

Mining GSWA's databases — production of exploration leads and targets

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Abstract

There are three major online databases (WAMEX, MAGIX, and MINEDEX) that contain mineral exploration information on Western Australia. Further regional data can be sourced from the Geological Survey of Western Australia's geological exploration packages, geochemical mapping products, the abandoned mine sites database (WABMINES), core library data (in WAPIMS), and geological publications. A significant amount of this information is digital or scanned, available online, and can be downloaded. Two examples are presented to illustrate the usefulness of this material for target generation of mineral deposits.

KEYWORDS: databases, exploration potential, literature reviews.

including mines and mineral deposits, abandoned mine sites, petroleum wells, live and dead leases, and so on. Users can make a quality PDF plot of their completed map (size A0 to A4) online.

The data available via the GeoVIEW.WA interface are not live, but are uploaded regularly, thus, it may not contain the most recent data captured in the source database.

Figure 1 shows a GeoVIEW.WA screen of the Murchison areas targeted for orogenic gold mineralization as examples of generating exploration leads from the open-file databases.

Introduction

'How can I obtain all the geological and exploration open-file data for my area of interest?' This is an important task for explorers, and this paper aims to answer this question.

Some of the early historic mineral exploration data are only available in hardcopy, but significant amounts of data are available in digital form and online at the Western Australian Department of Industry and Resources' (DoIR's) website at <<http://www.doir.wa.gov.au>>. The Geological Survey of Western Australia's (GSWA's) publications are also a source of data. These are listed in the Catalogue of pre-1980 Geological Publications and the Catalogue of Geoscience Products 1980–2005 at <<http://www.doir.wa.gov.au/gswa/catalogue.asp>>.

Databases

Four comprehensive open-file databases (WAMEX, MAGIX, MINEDEX, and WAPIMS) on the DoIR website provide data useful to mineral explorers. These may be accessed directly for a complete search. Alternatively, GeoVIEW.WA can be used as a spatial interface to help the data search. These databases are described in more detail below.

GeoVIEW.WA

GeoVIEW.WA (<http://www.doir.wa.gov.au/aboutus/geoview_launch.asp>) is a free interactive (GIS-based) mapping system that allows the users to make their own geological map (for their chosen area and scale), incorporating other mineral and petroleum exploration datasets

WAMEX

The Western Australian mineral exploration (WAMEX) database records mineral exploration reports submitted since the 1960s (<http://www.doir.wa.gov.au/aboutus/wamex.asp>). After a period of confidentiality, now set at five years from submission to GSWA or tenement death if earlier, exploration reports are made publicly available.

Of the more than 40 000 mineral exploration reports available on open file, reports released since 1997 (Item numbers 8600 onwards) are available online and can be viewed, printed or downloaded.

MAGIX

MAGIX (Mineral Airborne Geophysics Information eXchange)

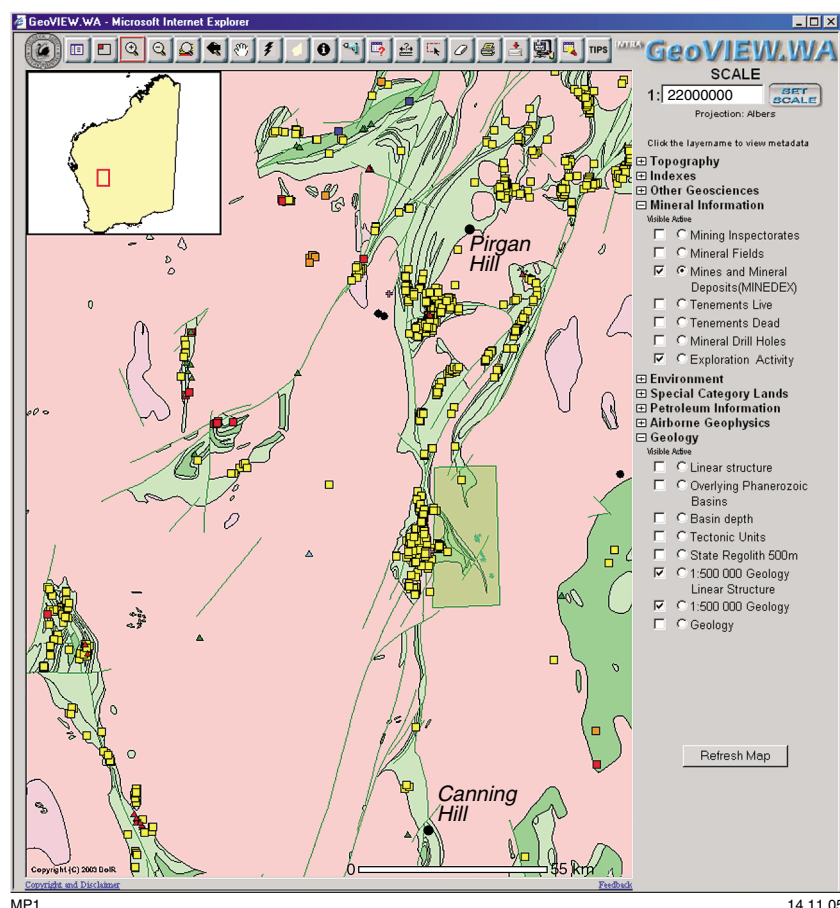


Figure 1. GeoVIEW.WA query of the Murchison study areas with geology, linear structure, MINEDEX, and historic exploration activity layers visible

is a GIS-based register (<http://www.doir.wa.gov.au/aboutus/magix>) of airborne geophysical surveys reported to DoIR under the provisions of the Mining Act 1978. It provides index maps showing the location of surveys available from DoIR and from commercial suppliers, comprehensive details on field recording parameters, and 'thumbnail' images of many of the available datasets.

MINEDEX

The mines and mineral deposits information (MINEDEX) database (<http://www.doir.wa.gov.au/minedex>) contains information on commodities, resource estimates, site type and status, location, corporate ownership, mine operators and contact addresses for mines and mineral deposits of Western Australia.

Abandoned mine sites (WABMINES)

The inventory of abandoned mine sites (WABMINES) provides data on historic mining-related features. The inventory records more than 90 000 mining-related features and includes two-thirds of the highest priority historic mine sites. It is available via GeoVIEW.WA or as a DVD (Geological Survey of Western Australia, 2005).

Geological publications

The GSWA publishes maps, books and digital datasets on the geology of Western Australia. Themes include geology, geochemistry, geophysics, mineralization and mineral deposits mapping, hydrogeology, and urban and environmental geology. Of particular use to explorers are the

1:250 000 regolith geochemistry maps and the 1:100 000 geological maps and Explanatory Notes. Publications can be ordered from the DoIR website (<http://www.doir.wa.gov.au/ebookshop>), which also contains details of all publications produced by GSWA since 1898. GSWA is currently scanning all publications back to 1895, and these will be available online in 2006.

The most recent publications are also available free online at (<http://www.doir.wa.gov.au/gswa/onlinepublications>).

Mineral core collection

Details of collected drillcore and other materials that have been acquired from mineral and petroleum exploration programs are in the Western Australian petroleum information management system (WAPIMS) database (<http://dp.doir.wa.gov.au/dp/index.jsp>). These data are also easily viewed through GeoVIEW.WA.

Geological exploration packages

Geological exploration packages containing topographic, geophysical, and geological legacy data for areas where GSWA geological mapping is underway are currently available for the Northern Murchison, Northeastern Yilgarn, Southeastern Yilgarn, and the West Musgrave areas. A package for the Tanami area is in preparation. Packages include aeromagnetic and radiometric images, satellite imagery, orthophotography, and geological interpretations. The Murchison geological exploration package (GSWA, 2004) includes J. A. Hallberg's 1989–94 Murchison 1:25 000 geology dataset with maps and reports (Hallberg, 2000).

Examples of the generation of exploration leads in the Murchison region

The Murchison region was used to give examples of the generation of exploration leads from data available from GSWA. Two areas were targeted

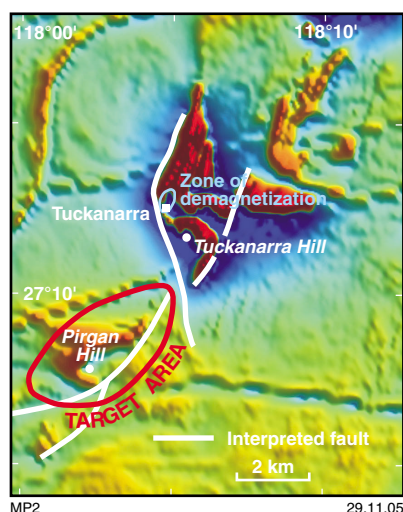


Figure 2. *Aeromagnetic interpretation of the Pirgan Hill area on the Reedy 2543 magnetic image from the Cue–Kirkalocka GSWA–GA 2004 survey*

for orogenic gold mineralization on the basis of aeromagnetic interpretation, and favourable structural settings and host rocks. Available geological and exploration open-file data were extracted from the GSWA databases and regional datasets.

Pirgan Hill

This target area centred on Pirgan Hill is on CUE*, 10 km south of the Tuckanarra mining centre. It is a structural target interpreted from the aeromagnetic data at the intersection of two faults, one of which is associated with the contact

between mafic rocks and granite, and is under cover. Figure 2 shows the aeromagnetic interpretation of part of the Reedy 2543 magnetic image showing the Pirgan Hill area.

Figure 3 shows data extracted from the databases, particularly WAMEX. These data include the aeromagnetic interpretation, Hallberg's (2000) detailed regional mapping (Tuckanarra SW 1:25 000 geological map, 1992) and detailed company geological mapping, grid soil sampling, rock-chip sampling, RAB and percussion drilling, and petrology, from WAMEX Item numbers I155 (Dodds, 1973), I3723 (Freeport Australian Minerals Limited, 1989), I4372 (Grigson, 1990), I4744 (Kelters, 1989), and I7687 (Taylor, 1994). These open-file reports yielded exploration leads such as alluvial workings for both gold and copper, that 'gold had been mined from kaolinised porphyry', surface geochemistry with gold-in-soil values up to 5.45 ppm, anomalous RAB geochemistry, as well as useful regional data including regolith depths from drilling records. There was no evidence of previous exploration at the intersection of the two faults.

Canning Hill

This target area is centred on Canning Hill in the Wydgee area, on KIRKALOCKA, 15 km south-southeast of the Kirkalocka gold mine. The area is a high-prospectivity conceptual target defined by prospectivity mapping (Pigott, 2001) based mainly on structural complexity (faulting and folding) and favourable rock types (banded iron-formations and mafic volcanic rocks).

An aeromagnetic interpretation of the Canning Hill area of the Kirkalocka 2440 magnetic image is shown in Figure 4.

Figure 5 shows exploration leads from aeromagnetic interpretation and the databases, particularly WAMEX, from Item numbers I1484 (Kia Ora Gold Corporation, 1973), I1634 (Aztec Exploration Limited, 1983), I3555 (Cull, 1985; Harvey, 1986a,b,c; Onley and Peters, 1984), I7826 (Davies and Meakins, 1994), I8366 (Hamdorf and Stewart, 1994), I9087 (Ewart, 1996), I9624 (Dalton, 1997), I10923 (Dudfield, 1998, 1999, 2000), I11720 (Westaway, 1999). They include potentially mineralized structures, a central demagnetized zone, and the locations of old workings.

The northern two-thirds of the area is under cover, which may have inhibited effective exploration.

Conclusions

Mining the GSWA open-file databases is an excellent and cost-effective means of exploration targeting. Exploration leads and useful regional data can be obtained. There is a wealth of data available, a significant amount of which is available via the DoIR website or on DVDs, and the databases and regional datasets are continuously being updated.

* Capitalized names refer to 1:250 000 map sheets.

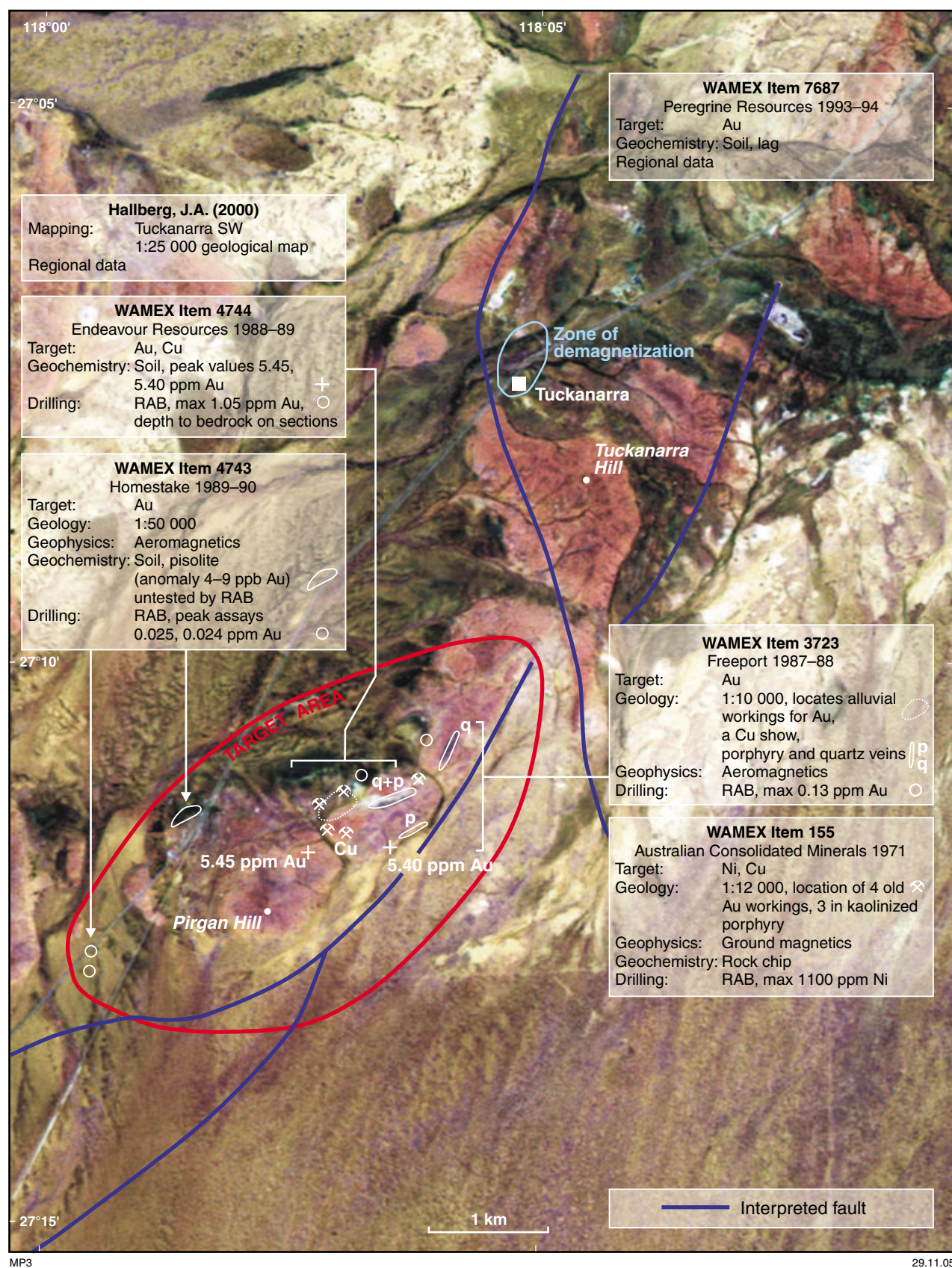


Figure 3. Pirgan Hill target area showing exploration leads from aeromagnetic interpretation, WAMEX, and Hallberg (2000) mapping on a Landsat 7 base

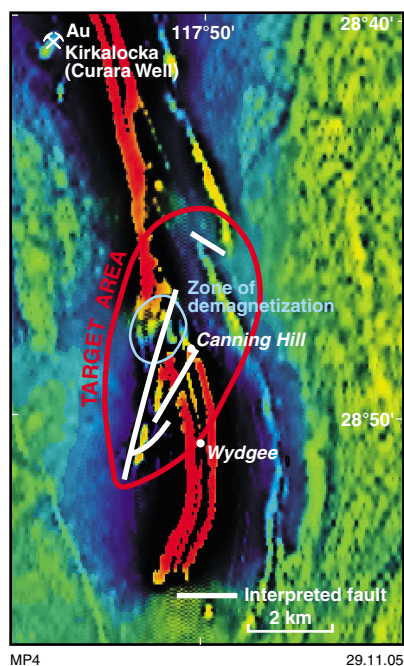


Figure 4. Aeromagnetic interpretation of the Canning Hill area on Kirkalocka 2440 First Vertical Derivative reduced-to-pole magnetic image from the Cue–Kirkalocka GSWA–GA 2004 survey

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Figure 5. Canning Hill target area, showing exploration leads from aeromagnetic interpretation and WAMEX on a Landsat 7 base

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