

In Brief

Collaboration delivers NEW INFORMATION to support MINERAL EXPLORATION

As part of the National Geoscience Accord, Geoscience Australia is collaborating closely with its state and territory counterparts in regional geoscientific studies to encourage mineral exploration.

GA is partnering with the Northern Territory Geological Survey (NTGS) and the Geological Survey of Western Australia (GSWA) on the North Australia and Tanami projects. In the Gawler Craton, we are collaborating with Primary Industry and Resources, South Australia (PIRSA) on the Gawler Project.

The recently released NTGS Report 18, 'Gold mineral system of the Tanami region', by Wygralak et al (order at www.minerals.nt.gov.au/ntgs/) documents the results of a joint NTGS-GA study on the genesis and geological controls on lode gold deposits in the Tanami region.

This report emphasises the importance of second-order structures associated with the D5 deformation event dated at younger than 1815 million years, and emphasises the range of pressures and temperatures of ore formation and the role of fluid reduction as a gold trapping mechanism.

More joint reports to come

Forthcoming joint reports with the NTGS include 'Geology and origin of some Cu-Pb-Zn (-Au-Ag) deposits in the Strangways Metamorphic Complex, Arunta Region, Northern Territory' by Hussey et al, which will document the geology and genesis of Zn-Pb-Cu-Ag and Cu-Au deposits in the eastern Arunta to the east-north-east of Alice Springs. A series of reports by Worden and co-workers will summarise the results of joint geochronology studies through the Northern Territory.

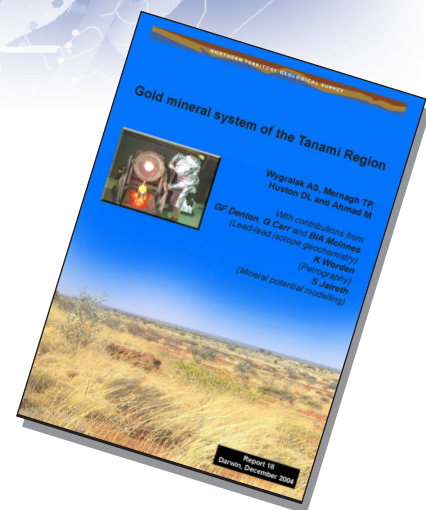
Joint work with GSWA on prospects in the western Tanami region will also be released as a GSWA report entitled 'Preliminary studies of the geologic setting of lode gold deposits in the western Tanami region, Western Australia' by Bagas et al. A 3D model of the architecture of the Tanami region was established through GA-NTGS-GSWA collaboration. It can be viewed at www.ga.gov.au/map/web3d/tanami/index.jsp.

This site will soon be updated to include results of geophysical inversions of potential field data (see '3D inversion modelling in the Tanami region' by Meixner in this edition of AusGeo News) and depth-to-magnetic-basement as determined by Euler deconvolution of aeromagnetic data. A deep crustal seismic reflection survey is planned to test the geological models and develop a more robust understanding of the regional architecture, and especially the regional-scale controls on gold mineralisation.

GA staff present results at AGES

GA staff presented results of collaborative scientific results at the NTGS Annual Geoscience Exploration Seminar (AGES) held in Alice Springs in March. More than 140 delegates, mostly from industry, attended AGES 2005 where GA scientists from the North Australia-Tanami Project presented three talks.

Claoue-Long et al suggested the possibility that the oldest sedimentary rocks in the Tanami, Arunta and Tennant regions were correlated and formed part of a 1840-1800 million year old basin or series of basins that may have extended from Mt Isa in Queensland to Halls Creek in Western Australia.



Cross et al showed that the Tanami Group, which hosts most of the gold in the Tanami region, was deposited ~1840 million years ago and may correlate with units in the Halls Creek region.

Meixner and Lane presented the results of gravity and magnetic inversions that mapped in 3D the distribution and geometry of granites and host units to gold.

Abstracts for these presentations can be downloaded from the NTGS website (www.minerals.nt.gov.au/ntgs/).

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NEW geoprovince-scale assessment of *Mineral Potential*

Subbash Jaireth and Yanis Miezitis

The online *Australian Mines Atlas* offers new geoprovince-scale qualitative assessments of mineral potential for 15 major styles of Australian mineral deposits.

The new assessments create a national-scale map and GIS (Geographic Information System) layer equivalent to other national-scale natural resource maps/GISs, such as those covering biogeographic regions, land tenure and forest cover, that are vital for informed land-use decisions. The province-scale assessment can also be used to assist in selecting future areas for regional studies.

Mineral potential and certainty maps are available for individual gold and base metal deposit styles. Composite mineral potential maps for gold and base metals deposits are also available. These maps represent the highest level of potential for any of the deposit styles in a region. The maps also show known major gold and base metal deposits. The GIS provides access to descriptive models of deposit style, assessment criteria, assessment sheets of provinces for the selected deposit style, and time–event plots of major geoprovinces.

The GIS provides a method and tool to compare the mineral potential of individual provinces for selected major deposit styles. This comparative analysis of mineral potential at geoprovince scale shows that areas of high potential—Mount Isa, New England Fold Belt, Lachlan Fold Belt, Musgrave, Tennant Creek and Arunta regions—extend under shallow cover.

The analysis also delineates regions with moderate and moderate-to-high potential but low levels of certainty for some deposit styles. These areas might be targeted for detailed studies to assess their potential with greater certainty.

For example, the Gawler Craton and the Eastern Mount Isa Inlier are known regions of high potential with high levels of certainty for iron oxide copper–gold deposits. However, the Curnamona Province, Mount Painter Block, Georgetown Block and Southern Arunta also have moderate and moderate-to-high potential for these deposits.

Similarly, the Adelaide Fold Belt is known for copper sandstone, hosting several small deposits, while mineral potential assessments indicate significant potential for these deposits in the Amadeus, Bangemall, Southern Bonaparte, Canning, Ngalia, Ord, Polda and Savory basins and Paterson Province.

Four types of orthomagmatic nickel deposits, as well as lateritic nickel deposits, are included in the new assessments. The results highlight regions with known high potential for nickel deposits, such as komatiite type deposits in the Eastern Goldfields and the Southern Cross subprovinces of the Yilgarn Craton, as well as the high potential for basal nickel cobalt sulphide (Voisey's Bay style) in the Pilbara Craton, the Musgrave Complex and the Halls Creek Orogen.

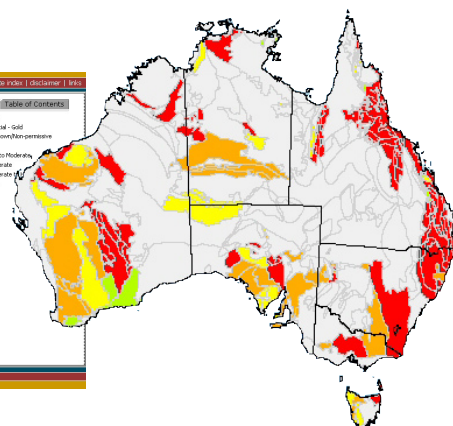
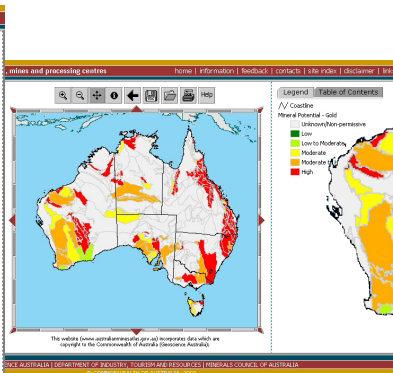
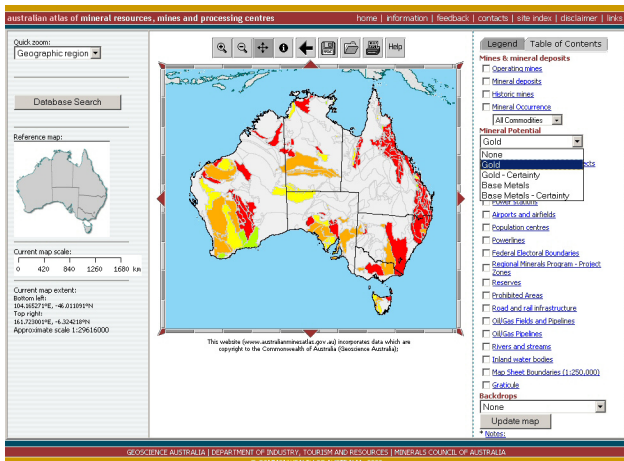


Significant lower levels of potential for all five types of nickel deposits are outlined in other provinces, including the Albany–Fraser Orogen where moderate potential for basal types of nickel deposits extends under the shallow cover of the Eucla Basin.

The available regional geoscience databases and research results of Geoscience Australia, state and territory agencies, and other sources show potential for flood basalt nickel–PGE type deposits (Norilsk type)—in the widespread Antrim Plateau basalts in northern Australia, the dolerite sills of the Bangemall Basin, and the Table Hill Volcanics in the Officer Basin in Western Australia.

Extensive mafic sills and dykes in the northwest Officer Basin and western extensions of the Bangemall Basin may represent eroded feeders to the Table Hill Volcanics and are currently being explored for Norilsk type nickel–PGE deposits.

The web address of the atlas is www.nationalminesatlas.gov.au



AUSTRALIA'S Maritime Boundaries 2005

Geoscience Australia has updated Australia's maritime boundaries in cooperation with relevant Commonwealth and state government agencies.

Australia's Maritime Boundaries 2005 (AMB 2005) will soon be available as digital data suitable for geographic information systems. This data will replace the Australian Maritime Boundaries Information System (AMBIS) 2001 Version 1.1 data released in October 2001.

The boundaries include the outer limits of the coastal waters, territorial sea, contiguous zone, exclusive economic zone (EEZ) and continental shelf. The delineation of these boundaries has strategic, economic and environmental implications for Australia.

Extensive work has been carried out to validate and, where necessary, update the territorial sea baseline from which the outer limits are derived. The straight baseline components of the territorial sea baseline have also been amended, with the new locations to be redefined by proclamation under the *Seas and Submerged Lands Act 1973*.

For the first time, the data also includes boundaries adjacent to the Australian Antarctic Territory and areas of continental shelf beyond 200 nautical miles from the baseline, as submitted by Australia to the United Nations Commission on the Limits of the Continental Shelf in November 2004.

AMB 2005 data is clearly attributed, providing information about the source material used to determine the baseline and linking the baseline with the various limits. The data is available in geographical coordinates related to the WGS84 datum used on charts and by mariners more generally.


Geoscience Australia has a lead role in determining the seaward limits of Australia's maritime jurisdiction. We carry out this role in accordance with the provisions of the United Nations Convention on the Law of the Sea and various domestic legislation, in particular the *Seas and Submerged Lands Act*.

Agencies use maritime boundary data for many purposes, including coastal surveillance, management of fisheries and fishing permits, management of petroleum leases and distribution of royalties, and legislative enforcement.

The AMB 2005 data is suited to most geographic information systems and is available in three common industry formats:

- ESRI ArcInfo export format (.e00 files)
- ESRI Shape Files (.shp, .shx, .dbf files)
- Map Info tables (.mid, .mif files).

Maritime Boundaries data can be downloaded free of charge from Geoscience Australia's website at <http://www.ga.gov.au/> or bought on CD-ROM.

**To order copies of the CDs
 phone Freecall 1800 800 173 (in
 Australia) or +61 2 6249 9966
 (email mapsales@ga.gov.au)** 

Remote sensing operations *evolving*

Operations of the Australian Centre for Remote Sensing (ACRES) will be conducted in-house by Geoscience Australia from 1 July, ending a 25-year period during which ACRES' operations have been contracted out.

The change will better align ACRES' national mapping and geospatial information functions with the information needs of Australian Government policy drivers, the spatial information industry and the Australian public. (For more detail see AusGeo News 76, "New directions for National Mapping Division").

The move follows a detailed review of ACRES in 2004 that recommended taking a more proactive national approach to remote sensing, and complements the role of the National Remote Sensing Technical Reference Group (see AusGeo News 77), which also formed in response to the review.


The review confirmed the ongoing importance of ACRES in providing medium-resolution imagery for public-good applications, such as environmental monitoring and crop forecasting. These outputs are becoming increasingly valuable in fulfilling state, national and international commitments through such programs as the National Carbon Accounting Scheme.

The National Remote Sensing Technical Reference Group met in April for the second time to provide further input to ACRES' LANDSAT 'contingency' plan. Through the reference group and closer relationships with remote sensing users in Geoscience Australia, ACRES will operate more strategically and will build a deeper understanding of the requirements of public-good imagery.

ACRES will continue to be identifiable to distributors and other clients as Geoscience Australia's remote sensing unit. Its products and processes, such as the online catalogue, will continue.



Geoscience Australia is committed to ensuring that ACRES' business processes will function seamlessly during the transition process.

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Australia's aeronautical charts *GO DIGITAL*

Geoscience Australia is collaborating with Airservices Australia to revise their World Aeronautical Charts (WAC).

World Aeronautical Charts are 1:1 000 000 scale paper maps used by pilots for flight planning and in-flight navigation on extended cross-country flights at low to medium altitudes and medium to high airspeeds. Forty-two WAC sheets provide complete coverage of Australia.

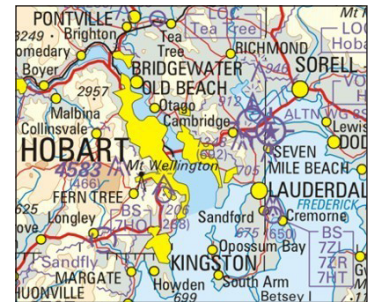
Whereas previous WAC revisions involved traditional manual cartographic techniques on film, the new Tasmania WAC has been produced from Geoscience Australia's fundamental topographic database, GEODATA TOPO-250K Series 2.

This new collaboration involves extracting the 1:250 000 scale topographic data from Geoscience Australia's seamless geographic database. Using the previous edition maps as a guide, the features are then tagged for future use at 1:1,000,000 scale. The update aeronautical information from Airservices Australia is then incorporated into the new data base. The refreshed data is then symbolised, cartographically offset and annotated to produce a WAC with the same look and feel as previous editions.

New WACs for Albany, Armidale, Cooper Creek and Perth will soon be available as part of an ongoing agreement between the agencies for the production of a national 1:1 million scale seamless database and the complete revision and production of the entire WAC series covering Australia.

As with the production of Geoscience Australia's 1:250 000 topographic NATMAP products, four spatial information companies are being contracted to produce the WACs.

Airservices Australia and Geoscience Australia have a long history of working together to produce various scale flight navigation charts like the WACs, 1:500 000 scale Visual Navigation Charts (VNC) and 1:250 000 scale Visual Terminal Charts (VTC).

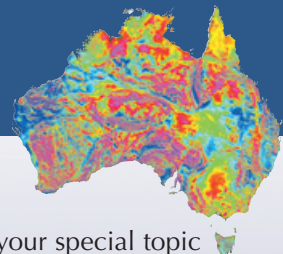


▲ **Figure 1.** [Extract of 1:1 million scale World Aeronautical Chart for Hobart, Tasmania]

Working together has many benefits for both agencies. Future revision of the digital data will be more efficient. The same data can be used in the production of other maps like Airservices Australia's VNCs and Geoscience Australia's Global Map data. Digital data could also enhance Airservices Australia's 'Flying Around' (a new online delivery of VTCs), or be used in any future online or in-flight navigation. ■

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in collaboration with

