



## From the Executive Director

Welcome to the August issue of On the Outcrop. 2018 seems to be flying by and we're now into a new financial year.

2018/19 will see the completion of a couple of major projects for GSNSW that commenced well before my arrival at the GSNSW over 3 years ago. In a couple of months, the Seamless Geology of NSW project will hit a significant milestone with the release of version 1 of the statewide dataset. This project, which has been a huge undertaking, will provide the state with a geological framework that is the equal of any available anywhere. In terms of lines and vertices, we believe that it is the most complex geological map ever produced. The coming months will also see the completion of the East Riverina Mapping Project, which like the Seamless Geology project started 5 years ago. This integrated project has hugely increased our understanding of the geological evolution and mineral potential of this previously poorly understood portion of NSW.

Of course, we also need to look forward and 2018/19 will see the commencement of the MinEx CRC, a \$220 million, 10-year research collaboration between state and federal governments, the mineral exploration industry, CSIRO and Australian universities that aims to unlock the mineral potential of the three quarters of Australia where prospective rocks are buried under younger, barren rocks and sediment. GSNSW is a major participant in the CRC, and will focus its efforts on four underexplored areas of the state.

We'll be releasing more information soon on the areas of NSW where we'll be focussing our efforts, so watch this space.

Chris Yeats  
Executive Director, Geological Survey of NSW

## New products

---

### New England Orogen 1:750 000 metallogenic map

A 1:750 000 scale metallogenic map is now available for the southern New England Orogen. It highlights the distribution of intrusion-related Sn, W, Mo and Au deposits and orogenic-related Au, base metal and Sb deposits. Base geology uses the Zone 56 seamless geology with units classified by depositional environment and age whilst granites are classified by age, fractionation state and redox parameters. The reverse side of the map features the mining history and a geological history of the area.

The map is available now for \$19.80 and can be supplied either folded or flat.

<https://search.geoscience.nsw.gov.au/product/9228>

## Nymagee S and Pb isotopes paper

Quarterly Note 151 titled *Isotope signatures of selected Silurian to Devonian mineral systems in the Nymagee area, central Lachlan Orogen, New South Wales* (Downes & Poulson 2018) presents new sulfur and lead isotope data for 22 Silurian to Devonian mineral systems in the Nymagee area of central NSW. The new data suggest a range of sulfur and lead sources and provide a baseline for further studies. The data indicate that some deposits have a magmatic signature and that both basement and fill to the Cobar Basin contributed lead and other metals to individual systems.

## Curnamona and Koonenberry mineral potential study

The Curnamona Province, Delamerian Orogen and Thomson Orogen in western NSW are prospective for multiple mineral systems. This includes Broken Hill Type Pb-Zn-Ag (BHT) and iron-oxide copper gold (IOCG) in the Curnamona Province, and orogenic Au and volcanic-associated massive sulfide (VMS) systems in the Delamerian and Thomson orogens. Spatial modelling by Kenex Pty Ltd in conjunction with GSNSW investigated the area's potential for these deposit types.

Between 63 and 97 valid predictive maps were created for each mineral system, with between 9 and 13 predictive maps selected and combined to produce a final mineral potential map. The GIS files used are included in a Mineral Potential Atlas and will also be available for download. The final project report and mineral system models (BHT, IOCG, orogenic Au, Grasmere-type) will soon be available from DIGS.

*Downes P.M. & Fitzherbert J.A. 2018. A mineral system model for orogenic gold mineralisation in the Koonenberry Belt, NSW. Geological Survey of New South Wales, Report GS2018/0372.*

*Downes P.M. & Fitzherbert J.A. 2018. A mineral system model for Grasmere-type massive sulfide mineralisation. Geological Survey of New South Wales Report GS2018/0370.*

*Fitzherbert J.A. 2018. A mineral system model for Broken Hill Type Pb-Zn-Ag mineralisation In New South Wales. Geological Survey of New South Wales Report GS2018/0400.*

*Fitzherbert J.A. & Downes P.M. 2018. A mineral system model for shear-hosted iron oxide–copper–gold (IOCG) mineralisation in the Broken Hill Block, with a focus on Copper Blow. Geological Survey of New South Wales Report GS2018/0371.*

*Ford A., Partington G., Peters K., Greenfield J., Blevin P., Downes P. & Fitzherbert J. 2018. NSW Zone 54 Mineral Systems. Mineral Potential Report.*

## Port Macquarie geotrail products

A brochure including a geotrail map tells the story of how the unique Port Macquarie area was formed and highlights geological features, so visitors can identify various rocks and learn how they formed. The free brochure is [available for download from DIGS](#) or at the [Sea Acres Rainforest Centre](#), 159 Pacific Drive, Port Macquarie.

You can also access the Port Macquarie Coastal Geotrail tour through the NSWGeoTours app ([Android](#) and [Apple](#)). This free app provides a self-guided tour that can be pre-loaded onto mobile phones or tablets, with key sites geotagged stop-by-stop using the device's inbuilt GPS.

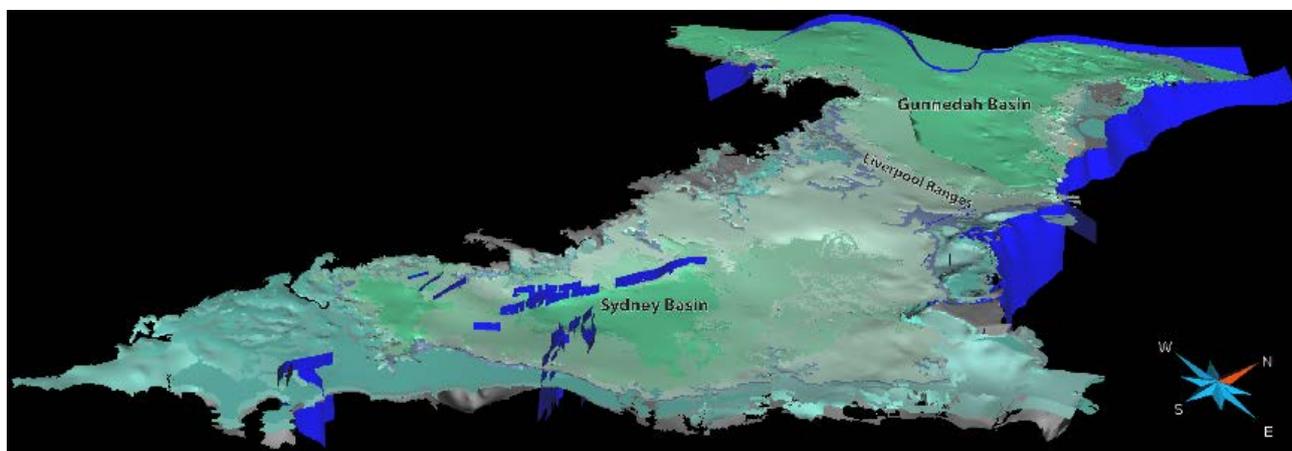
For further information on these new products email [geoscience.products@geoscience.gov.au](mailto:geoscience.products@geoscience.gov.au)

## Sydney–Gunnedah 3D model released

Since 2014, GSNSW has been using statewide geophysical imagery and other data, including drillholes, seismic sections and the seamless geology geodatabase, to interpret, map and model the 3D geology of NSW. The modelling program is developing a series of interlocking province-scale models, with a current focus on NSW sedimentary basins.

Recently the Sydney–Gunnedah 3D model was completed and a GS report published (Oliveira & Davidson 2018). The 3D geological model for the Sydney–Gunnedah Basin provides additional insight into the sub-surface geology of the region and adds detail to the consolidated cover volume created in the NSW depth to basement model. It also delivers a geological framework for future detailed modelling, by highlighting regional and basin-scale features, mapping the geometry of geological structures under cover, and refining the stratigraphy of major units in areas with limited information. The model highlights distinct changes in sea level and depositional environment, as well as the structural architecture and fault movements experienced by the basins. The modelled features will provide context and information to support resource exploration and land-use planning.

More information on 3D mapping: <https://www.resourcesandgeoscience.nsw.gov.au/miners-and-explorers/geoscience-information/projects/3D-mapping-of-NSW>



Location and extent of the Sydney–Gunnedah Basin 3D geological model. The geological layer is an extract of the GSNSW Seamless Geology Zone 56 map (Colquhoun et al. 2015), with overlying cover removed. The 3D model is based on the outcropping portion of this map.

Contact: [geoscience.products@geoscience.nsw.gov.au](mailto:geoscience.products@geoscience.nsw.gov.au) Ph: 02 4063 6653 for all product information.

## Project updates

---

### Seamless Geology of NSW

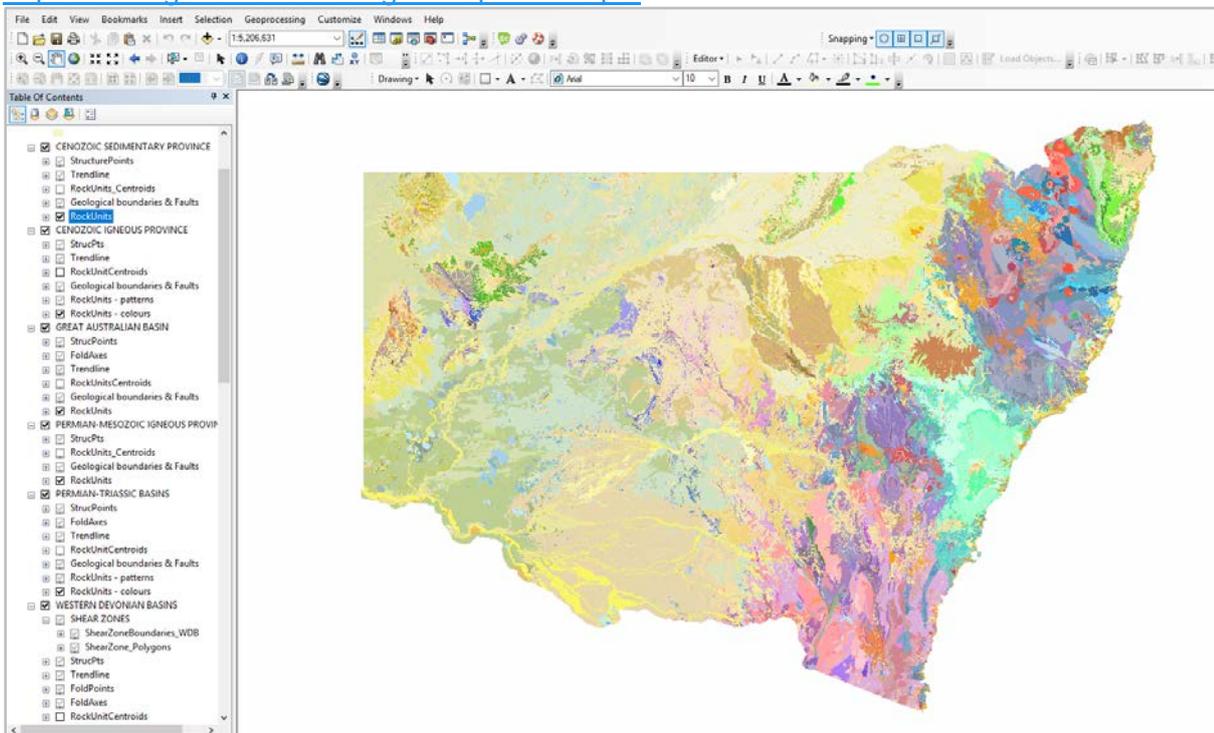
## Statewide release nearing completion

The NSW Seamless Geology Project is a five-year initiative which commenced in early 2014 to provide a statewide compilation of the best available digital geological mapping data in an internally consistent format. Due to the size of the project, the work was divided into UTM zones, starting in the east with [Zone 56](#) (released February 2015), then moving west to [Zone 54](#) (released December 2016), then adding the [eastern half of Zone 55](#) (released August 2017), and finishing with the western half of this Zone.

In 2017-2018, GSNSW focused on completing editing of the western half of Zone 55 and merging the results with the completed zones to produce the first statewide version of the Seamless Geology dataset. Completion of this stage will see the end of phase 1 of the Seamless Geology Project, but it is intended that the final Seamless Geology dataset will be continually updated and refined as new digital geological mapping data becomes available.

The Zone 55 West Seamless Geology will not be made available as a separate download, but will instead be merged with the previously completed zones and be available for download as part of the complete statewide dataset.

The first (version 1) statewide NSW Seamless Geology dataset is due for release in October 2018 and will be available for free download in ArcMap (10.4 or later), ArcGIS Pro (2.2 or later), MapInfo (11.5 or later) and QGIS (2.18 or later) formats. It will also be available through [MinView](#) and our mobile app platforms (Android and IOS). The currently available dataset can be downloaded from <https://www.geoscience.nsw.gov.au/phonemaps/>.



*NSW Seamless Geology in ArcMap.*

Contact: [chris.folkes@planning.nsw.gov.au](mailto:chris.folkes@planning.nsw.gov.au)

Ph:02 4063 6625

## East Riverina mapping project

## Final mapping trip

In the next few weeks, the mapping team will undertake the last field mapping trip of this 5-year project. In late 2018 and early 2019, the team will finalise line work, stratigraphic unit tables and FieldObs site data, and deliver a range of reports on geological and mineral system aspects of the project. The team will also present several talks at the October AGCC 2018 conference in Adelaide. More information and quarterly updates are on the [project web page](#).

Contact: [phil.gilmore@planning.nsw.gov.au](mailto:phil.gilmore@planning.nsw.gov.au)

Ph:02 4063 6737

## Southern Thomson project

### Workshop, core viewing and new results

A workshop at the WB Clarke Geoscience Centre in May presented results of the project and allowed participants to view new drillcore from the project area. The Southern Thomson Orogen stratigraphic drilling was a product of the collaborative project between GSNSW, Geoscience Australia and the Geological Survey of Queensland. Detailed well completion reports, including logs, preliminary geochronology, HyLogger™ data and mineralisation implications are now available in DIGS. Further results from the project, including research from the Southern Thomson ARC, will be presented at AGCC 2018 and in an upcoming special volume of the *Australia Journal of Earth Sciences*.

Contact: [chris.folkes@planning.nsw.gov.au](mailto:chris.folkes@planning.nsw.gov.au)

Ph:02 4063 6625

## Mendooran Drilling Project completed

Five holes in the Mendooran area were drilled and rehabilitated between August 2017 and January 2018. Depths of the holes ranged from 90 m to 560 m. A preliminary assessment of project data indicates that the coal seam thicknesses, quality and extent are unlikely to support the establishment of a commercially viable coal mine in this area. Although not a target for the program, the drilling also confirmed that the area is not prospective for coal seam gas, based on the results from safety measures that required the monitoring of gas during drilling. Follow-up drilling is not proposed for the Mendooran area.

Geological data from the exploration program can be found on the [Department's DIGS website](#)

Contact: [coal.geology@geoscience.nsw.gov.au](mailto:coal.geology@geoscience.nsw.gov.au)

Ph:02 4063 6744

## Online resources

---

### Retirement of PUBLIC Geoscientific Data Warehouse website

The public Geoscientific Data Warehouse (GDW) website was retired on 31 July 2018. It has been superseded by the new MinView system, an online web mapping application that has vastly improved the search and discovery of NSW geoscientific data.

This means that the website <http://dwh.minerals.nsw.gov.au/CI/warehouse> is no longer accessible. However, GSNSW will continue to provide the Google Earth kml file for those users who like to explore our data in Google Earth. A link will be made available via the Department's website. All functionality and datasets currently available in the GDW are available in MinView, along with many additional features. We encourage all users to switch to MinView and explore the new ways to search and discover our geoscientific data. Of course, we're available to help anyone having difficulty with the transition.

Contact: 02 4063 6612

## **Assay dataset validation**

The statewide geochemical assay dataset is the largest point dataset compiled by the GSNSW; the product of loading surface and drilling geochemical data from mineral exploration reports into a statewide relational database. A significant validation project is underway to address legacy data issues that have arisen for a variety of reasons, such as variable data formats, historic compilations, missing information and incorrect units.

Statistical analysis and spatial validation techniques are being run on the database to identify erroneous assay results which are then investigated and fixed. The initial focus was on gold results, examining the distribution of values and detecting anomalous patterns. This was then expanded to include base metal element results.

The goal is to provide a robust and accurate mineral exploration database. Validated open file data is being continuously released to public online systems, so there is no need to wait for the final product. This project will continue for 12 months.

## **New user-friendly assay downloads available in MinView**

### **XRF surface geochemistry**

The assay validation work highlighted the need to separate out XRF results for surface geochemistry due to the large proportion of the XRF data originating from portable XRF instruments which need to be considered separately. This has resulted in a new GIS-friendly data file called ASSAY\_SURFSAMP\_XRF that allows users to plot XRF and non-XRF data separately in their GIS system.

### **Drillhole assay data – pivoted output**

The drillhole assay data has been simplified to produce a user-friendly 'spreadsheet' style format of all downhole samples and related assay results. Included elements are limited to gold, base metal elements and related path finder elements; this is reflected in the data file name ASSAY\_DH\_DRILL\_AuBasePath.

Both new layers are available as part of the assay data download from MinView.

## Download data in GIS & CSV formats

Send download link to:

Map extent:  Use current view  All of NSW

Select the dataset to download:

- Exploration & Mining Titles
- Drillholes
- Mineral occurrences
- Drilling & surface assay geochemistry**
- All whole rock geochemistry
- Geological observations
- Geochronology
- Geology

Assays and NITON results - mainly trace elements.

File format

- CSV (spreadsheet)
- CSV (spreadsheet)
- Shape files
- Mapinfo tab**

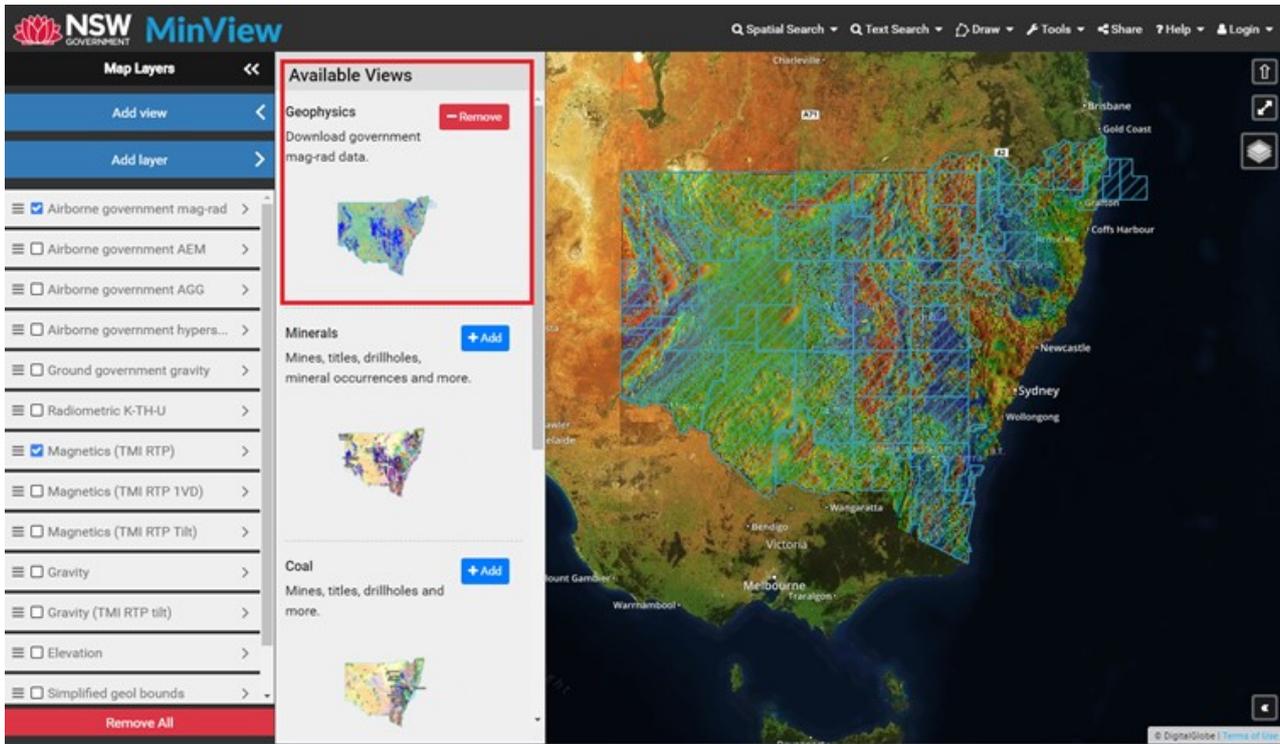
**Download**

MinView: <https://minview.geoscience.nsw.gov.au/>

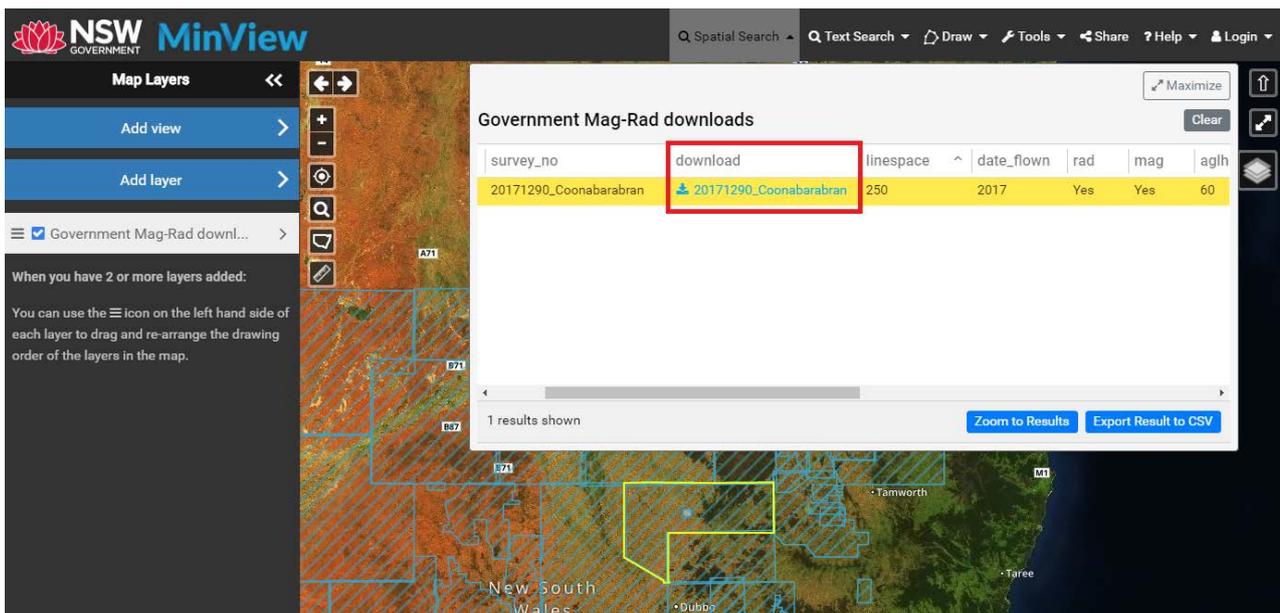
Contact: [geoinfo.admin@geoscience.nsw.gov.au](mailto:geoinfo.admin@geoscience.nsw.gov.au)

## New feature in MinView – download geophysical survey data

You can now download airborne magnetic and radioelement survey data that has been acquired by the NSW government, sometimes in collaboration with the Commonwealth government, direct from MinView.



Use the Add View > Geophysics option to quickly load all geophysics in one step



Select the Download link in the search result box to download government airborne magnetic/radioelement/DEM survey data.

## Exploration Data Workshop in Hunter Valley 30 August

This workshop will be held in Rutherford is designed for anyone who is currently working in the exploration industry and whose role involves exploration reporting and/or who works with NSW geoscientific data. It will provide an overview of the different reporting requirements, introduce new online systems designed to assist geoscientists in managing the exploration reporting processes, and showcase the vast array of available geoscientific data for New South Wales.

For more information or to register, click on this [link](#).

## Drillcore news

---

### HyLogger™ datasets uploaded to the AuScope and AusGIN portals since 1 May 2018

Dataset no.	GSNSW drill ID	Hole Name	Program	Upload week
305	MIN:068202	COD001	Condobolin	2/05/2018
306	MIN:040036	DDH8	Melrose Magnetic Anomaly - Nymagee	2/05/2018
307	MIN:040037	DDH8A	Melrose Magnetic Anomaly - Nymagee	2/05/2018
308	MIN:229712	Milcarpa 1	Southern Thomson Project	23/05/2018
309	MIN:229713	Euroli 1	Southern Thomson Project	23/05/2018
310	MIN:229717	Congarra 1	Southern Thomson Project	23/05/2018
311	MIN:229714	Tongo 1	Southern Thomson Project	23/05/2018
312	MIN:229715	Laurelvale 1	Southern Thomson Project	23/05/2018
313	MIN:229718	Congarra 2	Southern Thomson Project	23/05/2018
314	MIN:229716	Janina 1	Southern Thomson Project	23/05/2018
315	MIN:068206	COD005	Condobolin	18/07/2018
316	MIN:68207	COD006	Condobolin	25/07/2018

## Diary and contacts

---

### Upcoming conferences and events

**Using drones in geoscience** 14 August. Free public HEDG talk at Newcastle Museum for National Science

**Stories in Stone** 15 August. Free public Sydney Science Festival event. Come along and see the NSW library of rocks! WB Clarke Geoscience Centre, 947-953 Londonderry Rd, Londonderry, NSW

**Exploration Data Workshop** 30 August. The Bradford, 385 New England Hwy, Rutherford, NSW

**Linnean Society Symposium:** Volcanoes of northwest NSW. 25-27 September, Coonabarabran Bowling Club Auditorium, Edwards Street, Coonabarabran, NSW.

**Geological Survey of NSW Open Days** 5-6 October, Maitland NSW.

**Australian Geoscience Council Convention** 14-18 October, Adelaide Convention Centre, SA

**Brisbane Resources Round-up** 17-18 October 2018, The Hilton, Brisbane, QLD

## Products

Digital Imaging Geoscientific Systems (DIGS)

Geophysical images and data

Online sales: [www.shop.nsw.gov.au](http://www.shop.nsw.gov.au)

[OTO](#)

[Quarterly Notes](#)

## Product enquiries

**Maps and data packages:** [geoscience.products@geoscience.nsw.gov.au](mailto:geoscience.products@geoscience.nsw.gov.au) Tel: 02 4063 6653 **Geophysical images and data:** [geophysics.products@geoscience.nsw.gov.au](mailto:geophysics.products@geoscience.nsw.gov.au) Tel: 4063 6639

**Counter sales:** [mineralpublication.orders@geoscience.nsw.gov.au](mailto:mineralpublication.orders@geoscience.nsw.gov.au) Free call: 1300 736 122 Tel: 02 4063 6500

**General product enquiries:** [gavin.ayre@planning.nsw.gov.au](mailto:gavin.ayre@planning.nsw.gov.au) Tel: 02 4063 6653

**Subscribe to OTO newsletter:** [outcrop.newsletter@geoscience.nsw.gov.au](mailto:outcrop.newsletter@geoscience.nsw.gov.au)

**Subscribe to Quarterly Notes:** [geneve.cox@planning.nsw.gov.au](mailto:geneve.cox@planning.nsw.gov.au)

## Information

**Web:** [www.resourcesandgeoscience.nsw.gov.au](http://www.resourcesandgeoscience.nsw.gov.au)

**GSNSW:** Geological Survey of NSW

**Visit the [Geoscience Information webpages](#)** where you will find access to online systems DIGS®, MinView, upcoming GSNSW events, news, publications and product information.

### Privacy

Correct your recorded details by contacting [outcrop.newsletter@geoscience.nsw.gov.au](mailto:outcrop.newsletter@geoscience.nsw.gov.au)

***Disclaimer:** This newsletter contains materials prepared by the Division of Resources and Geoscience, under the Department of Planning and Environment (the Department). View the Department's [Copyright and Disclaimer](#) here.*