by DMP. Enquiries about this training can be directed to <publications@dmp.wa.gov.au>.



For more information,
contact Ann Fitton (ann.fitton@dmp.wa.gov.au).

Results screen



Exploration success in the Canning Basin

Exploration successes at Ungani, Yulleroo and Valhalla, and potentially abundant emerging shale and tight sand plays, have revived petroleum exploration and production in the Canning Basin of Western Australia. Report 124 Petroleum geochemistry and petroleum systems modelling of the Canning Basin, Western Australia analyses the petroleum geochemistry, organic petrology, apatite fission track analysis, heat flow, subsurface temperature, and other exploration data from the onshore Canning Basin.

Geochemical data indicate that Pictor oil was derived from Ordovician source rocks and Blina oil from Devonian source rocks, while oil from the Boundary, Lloyd, Sundown, West Kora, and West Terrace fields correlates with Early Carboniferous source rocks. Petroleum systems modelling of Acacia 1 and 2, Blackstone 1, Kidson 1, Lake Betty 1, and Yulleroo 1 indicate that maximum burial occurred during the Triassic–Jurassic in the Kidson and Gregory Sub-basins and the Fitroy Trough. In contrast, maximum burial occurred in the Willara Basin during the Cretaceous, based on Willara 1 data. The Ordovician self-contained petroleum systems are estimated to contain up to 8.1 trillion cubic metres or 288 trillion cubic feet of gas. Shale gas exploration in the Canning Basin is at an early stage and more work is needed to verify these estimates.

For more information,
contact Ameed Ghori (ameed.ghori@dmp.wa.gov.au).

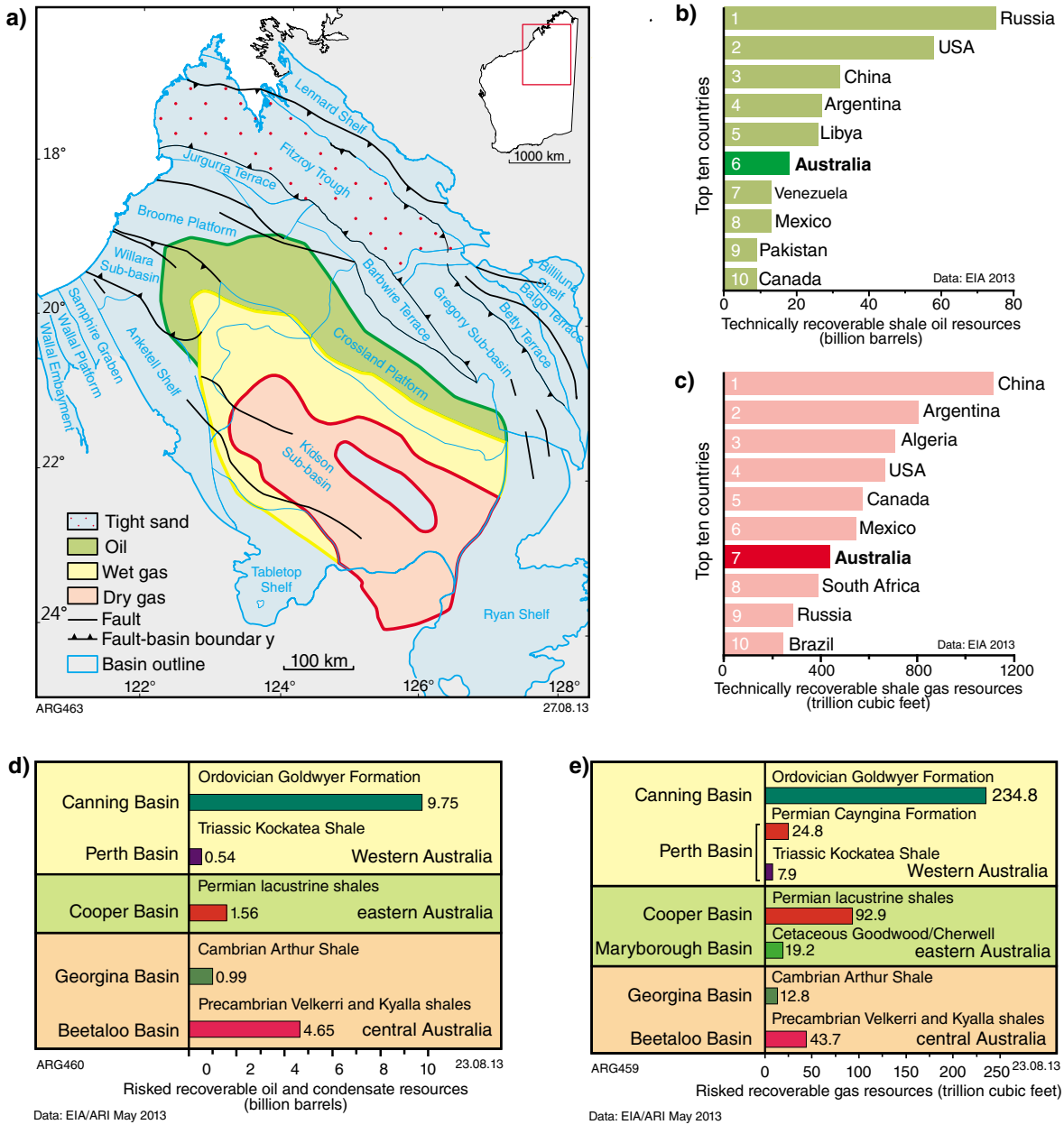


Figure 1. Distribution of petroleum resources in the Canning Basin of Western Australia: a) map; b) Australia's position in top 10 shale-oil resources in 42 countries; c) Australia's position in top 10 shale-gas resources in 42 countries; d) Western Australia's position in Australia for shale-oil resources; and e) Western Australia's position in Australia for shale-gas resources.

A magnetotelluric traverse across the southern Yilgarn Craton

The recently released GSWA Report 121 (Dentith et al., 2013) demonstrates that the magnetotelluric geophysical method is a viable means of mapping the deep-crustal and mantle structure of the Yilgarn Craton.

Under the Exploration Incentive Scheme (EIS), the Centre for Exploration Targeting (CET) at The University of Western Australia (UWA) carried out a 300 km-long magnetotelluric survey, comprising 56 stations, in the southern Yilgarn Craton over three campaigns during 2009–11. The survey was conducted along an east–west traverse (Fig. 1), extending from the South West Terrane, across the Southern Cross Domain (Youanmi Terrane), and onto the Kalgoorlie Terrane (Eastern Goldfields Superterrane).

The magnetotelluric data were processed with robust remote-reference algorithms. Data shown by phase tensor analysis to represent 1D and 2D variations in electrical properties were modelled using industry standard inverse modelling methods. A geo-electric strike direction of 010° was used for the modelling. Electrical conductivity variations to depths greater than 100 km have been mapped and interpreted.

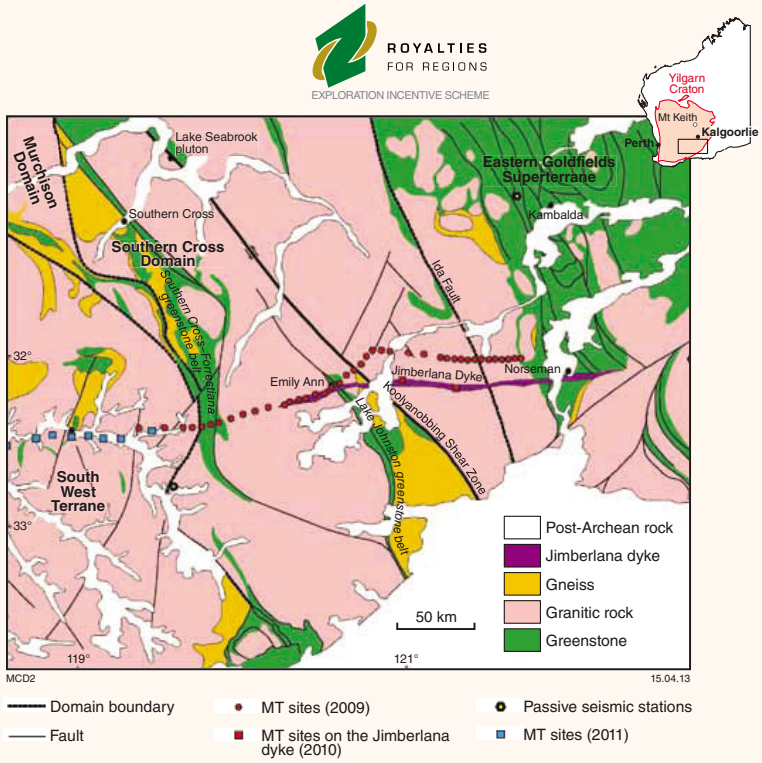


Figure 1. Locations of MT stations overlain on regional geological map of the southern Yilgarn Craton showing major geological and structural boundaries, and the terranes and domains in this part of the craton

The preferred resistivity cross section (Fig. 2) shows a series of narrow, dipping zones of increased conductivity in the crustal part of the model. These are interpreted as major faults that, in some areas, correlate with known surface structures. Resistivity variations at lower crust and mantle depths show that the local lithosphere comprises three recognizable units with probably steep boundaries. The three-fold subdivision of the local lithosphere is consistent with the geologically and geochemically defined terranes and domains in this part of the Yilgarn Craton. The central unit (Unit 2 on Fig. 2), interpreted as equivalent to the Southern Cross Domain, has a resistive crust overlying a more conductive mantle. The unit to the east (Unit 3 on Fig. 2) comprises a conductive lower crust overlying a resistive mantle. The eastern margin of the Southern Cross Domain, as inferred from deep crustal and mantle resistivity, lies about 50 km to the west of the Ida Fault, the margin of the domain at the surface. The disparity with the mapped location of the Ida Fault may reflect incorrect mapping of the Ida Fault, or offset of near-surface and deep-crustal and mantle suture zones, or both. The western margin of the central unit is interpreted to coincide with the western edge of a zone of more conductive mantle (Unit 1 on Fig. 2). The western unit has a resistive crust overlying a resistive mantle and is correlated with the South West Terrane mapped at the surface. Several conductive features in the crust might be linked to the edge of the zone of conductive mantle, but surface geology suggests the boundary is comparatively steep and coincides with a conductive zone close to the western edge of the Southern Cross greenstone belt.

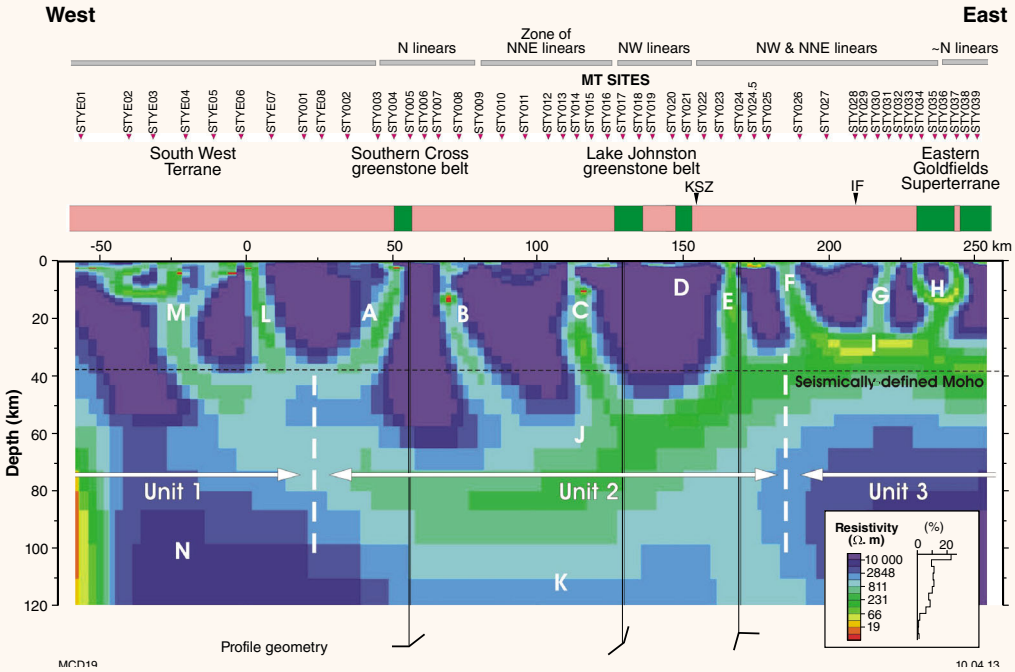


Figure 2. Resistivity cross section derived from 2D inverse modelling of MT data. KSZ – Koolyanobbing Shear Zone, IF – Ida Fault

For more information,
please contact Ian Tyler (ian.tyler@dmp.wa.gov.au).

GSWA pursues a rare opportunity

Western Australia is endowed with a number of significant rare earth element (REE) deposits, including Australia's only operating REE mine, Mount Weld. The Geological Survey of Western Australia (GSWA) believes that the State is highly prospective for discovering further REE mineralization. To assist REE explorers, GSWA has begun a research program to understand the geological characteristics and metallogeny of REE mineral systems in Western Australia.

Figure 1. Hyperspectral data collected from Cummins Range using the GSWA HyLogger

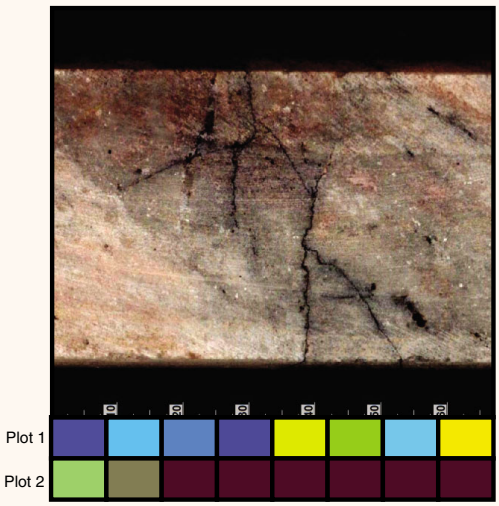
A preliminary collaboration between GSWA and Curtin University used the GSWA HyLogger to show that spectral absorption features attributable solely to REE could be detected in several common, light and heavy REE-enriched mineral species by using samples from the Western Australia Museum collection and from the Cummins Range drill core (see GSWA Record 2012/12).

GSWA's Mineral Systems group is now using the HyLogger to test whether individual REE minerals can be uniquely distinguished from their absorption spectra, and to document distribution and alteration mineralogy for a selection of Western Australian REE mineral deposits. The limitations of the technology will also be explored.

GSWA is looking closely at the different styles of REE mineralization in Western Australia, with a particular focus on the East Kimberley region. Recent discoveries suggest that this is an emerging REE province of particular significance, containing different deposit styles dominated either by the relatively common light REE (e.g. the Cummins Range carbonatite), or by the rarer and higher value heavy REE, such as the Hastings–Brockman alkaline volcaniclastic-hosted deposit, the newly recognized Browns Range and John Galt hydrothermal vein-hosted deposits, and perhaps the unconformity-related Killi Killi Hills prospects.

The ultimate goal is to apply our findings to exploration information acquired using other 'hyperspectral' platforms (field-portable, airborne, spaceborne), and to define protocols and procedures appropriate to different platforms.

For more information,
contact Sidy Morin-Ka (Sidy.Morin-Ka@dmp.wa.gov.au).



Note: High REE abundance (Plot 1) associated with dolomite (Plot 2) and/or late fracturing

Figure 3. REE-enriched zone in carbonatite at 138.4 m

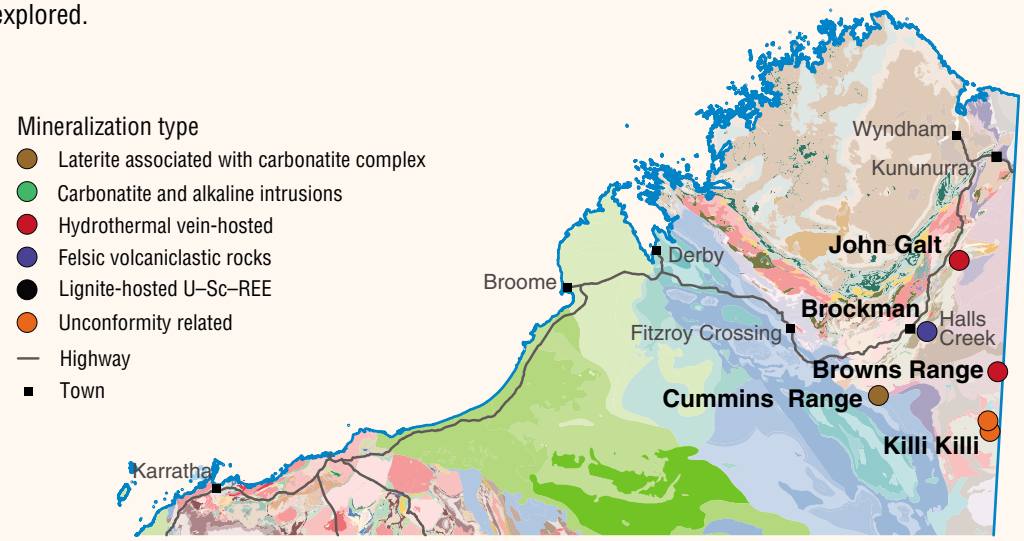


Figure 2. Map of Western Australia showing REE deposits and prospects in the Kimberley

Yilgarn Craton – Officer Basin – Musgrave Province (YOM) seismic reflection and magnetotelluric survey workshop

Interpretations of the 2011 Yilgarn Craton – Officer Basin – Musgrave Province (YOM) seismic reflection, magnetotelluric (MT) and gravity survey (11GA–YO1; Fig. 1) were presented at a well-attended workshop at Mineral House on 19 June 2013. Data collection and interpretation was a collaborative project between the Geological Survey of Western Australia (GSWA) and Geoscience Australia (GA), with funding coming from GSWA's Exploration Incentive Scheme (EIS) and GA's Onshore Energy Security Program (OESP). Processing of the reflection seismic and MT data was carried out by GA's onshore seismic and MT section of the Minerals and Natural Hazards Division, and a preliminary release of the migrated seismic line cross sections together with the locations of the seismic shot points and the common depth points (CDPs) was made in January 2013. The line was interpreted by a team of geoscientists from GSWA, GA, The Australian National University, and The University of Western Australia.

The major objectives of the June 2013 workshop were to evaluate:

1. the architecture and deep structure of the Archean Yamarna Terrane in the northeast Yilgarn Craton
2. the architecture and deep structure of the Mesoproterozoic Musgrave Province
3. the relationship between the Yamarna Terrane and the western Musgrave Province, beneath the western Officer Basin.

Combined with previous surveys, the YOM survey completes a comprehensive transect across most of south-central Western Australia, from the coast to the Northern Territory border (Fig. 1). Interpretation of the geology and petroleum potential of

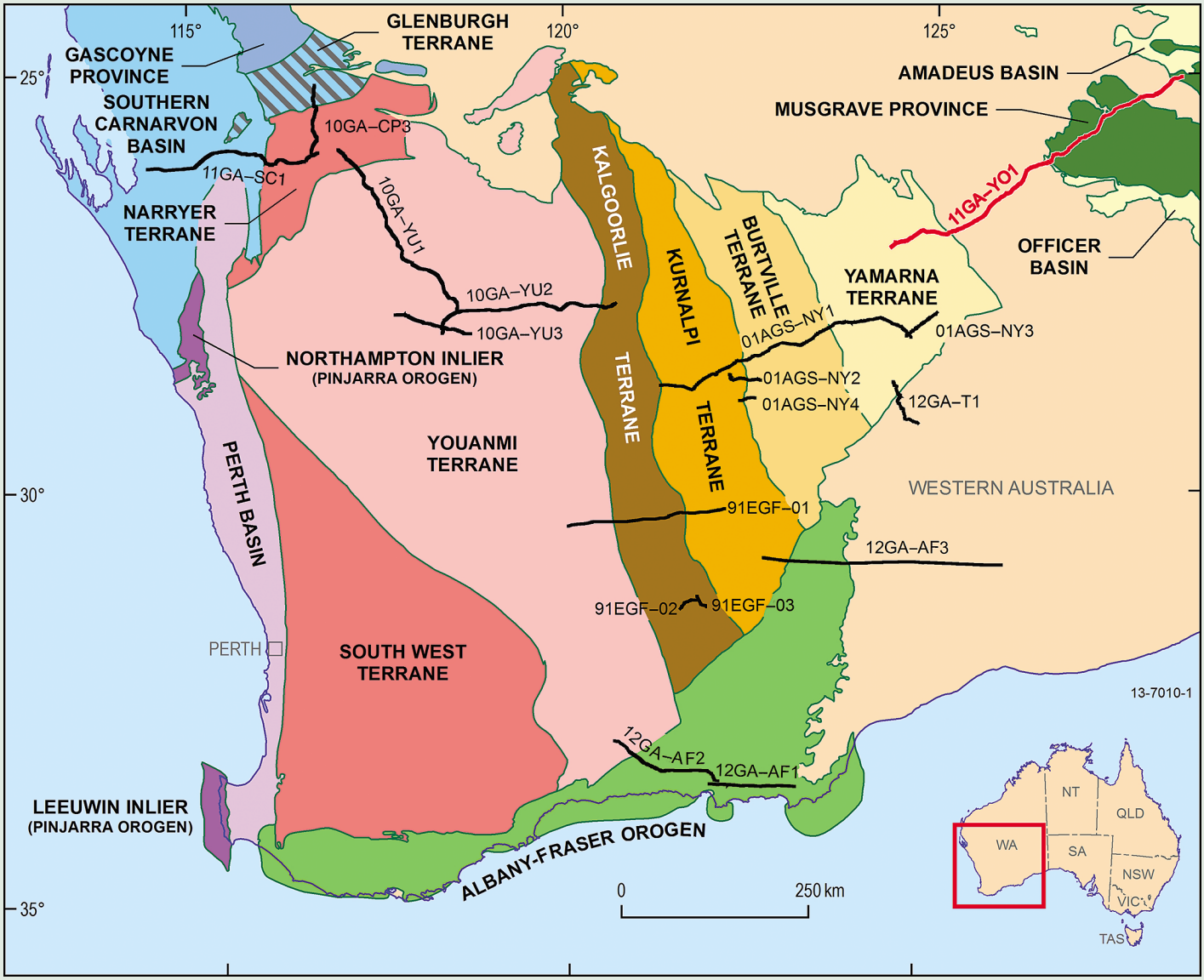


Figure 1. Major tectonic subdivisions of the southern half of Western Australia, showing the locations of major deep crustal seismic reflection lines

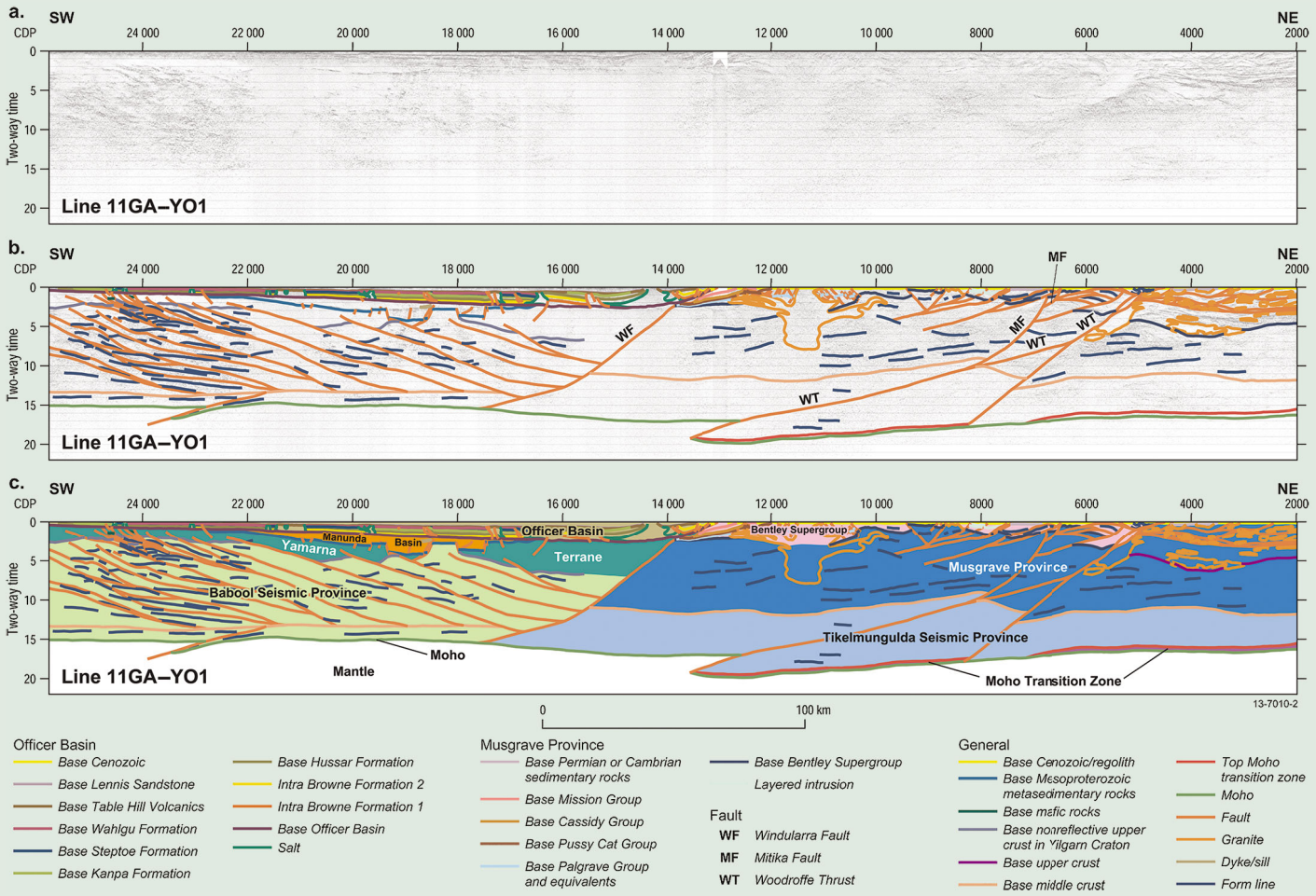


Figure 2. Migrated seismic section for the seismic section 11GA–YO1, showing both (a) uninterpreted and (b) interpreted versions. Display is to 22 s two-way-time (TWT) (~66 km) depth, and shows vertical scale equal to horizontal scale, assuming a crustal velocity of 6000 ms^{-1}. Panel (c) shows the distribution of the basins and provinces along the YOM seismic line.

the top six seconds of the migrated seismic section of 11GA–YO1 across the underexplored frontier western Officer Basin had previously been released at the 2012 APPEA Conference (Carr et al. 2012; see Fieldnotes 66, p. 6–7).

GA Record 2013/28 edited by Narelle Neumann, contains a series of extended abstracts summarizing the geological evolution of the region traversed by the survey together with preliminary interpretations of the seismic line, discussions of the acquisition and processing, the potential field geophysics and magnetotellurics. Other abstracts discuss the nature of the lithosphere in the region, the potential mineral systems, and the architecture of the Musgrave Province and numerical modelling of its evolution through time.

The YOM line (Fig. 2) provides an image of the northeast Yilgarn Craton where it is buried beneath the Officer Basin. In this part of the line the moho varies from a depth of 45 km in the southwest to 51 km in the northeast. Beneath the Officer Basin, the <1310 Ma Manunda Basin has a maximum thickness of 6 km. The underlying Yamarna Terrane is weakly to moderately reflective; having a maximum thickness of 13 km. Beneath the Yamarna Terrane is the strongly reflective middle to lower crust of the Babool Seismic Province, which may represent older basement.

The Windularra Fault (Fig. 2) separates the Yilgarn Craton from the Musgrave Province and Bentley Basin, and represents a major crustal boundary, separating two distinct pieces of the West Australian crust; it is the site of a probable Paleoproterozoic to Mesoproterozoic collision zone. The Moho beneath the northeastern part of the line reaches a depth of 59 km. The four-layered crust is made up of a weakly to strongly reflective upper crust (Bentley Supergroup and Warakurna Supersuite), a moderately reflective middle crust (Musgrave Province), the weakly to moderately reflective lower crust of the Tikelmungulda Seismic Province, and a thin crust–mantle transition zone. The Tikelmungulda Seismic Province may be related to underplating during the 1220–1150 Ma Musgrave Orogeny and the 1085–1040 Ma Giles Event.

The region traversed by the YOM survey has very few known mineral deposits. The crustal architecture and likely geodynamic processes that have been revealed have implications for mineral systems such as Archean orogenic gold and komatiite-related nickel in the Yilgarn Craton and orthomagmatic Ni-Cu±PGE associated with the Giles Event and the Warakurna Large Igneous Province (LIP). There is also potential for hydrothermal gold and copper in the Bentley Supergroup and for mineralization in the buried Manunda Basin.

GA Record 2013/28 can be downloaded from GA's website at: <www.ga.gov.au/products-services/new-releases.html>. Further information, including cross section images and copies of the workshop presentations, can be found on the GSWA website at <www.dmp.wa.gov.au/16910.aspx>.

For more information,
contact Hugh Smithies (hugh.smithies@dmp.wa.gov.au)
or Ian Tyler (ian.tyler@dmp.wa.gov.au).

Links between the Warumpi and Aileron Provinces, west Arunta region

ROYALTIES FOR REGIONS
EXPLORATION INCENTIVE SCHEME

The Arunta region (Fig. 1) comprises a large part of the southern margin of the North Australian Craton and records episodic tectono-thermal activity spanning the Paleoproterozoic to the Devonian. The 1690–1600 Ma Warumpi Province forms the southernmost part of the Arunta region and is separated from the older, 1860–1700 Ma Aileron Province to the north by the Central Australian Suture, which has been interpreted as a major deep crustal structure. Both the Warumpi and the Aileron Provinces are unconformably overlain by Neoproterozoic to Paleozoic basins.

New SHRIMP U–Pb and laser-ablation MC-ICP-MS Lu–Hf zircon isotope data for rocks from the west Arunta region shed further light on the nature of the Warumpi Province crust and its relationship to the Aileron Province (Fig. 2). Zircon Hf data for the Mount Webb Granite and the Ininti Granite and for the Walungurru Volcanics and volcanics of the Pollock Hills Formation show that there was diversity in the sources of the Warumpi Province crust into which igneous rocks were emplaced. Vertical $^{176}Hf/^{177}Hf$ arrays in zircons in the 1691 Ma Ininti Granite and dacite of the 1677 Ma Pollock Hills Formation indicate mixing between juvenile melts and Archean crust in the early stages of the 1690–1660 Ma Argilke Igneous Event. A similar mixing array in detrital zircon from the Neoproterozoic Kiwirrkurra Formation is also consistent with magmatic sources formed by mixing of c. 1633 Ma mantle-derived components with older crust during the 1640–1635 Ma Liebig Orogeny.

In contrast, the 1640 ± 7 Ma Mount Webb Granite and 1650 ± 4 Ma Walungurru Volcanics have tightly grouped Hf isotope signatures, close to chondritic uniform reservoir (CHUR), consistent with derivation from a common source with a distinct isotopic character either generated at c. 2.3 Ga or produced from efficient mixing processes at c. 1650 Ma.

Evidence for mixing between 1690–1630 Ma mantle-derived melts and older sources indicates that the history of the Warumpi Province involved interaction with significantly older crust of at least Mesoarchean age. The ages and Hf isotope compositions of inherited zircon in the 1677 ± 6 Ma Pollock Hills Formation are consistent with this older crust being part of the Aileron Province.

The Warumpi Province may represent a slice of Aileron Province crust, rifted away from the southern margin of the North Australian Craton at, or prior to, 1690 Ma. The Warumpi Province then acted as a locus for production of juvenile 1690–1660 Ma crust. This juvenile crust formation occurred both outboard of the southern Aileron Province margin, and during the 1640–1635 Ma Liebig Orogeny, when the Warumpi accreted back onto the Aileron Province.

See GSWA Record 2013/9 Zircon U–Pb–Hf isotope evidence for links between the Warumpi and Aileron Provinces, west Arunta region for details.

For more information,
contact Julie Hollis (julie.hollis@dmp.wa.gov.au).

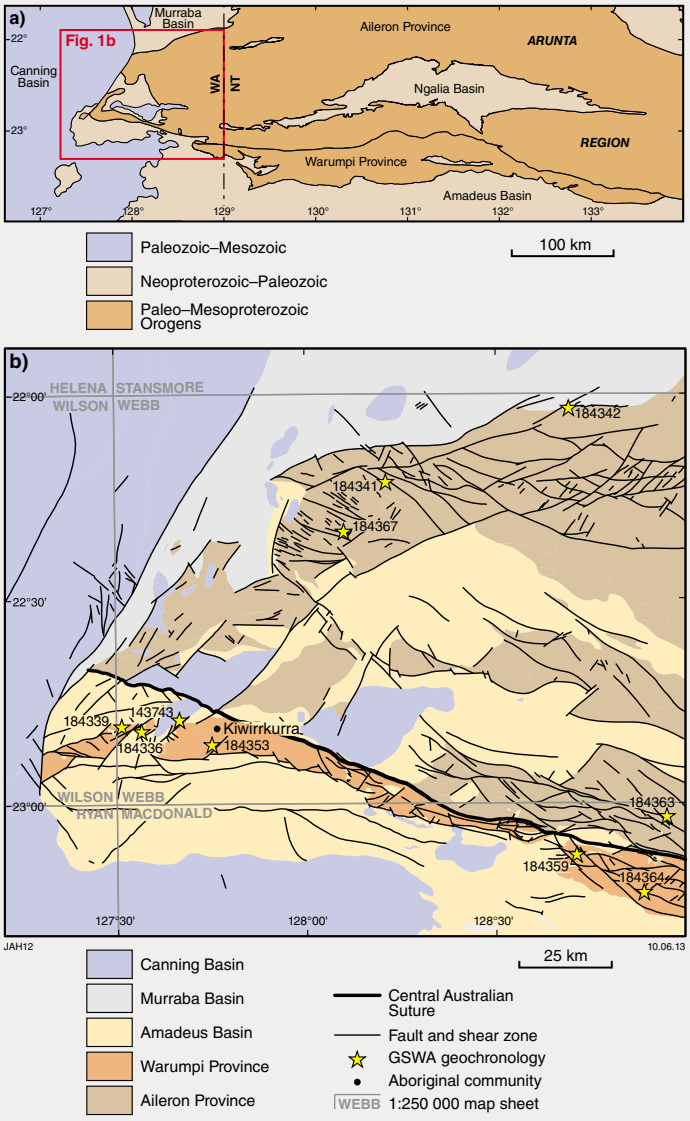


Figure 1. a) Location of the Warumpi Province on the southern margin of the Arunta region and of the North Australian Craton; b) simplified interpreted basement geology of the west Arunta region, showing locations of analysed samples

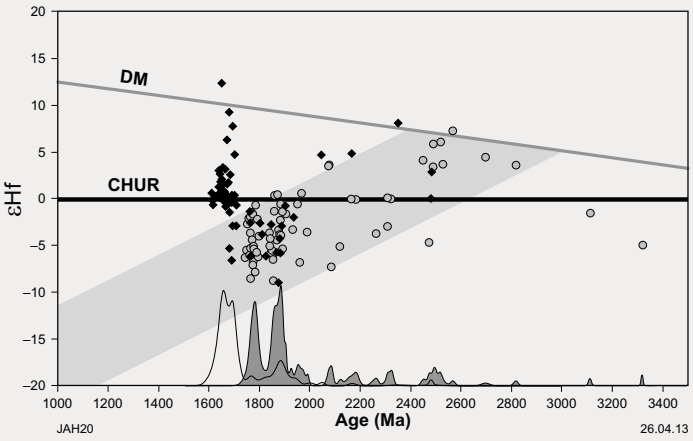


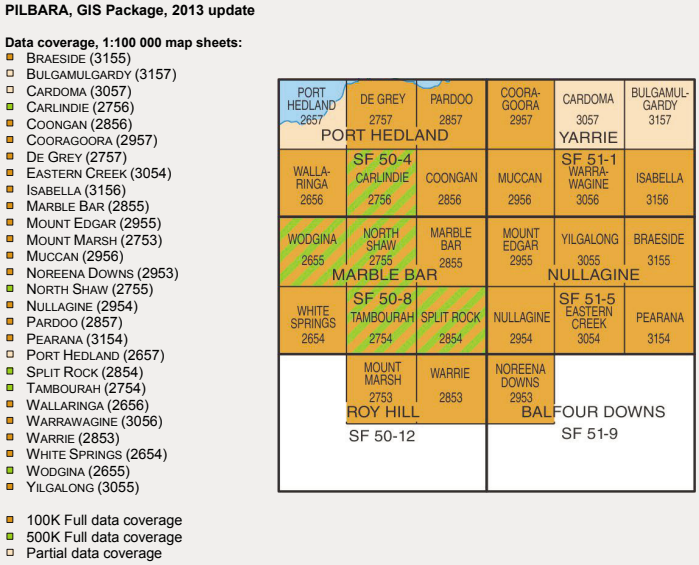
Figure 2. Hf vs age for zircons from the Aileron (grey circles) and Warumpi Provinces (black diamonds). Probability density plots show the age distributions. The grey line is model-depleted mantle (DM) and the black line is chondritic uniform reservoir (CHUR).

Extensive geological revision of the east Pilbara GIS

The 2013 Pilbara 1:100 000 Geological Information Series update increases the digital coverage of geological mapping in the northern Pilbara from 11 to 24 1:100 000 maps. Twelve of the extra 13 maps were originally released as hard copy maps prior to mid-2005, and used a previous unit coding system. Accordingly, geological revision has involved complete recoding of all units in addition to geological reinterpretation in line with the current regional stratigraphy. A major feature of the reinterpretation has been assignment of all granitic rocks to intrusions, suites, or supersuites.

The 2013 update also provides the first published 1:250 000 interpreted bedrock geology over 15 of the 1:100 000 map sheets, and revised 1:500 000 interpreted bedrock geology over five sheets (Tambourah, Carlindie, North Shaw, Wodgina, and Split Rock). The MINEDEX database has been expanded and updated, as has the geological lookup table. New, more extensive, Advanced Spaceborne Thermal Emission and Reflection (ASTER) imagery is provided, and all data can be viewed and queried with GeoMap.WA software.

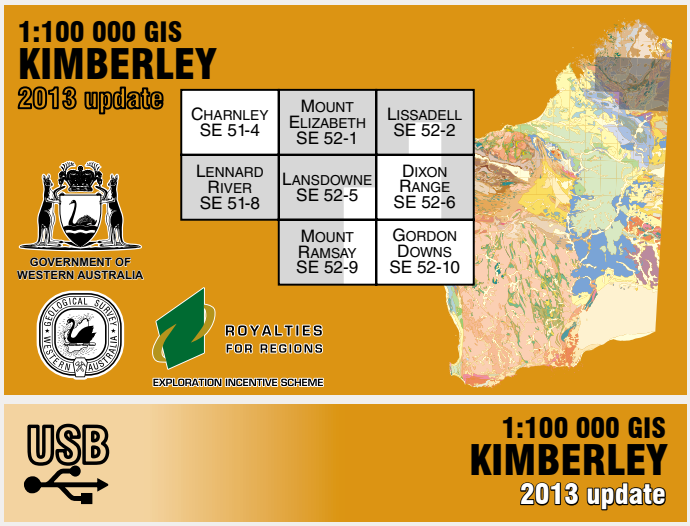
For more information,
contact Arthur Hickman (arthur.hickman@dmp.wa.gov.au).



Kimberley 1:100 000 GIS, 2013 update

The Kimberley 1:100 000 Geological Information Series 2013 update includes new, more extensive 1:100 000-scale interpreted basement geology, a new 1:250 000-scale interpreted bedrock geology layer, and a new interpreted regolith and landform map. The project area has been extended north from the previous update to incorporate the Kimberley region south of 16°S and east of 124°30'E. Information in this product covers 48 1:100 000 map sheets. Detailed data are provided for 14 of these map sheets, and regional data are provided for the other 34 map sheets.

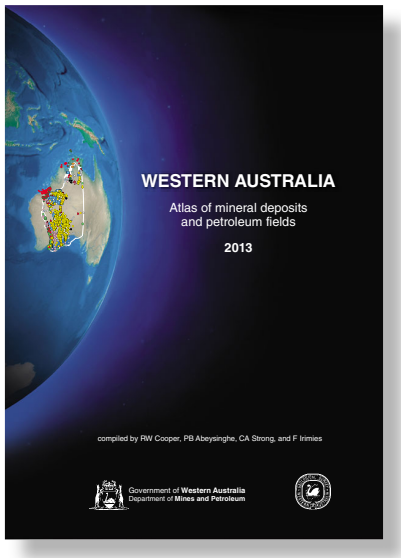
The new 1:250 000 layer comprises the geology of the Charnley 1:250 000 map sheet, and will be extended in future updates. The revised 1:100 000-scale interpreted basement geology layer sees completion of the compilation of all available 1:100 000-scale geological map sheets in the Halls Creek Orogen, which were mapped by GSWA and AGSO (now Geoscience Australia) in the 1990s. These maps have been compiled into a seamless 1:100 000-scale interpreted bedrock geology layer. In 2013 five new 1:100 000 maps were added to the layer: Dockrell, Antrim, Nicholson, Cow Creek and Gordon Downs. These comprise the southernmost part of the Halls Creek Orogen and younger volcanic rocks and basins to the east.



For more information,
contact Julie Hollis (julie.hollis@dmp.wa.gov.au).

Atlas shows mineral deposits and petroleum fields

The Western Australia atlas of mineral deposits and petroleum fields 2013 published by the Geological Survey of Western Australia (GSWA) shows the location of Western Australia's mineral deposits and petroleum fields, set against a background of simplified geology and cadastral information.



Information for the Atlas is drawn from a number of sources. The minerals and construction materials information, including ownership and stage of development, comes from the mines, mineral deposits, and prospects database (MINEDEX) of the Department of Mines and Petroleum (DMP). The atlas also includes major mining-related infrastructure sites captured in MINEDEX, i.e. nickel, alumina, and silicon smelters or refineries.

Information on petroleum fields in Western Australia (onshore and in State waters) and for adjacent offshore waters controlled by the Commonwealth is derived from a variety of sources, including DMP's Western Australian petroleum information management system database (WAPIMS) and the Petroleum and Geothermal section of DMP's website. Only major fields and recent major discoveries are shown, and are identified by a representative well for that field.

All maps in this publication have been produced using the Albers Equal Area Projection (Geocentric Datum of Australia 1994), with central meridian 121°00'E and standard parallels 17°30' and 31°30'S.

The Atlas is available as a free download from our website or can be purchased in hard copy for $11 by contacting 08 9222 3459 or sending an email to <bookshop@dmp.wa.gov.au>.

Popular gemstones book reprinted

Mineral Resources Bulletin 25, Gemstones of Western Australia, was first published with a Ministerial launch in January of this year. Due to its popularity, the Geological Survey of Western Australia (GSWA) has printed further copies (in soft cover) which are now available for sale. In a collaborative arrangement between GSWA and the Gemmological Association of Australia (GAA), the authors have assembled a comprehensive resource on most gemstones and decorative stones used in jewellery and ornamental sculpture in the State. Although diamonds command pride of place among the industries of Western Australia, far less is known about occurrences of beryl, topaz, tourmaline, tektites, gem-quality quartz and associated siliceous gems. Material peculiar to this State, such as zebra stone, orbicular granite and mookaite are described, as are pearls, fossil wood, and precious metals.

Figure 1. Green, blue, and pink watermelon tourmaline from Spargoville in the Kambalda region. The smaller crystal measures 6 mm in diameter (courtesy Vernan Potter).

Geographical locations are indicated where possible, and references are provided to earlier work. Gemstones of Western Australia is written not only for the professional geologist and gemmologist, but the book is also a valuable resource for the experienced fossicker and amateur rockhound.

The book is available to purchase from <www.dmp.wa.gov.au/GSWApublications> at a cost of $50 (including GST).
A downloadable PDF is available free.

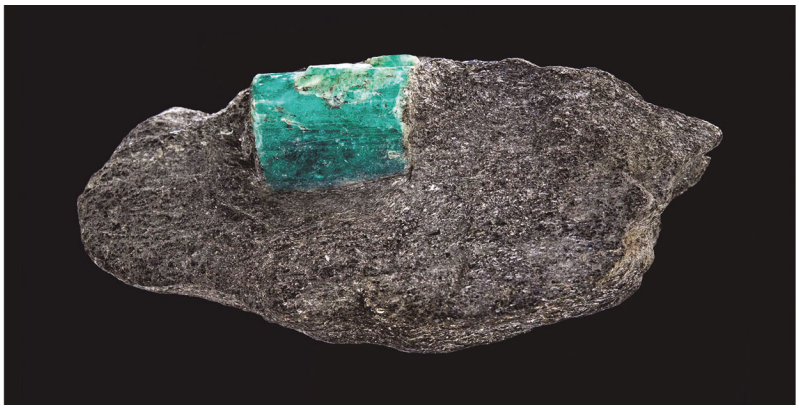


Figure 2. Emerald crystal in schist, Wonder Well deposit at Riverina in the Menzies region (courtesy Australian Museum)

GSWA regional geophysics surveys: October 2013 update

ROYALTIES FOR REGIONS
EXPLORATION INCENTIVE SCHEME

Data downloads

Final data releases from the Geophysical Archive Data Delivery System are at <www.ga.gov.au/gadds>.

Preliminary and final grids and images from the GSWA website are available from <www.dmp.wa.gov.au/geophysics>.

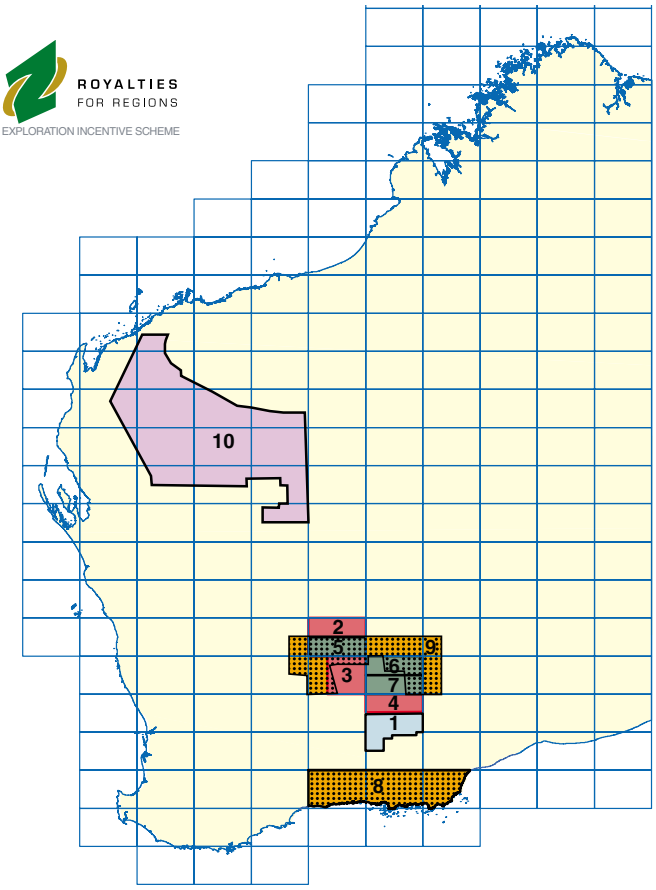
Subscribe to the GSWA eNewsletter for alerts of preliminary and final data release dates.

Airborne magnetic and radiometric surveys
'Goldfields 100 m' program

- Completed (2012–13)
- In progress (2013–14)
- In preparation (2013–14)

Other surveys

- Ground gravity surveys 2013–14
- Airborne EM surveys 2013–14



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

Airborne magnetic and radiometric surveys

ID	Area/Name	Line spacing and direction	Line-km	Contractor	Acquisition Start	Acquisition End	Current Status	Release Status[1] & Date
	2012–13 Program							
1	Widgiemooltha South 2012	100 m E-W	130 000	Thomson	Nov-12	Apr-13	Released	F: 6-Jun-13
	2013–14 Program							
2	Menzies North 2013	100 m E-W	92 000	GPX	Aug-13	Dec-13*	Survey 56%	Mar-14*
3	Kalgoorlie East 2013	100 m E-W	122 000	Thomson	Aug-13	Jan-14*	Survey 40%	Apr-14*
4	Widgiemooltha North 2013	100 m E-W	92 000	UTS	Aug-13	Jan-14*	Survey 47%	Apr-14*
5	Menzies South 2013	100 m E-W	92 000	GPX	Nov-13*	Apr-14*	Contract	Jun-14*
6	Kurnalpi North 2013	100 m E-W	92 000	Thomson	Nov-13*	Apr-14*	Contract	Jun-14*
7	Kurnalpi South 2013	100 m E-W	92 000	UTS	Nov-13*	Apr-14*	Contract	Jun-14*

Ground gravity surveys

ID	Area/Name	Station spacing	Stations	Contractor	Acquisition Start	Acquisition End	Current Status	Release Status[1] & Date
8	Esperance 2013	2.5 km grid + 1 km road traverses	7 891	Atlas	Jul-13	Sep-13	Processing	F: 24 Oct-13*
9	Goldfields 2013	2.5 km grid	8 100	TBD	Nov-13*	Apr-14*	Quotation	Jun-14*

Airborne reconnaissance EM surveys

ID	Area/Name	Line spacing and direction	Line-km	Contractor	Acquisition Start	Acquisition End	Current Status	Release Status[1] & Date
10	Capricorn 2013 (TEMPEST) [2]	5 000 m; N/S (E/W in part)	29 000	CGG [2]	Oct-13*	Feb-14*	Mobilization	TBD

Notes
*Asterisk indicates an estimated date (month/year) based on delivery information currently available. Subscribe to the newsletter for release alerts.

1. Release Status: F = final; P = preliminary
(Preliminary releases are made on a case-by-case basis and consist of ecw images and ERMapper grids of partially processed or unchecked data.)

2. Contact CGG directly regarding any requests for infill.

Colour legend Final data released | Prelim release or Final release date set | In progress | Under consideration

Information current at: 13 October 2013

Product releases

Any prices include GST

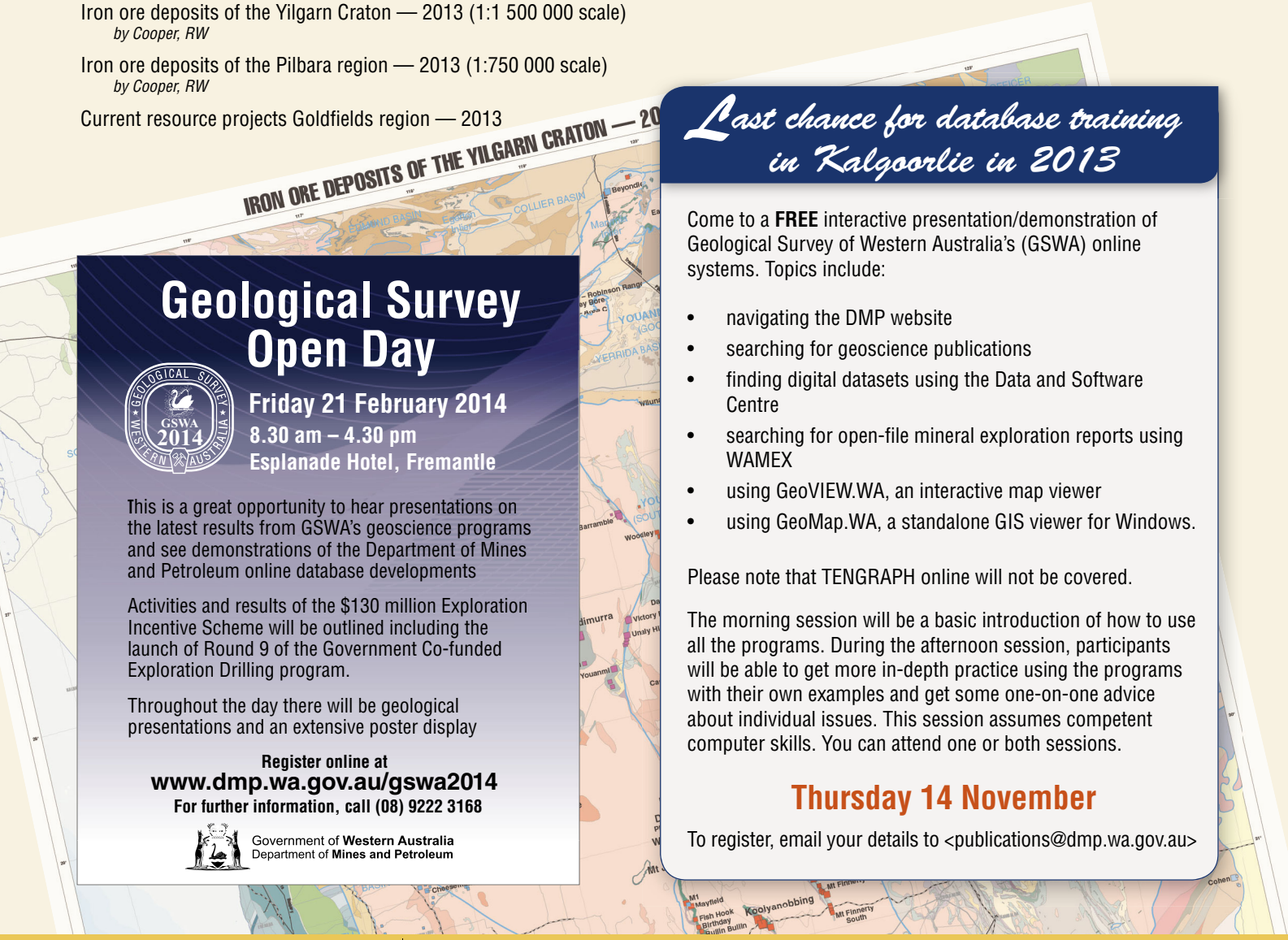
ISSN 1325-9377 ISBN (PRINT) 978-1-74168-522-0
ISSN 1834-2272 ISBN (PDF) 978-1-74168-521-3

NON-SERIES MAPS

Iron ore deposits of the Yilgarn Craton — 2013 (1:1 500 000 scale)
by Cooper, RW

Iron ore deposits of the Pilbara region — 2013 (1:750 000 scale)
by Cooper, RW

Current resource projects Goldfields region — 2013



Geological Survey Open Day

Friday 21 February 2014
8.30 am – 4.30 pm
Esplanade Hotel, Fremantle

This is a great opportunity to hear presentations on the latest results from GSWA's geoscience programs and see demonstrations of the Department of Mines and Petroleum online database developments

Activities and results of the $130 million Exploration Incentive Scheme will be outlined including the launch of Round 9 of the Government Co-funded Exploration Drilling program.

Throughout the day there will be geological presentations and an extensive poster display

Register online at
www.dmp.wa.gov.au/gswa2014
For further information, call (08) 9222 3168

Government of **Western Australia**
Department of **Mines and Petroleum**

Last chance for database training in Kalgoorlie in 2013

Come to a **FREE** interactive presentation/demonstration of Geological Survey of Western Australia's (GSWA) online systems. Topics include:

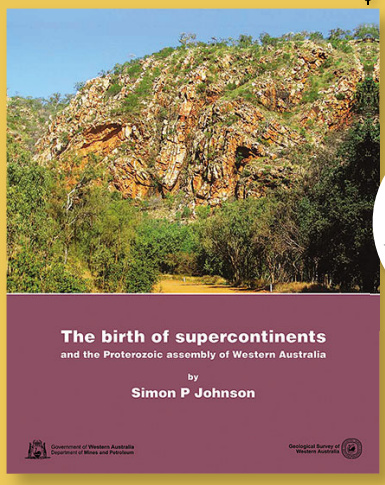
- navigating the DMP website
- searching for geoscience publications
- finding digital datasets using the Data and Software Centre
- searching for open-file mineral exploration reports using WAMEX
- using GeoVIEW.WA, an interactive map viewer
- using GeoMap.WA, a standalone GIS viewer for Windows.

Please note that TENGRAPH online will not be covered.

The morning session will be a basic introduction of how to use all the programs. During the afternoon session, participants will be able to get more in-depth practice using the programs with their own examples and get some one-on-one advice about individual issues. This session assumes competent computer skills. You can attend one or both sessions.

Thursday 14 November

To register, email your details to <publications@dmp.wa.gov.au>



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Further details of geological publications and maps produced by the Geological Survey of Western Australia can be obtained at <http://www.dmp.wa.gov.au/GSWA>.

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