



Department of Energy, Mines,
Industry Regulation and Safety



Geological Survey of
Western Australia

Record 2024/7



GSWA
Open Day
2024

Conference program

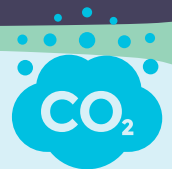
Session one – Welcome and strategic updates

- 09:00 Housekeeping – Michele Spencer
- 09:05 Welcome to Country – Kerry-Ann Winmar
- 09:15 Opening Address – The Hon David Michael MLA Minister for Mines and Petroleum
- 09:25 A year in review and forward thinking – Fawna Korhonen
- 09:40 A future with artificial intelligence – Nicole Roocke, Chief Executive Officer, Minerals Research Institute of Western Australia
- 10:00 Resourcing Australia's Prosperity: a new era of discovery – Andrew Heap, Chief of Minerals, Energy and Groundwater Division, Geoscience Australia

Morning tea 10:20–10:55

Session two – CO₂ Storage Atlas

- 10:55 Status of the new GSWA CO₂ Storage Atlas of Western Australia – Deidre Brooks
- 11:10 Developing CO₂ Storage Atlas data and interpretation products – Courtney Brennan
- 11:25 Leveraging well data to quantify reservoir quality for geological CO₂ storage prospectivity – Julie Cass
- 11:40 Searching for traps in the underworld: seismic interpretation and depth mapping – Robert Iasky
- 11:55 Q&A through the Slido app



Lunch 12:10–13:20

Session three – Fireside chat with WA Array, moderated by Richard Chopping

A special on-stage session with team WA Array as they showcase soon-to-be-released data, provide project updates, and discuss future plans on this ambitious passive seismic campaign. Ruth Murdie, John O'Donnell, Reza Ebrahimi and Huaiyu Yuan.
Q&A through the Slido app



Afternoon tea 14:35–15:05

Session four – Ongoing geoscience programs

- 15:05 Regolith-hosted HREE and Sc mineralisation above the North Stanmore alkaline intrusion – Ken Collerson, Technical Director, Victory Metals Australia
- 15:25 A statewide heavy mineral map for critical mineral exploration – Erin Gray
- 15:35 A Li-pegmatite paradigm consistent with Western Australia's Archean geology – Hugh Smithies
- 15:45 Sediment-hosted copper sniffs in the Officer Basin – Matt Clarke
- 15:55 The Perth Basin and basement: new insights from deep-crustal reflection seismic profiles – Charmaine Thomas
- 16:05 Geoscience data relationship mapping through knowledge graphs – Tony Perry
- 16:15 Q&A through the Slido app



Networking 16:30–18:00



Record 2024/7

GSWA Open Day 2024

Conference Program

Future-focused Geoscience
15 November 2024

Minister for Mines and Petroleum

Hon David Michael MLA

Director General, Department of Energy, Mines, Industry Regulation and Safety

Richard Sellers

Executive Director, Geological Survey and Resource Strategy

Michele Spencer

Reference

The recommended reference for this publication is:

Geological Survey of Western Australia 2024, GSWA Open Day 2024 – conference program:
Geological Survey of Western Australia, Record 2024/7, 24p.

ISBN 978-1-76148-020-1 (online); 978-1-76148-021-8 (print)

ISSN 2204-4345 (online); 0728-2311 (print)

Disclaimer

This product uses information from various sources. The Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) and the State cannot guarantee the accuracy, currency or completeness of the information. Neither the department nor the State of Western Australia nor any employee or agent of the department shall be responsible or liable for any loss, damage or injury arising from the use of or reliance on any information, data or advice (including incomplete, out of date, incorrect, inaccurate or misleading information, data or advice) expressed or implied in, or coming from, this publication or incorporated into it by reference, by any person whosoever.

Acknowledgement of Country

The Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) respectfully acknowledges Aboriginal peoples as being the traditional custodians of Western Australia. We acknowledge the enduring connection Aboriginal people continue to share with the land, sea and sky through both their ancestral ties and custodianship to Country. We pay our respect to Elders both past and present, and acknowledge the value brought to our department through the collective contribution of Aboriginal and Torres Strait Islander peoples across Western Australia.

Published 2024 by the Geological Survey of Western Australia

This Record is published in digital format (PDF) and is available online at
www.demirs.wa.gov.au/GSWApublications.



© State of Western Australia (Department of Energy, Mines,
Industry Regulation and Safety) 2024

With the exception of the Western Australian Coat of Arms and other logos,
and where otherwise noted, these data are provided under a Creative Commons
Attribution 4.0 International Licence.

(creativecommons.org/licenses/by/4.0/legalcode)

Further details of geoscience products are available from:

First Floor Counter

Department of Energy, Mines, Industry Regulation and Safety
100 Plain Street

East Perth Western Australia 6004

Telephone: +61 8 9222 3459

Email: publications@demirs.wa.gov.au

www.demirs.wa.gov.au/GSWApublications



Contents

Welcome to GSWA Open Day 2024.....	5
<i>Michele Spencer</i>	
Session 1	
GSWA Keynote: a year in review and forward thinking	6
<i>Fawna Korhonen</i>	
A future with artificial intelligence	7
<i>Nicole Roocke</i>	
Resourcing Australia's Prosperity: a new era of discovery	8
<i>Andrew Heap</i>	
Session 2	
Status of the new GSWA CO ₂ Storage Atlas of Western Australia	9
<i>Deidre Brooks</i>	
Developing CO ₂ Storage Atlas data and interpretation products	10
<i>Courtney Brennan</i>	
Leveraging well data to quantify reservoir quality for geological CO ₂ storage prospectivity	11
<i>Julie Cass</i>	
Searching for traps in the underworld: seismic interpretation and depth mapping.....	12
<i>Robert Iasky</i>	
Session 3	
Fireside chat with WA Array	13
<i>Richard Chopping, Ruth Murdie, John O'Donnell, Reza Ebrahimi and Huaiyu Yuan</i>	
Session 4	
Regolith-hosted HREE and Sc mineralisation above the North Stanmore alkaline intrusion	15
<i>Ken Collerson</i>	
A statewide heavy mineral map for critical mineral exploration	16
<i>Erin Gray</i>	
A Li-pegmatite paradigm consistent with Western Australia's Archean geology.....	17
<i>Hugh Smithies</i>	
Sediment-hosted copper sniffs in the Officer Basin	18
<i>Matt Clarke</i>	
The Perth Basin and basement: new insights from deep-crustal reflection seismic profiles	19
<i>Charmaine Thomas</i>	
Geoscience data relationship mapping through knowledge graphs	20
<i>Tony Perry</i>	



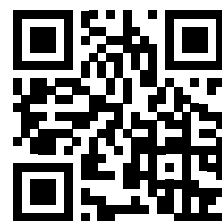
Join the conversation

Follow the QR code to access Q&As, live polls and more!

Event code **#GSWA2024**

or go to: app.sli.do
and enter the event code.

Scan here



#GSWA2024



Welcome to GSWA Open Day 2024

Kaya!

It is my pleasure to welcome you to the Geological Survey of Western Australia's (GSWA) Open Day 2024. We are excited to host our annual conference at a brand new venue, the Pan Pacific Perth, and to continue bringing you another year of future-focused geoscience.

GSWA Open Day continues to grow, garnering unprecedented attention across Western Australia and beyond. This year, we have curated an exceptional program featuring a wide range of geosciences, valuable networking opportunities, and updates on major GSWA initiatives that will help shape the future of our State.

We are proud to present keynotes from inspiring leaders Nicole Roocke of the Minerals Research Institute of Western Australia and Andrew Heap from Geoscience Australia. Their ongoing collaboration with GSWA strengthens research, development, and world-class geoscience across the country. The afternoon will feature special guest Professor Ken Collerson, who will present on a recent regolith-hosted heavy rare earth element discovery. These kind of discoveries underscore the importance of GSWA's mapping and precompetitive geoscience data acquisition in supporting future exploration.

GSWA presentations will include the launch of the new CO₂ Storage Atlas of Western Australia, a key initiative aligned with the Western Australian Government's priority to facilitate CO₂ sequestration. Team WA Array will engage in a fireside chat to candidly discuss their ambitious passive seismic program. In the afternoon, our expert geoscientists will share insights into the various other programs GSWA is actively pursuing.

We are committed to enhancing your experience as a delegate and deeply appreciate your enthusiastic participation. Each year, we reach new milestones that build upon past successes and further solidify GSWA's role as a leading provider of valuable, freely accessible, and trustworthy geoscience data.

Warm regards,

Michele Spencer

Executive Director, Geological Survey of Western Australia



Fawna Korhonen

Acting Director
Geoscience

Fawna has had various roles at GSWA, most recently Manager Critical Mineral Systems, and is currently Acting Director Geoscience.

GSWA Keynote: a year in review and forward thinking

The transition to a net zero economy is at the forefront of several national and global initiatives. In our ongoing efforts to support this transition and address these initiatives, GSWA continues to provide high-quality precompetitive geoscience data from across the State and in a variety of mineral systems. We are striving to adapt our work to provide relevant and timely information across a wide range of geoscience, and while this does not necessarily change the work that we do, it is changing the way we think about, prioritise, and present our data and knowledge products.

This keynote presentation will summarise some of GSWA's highlights for the year, with a focus on how these datasets can inform on critical mineral and energy systems, and carbon capture, use and storage (CCUS). It will then offer some insight into our future plans and ambitions over the next few years to ensure we are helping drive and sustain future exploration.

Fawna's Keynote is at 09:25





Nicole Roocke

Chief Executive Officer,
Minerals Research
Institute of Western
Australia

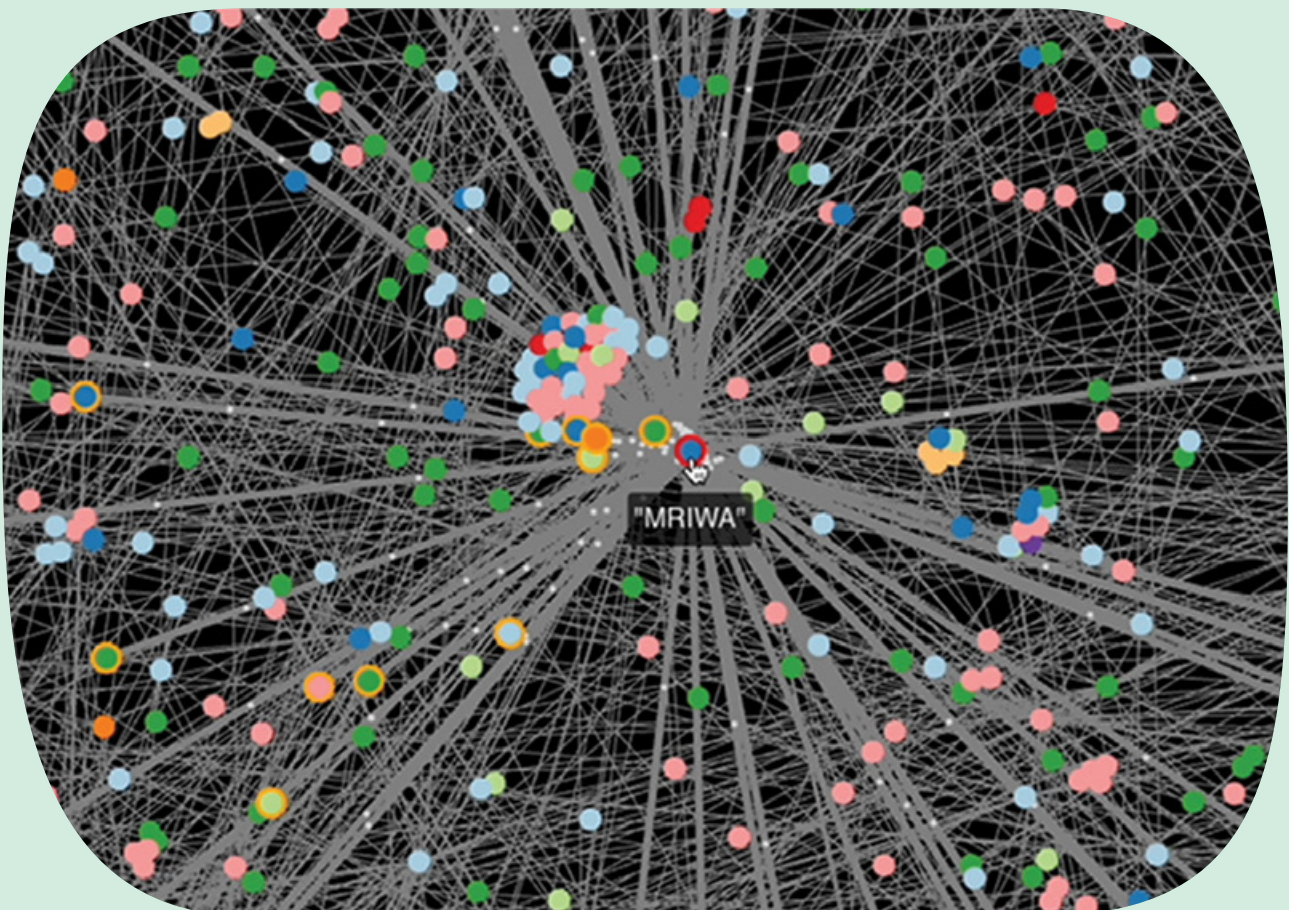
Nicole joined MRIWA in 2018 after 15 years with an industry association, where she coordinated industry input on various government regulatory and policy issues and facilitated collaboration within the resources sector.

A future with artificial intelligence

Artificial intelligence (AI) is revolutionising various fields, including geosciences, by enhancing data analysis, pattern recognition, and predictive modelling. This presentation explores the concepts of AI and their applications in geosciences. It will address the key challenges associated with AI in this domain, including data quality, bias, and the need for domain-specific expertise. Additionally, the presentation highlights opportunities for AI to advance geoscientific research and practical applications. By examining this topic, we aim to provide insights into how AI can be effectively integrated while also addressing potential pitfalls and other considerations. This exploration will offer an understanding of AI's impact on the future of geosciences.

Email: mail@mriwa.wa.gov.au
www.mriwa.wa.gov.au

Nicole's presentation is at 09:40





Dr Andrew Heap

Chief of Minerals,
Energy and Groundwater
Division

Geoscience Australia

Andrew oversees priority research programs to develop a national prospectus of Australia's mineral, energy, and groundwater resources that will maximise Australia's resource wealth now and into the future.



Australian Government
Geoscience Australia

Resourcing Australia's Prosperity: a new era of discovery

Australia's abundant geological resources are a cornerstone to the country's long-term growth, prosperity, and security. By leveraging our competitive advantage and building sovereign capability, the Australian Government is looking to generate the energy, skills, jobs, technology, and investment that will power our future.

Andrew's presentation will provide an overview of Resourcing Australia's Prosperity, a landmark \$3.4 billion initiative to be led by Geoscience Australia (GA). Over the next 35 years, GA will map the critical minerals and strategic materials, low emissions energy and groundwater resources needed to support our future prosperity and achieve net zero by 2050.

Andrew will discuss how the suite of geoscience activities at GA are delivering on a range of national priorities, and how valuable collaborations with governments and academia are ensuring the benefits of precompetitive geoscience are maximised for the nation. In partnership, these activities will stimulate exploration investment, underpin new resource discoveries, advance clean energy technologies to support the transition to net zero, and enable the sustainable management of Australia's water resources.

Andrew will delve into the world-class science, innovative tools, and emerging technologies being developed by GA and how governments, industry, and communities can use them to inform their decision making and investments.

Email: clientservices@ga.gov.au
www.ga.gov.au

Andrew's presentation is at 10:00





Deidre Brooks

Manager Energy
Systems and Geological
Storage

Deidre's branch undertakes geoscientific research on petroleum and new alternative energy-related commodities including natural hydrogen, helium, geothermal and CO₂ sequestration.

Status of the new GSWA CO₂ Storage Atlas of Western Australia

The Ministerial Taskforce on Climate Action, established in May 2021, identified the enhancement of CO₂ sequestration as a key government priority. GSWA received Western Australian State Government funding through this taskforce in July 2022 to create a new CO₂ Storage Atlas of Western Australia.

The atlas incorporates updated and quality-controlled statewide geological datasets and new interpretations to provide a regional assessment of the potential for CO₂ geosequestration in the Perth, Southern Carnarvon, Northern Carnarvon (onshore and State waters), Canning and Officer Basins.

Data discovery and clean-up is complete for all basins. Work on the stratigraphic framework is underway including well formation picks and new well correlations. Depth and isopach maps help to define the structural framework for each basin and are key input into the temperature modelling which are completed for the Perth and Officer Basins. Regional reservoir porosity assessment is underway.

All available datasets and digital results can be downloaded from WAPIMS from the CO₂ Storage Atlas tile on the home page.

Email: basinenergy.geoscience@demirs.wa.gov.au

Note: all email enquiries for this session can be sent to this inbox.

www.demirs.wa.gov.au/wapims

Deidre's presentation is at 10:55

WAPIMS home page showing the location of the CO₂ Storage Atlas data

Welcome to WAPIMS
Petroleum & Geothermal Information Management System

Search the Petroleum Exploration Database

WELLS	SURVEYS	REPROCESSING	TITLES	FIELDS	CORE LIBRARY	FACILITIES	NEW RELEASES	ACREAGE RELEASES	GIS MAP
-------	---------	--------------	--------	--------	--------------	------------	--------------	------------------	---------

Well name

Well operator

Field

Basin

Title

Is offshore?

Spud date from

Spud date to

Report types

SEARCH

CLEAR ALL

About WAPIMS
Western Australian Petroleum and Geothermal Information Management System (WAPIMS) is a petroleum exploration database containing data on titles, wells, geophysical surveys and other related exploration and production data. The system also contains the Core Library (Perth and Kalgoorlie) database.

New Uploads
Documents previously not available online and recently uploaded to Azure

Well Tops, Samples & Analyses
Open file well formation tops, samples & analysis data extracted from reports submitted to DEMIRS.

Digital Core Analysis
An interactive display multiple datasets overlaid and images of individual trays

CO₂ Storage Atlas
Data, information and modelling produced as part of the CO₂ Storage Atlas Project

wapims.dmp.wa.gov.au/WAPIMS

Session two

GSWA Open Day 2024 Conference Program |

9



Courtney Brennan
Senior Geologist

Courtney has twenty years' experience supporting exploration and development decisions in Western Australia's resources industry. She is a lifelong knowledge-seeker focused on asking and answering the right questions.

Developing CO₂ Storage Atlas data and interpretation products

Huge geology products a mouse-click away...

Three examples of data and interpretation products from the CO₂ Storage Atlas project will be presented. These products are among many designed to support characterisation of subsurface elements critical for successful underground storage of greenhouse gases.

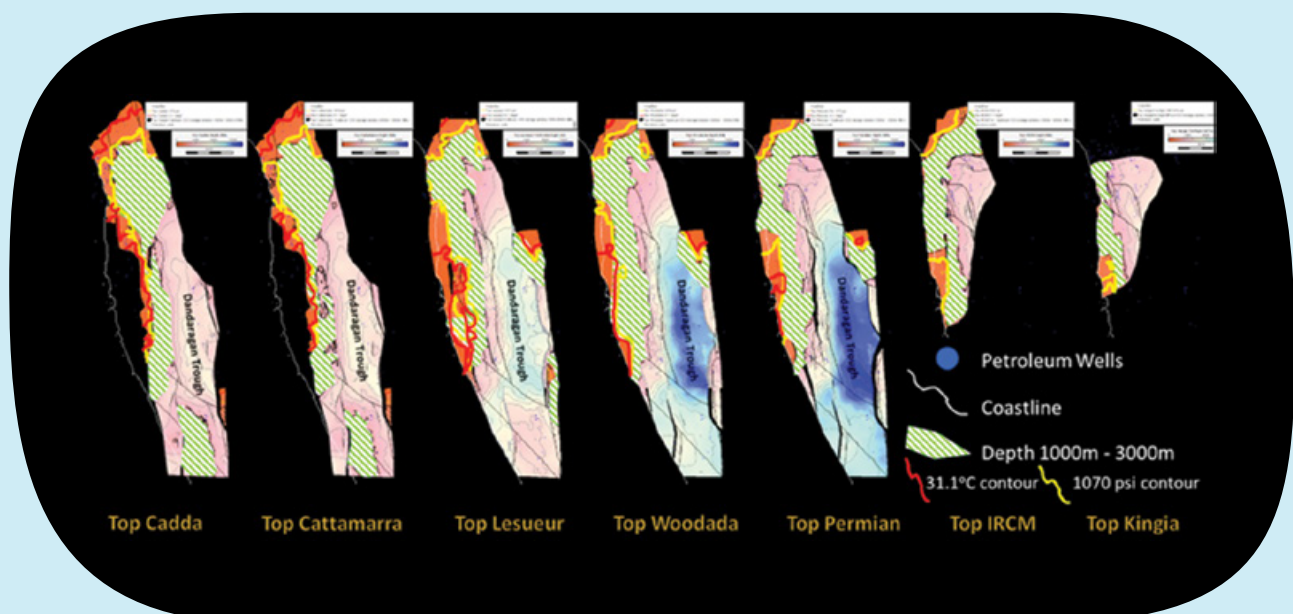
We have curated a temperature database which can be downloaded from WAPIMS. This data, derived from all open-file petroleum industry production, drill stem and wireline reports within Western Australian jurisdiction, includes essential supporting data such as depth, circulation time, time since circulation and correction type.

A comprehensive set of formation tops was interpreted for petroleum wells in the Northern Carnarvon Basin onshore and within State waters. The interpretation was built on a framework which leveraged published significant Mesozoic and Cenozoic sequence stratigraphic correlations of biostratigraphic zonation (Marshall and Lang, 2013). These regional surfaces can be identified across the entire Westralian Superbasin, enabling correlation between different lithostratigraphic formations across the Northern Carnarvon Basin.

Consolidation of key geoscience datasets is required to build models predicting present day subsurface temperatures and pressures. Temperature models are already available for the Perth and Officer Basins through WAPIMS. The results help define areas prospective for CO₂ sequestration.

▼ *Atlas products include thermal modelling maps for Perth Basin*

Courtney's presentation is at 11:10





Julie Cass

Manager Geological Storage and Geothermal Systems

Julie is a petrophysicist with over 20 years' experience in the oil and gas industry. She has worked mainly for operating companies in Australia and the United Kingdom before joining DEMIRS in 2021.

Leveraging well data to quantify reservoir quality for geological CO₂ storage prospectivity

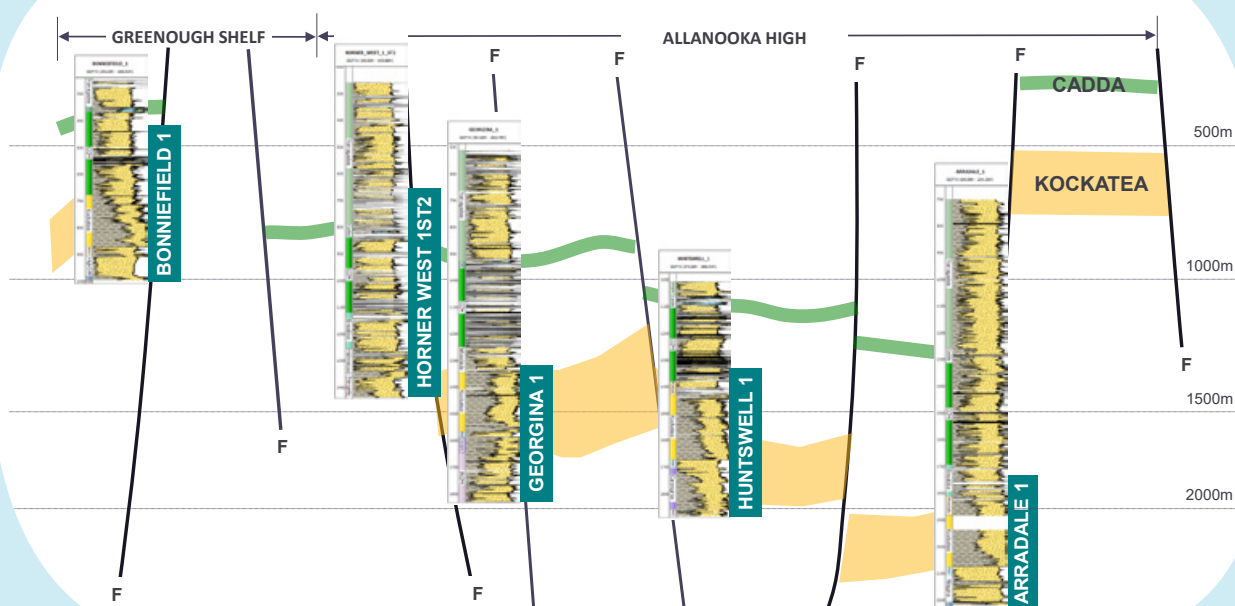
To enable a regional assessment of reservoir quality for the CO₂ Storage Atlas of Western Australia project, 8,070 well log LAS files were standardised into a uniform format using Python, resulting in consistent depth references, mnemonics, units, coordinates, and well names for AI-based analysis. Additionally, routine core analysis (RCA) data was quality-checked and reformatted to enhance accessibility.

Given the 70-year span of acquisition, aspects of data quality required careful consideration due to variations in tool physics, calibration standards, logging conditions, hole size, wellbore fluids, and whether the well was cased during logging, before attempting to interpret the well data.

The gamma ray logs, in all wells, were inspected to identify subdued responses due to logging behind casing. A multiplier was applied to align these readings with those from openhole sections. Subsequently, gamma ray logs were rescaled to a 0–150 GAPI range, ensuring consistent visual representation across wells, though not normalising absolute values.

Quantitative volume of shale was calculated using gamma ray calibrated to the density/neutron volume of shale. This volume was then used to estimate porosity, with a kill flag used to null bad log quality.

Julie's presentation is at 11:25





Robert Iasky
Senior Geologist

Robert is an experienced geoscientist studying sedimentary basins for both government and the petroleum industry. He is currently involved in seismic mapping for the GSWA CO₂ sequestration project.

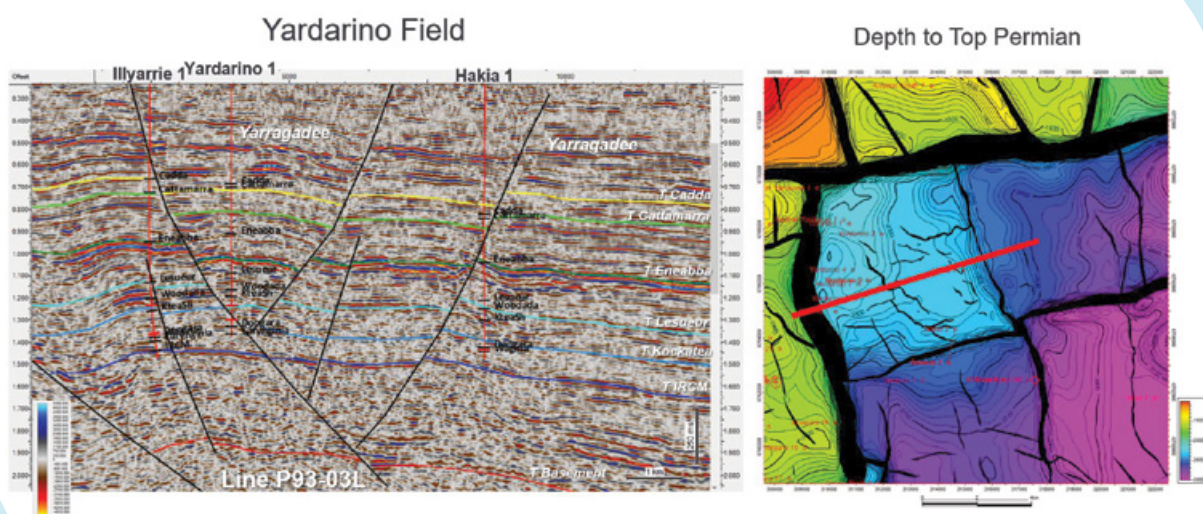
Searching for traps in the underworld: seismic interpretation and depth mapping

Regional subsurface mapping of key strata in onshore sedimentary basins in Western Australia is an essential component identifying prospective areas to store CO₂ as part of the current GSWA's CO₂ Storage Atlas of Western Australia project. The task involves interpreting open-file seismic data recorded by petroleum exploration companies over roughly the last 70 years.

The interpretation process includes loading digital seismic (SEG Y) and well (LAS) data into Kingdom software. Most available seismic data is in two-way time so mapping is carried out in time and then converted to depth using various techniques. Mappable horizons identified on seismic data are tied to formation boundaries intersected by petroleum wells and drillholes where downhole velocity data were recorded, therefore a byproduct of this project includes capture and clean-up of velocity survey data from well reports.

Depth mapping has been completed for the Officer and Perth Basins and interpretation continues for the Canning, Northern and Southern Carnarvon Basins. The main features to note in the Perth and Officer Basin maps, in relation to CO₂ storage potential, are the location and density of faults, depths and thickness of the potential reservoir formations and in the Officer Basin the location of salt bodies.

Robert's presentation is at 11:40



Fireside chat with WA Array



Richard Chopping
Strategic Science
Advisor

Richard Chopping is a geophysicist with a focus on how geoscience can address societal challenges such as navigating the energy transition.



Ruth Murdie
Manager Earth Imaging
and Observation

Ruth manages the WA Array and WA-MT projects. She is a geophysicist that has been leading passive seismic projects for twelve years and is involved in generating 3D geological models.



John O'Donnell
Senior Geophysicist

John specialises in mapping the 3D structure of Western Australia's lithosphere using seismic waves. His work focuses on understanding the layers beneath the Earth's surface.



Reza Ebrahimi
Seismologist

Reza studies Earth's vibrations, particularly earthquakes, using specialised instruments to understand seismic waves, the Earth's structure, and the causes and effects of tectonic movements.



Huaiyu Yuan
Technical Lead
Seismologist

For over 15 years, Huaiyu has studied the Earth's continental lithosphere, harnessing advanced seismic techniques to uncover the hidden dynamics of earthquakes.

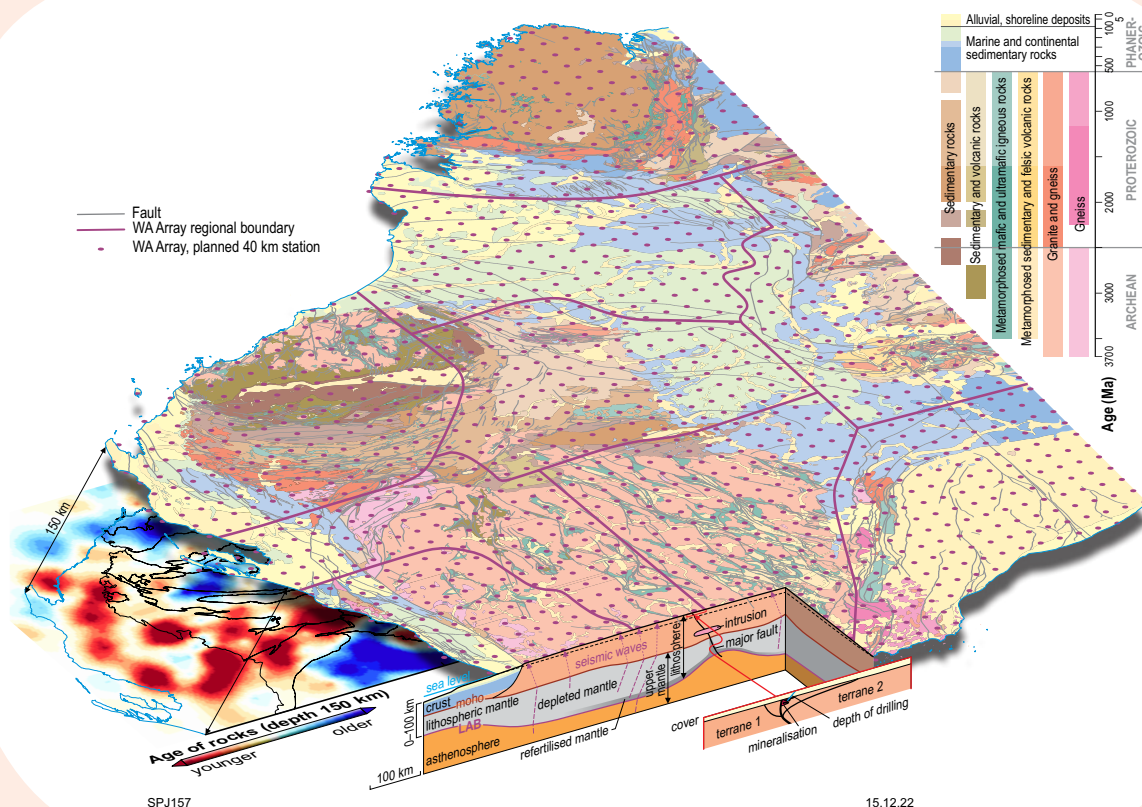
Fireside chat with WA Array

WA Array has reached its first milestone: the release of data and models from the first phase of the project which covers the southwest Yilgarn, Southern Perth Basin and underlying Pinjarra Orogen, and western Albany–Fraser Orogen. One hundred and fifty new stations in addition to 10 permanent stations in the southwest have imaged the crust and upper mantle of this region in high resolution, the best resolution yet observed in Australia. Derivative datasets include depth to Moho, seismic velocity models, mantle anisotropy, and a local seismicity catalogue with focal mechanisms and estimates shallow ground conditions for seismic hazard. Spatial and 3D products will be available through GSWA online geoscience data platforms.

In this fireside chat, team WA Array will discuss current results, deployment, and future plans. Attendees are encouraged to dig deep and shake as much knowledge from these experts to understand the ways in which these data will help explorers, researchers, and the community.

Email: wa.array@demirs.wa.gov.au

Moderated by Richard Chopping, session three commences at 13:20



▲ The concept of WA Array, showing how incoming waves from distant earthquakes will image the subsurface down to 250 km



Ken Collerson
PhD, FAusIMM

Technical Director,
Victory Metals Australia

Professor Ken Collerson played a pivotal role in discovery and characterisation of the North Stanmore HREE-Sc enriched regolith deposit. At Victory Metals Australia, he is responsible for corporate technical leadership.

Regolith-hosted HREE and Sc mineralisation above the North Stanmore alkaline intrusion

The North Stanmore HREE and Sc deposit occurs in saprolite above a previously unrecognised post-tectonic ~16 x 5 km alkaline intrusion, north of Cue. Compositions include peridotite, pyroxenite, gabbro and monzonite, with subordinate carbonatite. It lies on the same plume track that hosts the Mount Weld carbonatite (Fiorentini et al., 2020). The saprolite is up to ~70m thick, with constant Nb/Ta ratios (~av.15.8) indicating an in situ regolith. REEs are either ionically adsorbed on clay or are hosted by secondary rhabdophane and churchite. REE rich zones have HRE/TRE ratios of ~35%. All have negative Ce/Ce* anomalies, reflecting loss of Ce⁴⁺ during oxidation; a feature typical of leachable ionic clay REE systems. Elevated REE concentration occur in three horizons, that are interpreted to reflect water table fluctuations during tropical weathering between ~80 and ~5 Ma (Vasconcelos et al., 2013). Maximum TREO and Sc₂O₃ values are 1 wt% (Ce/Ce* 0.32) and 300 ppm respectively. With grade-beneficiation confirmed, ~90% leaching REE recoveries, demonstrated production of mixed REE carbonate, and a JORC indicated resource of 149 M tonnes REOs, containing 4,600 tonnes Dy₂O₃ plus Tb₄O₇ and 6,279 tonnes Sc₂O₃ in 8% of the tenement area, the North Stanmore discovery is emerging as a significant new ethical source of DyTb and Sc.

▼ *Air Core samples 22NSTAC0071 showing variation REE-Sc enriched regolith at North Stanmore*

Email: info@victorymetalsaustralia.com

Ken's presentation is at 15:05





Erin Gray
Senior Geologist

Erin is a dedicated geologist specialising in mineralogical characterisation, using her expertise to solve complex geological problems and enhance exploration targeting for more efficient resource discovery.

A statewide heavy mineral map for critical mineral exploration

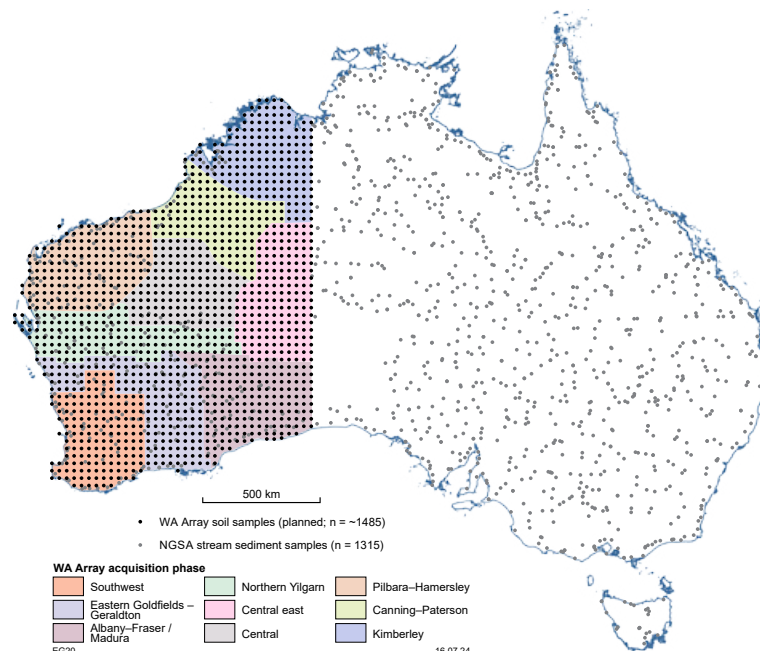
Heavy mineral distribution maps of surficial deposits are a valuable precompetitive geoscience dataset, providing information about mineralogical associations indicative of economically important mineral systems. A vast area of Western Australia has no such data available; therefore, as part of the WA Array project, GSWA is collecting soil samples from each seismometer site. A total of around 1485 samples will be used to create a Heavy Mineral Map of Western Australia, enabling us to investigate the mineralogical characteristics of regolith-derived heavy mineral concentrates, with a focus on those critical minerals essential for modern technology and decarbonisation.

The Heavy Mineral Map of Western Australia is intended to be consistent and interoperable with the recently released Heavy Mineral Map of Australia, and will provide an unprecedented level of coverage across the State with a number of potential applications, including:

- targeted mineral chemistry
- indicator mineral studies
- incorporation into prospectivity mapping.

This dataset will support exploration efforts for critical minerals in Western Australia by detecting indicator minerals related to mineralization in areas obscured by cover, and provide information over traditionally underexplored areas where significant gaps in our geological understanding exist.

Erin's presentation is at 15:25





Hugh Smithies

Manager Geoscience
Mapping and Mineral
Systems

Hugh manages the collection, compilation, interpretation and publication of material and information relevant to enhancing understanding of WA's basement geological evolution and mineral systems.

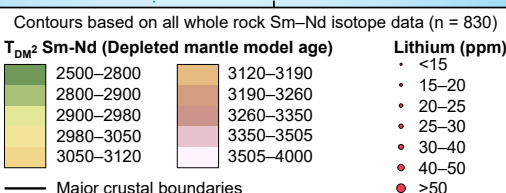
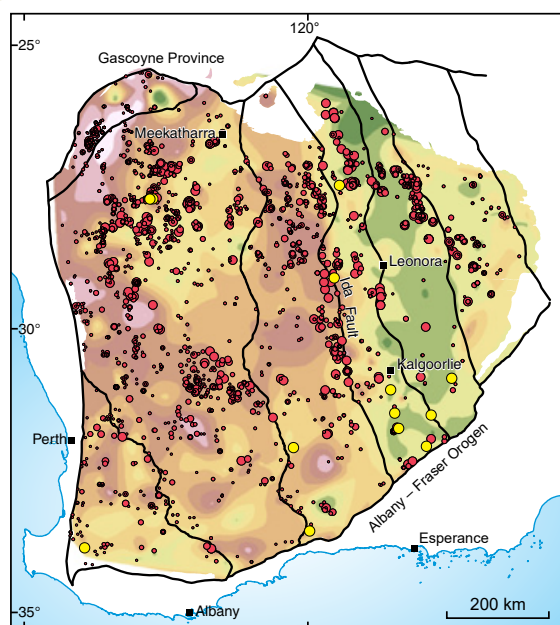
A Li-pegmatite paradigm consistent with Western Australia's Archean geology

Lithium is a critical component in the global transition to clean energy. Most of the world's current lithium supply comes from pegmatites that formed in the Archean eon, yet our understanding of how they formed is largely based on studies of pegmatites from terranes, often with no clear relevance to Archean settings. To address this, GSWA is accumulating a large geochemical dataset on granites from the Yilgarn and Pilbara Cratons, concentrating on those spatially and temporally associated with Li-pegmatites. This dataset, along with published regional maps, shows that S-type granites and viable metasedimentary melt sources implicated in petrogenetic studies of post-Archean Li-pegmatites are not found in Australian Archean terrains. Preliminary interpretations of our expanding geochemical dataset allow for alternative sources more consistent with Archean granite-greenstone evolution.

This presentation will discuss our basis for refuting 'sediment source' models for Li-pegmatite formation and present the data and interpretations that lead us to suggest the biotite altered root-zones of greenstone belts as an alternative source.

Hugh's presentation is at 15:35

EXPLORATION
INCENTIVE
Scheme



RHS1355b

27.08.24



Matt Clarke

Principal Geologist –
Land Use Geoscience

As a member of the Land Use Geoscience team, Matt plays a key role in shaping and informing land use planning policies by providing expert advice on geoscience, resource mapping and prospectivity assessments.

Sediment-hosted copper sniffs in the Officer Basin

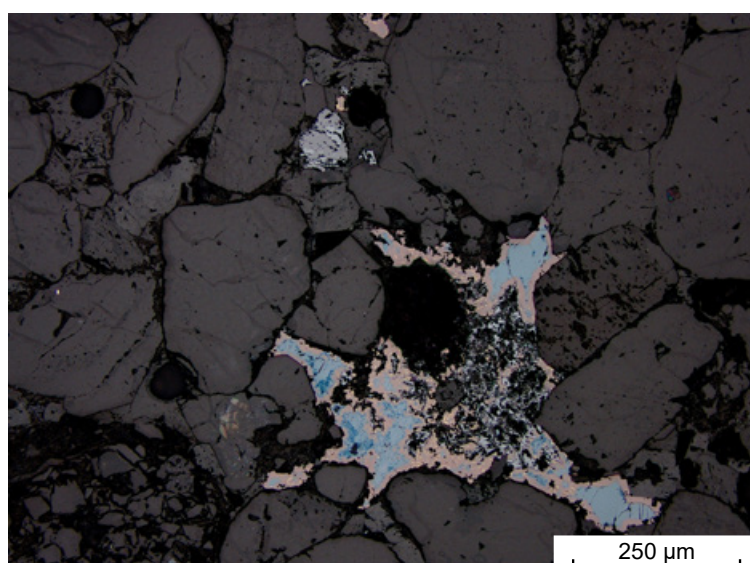
As global demand for renewables, electric vehicles and consumer electronics increases, so will the demand for copper. GSWA aims to enhance precompetitive data and knowledge to support exploration for this strategic metal. Sediment-hosted copper deposits supply roughly one quarter of the world's copper, with notable Western Australian examples within the well-explored Yeneena Basin. However, much of the neighbouring Officer Basin remains underexplored and undervalued with respect to copper.

Conceptually, the Officer Basin is a fit for the sediment-hosted copper model, with evidence for the necessary source, fluids, pathways and traps. A review of Officer Basin WAMEX and WAPIMS reports yielded indications of copper sulfides or anomalism. Subsequently, GSWA Core Library-housed drillcore, obtained from across the basin, were examined and selectively sampled to identify sediment-hosted copper signatures. Results showed both geochemical anomalies and mineralisation consistent with reduced facies, and Revett or redbed-style copper enrichment.

These findings suggest the presence of a sediment-hosted copper system within the Officer Basin, opening the possibility for a new copper province. This preliminary study is to be followed up with further work by GSWA to unlock the copper prospectivity of Western Australia's sedimentary basins.

Matt's presentation is at 15:45

Polished thin section image in reflected light from the GSWA Vines 1 drillhole at 340 meters, showing a copper sulfide mineral assemblage (bornite-chalcocite-chalcopyrite±covellite) within Wahlgu Formation sandstone



MC38

03.09.24



Charmaine Thomas

Senior Geologist/
Geophysicist

Charmaine's work is focused primarily on understanding the architecture of Western Australia's sedimentary basins using seismic and other geophysical datasets, and well/drillholes.

EXPLORATION
INCENTIVE
Scheme

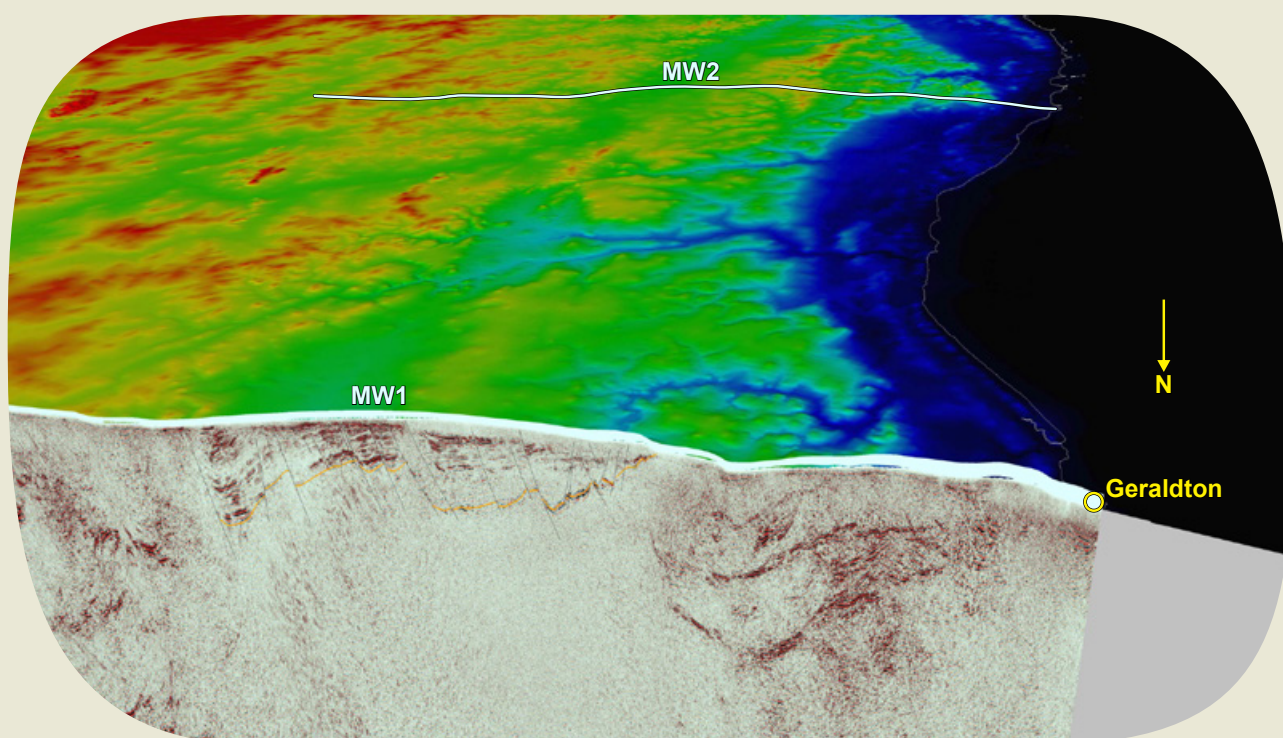
The Perth Basin and basement: new insights from deep-crustal reflection seismic profiles

In 2023, GSWA contracted Hi-Seis to acquire three reflection seismic profiles covering the Perth Basin, Proterozoic Inliers of the Pinjarra Orogen and the Yilgarn Craton, recording 20 seconds of data. Processing included prestack time and depth migration. Although the Perth Basin has dense coverage of petroleum industry seismic data, the new lines were located where coverage was sparser or consisted of only short vintage lines.

Line SW1 provides the only seismic image of the Leeuwin Inlier and the Dunsborough Fault separating it from the Perth Basin. Line MW1 images the Devonian (and older?) to Permian half-graben fill against the Urella and Darling Faults and onlap onto the Northampton Inlier (below). It also images Proterozoic metasedimentary basement. Line MW2 is the sole subsurface image of the Proterozoic Moora Basin and helps clarify the complicated structure of the Coomallo Trough and Cadda Terrace of the Perth Basin.

In all three lines, the Moho is not readily discernible beneath the basin and a narrow strip of craton immediately adjacent the Darling Fault, despite fair reflectivity at Moho depths within the craton generally. Further interpretation in conjunction with other GSWA datasets including passive seismic velocities is ongoing to understand large-scale basin-forming processes.

Charmaine's presentation is at 15:55



Session four



Tony Perry

Program Manager,
Geoscience Data
Transformation Program

Tony is an experienced data management specialist who has worked across the UK, Europe, US, Canada, Middle East, India, New Zealand, and Australia.

Geoscience data relationship mapping through knowledge graphs

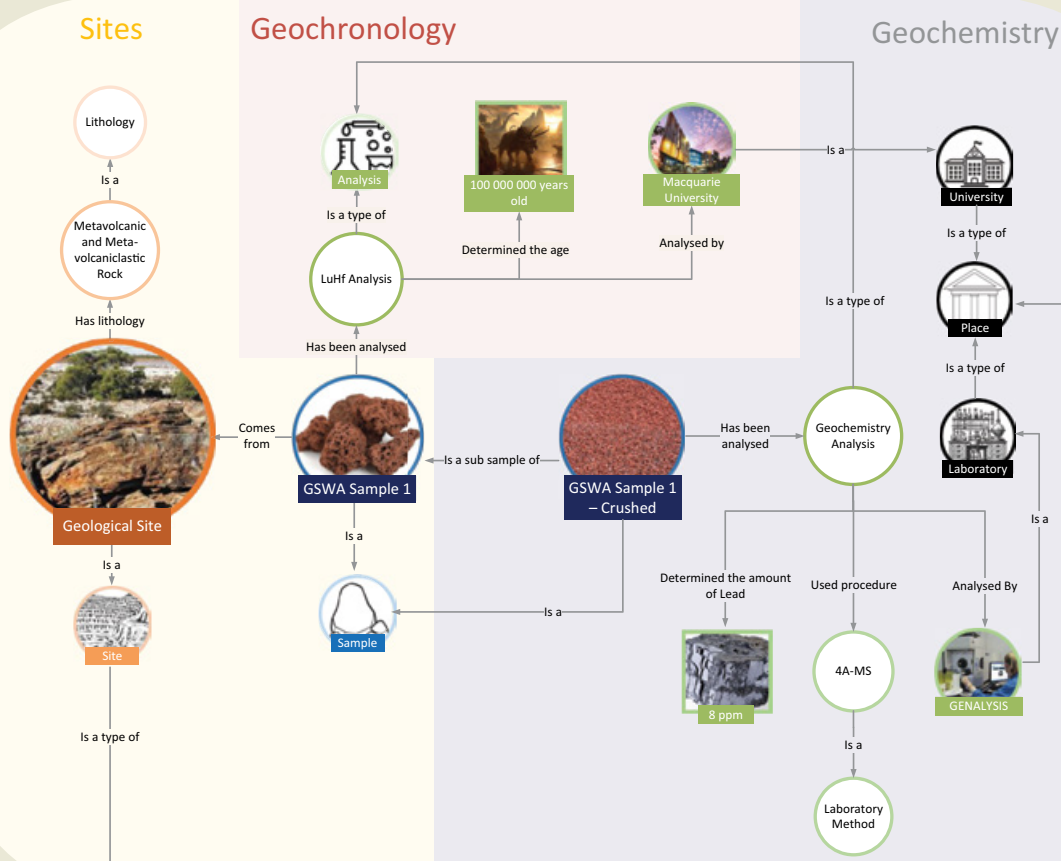
The Geoscience Data Transformation Program is three years into its five-year lifespan as it seeks to improve GSWA data accessibility now and for the future. Behind the scenes, the program is making use of knowledge graph structures to improve data integration and discovery for all users.

Knowledge graphs, or semantic networks, will be explained in the context of GSWA data and what that means for an improved user experience in the future. GSWA data will become more agile, more connected, and more powerful.

The program has been responsive to widespread feedback on the inaccessibility of GSWA data and the disconnection of datasets. Engagement through the External Reference Group, and other opportunities, continues to influence and impact program priorities.

As the program continues to achieve milestones towards solution implementation, its engagement with GSWA data users becomes more important than ever.

Tony's presentation is at 16:05



GSWA data – world-class, authoritative, reliable



Mines and Mineral Deposits (MINEDEX)

A spatial and textual database providing comprehensive data on mining and exploration sites and projects in Western Australia. MINEDEX provides data on the location and geology of mineralized sites, commodities, project structure, status, ownership and history, mineral resource estimates and production data, environmental registrations, and site operators. It also includes an inventory of abandoned mine sites.

www.demirs.wa.gov.au/minedex



Western Australian Petroleum and Geothermal Information Management System (WAPIMS)

A petroleum exploration database containing data on wells, geophysical surveys, titles, and other related exploration and production data. The system also contains the core library (Perth and Kalgoorlie) database. Users must be registered against a company to access the online submission system. The data received are strictly confidential; only data lodged by the company you are registered for will be displayed.

www.demirs.wa.gov.au/wapims



Mineral exploration reports (WAMEX)

Mineral explorers are required to report annually on their exploration projects under Western Australian legislation. After a period of confidentiality, the exploration reports and data are made publicly available; these are referred to as open-file (public) reports. Mineral exploration open-file reports are stored in the WAMEX database. Reports can be accessed and downloaded free of charge.

www.demirs.wa.gov.au/wamex



DEMIRS eBookshop

The eBookshop contains more than 6000 geological products including books, maps and data packages.

www.demirs.wa.gov.au/ebookshop



Data and Software Centre

Data and Software Centre allows you to download spatial datasets relating to geology, mining and petroleum titles, geochemistry and other geoscience information.

dasc.demirs.wa.gov.au

GSWA experts are available to discuss data access and lodgement with you.



#GSWA2024

Government of Western Australia

Department of Energy, Mines, Industry Regulation and Safety

Mineral House 100 Plain Street
East Perth Western Australia 6004

Telephone: +61 8 9222 3333

Website: www.demirs.wa.gov.au

Email: publications@demirs.wa.gov.au