

South Australia's Geoscience Data AI Ready?

Christie Gerrard

Department for Energy and Mining



Government of South Australia
Department for Energy and Mining

ENERGY RESOURCES SUMMIT

Innovate with past, future data collections, providing the right tools for future exploration and research technologies.

140 years of geoscience information

- Geology, basins and prospectivity
- Mines, deposits and commodities
- Geophysical surveys and imaging
- Geoscientific databases
- Core photography and scanning
- Maps and publications
- Company drilling and reporting
- Geochronology and biostratigraphy
- Physical core and samples
- Metadata, vocabs and standards
- GSSA research and insights, plays, data and publications



People

Easy access to accurate, up-to-date geoscience data for exploration decisioning making.

Process

Cloud-based integration improving digital service efficiency, flexibility and scalability.

Technology

Establish open API endpoints making geoscience data findable, accessible, interoperable and reusable (FAIR data principles).

Digital Delivery

Expanded digital footprint of South Australia geoscience information to unlock resources.

**Open Access
to
digital platforms
and data services**



Interoperability – a key for AI pipelines!

Standards, protocols, technologies, and mechanisms that allow data to flow between diverse systems with minimal human intervention. It allows diverse systems to talk to each other and share information in real time.

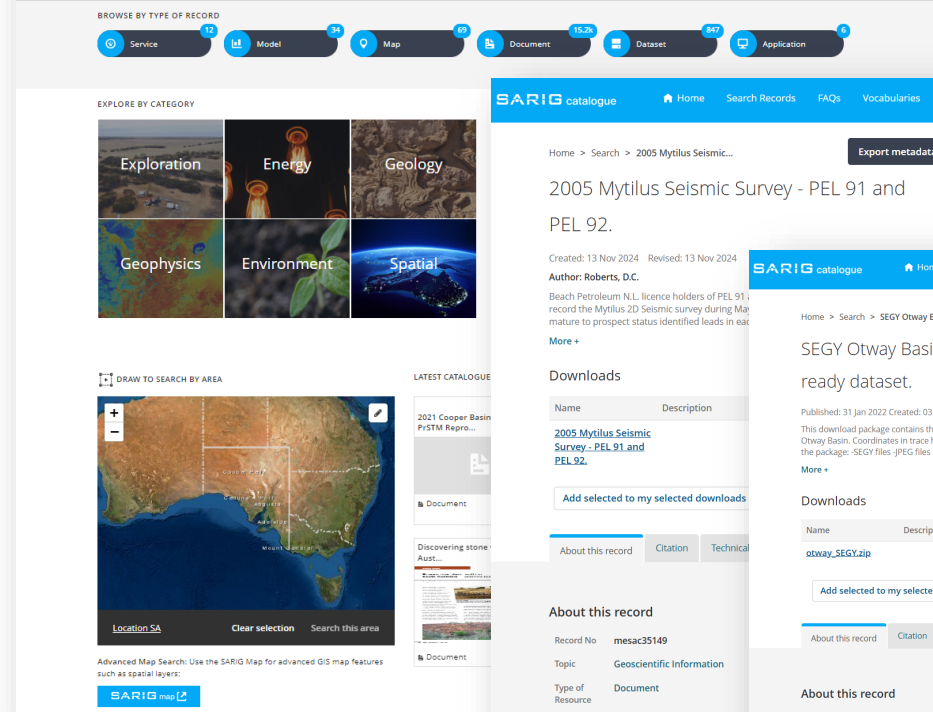
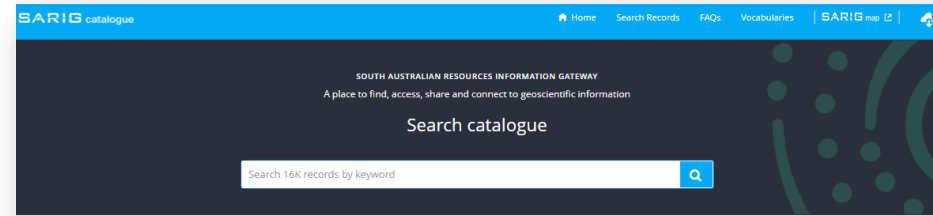
How to achieve Interoperability - we need an API?

- Geoscience Information use **Web Services** as the API, as its foundation is to communicate access, visualise and analyse **geospatial data**.
- **Open Standards** and **Vocabularies** are vital for interoperability and enable AI models and agents to work and provide the tools for *innovation*.

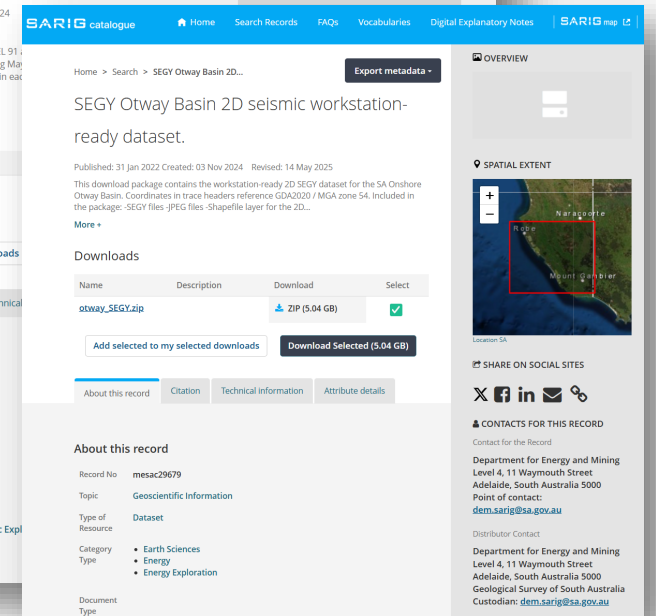


SARIG Catalogue – connect to geoscience data, maps, models and publications

- Consolidated multiple datastores into one catalogue
- Search across all geoscience data, geospatial, maps, models and publications/reports.
- Spatially enabled catalogue
- Metadata Standard ISO 19115-3
- New Category Types - mapped to Australian and New Zealand Standard Research Classification (ANZSRC) 2008.
- All dates mapped to dd/mm/yyyy format, for easier searching



- ✓ Tenement spatial datasets
- ✓ Petroleum well spatial locations
- ✓ Seismic spatial data
- ✓ Seismic workstation ready data
- ✓ Seismic company reporting and data



SARIG Catalogue – connect to geoscience data, maps, models and publications

- **CSW - Catalogue Service for the Web (OGC standard)**
- **CSW v2.02:**
<https://catalog.sarig.sa.gov.au/csw?Request=GetCapabilities&service=CSW&version=2.0.2>
- **GSSA GitHub – SARIG catalogue**
 - Notebook examples of how to use the CSW service
- **South Australia Vocabularies**
 - List of all vocabularies used in the SARIG catalogue

The image shows two overlapping screenshots. The background is a GitHub repository page for 'GeologicalSurveySouthAustralia / SARIG-Catalogue-CSW'. The repository is a public template with 2 branches and 0 tags. The README section is visible, titled 'The Geological Survey of South Australia SARIG Catalogue CSW'. It describes the 'NEW SARIG catalogue and CSW API' and states that the SARIG Catalogue is a comprehensive online resource providing access to Department for Energy and Mining (DEM) publications. The foreground is a screenshot of the 'SARIG catalogue' website. The website header includes 'SARIG catalogue' and navigation links for Home, Search Records, FAQs, Vocabularies, and SARIG map. The main content area is titled 'South Australian Vocabularies' and features a section for 'SARIG Vocabularies' with a prominent orange button that says 'The list of SARIG Vocabularies'. To the right, there are sections for 'Alternate Profiles' and 'This System'.

SA Geology – 1st Edition

SA Government Geoscience Data Web Services

<https://sarigdata.pir.sa.gov.au/geoserver/ows?service=wfs&version=2.0.0&request=GetCapabilities>

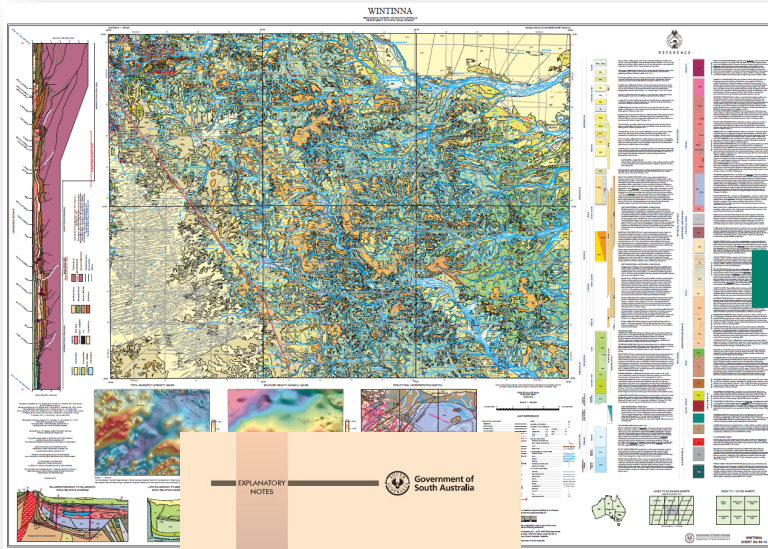
National Petroleum Tenements
National Mineral Tenements
International NVCL Drillholes
International Mineral Occurrences

Now including SA Geology

GeoSciML lite : International standard

Contacts, folds, foliation, shear displacement structures and geological units and geomorphologic features

GeoSciML – is a data model and data transfer standard for geological data - from basic data to complex relational geological databases.



PDF to Digital Explanatory Notes

45 new seamless geology spatial layers.

14 Time slices (geology, linear structures, boundary, trendline)

SARIG map

All Map Layers Active Layers Saved Maps

Map Layers

The map layers displays a list of all spatial layers available in the SARIG map and can be quickly filtered by the layer name. To activate a map layer on the map simply tap on the layer name. To view map layer legend, metadata, access downloads go to the "Active layers" option on the above toolbar.

Search map catalog

All themes | New releases | CC BY Expand/Collapse CLEAR

- Time slice - SA Geology 1st Edition
- SA Geology 1st Edition - geological units
- Geology - SA Geology 1st Edition
- Cenozoic time slice (0-64 Ma)
- Cenozoic time slice (0-64 Ma)
- Cenozoic time slice (0-64 Ma)

SARIG catalogue

Search Notes - Arkaringa Basin

Arkaringa Basin

Approved: 14 Apr 2025

The Arkaringa Basin is a Late Carboniferous to Permian aged intracratonic sedimentary basin located in central-northern South Australia. The basin comprises a succession of partly glacial, fluvio-lacustrine to marine siltstones of up to 1300 m thick and contains numerous coal measures.

Synonyms: Permian Time Slice (299 - 250 Ma)

Download report

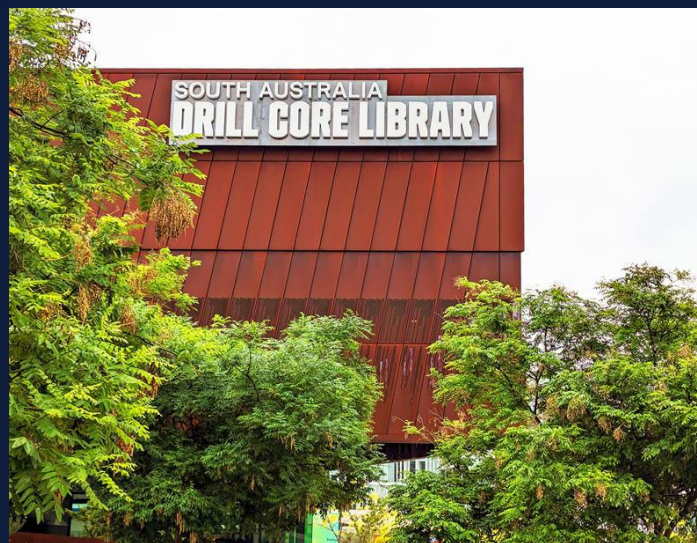
Summary	Geological activity and stratigraphy	Prospectivity	Exploration	Energy prospectivity	Citation	References
<p>The Arkaringa Basin is a Permo-Carboniferous intracratonic basin in South Australia located approximately 750 km north-west of Adelaide and covering an area of around 80,000 km². The basin fill is mainly composed of glacial, marine, and freshwater sedimentary deposits, with thicknesses up to 1300 m in the Boorthanna Trough. This Late Carboniferous to Early Permian-aged succession is overlain by up to 300 m of sediments from the Eromanga Basin and generally less than 10 m of tertiary cover.</p> <p>The Arkaringa Basin comprises 3 main formations distinguished by lithological and stratigraphic characteristics (Hibbert 1984). These include the Boorthanna, Stuart Range, and Mount Tooinina Formations. The Boorthanna Formation features a basal glauconitic facies that transitions to marine facies at the top. The lithologies include diamicitic, rhythmically bedded sandstone – which likely formed by turbidity currents – and laminated mudstone. The overlying Stuart Range Formation is predominant.</p> <p>More+</p> <p>Extent</p> <p>The Arkaringa Basin covers an area of about 80,000 km² in the central-northern part of South Australia; it extends almost 500 km in a W-E direction and about 380 km in a N-S direction. Geographically centred at the town of Coober Pedy, the basin's northern margin lies in the area between Maria and Oodnadatta and the south-east margin lies just north of Lake Labyrinth. In the south-west, the basin extends to the</p>						

SARIG Core Intelligence Program

Leverage the geoscience wealth of the Drill Core Library's past, present and future, to enable modern **data-driven exploration** and **resource discovery**.

Expand South Australia's global geoscience information leadership by "exploring" and transforming its physical resources into a **digital intelligence library**.

Enable drill core and associated datasets to be **accessible anytime, from anywhere in the world**.



140 years of exploration for energy and minerals resources

- **10,000,000 metres** of drill core and cuttings
- Approximately **8,000** rock samples
- **22,000 thin sections** catalogued

Challenge....

Core photography, core scanning and sample imagery

- Backlog & growth in image data
- Fragmented storage
- New image data types
- Performance for future visualisation

Computer Vision: AI Data Processing and Enablement

Computer Vision used to process the individual drill hole images into a single, continuous core image.

Computer Vision techniques extracts, interprets and enriches existing visual information into more useful standardised formats. This Computer Vision technique uses Optical Character Recognition (OCR) for extracting depths and metadata.

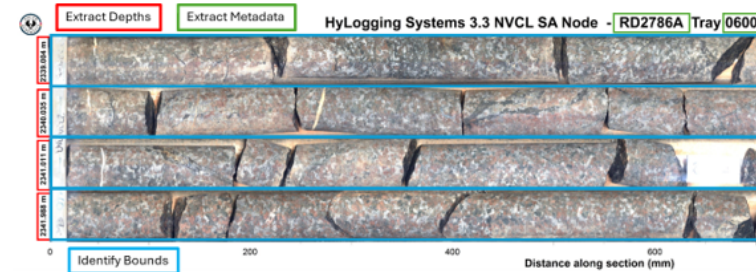


Figure 1: Extracting Depths, Bounds and Metadata from A HyLogging Image

PEPS SA

SA Geodata

HyLogger - NVCL

Network & Physical Media

Structured Data

Company Core Images

Thin Section Images

Image Binary

Tray Image

Raw Files

Raw Images

Raw PDF

MicroXRF

High-Res Images

Paleontology Images

X-Ray Images

Fossil Images

Thank You



Government of South Australia
Department for Energy and Mining

ENERGY RESOURCES SUMMIT

