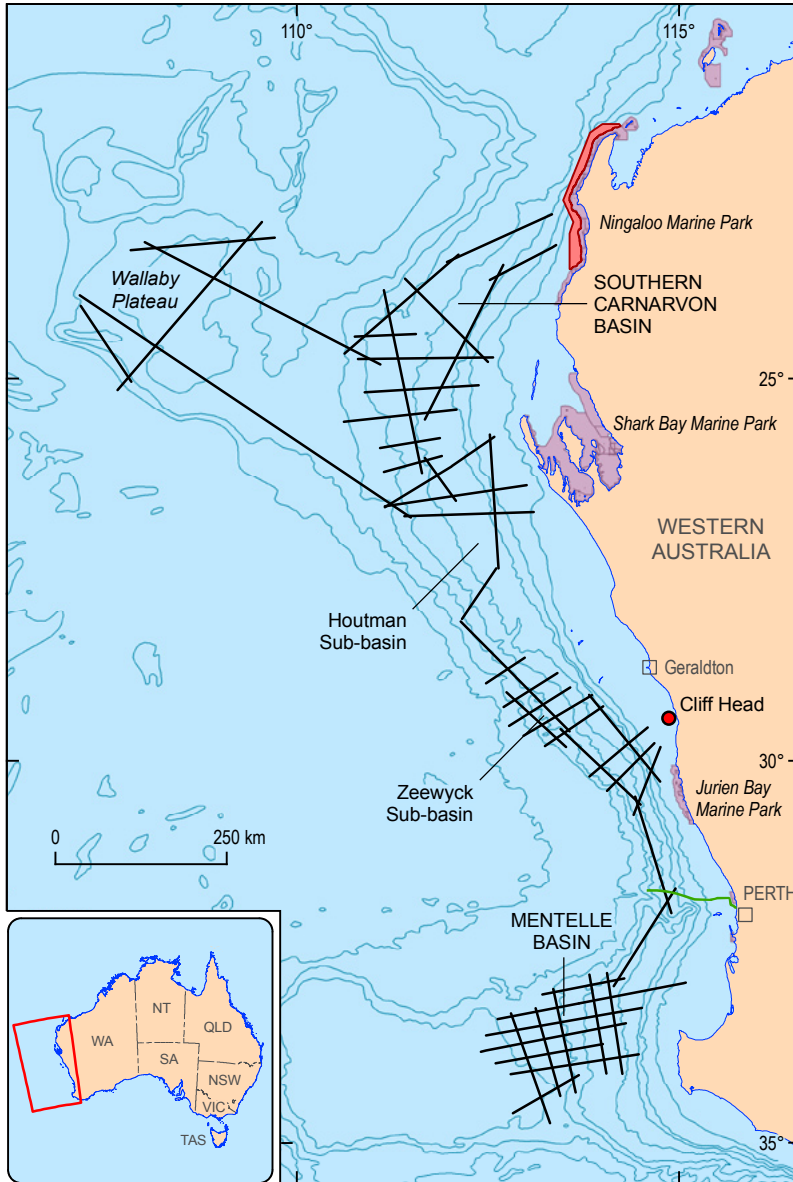


Surveys off southwest Western Australia

As part of Geoscience Australia's Southwest Margins and Seabed Characterisation Projects, two surveys are currently underway off the coast of southwest Western Australia. The areas being investigated include the frontier Mentelle Basin, Zeewyck Sub-basin and the Wallaby Plateau, as well as poorly explored areas of the Northern Perth and Southern Carnarvon Basins (figure 1).



Southwest Margins 2D Seismic Survey 2008

- | | |
|-----------------------------------|--------------------------------|
| Marine park (Commonwealth waters) | Southwest margins survey lines |
| Marine park (WA state waters) | Bathymetry contours |
| Submarine Cable Protection Zone | Production facility |

Figure 1. Location of the 2D seismic reflection survey, offshore Western Australia.

The Southwest Margins Project aims to maximise opportunities for the discovery of a new hydrocarbon province and underpin promotion of selected areas for petroleum exploration. Results from the survey will also assist with the planning and management of Australia's marine environments.

A 2D seismic reflection survey will run from late November 2008 to late January 2009 whilst a marine reconnaissance survey which commenced in October 2008 will be completed in January 2009. Both surveys are part of Geoscience Australia's offshore frontier basin research (Offshore Energy Security Program) which has funding of \$75 million over five years (2007 to 2011) to provide a stimulus for petroleum exploration activities in Australia and support the vital quest to find a new offshore oil province (see *AusGeo News* 90).

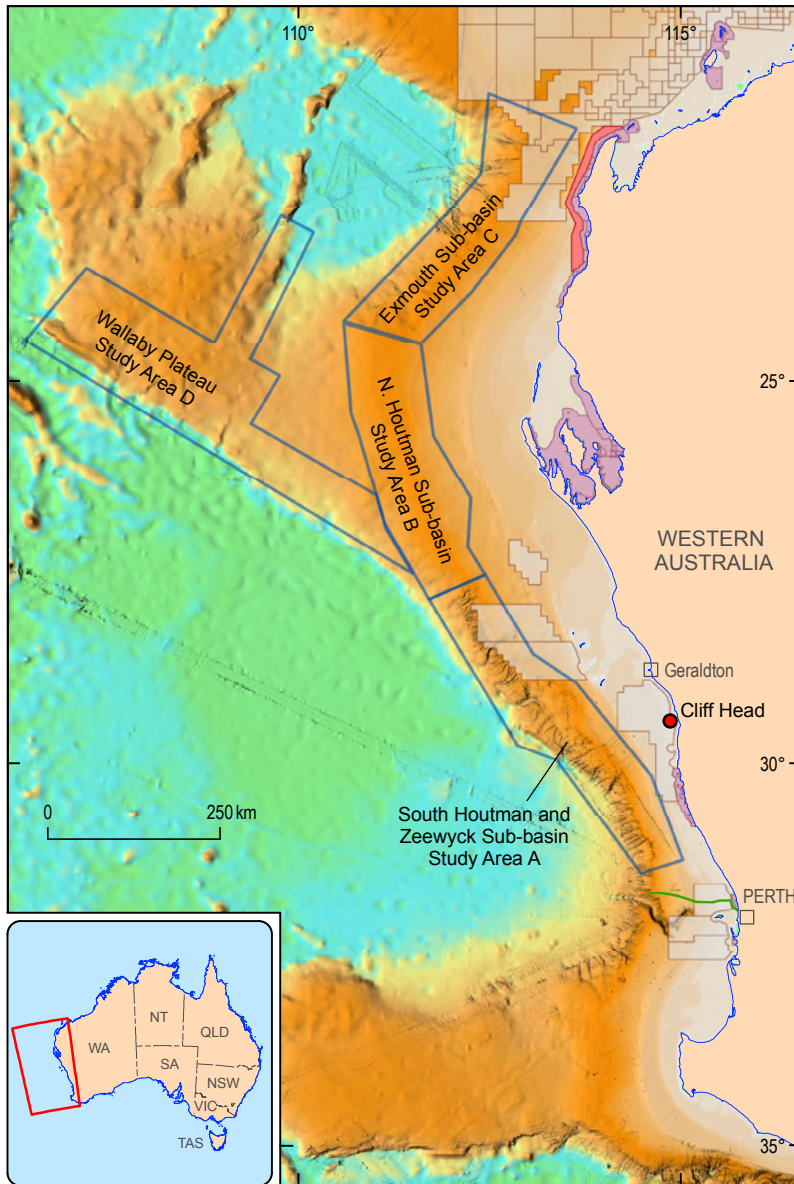
2D seismic reflection survey

This survey will collect up to 8000 kilometres of 2D seismic reflection, magnetic and gravity data along 52 proposed regional lines within the Mentelle, Perth (Zeewyck and Houtman Sub-basins), and Southern Carnarvon Basins and on the Wallaby Plateau (figure 1). Seismic data

provides information on the geological structures and sediment thickness below the seafloor and is carried out using a specialised seismic acquisition vessel. Geoscience Australia has contracted CGG Veritas to undertake the seismic survey and they will be using their commercial seismic vessel, the *Duke*. This vessel operates a 4290 cubic inch airgun array and an 8 kilometre solid streamer. The airguns generate an energy pulse and the returned signal is recorded for 12 seconds.

The objective of the seismic survey is to collect geophysical datasets within and across the identified geological regions to assist in understanding the basin shape, sedimentary fill characteristics and geometry of the controlling geological structures.

The acquired data will assist in understanding the petroleum prospectivity of the region. This data will facilitate more detailed mapping of the regional geology and determination of total sediment thickness, as well as interpretation of the nature and thickness of the crust beneath the major depocentres (or area of major sediment accumulation). It will also support modelling of tectonic evolution and an assessment of the petroleum prospectivity of the frontier basins along the southwest margin.



Southwest Margins Marine Reconnaissance Survey 2008

- | | |
|-----------------------------------|---------------------------------|
| Marine Reconnaissance Study Areas | Marine park (WA state waters) |
| Current permits | Submarine Cable Protection Zone |
| Marine park (Commonwealth waters) | Production facility |

Figure 2. Marine reconnaissance survey locations, offshore Western Australia.

Marine reconnaissance survey

This survey of about 100 days duration will be conducted along the southwest margin between October 2008 and January 2009.

The survey will be conducted using the RV *Sonne* in three survey legs (figure 2). The first leg will cover Study Area A (South Houtman and Zeewyck



Sub-basin) followed by the second leg covering Study Areas B and C (North Houtman and Exmouth Sub-basin) and the third leg will cover Study Area D (Wallaby Plateau). The overall scientific aim of the survey is to collect geophysical, geological and biophysical data for the Zeewyck and Houtman Sub-basins (part of the Perth Basin), the Southern Carnarvon Basin, and Wallaby Plateau areas to assist in understanding their petroleum prospectivity, geological setting and environmental significance.

The geophysical component of the marine reconnaissance survey involves collection of regional bathymetry and sub-seafloor data (multi-beam sonar and sub-bottom profiler data) and potential field data. The geological component involves sampling of the seafloor, the water column and the bedrock. The multi-beam swath acquisition images the sea floor bathymetry and characterises the seabed type to assist in a better understanding and management of the marine environment. The magnetic and gravity data reflects variations in the magnetism and density of the bedrock geology. Sampling of scarps in submarine canyons will help to build an understanding of the age and composition of rocks in frontier basins. Samples will be analysed at Geoscience Australia and incorporated into an analysis of the geological history of these basins.

The multibeam sonar mapping will cover around 210 000 square kilometres over the three survey legs, increasing the area of multibeam sonar coverage in Australia's Exclusive Economic Zone by 12 per cent. The survey will therefore be the biggest, in terms of area mapped, ever carried out in Australia's ocean territory.

Data availability

Information and data collected on the surveys will be used to support the work programs of the Department of Resources, Energy and Tourism. The data will be available to the petroleum exploration industry as pre-competitive data sets to support future releases of offshore petroleum exploration areas by the Australian Government. Data will also be provided to relevant Australian Government agencies to assist with marine management of these areas. It will also be used to potentially support the design of a national representative system of marine protected areas.

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Related articles/websites

AusGeo News 90: Offshore energy program underway
www.ga.gov.au/ausgeonews/ausgeonews200806/offshore.jsp

Rankins Springs-Yathong Troughs Seismic Survey

The Rankins Springs-Yathong Troughs Seismic Survey was the first survey of an under-explored onshore petroleum basin undertaken as part of Geoscience Australia's Onshore Energy Security Program. The deep seismic survey comprised two east-west traverse lines, one each across the Rankins Springs and Yathong Troughs in the southeastern Darling Basin in western New South Wales (figure 3). The survey acquired a total of 234 kilometres of seismic data in March 2008 and a 40

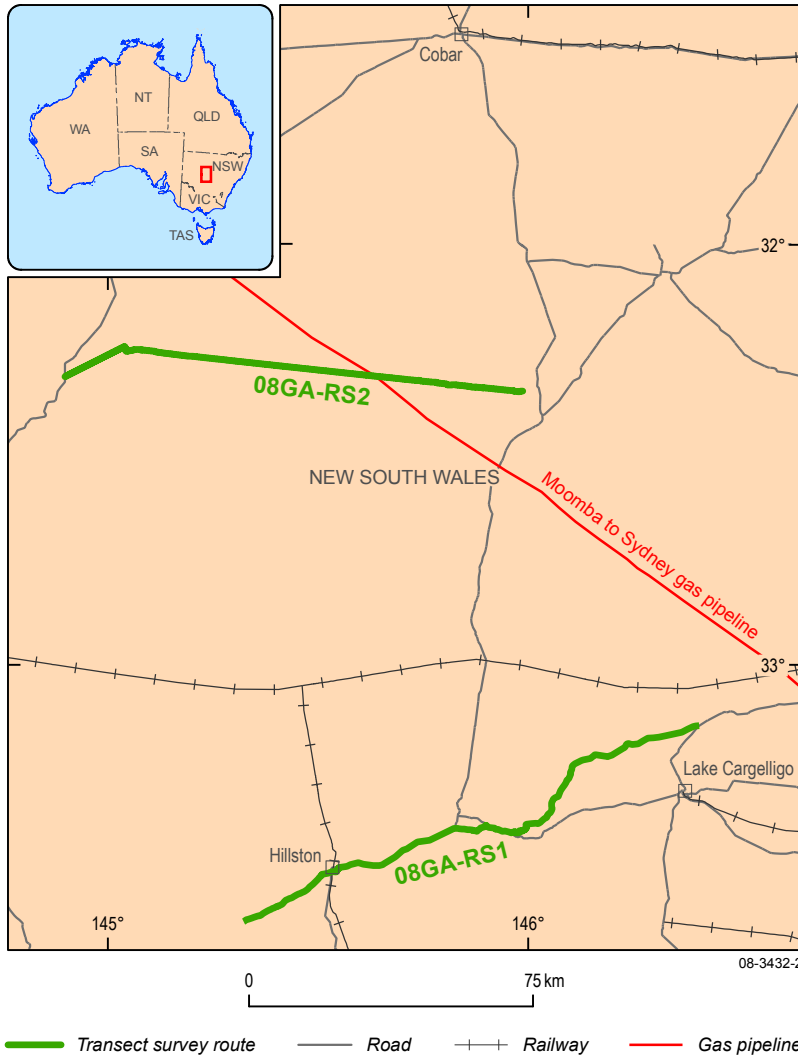


Figure 3. Traverse lines for Rankins Springs and Yathong Troughs deep seismic survey, New South Wales.

kilometre extension to the Yathong Trough traverse is planned for early 2009.

Preliminary analysis of the seismic sections indicates the presence of well-stratified basin sediments, possibly of Devonian age, overlying a thick section of unknown age and lithology, which in turn overlies crystalline basement. The mapping of thick sedimentary rocks in an under-explored 'frontier' basin is a significant development for onshore petroleum exploration in Australia. If petroleum source rocks can be identified, either from seismic interpretation or by drilling exploration wells, then the prospectivity of the Darling Basin may be re-assessed by petroleum companies and lead to further exploration.

The survey was jointly funded by the New South Wales Department of Primary Industries and Geoscience Australia through the Onshore Energy Security Program. The raw seismic data and

un-interpreted processed seismic sections from the survey are now available to the petroleum industry.

Gawler-Officer-Musgrave-Amadeus Seismic Survey

Geoscience Australia is currently conducting a seismic survey in Central Australia.

The survey consists of one continuous traverse crossing from the Gawler Province, over the Officer Basin to the Musgrave Block and then into the Amadeus Basin in the Northern Territory (figure 4). This traverse is planned to be approximately 634 kilometres long.

Acquisition commenced at the northern end of the traverse approximately 25 kilometres southeast of Eralunda in the Northern Territory on November 1. This traverse follows the Adelaide to Alice Springs railway line utilising the railway access road and is planned to conclude in late December near Tarcoola in South Australia.

This survey aims to provide new insights into the crustal architecture of the two Neoproterozoic sedimentary basins in Central Australia and their tectonic relationship to older (Mesoproterozoic) basement terrains. Of particular interest is the identification

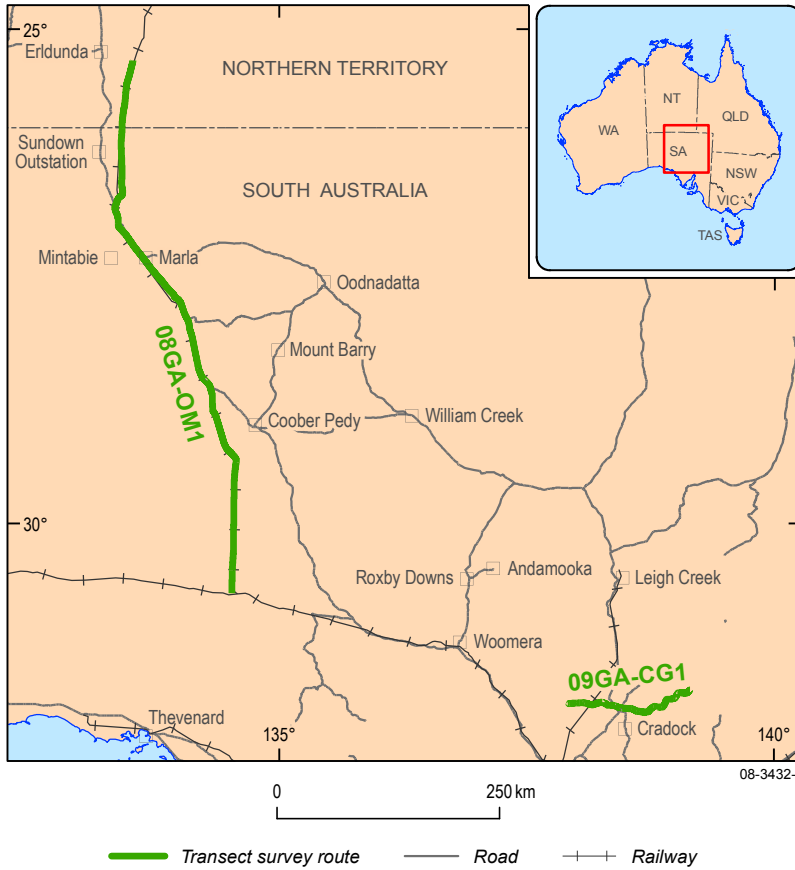


Figure 4. Traverse line for Gawler-Officer-Musgrave-Amadeus seismic survey, South Australia and Northern Territory.

of structural elements in the basal sections which may host hydrocarbons that were generated prior to the Alice Springs Orogeny.

This survey is jointly funded by Geoscience Australia through the Onshore Energy Security Program, Primary Industries and Resources South Australia and AuScope. AuScope is an initiative established under the National Collaborative Research Infrastructure Strategy to characterise the structure and evolution of the Australian continent.

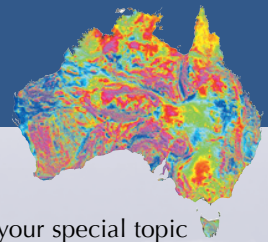
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