Contents

ISSUE 107 Dec 2012

Editor
Vicki Pow

Graphic Design
Graphic Design & Print Team

Web Design
Graphic Design & Print Team

Graphics and GIS
Geographics Team

ISSN 1035-9338

Geoscience Australia
GPO Box 378
Canberra ACT 2601 Australia
Cnr Jerrabomberra Avenue &
Hindmarsh Drive
Symonston ACT 2609 Australia

www.ga.gov.au

Chief Executive Officer
Dr Chris Pigram

Subscriptions
Online subscriptions
www.ga.gov.au/about-us/
news-media/subscribe/index.jsp

Editorial enquiries & Feedback
Mary Walsh
p: +61 2 6249 9263
f: +61 2 6249 9926
e: ausgeomail@ga.gov.au

Sales Centre
p: +61 2 6249 9966
f: +61 2 6249 9960
e: sales@ga.gov.au
GPO Box 378
Canberra ACT 2601 Australia

CEO comment

This issue of *AusGeo News* features an article on the Australian Government's recent commitment to future funding for Geoscience Australia. Geoscience Australia will receive a funding boost of $34 million in 2013 – 14 rising to $40 million per year from 2014 – 15 onwards. The money will enable Geoscience Australia to undertake new pre-competitive data acquisition to attract industry exploration investment and to consolidate its role as the national custodian of important geoscientific databases and information. The funding will also allow continuation of vital national interest activities such as natural hazards assessment, global positioning framework and groundwater assessment to underpin evidence based decision making by government.

Two important recent events for Geoscience Australia were the launch of results from Phase 1 of the *National Flood Risk Information Project* by the Minister for Resources and Energy, the Hon Martin Ferguson, AM MP and the Minister for Emergency Management, the Hon Nicola Roxon, MP; and the release of the *National Earthquake Hazard Map of Australia*.

Phase 1 of the *National Flood Risk Information Project* will see the development of a flood information portal which will provide communities and planners with a better understanding of their exposure to floods, and assist insurers in developing fair and reasonable policies.

Seismologists at Geoscience Australia have developed a series of maps that will provide new information on which areas of Australia are susceptible to earthquakes. Information contained in the *National Earthquake Hazard Map of Australia* is intended for incorporation into Australia's building code, and will allow engineers and planners to design and locate buildings and infrastructure so as to better protect our communities.

Details of the release of new pre-competitive data collected from the Petrel Sub-basin offshore from the Northern Territory are included in this issue. This data will contribute to Australia's efforts to accelerate the development of Carbon Capture and Storage technology and will enable industry to make more informed decisions regarding the suitability of sites for CO_2 storage and encourage industry to potentially uptake this site.

I am pleased to report that a new edition of the national 1:1 million scale Surface Geology of Australia dataset is now available. The 2012 edition updates the previous 2010 data with new or revised mapping in the Northern Territory, north-west Queensland, and Western Australia.

Our article on Australia's coastal zone is an extract from the Geoscience Australia publication *Shaping a Nation: A Geology of Australia* (Chapter 6) – and takes the reader on a walk along the Australian shore to gain an understanding of coastal processes and how this unique and valuable edge has shaped Australian society.

Finally, I wish to thank all our readers for your continuing support and extend best wishes for the festive season and the New Year.

Dr Chris Pigram
CEO Geoscience Australia

Geoscience Australia receives new funding

Ned Stolz

Geoscience Australia (GA) will receive a funding boost of $34 million in 2013 – 14, rising to $40 million per year from 2014 – 15 onwards. The Minister for Resources, Energy and Tourism, the Hon Martin Ferguson, AM MP announced the funding, stating that the money will sustain GA into the future, enabling it to undertake new precompetitive data acquisition and to consolidate its role as the national custodian of geoscientific data. The funding will also support continuing vital national-interest activities such as natural hazards assessment, global positioning infrastructure and groundwater assessment which will underpin evidence based decision making by government.

The new funding announcement is a great result for Geoscience Australia and is recognition of the value of the Agency's work to Government and to the Nation.

Background

The previous major funding package for Geoscience Australia was announced by the then Howard Government in 2006 and provided $150 million over five years for programs aimed at securing Australia's energy future. The Energy Security Program (ESP) included offshore and onshore activities and released a wide range of high quality data, products and reports to industry which stimulated investment and reduced risk in exploration for energy resources. The ESP concluded in 2011 and produced a substantial body of work which confirmed GA's established reputation as a 'delivery' agency providing reliable and relevant products to stakeholders. Closely following the ESP was funding of $64 million over four years from 2011 – 12 for major participation in the National CO_2 Infrastructure Plan to undertake assessment of potential offshore carbon capture and storage sites.

In 2010 the Government commissioned a major review into GA as part of an assessment of the Agency's long term financial outlook. The Strategic Review of Geoscience Australia (The Review) was completed by the Department of Finance and Deregulation and Department of Resources Energy and Tourism in May 2011 and concluded that all of GA's main activities were underpinned by a sound business case, there was little duplication with other government programs, the activities were well aligned with government priorities and had a strong 'public good' element. In particular, The Review acknowledged the value of making high quality pre-competitive data freely available to industry, recognising that these data could be considered a 'prospectus' for Australia's resource potential. The prospectus attracts companies to invest and acquire their own more detailed data to discover, delineate and develop resources and create wealth for all Australians. The value of this investment represents an excellent return for the nation. The Review also highlighted that data stewardship was an agency priority for GA.

The Review was a major vote of confidence in GA and confirmed the value of its programs to government, however, it stated that prioritisation of Agency activities in the context of limited funding and resources was an internal matter for GA. The Review invited GA to submit

a New Policy Proposal (NPP) seeking appropriate funding to sustain the range of activities into the future.

By 2012 a much tighter financial outlook was forcing many government departments to cut budgets. In this tough environment, the GA NPP team with great support from Minister Ferguson and the Resources Energy and Tourism Department, where able to convince Government to support GA's activities.

New Funding Measures

Pre-competitive data acquisition: $26 million per year

Funding for pre-competitive data will be split $15 million for the petroleum and energy sector and $11 million for minerals work. The funds will enable GA to design fit for purpose data acquisition programs within a strategic framework to achieve scientific goals and exploration investment outcomes for Australia.

The Review identified that government provision of pre-competitive information was a successful way to attract investment in resources exploration. The resources sector makes a vast contribution to Australia's export earnings, and a substantial contribution to GDP, employment, government revenues, exploration expenditure and capital expenditure on new projects, including infrastructure. The sector's export performance is critical to the long-term maintenance of Australia's current account position and the strength of the economy. Resources investment also generates a range of regional economic and social benefits including community development, infrastructure and job creation and, in a number of cases contributes to the emergence of sustainable indigenous communities.

Figure 1. Geophysical data acquisition aircraft typical of the type used in Geoscience Australia pre-competitive data programs.

Energy Programs

These will focus on enhancing the energy resource potential of Australia's largely unexplored offshore and onshore frontiers. Geoscience Australia will consult with industry to prioritise the 38 offshore basins which have hydrocarbon potential.

The offshore program will allow full basin analysis for a range of geophysical datasets, seafloor mapping and sampling of sediments and biota. This work provides the data for a comprehensive petroleum systems analysis as well as baseline environmental data that can support improvements to regulatory processes, including reductions in 'green tape'.

Minerals Programs

Assessing the potential mineral wealth of Australia was the primary focus of GA's predecessor agency, The Bureau of Mineral Resources, established in the late 1940s. This was the start of many decades of government data acquisition, culminating with the completion of surface geological mapping at 1:25 000 scale and the complete coverage of the continent with magnetic and gravity data. These data underpinned the highly successful mineral exploration from the 1960s to the 1990s resulting in the discovery of numerous high-value deposits.

The new funding will allow GA to continue this work and apply the latest technologies and methodologies to government pre-competitive data programs.

In particular, GA will seek to extend the mineral prospectivity assessment to 'undercover' areas. These are the large regions of Australia where recent sedimentary rocks or geological processes now obscure the underlying older basement lithologies, making direct mapping by surface observations of outcrop impossible. In some of these areas the geophysical data indicate that prospective rocks from neighbouring endowed provinces extend underneath the barren cover sequences. In other regions there is no knowledge of what rocks occur at depth. Geoscience Australia will seek to reveal the unknown geology and unlock these regions for new mineral exploration.

The work will be guided by the *Uncover Agenda* released recently by the Australian Academy of Science as a response to the declining discovery rate of mineral deposits in Australia over the past decade. The themes of *Uncover* are: Characterising Australia's cover; Investigating Australia's lithospheric architecture; Resolving the 4D geodynamic evolution, and; Characterising the distal footprints of ore deposits.

The work, which will be undertaken in collaboration with state and territory geological surveys and the research community, will include systematic drilling programs to test geological models and identify key indicators which point to mineral resource potential in the subsurface.

Figure 2. Data storage server racks. Information stewardship and delivery of high quality data to clients in the formats they require is an important role for Geoscience Australia.

Data Custodianship: $5 million in 2013 – 14, $8 million per year 2014 – 15 onwards

Geoscience Australia's extensive holdings of geospatial and geoscientific data are the product of six decades of onshore and offshore data acquisition and represent millions of dollars of government investment. These data run to many thousands of terabytes and include strategically important national compilations such as the topographic map gazetteer, 30 years of satellite observation (Landsat) imagery, the bathymetric grid, and national geological and geophysical coverages. Almost all of these data are freely available to the public and constitute a valuable national asset.

The new funding will rejuvenate GA's program of collation of all data to internationally agreed data-exchange standards, renovation of poorly compiled datasets and 'cleaning' of any non-compliant data. This ensures data is machine readable and can be amalgamated into 'big data' which can be processed and modeled to produce new, innovative products and services using high performance computers such as the National Computing Infrastructure facility at the Australian National University. The funding will also expedite development of user friendly delivery of data to clients, including to mobile devices, and web services for seamless input into client's data processing and interpretation software.

Sustainable Operations: $3 million in 2013 – 14, $6 million per year 2014 – 15 onwards

Many of GA's ongoing programs are increasingly important for supporting evidence based decision making about geospatial and geoscientific issues that can directly affect the lives of many Australians. These programs include:

- Groundwater resource assessment and management
- Energy for a carbon constrained economy including geothermal and carbon capture and storage
- Geoscience infrastructure including National Seismometer Network and the Global Navigation Satellite Systems Network which enables high precision positioning for applications in transport, mining, industry and agriculture
- Earth observation from space, including Landsat imagery capable of monitoring changes in the landscape over timescales from days to decades
- Monitoring and risk assessment of natural hazards including earthquake, tsunami, floods and bushfires

Figure 3. Flinders Island, Bass Strait. Satellite imagery provides multiple 'snapshots' of landscapes over various timescales enabling environmental monitoring and informing land-use decisions.

Future Outlook

The new funding announcement is a great result for GA and is recognition of the value of the Agency's work to Government and to the Nation. It is a vote of confidence in the relevance of the GA program priorities and its reputation for reliable delivery. The funding sets up GA for an exciting period of new program development and implementation, and consolidates existing activities that will assist all Australians to meet the challenges of maintaining prosperity and resilience into the 21st century and beyond.

Related articles/websites

Commonwealth of Australia, Department of Finance and Deregulation, 2011, Strategic Review of Geoscience Australia

www.finance.gov.au/publications/strategic-reviews/geoscience.html

Geoscience Australia, 2011, Energy Security Program Achievements—Towards Future Energy Discovery

https://www.ga.gov.au/products/servlet/controller?event=GEOCAT_DETAILS&catno=71823

Australian Academy of Science, 2012, Searching the Deep Earth: A vision for exploration geoscience in Australia

www.science.org.au/policy/uncover.html/

Additional Funding - fact sheet and frequently asked questions page

www.ga.gov.au/about-us/corporate-documents/additional-funding-from-2013-14.html

For more information

email ausgeomail@ga.gov.au

in brief

Flood mapping information to be centralised under joint project

A significant milestone was reached for the National Flood Risk Information Project (The Project) when results from Phase 1 were released at Geoscience Australia in November 2012. This has brought access to centrally located flood mapping information one step closer.

Released by the Federal Minister for Resources and Energy, the Hon Martin Ferguson, AM MP, and the Minister for Emergency Management, the Hon Nicola Roxon, MP, Phase 1 results included the updated Australian flood studies database, and a pilot series of maps derived from satellite imagery.

The updated database contains details on over 1300 existing flood studies and direct access to an increasing number of flood studies reports, making it easier for planners, the public and insurers to determine flood hazard.

"Easy access to flood risk information will give communities and planners a better understanding of their exposure to floods, as well as assist insurers in developing fair and reasonable policies," said Minister Ferguson at the release.

The satellite imagery derived maps show the observed extent of floods over the last six years for three key study areas: Condamine River, Queensland; Flinders and Norman Rivers, Queensland; and Goulburn and Loddon Rivers, Victoria. These maps will be used to understand the frequency and extent of flooding across large regions, especially in areas where flood studies have not been undertaken.

Figure 1. The Hon Nicola Roxon MP (left), the Hon Martin Ferguson, AM MP (centre) and Gai Brodtmann MP (right) at the release of the National Flood Risk Information Project at Geoscience Australia.

The national project was created as part of the Australian Government response to the Natural Disaster Insurance Review, and aims to increase the quality, consistency and accessibility of flood risk information in Australia.

The Project will also see the development of a flood information portal over four years (starting 2012) which will be hosted by Geoscience Australia and updated in November each year.

"We are working towards a portal that will provide a single access point to all available flood maps and studies where users can assess whether they are in an area at risk of flooding," said Minister Ferguson.

Moving beyond 2012, Phase 2 of the Project will see further enhancements to the database including access to more data and improved functionality. The database will bring together flood studies information with satellite derived flood extents for priority areas across the country. This newly integrated information will be accessible through a spatially enabled web-interface with enhanced functionality. These improvements will enable easier data entry and retrieval for users and data custodians.

During the project Geoscience Australia will work with Engineers Australia to revise and publish the *Australian Rainfall and Runoff* guide. "The new guide will enable engineers to develop more accurate and detailed flood studies, and will

in brief

enable them to consider the potential impact of climate induced changes to rainfall and river flow patterns," Minister Ferguson said.

The Project – a joint Australian Government initiative from Geoscience Australia and the Attorney-General's Department – directly supports implementation of the National Strategy for Disaster Resilience, which emphasises the importance of building community resilience to reducing the impact of natural disasters.

Related articles/websites

The National Flood Risk Information Portal
www.ga.gov.au/flood-study-search/

Natural Disaster Insurance Review Report
www.ndir.gov.au/content/Content.aspx?doc=report.htm

For more information

email ausgeomail@ga.gov.au

Australian mineral exploration investment opportunities promoted in China and Japan

Geoscience Australia, together with senior representatives from State and Northern Territory (NT) government geoscience agencies (*Australia Minerals* team), visited China and Japan in November to promote investment in Australian mineral exploration and mining opportunities. Geoscience Australia's Mineral Exploration Promotion team in the Minerals and Natural Hazards Division coordinates and leads the Australia Minerals promotional activities both domestically and internationally.

Australia Minerals had a major presence at the China Mining convention in Tianjin (3 to 6 November), with a new and upgraded booth plus a symposium on 'Australia: Mineral Exploration and Mining Opportunities'. The convention attracted more than 5000 Chinese and international delegates, and is the second most important forum *Australia Minerals* attends after the annual Prospectors and Developers Association of Canada (PDAC) convention in Toronto. In addition to questions on specific projects and opportunities received at the booth, many of the questions at the symposium were focused on issues around doing business in Australia.

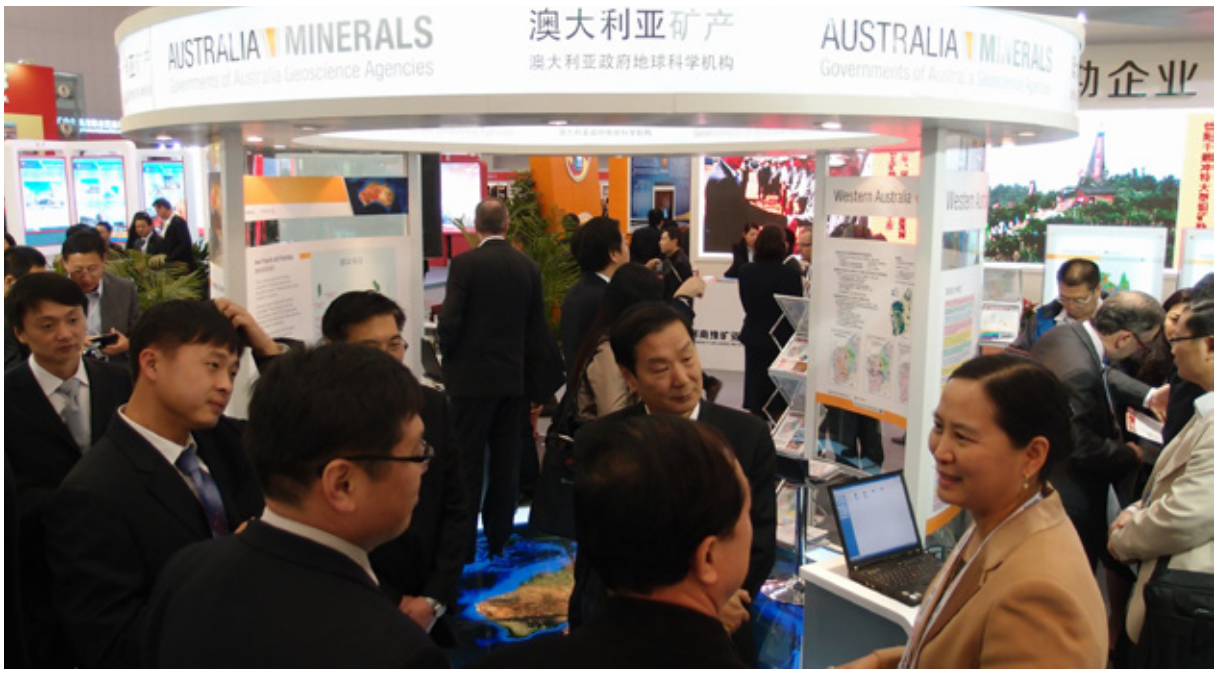


Figure 1. *Australia Minerals* booth at the China Mining Convention, Tianjin, November 2012.

in brief

Seminars on opportunities for mineral exploration investment were also held in Beijing in conjunction with the China Ministry of Land and Resources and in Tokyo with Austrade and sponsored by Japan Oil, Gas and Metals National Corporation. The Beijing seminar attracted approximately 300 participants and involved speakers from Austrade and Department of Resources, Energy and Tourism, Geoscience Australia, most states and the NT, four Australian exploration companies, and the China Mining Association.

Some of the key messages delivered in these promotional activities are that Australia is still under-explored and has high potential particularly in areas 'under cover'; the sovereign risk is low; and federal and state/NT governments strongly support investment through provision of free pre-competitive geoscientific data and other programs.

For more information

email ausgeomail@ga.gov.au

Living on the edge – the coast

Summertime and the coast are synonymous for many Australians.

But what makes our coastline so special. Is it our geological features that make our coastline so distinct from the rest of the world or is it how our nation developed with the reliance on the coast and seas for transport and trade during European settlement through to present day where it is the setting for most of Australia's population, industry, tourism and recreation?

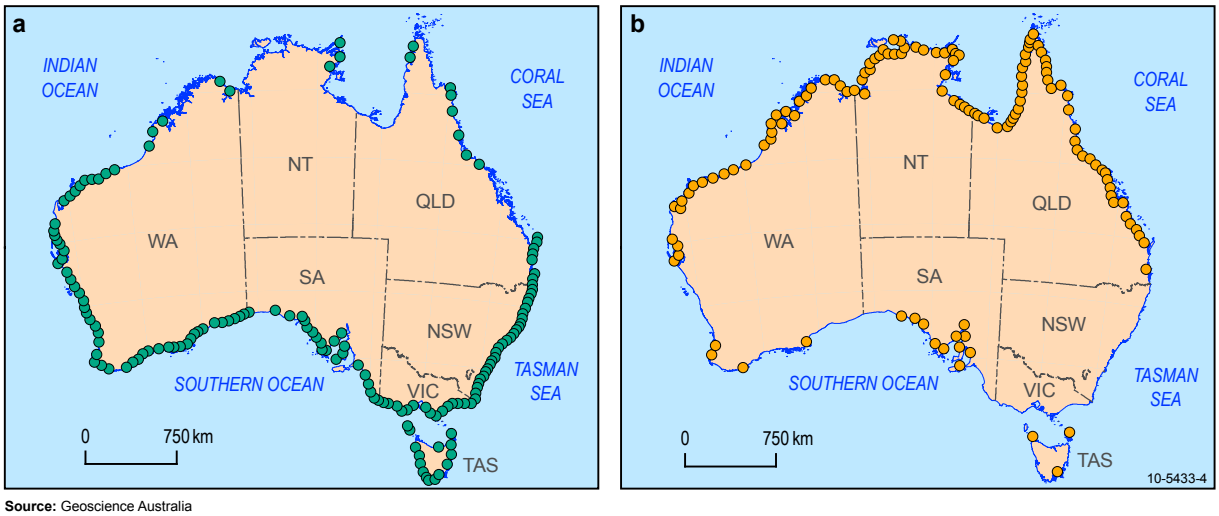
Living on the edge - waterfront views is Chapter 6 from Geoscience Australia's publication *Shaping a Nation: A Geology of Australia* and explores this very question.

The coast of Australia takes many forms, but it is the sand, surf and sun that are the well-known characteristics of the Australian coast, which totals more than 36 000 km in length.

A range of characteristics of the Australian coast clearly distinguishes it from other continents. These features are a consequence of the continent's geological evolution which has set the configuration and aspect of the coast, in concert with a unique set of climatic and oceanographic regimes that determine wave and tide energy and the supply and distribution of sediment.

Why are Australia's beaches so good for surfing?

Well, not all of them are. Australia's beaches can be classified into four major types: wave dominated, tide modified, tide dominated, and beaches



Source: Geoscience Australia

Wave dominated beaches

Tide dominated beaches

Figure 1. Distribution of a) wave-dominated beaches and) tide-dominated beaches.

in brief

Figure 2. Wave-dominated beach–Lighthouse beach.

fronted by rock or reef flats. In Australia wave- and tide-dominated and tide-modified beaches represent nearly 90% of all beaches. They are typically bound by headlands and are usually free from offshore rocks and reefs. Wave-dominated beaches occur principally around the southern half of Australia; tide-influenced and tide-dominated beaches occur mainly along the northern half; and beaches with rock and reef flats are slightly more abundant in the north.

In reality, each beach can be classified by a 'modal state' that is aligned with the most common wave conditions to which it is subject. The morphology of a beach changes in response to variations in wave energy. Thus, wave-dominated beaches experience persistent high wave energy throughout the year and develop a wide, low gradient profile. This is in contrast to Northern Hemisphere low-gradient beaches that often experience greater seasonality, with a distinctive low–wave energy season.

The morphology of wave-dominated beaches results in their being particularly good for surfing, but they are also relatively hazardous for swimming due to the plunging breakers and well-developed rip currents. For beaches fronted by rocks and reef flats, waves breaking on the steep upper beachface at high tide produce very dangerous surf conditions. These beaches are therefore some of the most hazardous, particularly along the southern Australian coast. At low tide, the rock or reef platform is exposed and waves break far offshore.

In southern Australia, beaches are wave dominated and have been clearly the most favoured backdrop for European settlement and urban expansion. These beaches have a broad low-gradient beach face made of well sorted sand, and a wide surf zone with well-developed sandbar and troughs. They are often set between prominent headlands, comprise clean, white quartz or carbonate sand, with clear, clean water, and with a wave climate that produces regular year-round surf.

Many of the beaches in Northern Australia are largely shaped or significantly influenced by tides. They generally have a narrow, steep beach face or relatively coarse shelly sand, fronted by an extensive low-gradient sand or mud flat. At low tide, the shoreline may be hundreds of metres to a few kilometres (on low-gradient coasts) from the sandy beach face, the width increasing with tidal range. These beaches usually lack good surfing waves as a consequence of the large tides, beach morphology and generally low wave energy. They occur where there are macrotidal regimes or where tidal energy is high relative to wave energy, such as Cable Beach near Broome or Carmila Beach near Broad Sound.

Coastal dunes

Approximately 85% of the sandy beaches in Australia are backed by coastal dunes. These aeolian landforms comprise sand that was transported to the beach by waves from the continental shelf (offshore) or from rivers (alongshore), then eroded from the beach by strong onshore winds and deposited inland.

There are significant differences between the coastal dunes of northern and southern Australia. In southern Australia, dunes are more extensive and contain a far larger volume of sand than those in the north. A few exceptions are large coastal dunefields in Arnhem Land, and Cape St Lambert. Overall, these

in brief

Figure 3. The Dawesville Channel was opened in 1994 to provide a new and permanent opening to the sea for the large Peel Estuary in Western Australia. *Source: Port Bouvard Marina (www.portbouvardmarina.com.au)*

differences are a product of the higher wind- and wave-energy regimes of beaches in the south, where the coast feels the impact of strong swell and onshore wind, especially from the Southern Ocean, and a supply of sand from offshore (shelf) or alongshore (river). In contrast, the coast of northern Australia experiences much lower levels of wave energy and therefore lower rates of sediment delivery to beaches, as well as less frequent strong onshore wind.

Australia's coastal waterways and estuaries

Estuaries are transition zones between marine and terrestrial environments. Frequent changes in the relative influence of land and marine processes result in estuaries being highly dynamic environments. We rely on estuaries for essential ecosystem services, such as shoreline protection and disturbance regulation (e.g. mangrove mitigation of cyclones), nutrient cycling, habitat diversity, food production and recreation. There are more than 1000 estuaries and other coastal waterways around Australia, and these have been classified into different types based on sediment supply and the relative influence of wave, tide and river processes.

Better valuing the edge

Two common adages of real estate are 'you can't beat a waterfront view' and 'location, location, location'. The allure of a coastal home in temperate Australia has been a major factor in the recent rapid expansion of the large coastal cities of Australia, driven by a growing population and prolonged strong economic growth generated by the other 'boom' in the export of commodities. This expansion of coastal cities has been an important driver of the domestic economy and has further increased the proportion of the population in these cities. In the

in brief

more remote and sparsely populated sections of coast are the ports that play a key role in the expansion of the commodities trade and the economic prosperity of Australia.

There is much more to the 'clinging to the coast' by Australians than the desire for a waterfront view. Much of the Australian coast is dry, wild and remote and represents the antithesis of a 'good location' for European settlement and development.

As a consequence, modern Australian society is concentrated in the more benign humid, temperate coastal regions. The spatial distribution of the Australian population, therefore, reflects the strong influence of the continent's geological evolution on the geomorphological and oceanographic character of the coast. This interaction of geology, ocean and climate has produced the distinctive, as well as the less well-known, coastal environments of Australia.

Shaping a Nation: A Geology of Australia is the story of a continent's geological evolution as seen through the lens of human impacts. Exploring the geology, resources and landscapes of Australia, the book reveals how these have helped to shape this nation's society, environment and wealth. Presented in a refreshingly non-linear format, the book summarises much of what we know about this country's geological history, discussing the fossil record and evolution of life across the continent, describing its mineral and energy reserves, and revealing the significance of its coastal and groundwater systems.

The book also explores some of the challenges and opportunities presented by Australia's rich geological heritage, and outlines the issues they present in Australian society today. Based on much of the latest science, the book reveals Australia's expertise in the geosciences and reinforces the vital role they play in informing its present and future development.

In presenting the latest geoscientific knowledge, *Shaping a Nation: A Geology of Australia* is vividly illustrated by technical drawings and figures and accompanied by stunning photography that reveals the extraordinary beauty of Australia's geology and landscapes. For the avid reader, an accompanying DVD hosts extensive appendices, including supplementary reading and reference material, maps, movies and an interactive 3D model showcasing many geoscience datasets.

Related articles/websites

Shaping a Nation: A Geology of Australia

www.ga.gov.au/products-services/publications/shaping-a-nation.html

Geoscience Australia Sales Centre

www.ga.gov.au/products-services/how-to-order-products/sales-centre.html

ANU E Press

http://epress.anu.edu.au/titles/shaping-a-nation

For more information

email ausgeomail@ga.gov.au

product news

New data in the Petrel Sub-basin supports CO_2 storage assessment

The Minister for Resources and Energy, the Hon Martin Ferguson AM MP, recently announced the release of new pre-competitive data acquired by Geoscience Australia as part of the Australian Government's multi-year program to assess highly prospective offshore basins for their CO_2 storage potential.

Minister Ferguson said this work will make a major contribution to Australia's efforts to accelerate the development of Carbon Capture and Storage (CCS) technology and help to reduce Australia's greenhouse gas emissions. The recently released Energy White Paper highlights the important role that CCS technology will play in helping Australia, and its prospective coal and gas industries, to find ways to reduce CO_2 emissions.

The new data, collected offshore from the Northern Territory in the Petrel Sub-basin, is a significant first step in the Australian Government's $40 million investment to assess the geological suitability of highly prospective offshore basins to potentially store CO_2. This work is being undertaken under the National CO_2 Infrastructure Plan (NCIP) and the National Low Emissions Coal Initiative (NLECI).

The Petrel Sub-basin was targeted following its identification as a prospective site for CO_2 storage by the Carbon Storage Taskforce in 2009, due to its favourable geology and proximity to major emission sources.

The acquisition of 2D seismic reflection and supporting seabed data in the Petrel Sub-basin, funded through the NLECI, fills a significant information gap

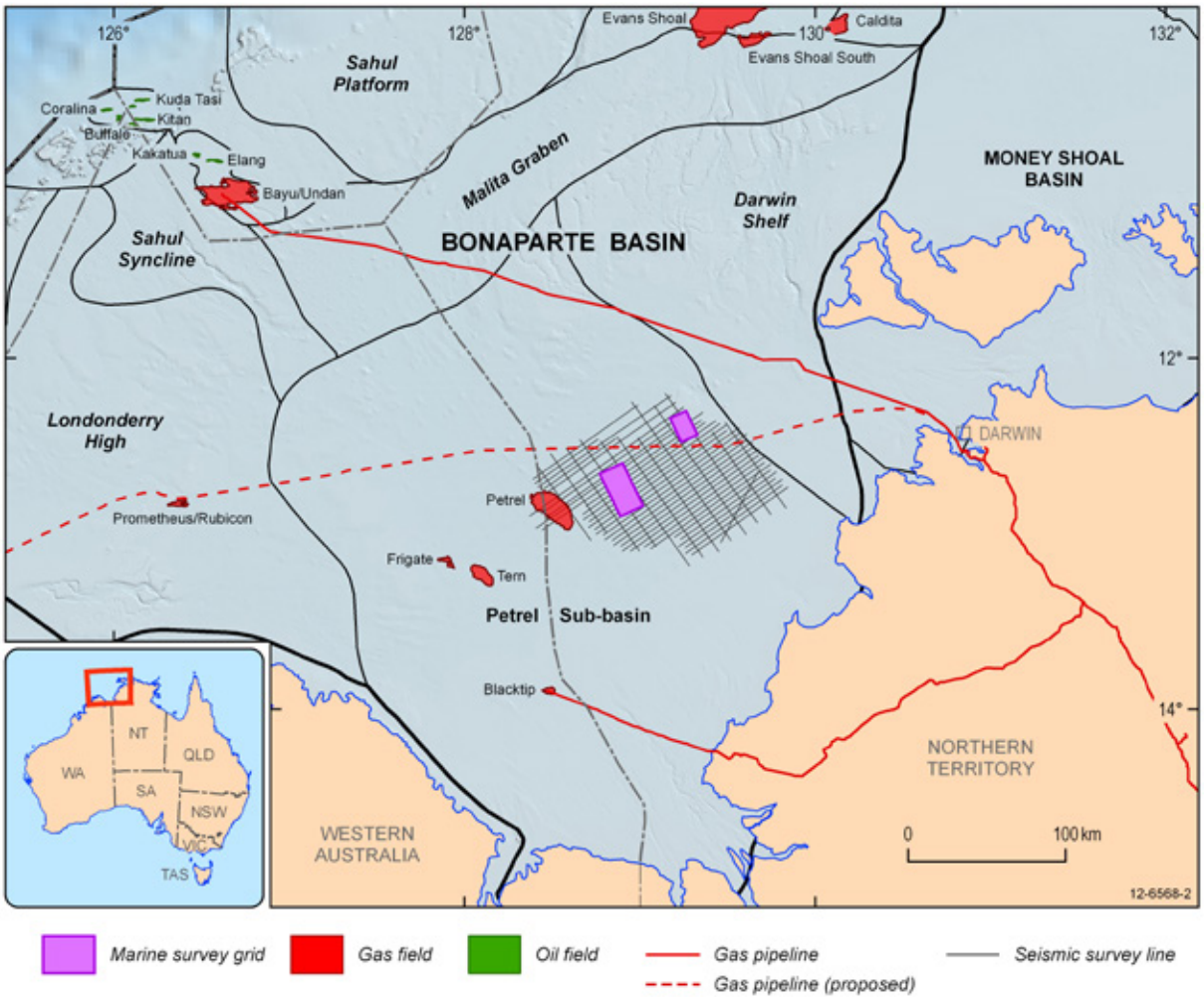


Figure 1. Showing the location of the acquisition of seismic data and supporting seabed data in the Petrel Sub-basin, beneath the Joseph Bonaparte Gulf offshore from the Northern Territory.

product news

about the sub-basin and associated seabed environments. Importantly, these data will enable industry to make more informed decisions regarding the suitability of sites for CO_2 storage, and encourage industry to potentially uptake this site.

Minister Ferguson said the data will underpin a comprehensive assessment of the CO_2 storage potential of the Petrel Sub-basin. The results of this assessment, including the associated geological reports, will be available mid-2013.

In addition to the Petrel Sub-basin, CO_2 storage assessments are also currently being undertaken for the Vlaming Sub-basin (offshore Western Australia), the Browse Basin (offshore Western Australia) and the Gippsland Basin (offshore Victoria).

Petrel Sub-basin CO_2 Storage Seismic Survey (GA336)

Between 3 May and 24 June 2012 the *MV Duke* acquired high resolution multichannel seismic data in the Petrel Sub-basin. The seismic data have been processed to focus on enhancing the stratigraphy in the shallower formations that are less than 1000 metres below the seabed.

Data acquired:

- 4091 line kilometres of seismic reflection
  - 4 second record length
  - 2 millisecond sample rate, 408 traces
  - 5100 metres solid streamer
  - 12.5 metre shotpoint and 12.5 metre group interval
  - Source depth: 4 metres; streamer depth: 5 metres
  - 2080 cubic inch gun array at 2000 psi
- 8000 line kilometres of multibeam swath bathymetry

Petrel Sub-basin Marine Survey (GA335)

The Petrel Sub-basin Marine Survey (GA335) was conducted in collaboration with the Australian Institute of Marine Science in May 2012 using the *RV Solander*. The survey targeted two study areas to investigate possible links between geological formations suitable for CO_2 storage and the shallow geology and seabed.

Data acquired included 5300 line kilometres of multibeam swath bathymetry, 655 line kilometres of sub-bottom profiles, underwater video and still images from 11 sites. Seabed sediment and biological samples were collected from 15 sites. These sampling sites were identified from a preliminary analysis of the multibeam bathymetry and sub-bottom profiles, and were selected to cover a range of seabed features.

Petrel Sub-basin CO_2 Data package

The data package includes high resolution 2D seismic, sub-bottom profiles, and multibeam sonar bathymetry data, as well as geological and ecological seabed data. The data package, including initial data analysis and post-survey reports, is now available through the Bonaparte CO_2 Storage Project webpage on the Geoscience Australia website.

Related articles/websites

Minister Ferguson's Media Release
http://minister.ret.gov.au/MediaCentre/MediaReleases/Pages/NewDatatoAccelerateDevelopmentofCarbonCaptureandStorageTechnology.aspx

Energy White Paper
www.ret.gov.au/energy/facts/white_paper/Pages/energy_white_paper.aspx

Bonaparte CO_2 Storage Project
www.ga.gov.au/ghg/projects/bonaparte-co2-storage.html

Carbon Storage Taskforce
www.ret.gov.au/energy/clean/ccs/nleci/cst/Pages/index.aspx

National CO_2 Infrastructure Plan
www.ret.gov.au/energy/clean/ccs/geological/nco2infplan/Pages/default.aspx

National Low Emissions Coal Initiative
www.ret.gov.au/energy/clean/ccs/nleci/Pages/index.aspx

Marine environmental data to shed light on CO_2 storage in Petrel Sub-basin
www.ga.gov.au/ausgeonews/ausgeonews201209/inbrief.jsp#inbrief2

For more information

email ausgeomail@ga.gov.au

product news

New earthquake hazard map for Australia

A newly updated map depicting the level of ground shaking which regions of Australia may experience from earthquakes has been released. It provides an insight into which areas of the continent are most likely to experience hazardous levels of ground shaking during an earthquake event.

The Earthquake Hazard map of Australia 2012 is a national scale map of earthquake hazard which has been developed by scientists at Geoscience Australia following an assessment of historic and ancient, pre-historic earthquakes in Australia. The results of the assessment are presented as a map showing the bedrock peak ground motion with a 10 per cent probability of being exceeded every 50 years.

The map was released in November by the Minister for Resources and Energy, Martin Ferguson, AM MP.

Although Australia is commonly considered to be a stable continent with few earthquakes, a total of 168 above magnitude 5.0 have been experienced since 1950, with 82 events recorded at magnitude 3.0 or above in 2011.

The *Earthquake Hazard map of Australia 2012* does not enable scientists to predict earthquakes, but provides insights into where earthquakes are most likely to cause hazardous levels of ground shaking. As well as the information on the relative hazard, the map offers a nationally consistent mechanism for selecting locations for more detailed earthquake impact and risk assessments in the future.

The information produced by this study can be used to inform the earthquake loading section of the Australian building code which allows engineers to

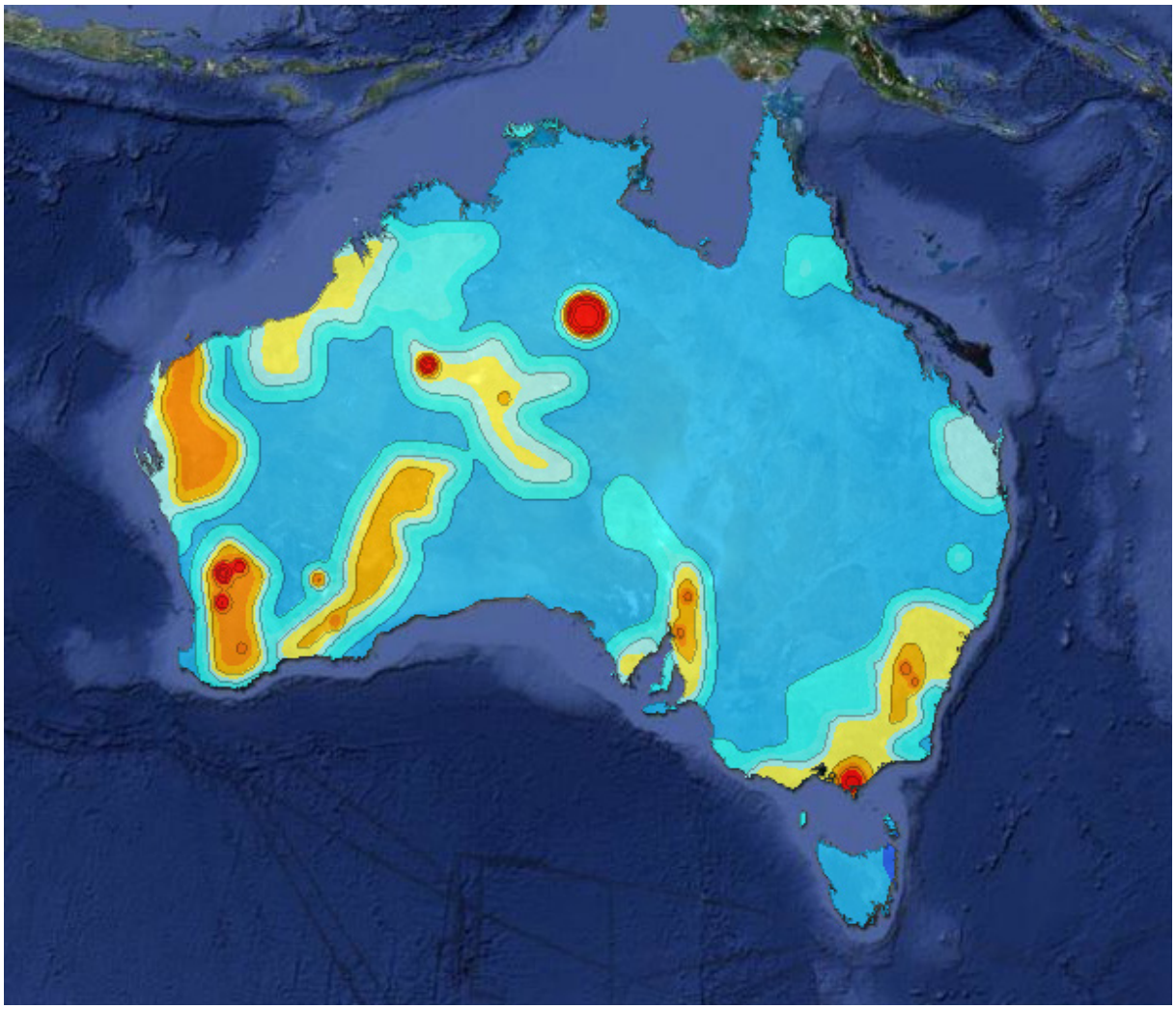


Figure 1. Screenshot of the Earthquake Hazard map of Australia 2012.

product news

design structures to mitigate the effects of ground shaking and better protect communities. It is the strong ground shaking produced by earthquakes rather than only the magnitude of an earthquake which endangers people, buildings and infrastructure.

The underlying models and datasets used to derive the earthquake hazard map can be used by emergency managers, regional and urban planners, the insurance industry, researchers and individuals to undertake further analysis and to develop detailed impact models.

The maps can be displayed with various layers including topography, geology, gravity and magnetics, as well as land cover and Google map satellite imagery. The map and a detailed record of the processes involved in generating it can be downloaded also from the page on the Geoscience Australia website.

Related articles/websites

Earthquake hazard map for Australia
www.ga.gov.au/darwin-view/hazards.xhtml

For more information

email ausgeomail@ga.gov.au

New geophysical datasets released

Datasets from seven new geophysical surveys have been released since September 2012. These data can be downloaded from the Australian Government Geoscience Portal

Airborne Magnetic – Radiometric - Elevation Surveys

Survey	Date	1:250 000 Map Sheets	Line Spacing (m), terrain clearance (m), orientation	Line Km	Contractor
Murgoo	March 2011 – July 2012	Murgoo (pt), Yalgoo (pt)	200 m 50 m east – west	128 000	Thomson Aviation Pty Ltd
Carnarvon Basin South	April 2012 – September 2012	Shark Bay (pt), Wooramel (pt), Edel (pt), Yaringa (pt)	400 m 60 m east – west	123 300	GPX Surveys Pty Ltd
West Kimberley (Prince Regent – Montague Sound)	July 2011 – June 2012	Prince Regent, Montague Sound (pt), Camden Sound (pt), Charnley	P Regent, Montague: 400m 60 m north – south. Charnley: 200m 50 m north – south	134 000	UTS Geophysics Pty Ltd

Table continued over page

product news

Kauring Infill (Combination of data acquired on the Moora (UTS) and Corrigin (GPX) surveys to create coverage at 100m spacing)	June 2011, March 2012	Perth (pt), Kellerberrin (pt), Pinjarra (pt), Corrigin (pt)	100 m 50 m east – west	5100	June 2011 – UTS Geophysics Pty Ltd. March 2012 – GPX Surveys Pty Ltd
Galilee	August 2011 – Aug 2012	Manuka (pt), Tangorin (pt), Buchanan (pt), Winton (pt), Muttaburra (pt), Galilee (pt), Longreach (pt), Jericho (pt)	400 m 80 m east – west	125 959	UTS Geophysics Pty Ltd
Thomson East/ West/North	May 2011 – September 2012	Quilpie (pt), Charleville (pt), Toompine (pt), Wyandra (pt), Eulo (pt), Cunnamulla (pt), Adavale (pt), Augathella (pt)	400 m 80 m east – west	299 000	Thomson Aviation Pty Ltd.
Thomson Extension	June – November 2011	Augathella (pt), Eddystone (pt), Charleville (pt), Mitchell (pt).	400 m 80 m east – west	47 777	UTS Geophysics Pty Ltd

For more information

email ausgeomail@ga.gov.au

Related articles/websites

Australian Government Geoscience Portal
www.geoscience.gov.au

New 1:1 million scale Surface Geology of Australia

A new 2012 edition of the national 1:1 million scale Surface Geology of Australia dataset is now available. The data is available in ESRI geodatabase, shapefile and Mapinfo formats, and will be available as a web service in early 2013.

The 2012 edition data updates the previous 2010 data with new or revised mapping in the Northern Territory, north-west Queensland, and Western Australia (Figure 1). The new dataset also updates the stratigraphic and descriptive geological information from the previous 2010 edition, and has been restructured to now be fully compliant with international geoscience data standards.

The geology data can be viewed, queried, and downloaded along with Geoscience Australia's topographic map data through the MapConnect online mapping tool. The dataset can also be ordered on DVD from the Geoscience Australia Sales Centre.

product news

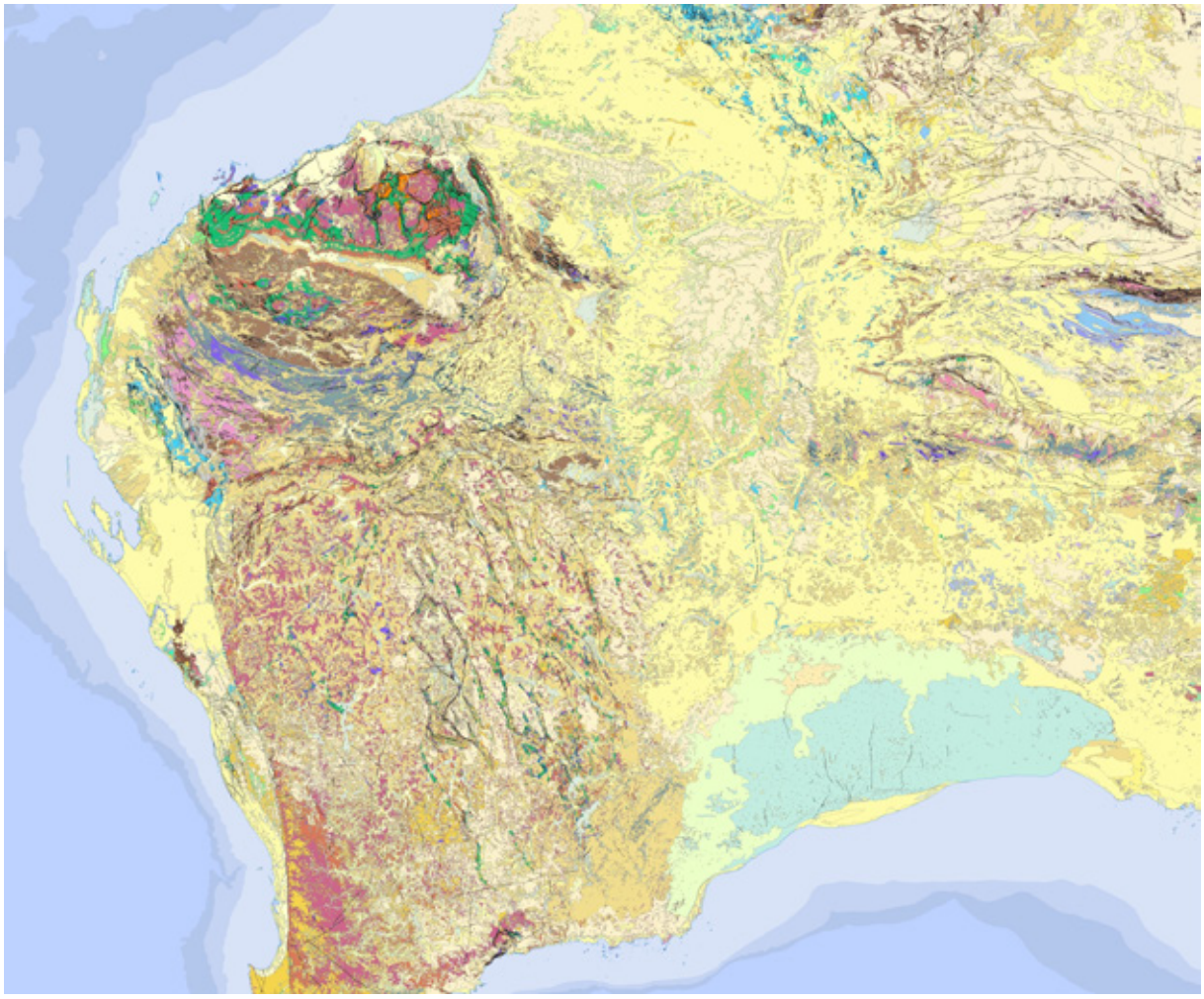


Figure 1. Detail from the Surface Geology Map of Australia over the western part of the continent showing outcropping rocks from the Yilgarn, Pilbara and Musgrave Provinces.

Related articles/websites

MapConnect

www.ga.gov.au/mapconnect

Geoscience Australia Sales Centre

www.ga.gov.au/products-services/how-to-order-products/sales-centre.html

For more information

email ausgeomail@ga.gov.au

events calendar

NAPE Expo	5 to 6 February 2013
George R Brown Convention Center, Houston Texas Contact: NAPE Headquarters, 4100 Fossil Creek Blvd., Fort Worth, Texas 76137 USA	p +1 817 847 770 f +1 817 847 774 e info@napeexpo.com www.napeexpo.com
PDAC 2012 International Convention, Trade Show and Investors Exchange	**3 to 6 March 2013**
Prospectors and Developers Association of Canada Metro Toronto Convention Centre, Toronto, Canada Contact: PDAC, 135 King Street East, Toronto, Ontario, M5C IG6	p +1 416 362 1969 f +1 416 362 0101 e info@pdac.ca www.pdac.ca

For more information on Geoscience Australia's involvement in the above events email ausgeomail@ga.gov.au