Australian Government

Geoscience Australia

Geoscience Australia

Product Catalogue 2007

CONTENTS

ABOUT THIS CATALOGUE

This catalogue provides details about Geoscience Australia's products and services.

The product range includes

- **printed maps,**
- **vector and raster digital map data,**
- **digital elevation data,**
- **satellite image data,**
- **aerial photography,**
- **geological data,**
- **geophysical data,**
- **geohazards data,**
- **geodetic datasets and**
- **educational materials.**

The information in this catalogue was current at the date of publication. However, product details and prices are subject to change.

All prices include the Goods and Services Tax.

HOW TO OBTAIN PRODUCTS

There are a variety of ways to obtain our products and services, whether it is a visit to your local map shop, downloading or purchasing online, or contacting a specialist distributor for a complex product. Choose the one that suits you:

PAPER MAPS	Visit your local map shop and ask for a NATMAP. Purchase maps and packaged products online at **www.ga.gov.au**. Or contact the Geoscience Australia Map Shop (see below).
DIGITAL TOPOGRAPHIC DATA	Available through Geoscience Australia Sales Centre (see below) or free online at **www.ga.gov.au**.
GEOTHEMATIC AND EDUCATION PRODUCTS	Contact the Geoscience Australia Sales Centre (see below) or online at **www.ga.gov.au**.
ACRES SATELLITE IMAGERY	Contact a specialist distributor. Visit our website or contact Geoscience Australia Customer Services (see below) to find your nearest distributor.
AERIAL PHOTOGRAPHY	Only available through United Photo and Graphic Services (see page 43). Online catalogue of Flight Line Diagrams at **www.ga.gov.au**.
GEODETIC PRODUCTS	Available online at **www.ga.gov.au**.

Geoscience Australia Sales and Distribution

If you need assistance, contact Geoscience Australia at one of the following locations:

For Topographic map and data products, Geological, Geophysical, Geohazards and Education products

Customer Support and Sales Centre
Sales Centre open 9am–5pm, Monday to Friday, excluding public holidays and Christmas/New Year period.
Cnr Jerrabomberra Ave and Hindmarsh Drive, Symonston ACT 2609
Freecall within Australia: 1800 800 173
Tel: + 61 2 6249 9966
Fax: + 61 2 6249 9960
Email: sales@ga.gov.au

For ACRES Satellite Imagery

Customer Services
GPO Box 378, Canberra ACT 2601
Freecall (within Australia): 1800 800 173
Tel: + 61 2 6249 9779
Fax: + 61 2 6249 9938
Email: acres@ga.gov.au

For more information, visit our website, **www.ga.gov.au.**

DOWNLOAD FREE DATA

Many of the products and services in this catalogue are available free online, as a result of the Commonwealth's policy to maximise the accessibility and affordability of spatial data.

These downloads are intended for use in geographic information systems (GIS), computer aided design (CAD) or image processing systems. You will need specialist software to view and manipulate the data.

Use the Search facility on our website for quick access to the dataset you want.

www.ga.gov.au

METADATA AND DATA USER GUIDES

Detailed information about Geoscience Australia data products that are available for free download from metadata pages on our Internet site. Data User Guides are also provided in PDF format for more complex products.

COPYRIGHT

The Commonwealth holds the copyright on all Geoscience Australia data products. Consequently, rather than selling the actual data, Geoscience Australia sells a **licence to use the data**.

In the case of free online data, the data is also provided subject to a licence to use the data.

For further information refer to the Copyright and Licensing section in this catalogue.

GEOSCIENCE PORTAL

The Geoscience Portal at **www.geoscience.gov.au** provides access to geoscience information from Australian governments at State and Federal levels.

AUSTRALIAN SPATIAL DATA DIRECTORY

If Geoscience Australia does not have the products you need, you may wish to search the Australian Spatial Data Directory for alternatives.

This directory, which is accessible via the Geoscience Australia website, contains a list of spatial data produced by a wide range of government, academic and private sector suppliers and is provided by the Australia New Zealand Land Information Council (ANZLIC).

TOPOGRAPHIC AND THEMATIC PRODUCTS

Geoscience Australia is responsible for producing public interest map products with a national coverage. These include a range of printed maps as well as digital maps and data across a range of topographic, general reference and thematic products.

TOPOGRAPHIC MAPS

1:50 000 Scale Maps

At this scale, 1cm on the map represents 500m on the ground. Selected 1:50 000 scale topographic maps, produced by the Australian Army, are available from Geoscience Australia. Each map depicts an area of a quarter of a degree of latitude by a quarter of a degree of longitude, which corresponds to approximately 25 kilometres by 25 kilometres.

The contour interval is 10 metres.

Coverage: Partial coverage predominantly in northern Australia, along major transport routes and selected areas. About 1 000 maps have been published to date.

Currency: Ranges from 1968 to 2005.

Coordinates: Geographical and UTM.

Datum: AGD66 or WGS84.

Projection: Universal Transverse Mercator.

Format: Paper, flat copies only.

Recommended Price: $9.25 per sheet.

Forward Program: Selected maps under revision.

1:100 000 Scale NATMAPs

At this scale, 1cm on the map represents 1km on the ground. Each map covers an area of half a degree of longitude by half a degree of latitude, or about 54km from east to west and north to south. The contour interval is 20 metres. Many sheets are supplemented by hill shading.

Coverage: Australia is covered by more than 3 000 x 1:100 000 scale maps, of which 1 600 have been published as printed maps. Unpublished maps are available as compilations.

Currency: Ranges from 1961 to 2004. Average 1997.

Coordinates: Geographical and AMG or MGA grid coordinates.

Datum: AGD66 or GDA94.

Projection: Universal Transverse Mercator.

Format: Printed maps: Paper flat and folded copies. Compilations: Paper or film, flat copies only.

Recommended Price: $9.25 per published sheet.
$16.40 per paper compilation.
Film price on request.

Forward Program: Selected maps under revision.

See Topographic Data section for digital data details.

1:100 000 Scale NATMAP ACT Region Map

The ACT region map features bushland, vegetation, trails, waterways, urban and recreational areas. A bonus satellite image of the region is also included on the reverse side.

The map not only provides emergency service workers with critical information like the location of fire trails, bridges and dams, it also provides other local users with a good overview of the ACT and surrounding region.

Recommended Price: $11.95

1:250 000 Scale NATMAPS

At this scale, 1cm on the map represents 2.5km on the ground. Maps with 'Special' included in the title are extended sheets. A non-special or standard sheet covers an area of one and a half degrees of longitude by one degree of latitude, or about 150km from east to west and 110km from north to south. The contour interval is 50 metres. This is the largest scale at which topographic maps cover the entire continent.

Coverage: This series covers the whole of Australia with 513 maps.

Currency: Ranges from 1995 to 2004.

Coordinates: Geographical and MGA grid coordinates.

Datum: AGD66 or GDA94.

Projection: Universal Transverse Mercator.

Format: Paper, flat and folded copies.

Recommended Price: $9.25 per sheet.

Forward Program: Ongoing revision.

See NATMAP Raster for digital map details.

1:1 Million Scale NATMAPs

At this scale, 1cm on the map represents 10km on the ground. The contour interval is 500 metres, with an additional 200 metre contour. Each map covers an area of six degrees of longitude and four degrees of latitude.

Coverage: This series covers the whole of Australia in 49 maps. National coverage completed in 1975.

Currency: Ranges from 1971 to 1983. Average 1976.

Coordinates: Geographical.

Datum: AGD66 (GDA94 compliant at this scale).

Projection: Lambert Conformal Conic.

Format: Paper, flat and folded copies.

Recommended Price: $9.25 per sheet.

Forward Program: Under review. World Aeronautical Charts (WAC) under development. Will replace 1:1 million scale maps from 2006.

See Topographic Data section for digital data details.

MAPS OF AUSTRALIA

Wall Maps

The Wall Map of Australia is ideal for offices, class and conference rooms and displays. The four component sheets are available individually or as a set: north-east, north-west, south-east and south-west. The dimensions of each map sheet are 103cm x 88cm while the assembled size is 2m x 1.7m. At this scale (1:2.5 million), 1cm on the map represents 25km on the ground.

Coverage: Complete coverage of Australia.

Currency: Last revised 1998.

Coordinates: Geographical.

Datum: GDA94; AHD.

Projection: Simple Conic on two standard parallels 18°S and 36°S.

Format: Paper, flat copies only.

Recommended Price: $9.25 per sheet.

Foward Program: Under review.

See Topographic Data section for digital data details.

Reference Map

This General Reference Map shows all of Australia in a single map of 112cm X 85cm (1:5 million scale). At this scale, 1cm on the map represents 50km on the ground.

Coverage: Complete coverage of Australia.

Currency: Last revised 1995.

Coordinates: Geographical.

Datum: AGD66 (GDA94 compliant at this scale).

Projection: Simple Conic on two standard parallels 18°S and 36°S.

Format: Paper, flat and folded copies.

Recommended Price: $9.25 per sheet.

Forward Program: Under review.

MAPS OF AUSTRALIA

Compact Reference Map

The Compact Reference Map is the ideal product for discovering more about Australia from one convenient source.

On the reverse side is included a colourful array of information about Australia's people, flag, language, national anthem, birds and animals, parliamentary system and more. Text versions are English, Chinese (Traditional and Simplified), German, Italian, Japanese, Korean, Malay, Portuguese, Spanish, Thai, Vietnamese and Indonesian.

It makes a great souvenir for overseas visitors as well as a useful general reference item for school or home use. Available flat (62cm x 50cm) or folded (13cm x 25cm). At this scale (1:9 million), 1cm on the map represents 90km on the ground.

Coverage: Australia.

Currency: Last revised 1998.

Coordinates: The maps do not show coordinates.

Datum: AGD66 (GDA94 Compliant at this scale); AHD.

Projection: Simple conic on two standard parallels 18°S and 36°S.

Format: Paper, flat and folded copies.

Recommended Price: $6.80 per sheet.

See Topographic Data section for digital data details.

Folio Map

This A3 map of Australia has been produced as a convenient inclusion to publications or as a small size, stand-alone map. This is a smaller scale version of the 1:9 million scale map and contains a selection of features from that map.

Coverage: Complete coverage of Australia.

Currency: Last revised 1996.

Coordinates: The map does not show coordinates.

Datum: No horizontal datum; AHD.

Projection: Simple Conic on two standard parallels 18°S and 36°S.

Format: Paper, flat copies only.

Recommended Price: $3.70 per sheet.

Report Map

This A4 size map has been designed for inclusion in publications requiring a simple multicoloured graphic of Australia. Similar to the folio map but at a smaller scale. Depicting the major features of the continent, this map allows users to quickly familiarise themselves with the Australian landscape and geography.

Coverage: Complete coverage of Australia.

Currency: Last revised 1996.

Coordinates: The map does not show coordinates.

Datum: No horizontal datum; AHD.

Projection: Simple Conic on two standard parallels 18°S and 36°S.

Format: Paper, flat copies only.

Recommended Price: $2.45 per sheet or available free online.

Other Maps of Australia

Thematic maps are produced at 1:5 million scale, depicting the distribution and variation of a range of themes across Australia. These maps are about 100cm wide by 80cm high. Current titles include:

- Soils
- Vegetation
- Land Tenure
- Public Lands
- Railways of Australia
- Aboriginal Australia
- Postcode
- Maritime Zones
- Geology

Coverage: Australia.

Currency: Reflected by the reliability date of the printed map.

Coordinates: Geographical.

Datum: AGD66 (GDA94 compliant at this scale).

Projection: Simple Conic on two standard parallels 18°S and 36°S.

Format: Paper, flat and folded; selected maps available online as PDF documents.

Recommended Price: $9.25 each; Aboriginal Australia $24.70; Postcode $16.40.

Map Sheet/Map Indexes 2004 (for 100K & 250K NATMAP and 250K GEODATA)

Product Code: M1

The dataset provides details of printed 1:250 000 and 1:100 000 scale topographic maps and GEODATA 250K Series 2 data tiles. It contains map number, map name, latitude and longitude of the extents of all sheets covering Australia.

PDF versions of the "1:100 000, 1:250 000, and 1:1 000 000 Topographic Map Index" and the "1:50 000 Topographic Map Index", are also available on GA web site for free download. Maps are listed by name on the back of the index. The 1:50 000 Index also lists availability of Orthophoto Map (OPM) and Topographic Line Map (TLM) for available 1:50 000 maps.

Coverage: Australia.

Currency: 2004 (PDF); 2004 (data).

Coordinates: Geographical.

Datum: GDA94.

Format: ArcInfo Export, ArcView Shapefile and MapInfo mid/mif; PDF (maps only).

Medium: Available free online and on CD-ROM (fee applies).

DIGITAL MAPS

NATMAP Raster Digital Maps of Australia

Since its first release in 1997, NATMAP Raster digital maps of Australia has become one of Geoscience Australia's most popular products. Now available in two versions — NATMAP Raster 2005 and NATMAP Raster Premium 2005 — and are ideal for professional and recreational use, including GPS and GIS applications.

The 2005 editions include a 1:250 000 topographic mosaic and (depending on version) separate map sheets or eight UTM zones for measuring distances. A satellite image of Australia is also included. A distance measuring tool and dynamic scale bar have been introduced into these versions.

NATMAP Raster 2005, available on CD $99.00 (recommend price)
NATMAP Raster 2005 Premium, available on DVD $119.00 (recommend price)

TOPOGRAPHIC DATA

1:100 000 Scale Data

GEODATA TOPO 100K ACT Region

GEODATA TOPO 100K ACT Region is a vector representation of the major topographical features appearing on Geoscience Australia's ACT Region 1:100 000 scale topographic map and is primarily designed to provide high quality data for mapping and GIS professionals.

Release date: 7 May 2006

Currency: 2005

Coordinates: Geographical

Datum: Geocentric Datum of Australia (GDA94); Australian Height Datum

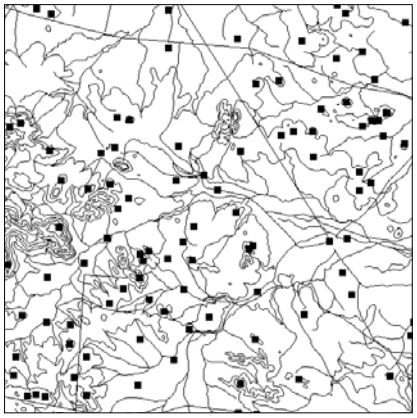
Formats: ESRI Personal Geodatabase Version 8.3, ESRI Shapefiles, MapInfo mid/mif, ER Mapper Compressed Wavelet (ECW) Raster

Mediums: Online download and Packaged product

Price: Free online; $99 per package

Themes: Administration, Aviation, Cartography, Culture, Drainage, Framework, Habitation, Industry, Physiography, Rail transport, Relief, Road transport, Series Index, Survey Marks, Utility, Vegetation and Water-bodies

---



Topographic Base 1:100 000 Scale

Product Code: M2

Comprises data captured from 1:100 000 scale map production material.

Data may be available in the following themes:

- cultural — roads, railways, towns, mines, state borders, buildings, (without names),
- drainage — coastline, reefs, streams, lakes, tanks, bores, (without names),
- relief — contours, spot heights, (with elevation identified), and
- vegetation — scattered, medium and dense.

Coverage: Incomplete. Refer to Topographic Map and Data Index for up-to-date data availability at this scale. The Index is available on the Internet.

Currency: Ranges from 1961 to 1990.

Coordinates: AMG.

Datum: AGD66 (some contour lines are WGS84); AHD.

Format: ArcInfo Export, MapInfo mid/mif, AS2482 – 1989.

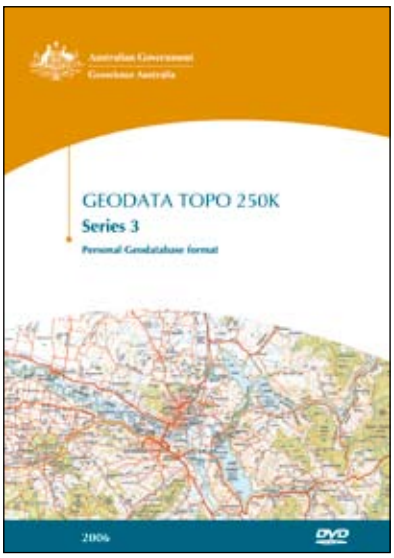
Medium: No free download. Available for purchase on CD-ROM only.

Recommended Price: $108.00 per 1:100 000 area tile. Bulk discounts apply.

Note: Map data (data is not topologically structured).

1:250 000 Scale Data

GEODATA TOPO 250K Series 3



GEODATA TOPO 250K Series 3 is a vector representation of the major topographic features appearing on the 1:250 000 scale NATMAP topographic maps. It is primarily designed to provide high quality data for mapping and GIS professionals.

GEODATA TOPO 250K Series 3 is available as a packaged product in Personal Geodatabase, ArcView Shapefile or MapInfo TAB file formats. The data is provided as a seamless coverage of Australia in the following themes:

- Cartography
- Elevation
- Framework
- Habitation
- Hydrography
- Infrastructure
- Terrain
- Transport
- Utility
- Vegetation

These themes contain up to 92 feature classes, covering many features depicted on the paper map series.

Intending purchasers, please note: The Shapefile format does not support annotation feature classes - as a result three annotation feature classes have not been provided. The annotation feature class is also not available in TAB format at this time due to technical issues.

Use of *GEODATA TOPO 250K Series 3* is subject to a licence, the full terms of which are contained within the package. A comprehensive User Guide is also included with each package.

These products are only available from the Geoscience Australia Sales Centre on 1800 800173 (Freecall within Australia) or +61 2 6249 9966. Please specify the file format that you require.

Customised *250K GEODATA* is available where requirements are not met by the packaged or online download options. The price will be determined after assessing your needs—to enquire please contact the Geoscience Australia Sales Centre. Alternately, we may refer you to a third party supplier.

PRODUCT SPECIFICATIONS	
Coverage	*GEODATA TOPO 250K Series 3* coverage of Australia
Extent of Geodatabase	-8.9 to -44 degrees of latitude and 112.8 to 154.1 degrees of longitude
Currency	Data currency is generally less than five years
Coordinates	Geographical
Datum	Geocentric Datum of Australia (GDA94)
Format	Each package includes data in one of three formats - Personal Geodatabase, ArcView Shapefile or MapInfo TAB files
Medium	Packaged DVD ROM ($99 per package). Personal Geodatabase package consists of 2 DVD ROM; Shapefile and TAB format packages have one DVD ROM each
Previous Version	Replaces GEODATA TOPO 250K Series 2
Release Date	26 June 2006

1:250 000 Scale Data

GEODATA TOPO 250K Series 3 for Google Earth

GEODATA TOPO 250K Series 3 for Google Earth contains 1:250,000 scale vector map data for Australia that can be viewed on Google Earth™ Mapping Service Version 4. Data is the same as found in other *GEODATA TOPO 250K Series 3* products produced by Geoscience Australia, however is provided in KML format in this product. Unlike other *GEODATA TOPO 250K* products, this version is designed for use with Google Earth™ Mapping Service and therefore requires no specialist GIS software or expertise.

The map data is displayed with the Google Earth™ Mapping Service satellite imagery in the background and is arranged in tiles to facilitate ready display - only the current tile's data is loaded at any time. However, by simply panning seamlessly to a neighbouring tile, this tile's data can then be loaded.

GEODATA TOPO 250K Series 3 for Google Earth allows you to click on a selected feature for its description. Data is arranged in nine main themes:

- Elevation
- Framework
- Habitation
- Hydrography
- Infrastructure
- Terrain
- Transport
- Utility
- Vegetation.

Each of these themes contain relevant data layers that can easily be switched on or off, without the need for sophisticated and expensive GIS systems. For ease of use, some area features have been turned off. Users also have the choice of basic map data or a complete set of features that allows you to customise the information displayed.

Important note: *GEODATA TOPO 250K series 3* for Google Earth has been wholly developed by Geoscience Australia. This product has not been developed in association with the developers and/or owners of Google Earth™ Mapping Service. In addition, this product has not been sponsored, approved or endorsed by the developers and/or owners of Google Earth™ Mapping Service.

GEODATA TOPO 250K Series 3 for Google Earth is available on DVD ROM from the Geoscience Australia Sales Centre on 1800 800173 (Freecall within Australia) or +61 2 6249 9966 or from select map retailers.

Image © 2007 TerraMetrics, © 2007 Europa Technologies, © 2007 DigitalGlobe

About Google Earth

Google Earth™ Mapping Service was released by Google in 2005 as a free interactive internet application. Browsers simply point and zoom to any place on Earth to see a satellite image and a host of facts and features for their chosen location. The free Google Earth™ Mapping Service viewer also has a number of other practical functions. Google Earth™ Mapping Service satellite imagery shows detail at moderate-high resolution and with a high spatial accuracy.

PRODUCT SPECIFICATIONS	
Coverage	National (Powerlines not available in South Australia)
Currency	Data currency is generally less than five years
Coordinates	Geographical
Datum	World Geodetic System 1984 (WGS84) - data converted from GDA 94
Format	KML
Medium	Packaged DVD ROM
Previous Version	First edition
Release Date	28 August 2007
Price	$99

1:1 Million Scale Data

Global Map 1M

Global Map Data Australia 1M 2001 covers the Australian landmass and island territories at a 1:1 million scale. It consists of eight layers of information: four vector (boundaries, drainage, population centres and transportation); plus four raster layers (elevation, land cover, land use and vegetation).

Coverage: Australia.

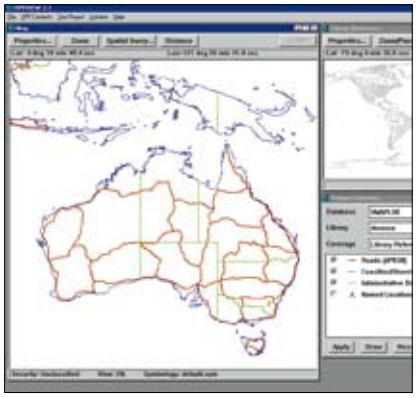
Currency: Variable, based on GEODATA TOPO 250K Series 1.

Coordinates: Geographical.

Datum: GDA94; AHD.

Format: Vector: ArcInfo Export, ArcView Shapefile, MapInfo mid/mif and Vector Product Format (VPF). Raster: Band Interleaved by Line (BIL).

Medium: Available free online and CD-ROM (fee applies).



VMAP Level 0 (Formerly Digital Chart of the World)

Product Code: O5

Data is derived from the 1:1 million scale Operational Navigation Charts (ONC). Data categories include: aeronautical, transport structure, vegetation, populated places, utilities, drainage, roads, railways, political boundaries, land cover and relief.

Coverage: World.

Note: The New Zealand Government holds copyright over New Zealand data.

Currency: Currency varies according to the reliability date of the ONCs — generally from the 1970s to the 1990s.

Coordinates: Geographical.

Datum: WGS84.

Format: Vector Product Format (VPF).

Medium: Available on four CD-ROMs with PC application software.

Recommended Price: $173.00.

1:2.5 Million Scale Data

GEODATA TOPO 2.5M

Product Code: M18

GEODATA TOPO 2.5M 2003 is a seamless mapping data set at 1:2.5 million scale which covers all of Australia. The data is particularly suited to national, state-wide and larger regional applications.

It is a vector representation of the Australian landscape as represented on the Geoscience Australia 1:2.5 million scale general reference maps. This data supersedes the TOPO 2.5M 1998 product through the following characteristics:

- Developed according to GEODATA specifications; and
- Derived from GEODATA TOPO 250K Series 2 data where available.

Themes: GEODATA TOPO 2.5M 2003 consists of eleven layers: built-up areas; contours; drainage; framework; localities; offshore; rail transport; road transport; sand ridges; spot heights; and waterbodies.

Coverage: Australia.

Currency: 2003.

Coordinates: Geographical.

Datum: GDA94; AHD.

Format: ArcInfo Export, ArcView Shapefile and MapInfo mid/mif.

Medium: Available free online and CD-ROM (fee applies).

GEODATA TOPO 5M 2004

GEODATA TOPO 5M 2004 is a seamless mapping data set at 1:5 million scale which covers all of Australia. The data is particularly suited to national, state-wide and larger regional applications.

Offshore and sand ridge layers were sourced from scanning of the original 1:5 million map production material. The remaining nine layers were derived from the GEODATA TOPO 2.5M 2003 dataset.

Themes: GEODATA TOPO 5M 2004 consists of eleven layers: built-up areas; contours; drainage; framework; localities; offshore; rail transport; road transport; sand ridges, spot heights and waterbodies.

Coverage: Australia.

Currency: 2004.

Coordinates: Geographical.

Datum: GDA94, AHD.

Format: ArcInfo Export, ArcView Shapefile and MapInfo mid/mif.

Medium: Available free online and CD-ROM (fee applies).

1:10 Million Scale Data

GEODATA TOPO 10M 2002

Product Code: G2

The data is derived primarily from GEODATA TOPO 250K Series 1 data. In October 2003, the data was released in double precision coordinates.

Themes: GEODATA TOPO 10M 2002 consists of ten layers: built-up areas; contours; drainage: spot heights; framework; localities; offshore; rail transport; road transport; and waterbodies.

Coverage: Australia.

Currency: 2002.

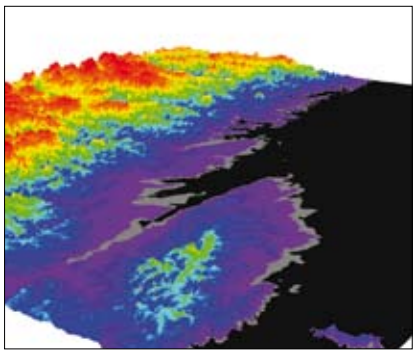
Coordinates: Geographical.

Datum: GDA94, AHD.

Format: ArcInfo Export, Arcview Shapefile and MapInfo mid/mif.

Medium: Available free online and CD-ROM (fee applies).

ELEVATION DATA



GEODATA 9 Second DEM Version 2 Digital Elevation Model

Product Code: G5

A digital elevation grid modelled from GEODATA TOPO 250K Series 1 relief and hydrography themes, trig data points from the National Geodetic Data Base and relevant topographic features from 1:100 000 scale mapping. The grid spacing is 9 seconds in latitude and longitude (approximately 250 metres).

The Geoscience Australia 9 Second DEM Version 2 was produced using the ANUDEM 5.0 elevation gridding program developed by the Centre for Research and Environmental Studies (CRES) at the Australian National University.

Coverage: Australia.

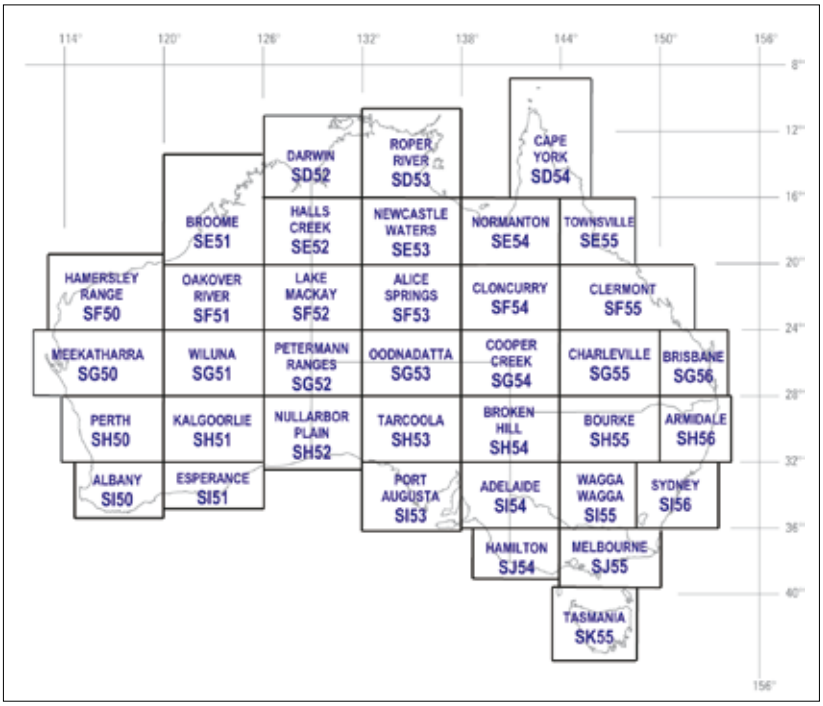
Currency: 2000.

Coordinates: Geographical.

Datum: GDA94.

Format: GRIDASCII and ASCII XYZ, free online data in ER Mapper (ERS) format only.

Recommended Price: $99.00.



The 9 Second DEM is supplied in tiles that generally have extents of six degrees of longitude by four degrees of latitude. The tiles roughly equate to standard 1:1 million scale topographic map boundaries. In coastal areas the tile extents have been varied to avoid the supply of large areas of sea and small areas of land. There are 37 tiles in the national coverage.

3 Second Gridded Digital Elevation Model

Product Code: M7

Data is regularly gridded at 3 seconds of latitude and longitude (approximately 100 metres). The source data for this grid is the spot elevation data held in the GEODATA TOPO-250K Series 1 Relief theme.

Coverage: Data are available for: the coastal strip running from southern Queensland to the Victorian border, most State capital cities and small areas in the Northern Territory.

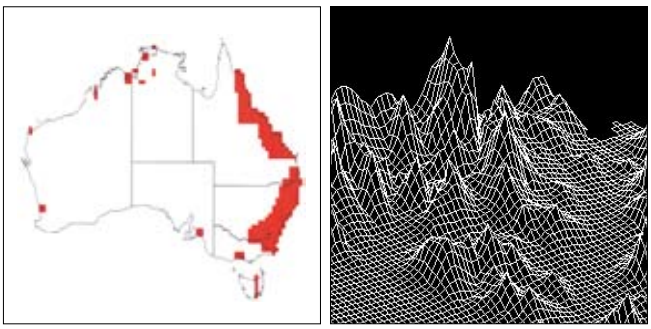
Currency: Varies and is based on reliability date of GEODATA TOPO–250K Series 1 Relief theme data.

Coordinates: Geographical.

Datum: AGD66; AHD.

Format: Formatted ASCII XYZ.

Medium: CD-ROM ($99.00).



Availability of Three Second DEM.

PLACE NAMES

Gazetteer of Australia

Product Code: O6

2006 version of Gazetteer provides information on the location and spelling of 322,328 geographical names across Australia as of March 2006. Supply of data is coordinated by the Intergovernmental Committee on Surveying and Mapping (ICSM) and derived from State, Territory, and Commonwealth government agencies.

Copyright of the gazetteer data and postcode data resides with the relevant State, Territory and Commonwealth governments within Australia who are custodians of the data.

The gazetteer fields include:

- Record ID
- Authority ID
- State ID
- Name
- Feature code
- Status
- Variant name
- Postcode
- Concise Gazetteer
- Longitude
- Latitude
- 1:100K map number
- CGDN

Coverage: Australia.

Currency: 2006.

Coordinates: Geographical.

Datum: GDA94.

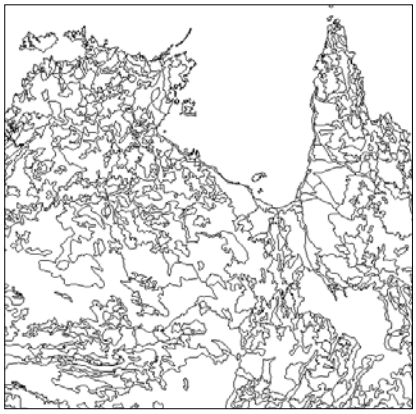
Format: Fixed width ASCII and Microsoft Access Database.

Medium: CD-ROM.

Recommended Price: $540.00 single user; $1080.00 multiple user; $1620.00 Internet use.

Upgrade from any previous edition licence fees: Single User $100.00, Multiple User $200.00 and Internet Application $300.00.

Vegetation Data



Vegetation – Pre-European Settlement (1788)

Shows a reconstruction of Australian vegetation in the 1780s. Areas over 30 000 hectares are shown, plus small areas of significant vegetation such as rainforest. Attribute information includes: growth form of tallest and lower stratum, foliage cover of tallest stratum and dominant floristic types. Data was captured from 1:5 million source material.

Data is suitable for use in GIS applications.

Vegetation – Post-European Settlement (1988)

Shows the vegetation of Australia in the mid-1980s. Areas over 30 000 hectares are shown, plus small areas of significant vegetation such as rainforests and croplands. Attribute information includes: growth form of tallest and lower stratum, foliage cover of tallest stratum and dominant floristic types. Data was captured from 1:5 million source material.

Data is suitable for use in GIS applications.

Coverage: Australia.

Currency: Compiled mid-1980s.

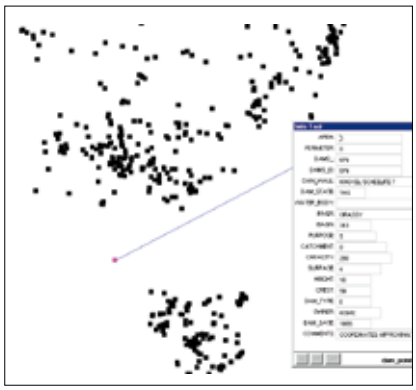
Coordinates: Geographical.

Datum: AGD66.

Format: ArcInfo Export, ArcView Shapefile and MapInfo mid/mif.

Medium: Available free online and CD-ROM (fee applies).

Dams and Water Storages



Product Code: M17

Shows point location of large reservoirs in Australia owned by a public authority. Attribute information includes: name of dam wall and associated water body, name of the watercourse on which it is located, storage capacity and surface area of the water body, ownership and construction details of the dam wall.

Data captured from 1:1 million scale mapping and suitable for GIS applications.

Coverage: Australia.

Currency: August 1990.

Coordinates: Geographical.

Datum: AGD66.

Format: ArcInfo Export, ArcView Shapefile and MapInfo mid/mif.

Medium: Available free online and CD-ROM (fee applies).

Public Lands

Product Code: M8

Contains boundary and attribute information for parcels of public land in Australia which are larger than 40 hectares.

Categories include: nature conservation reserves, forestry reserves, water reserves, defence reserves and mining reserves. The amount of attribute information recorded varies with the type of reserve. Generally, it includes reserve name, reserve type, administering authority, size (in hectares), identification number and date of original proclamation and latest update.

Note: Data has been collected for mapping purposes and may not meet the needs of all users.

Coverage: Australia by State.

Currency: 2003.

Coordinates: Geographical.

Datum: GDA94.

Format: ArcInfo Export, ArcView Shapefile and MapInfo mid/mif.

Medium: Available free online in PDF format.

Forward Program: Digital data suitable for GIS applications to be available in 2006.

CURRENCY OF DATA (NATIONAL PUBLIC AND ABORIGINAL LANDS)							
Category	**NSW**	**NT**	**QLD**	**SA**	**TAS**	**VIC**	**WA**
Nature Conservation Reserves	6/97	9/91	9/90	12/90	4/91	4/91	6/90
Forestry Reserves	6/97	N/A	3/91	12/90	4/91	4/91	6/90
Aboriginal Land	6/97	9/91	9/90	12/90	4/91	4/91	6/90
Water Reserves	6/97	3/91	9/87	6/86	4/91	4/91	6/88
Defence Reserves	6/97	3/91	9/87	6/86	4/91	4/91	6/88
Mining Reserves	6/97	3/91	9/87	6/86	4/91	4/91	6/88

Australian Land Tenure (1993)

Product Code: M9

Contains boundary and attribute information for parcels of public, private and Aboriginal lands in Australia. Data are sourced primarily from government gazette notices, cadastral maps and plans.

Public land belongs to the crown and includes property which is reserved, owned for public purposes or vacant. It typically includes reserves for nature conservation, forestry, marine, water, mining, defence, vacant and other crown land. Private land makes up the largest part of Australia and can be freehold land or Crown leasehold land. Aboriginal land may be freehold, leasehold, Crown reserve or native title land.

A nominal scale of around 1:5 million and a minimum 50 square kilometre threshold limit for land parcels was used in the generalisation of this product from the National Public and Aboriginal Lands data. Data is suitable for GIS applications.

Coverage: Australia.

Currency: Mid 1993.

Coordinates: Geographical.

Datum: AGD66.

Format: ArcInfo Export, ArcView Shapefile, MapInfo mid/mif and AS2482.

Medium: Available free online and CD-ROM (fee applies).

Forward Program: Being revised, expected availability 2006.

Australia's River Basins

Product Code: M12

The data is a result of a joint State and Commonwealth project to create a national seamless database of major hydrologic basins. This data shows boundary and attribute information for 12 divisions, 77 regions and 245 basins. It also contains, for each basin, information relating to its individual basin/region/division name and number. State borders are also included in the data. Data for Division XIII Distant Islands Division is not included.

These basins are the primary building block for the collection of national hydrologic data and the assessment of water resources.

Data are suitable for GIS applications.

Coverage: Australia.

Currency: June 1997.

Coordinates: Geographical.

Datum: AGD66.

Format: ArcInfo Export, ArcView Shapefile and MapInfo mid/mif.

Medium: Available free online and CD-ROM (fee applies).

Australian Surface Water Management Areas

A digital representation of the boundaries and names of Surface Water Management Areas defined by State and Territory water management agencies for use in national water resources reporting.

Surface Water Management Areas generally correspond to Australia's River Basin boundaries. However, in some States and Territories the Areas are a sub-set or a major part of Australia's River Basins.

The dataset is produced by the National Land & Water Resources Audit (NLWRA) and distributed by Geoscience Australia. The data is suitable for GIS applications.

Coverage: Australia.

Currency: November 2000.

Coordinates: Geographical.

Datum: GDA94.

Format: ArcInfo Export, ArcView Shapefile and MapInfo mid/mif.

Medium: Available free online and CD-ROM (fee applies).

Australian Maritime Boundaries (AMB 2005)

Product Code: M13

Replaces previous maritime boundaries product (AMBIS 2001). Shows the territorial sea baseline around the entire Australian coastline. The baseline data is used to define the outer limits of a number of maritime zones, including the 3 nautical mile coastal waters, the 12 nautical mile territorial sea, the 24 nautical mile contiguous zone and the 200 nautical mile Australian Exclusive Economic Zone.

Coverage: Australia and external territories — including Australia's Antarctic Territory.

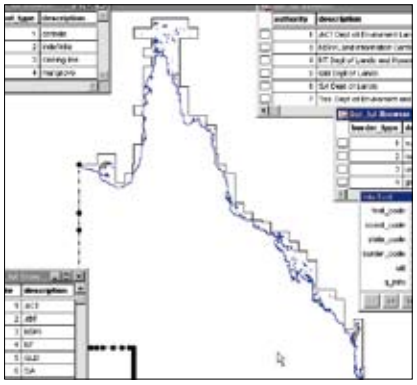
Currency: January 2005.

Coordinates: Geographical.

Datum: GS84.

Format: ArcInfo Export, ArcView Shapefile and MapInfo mid/mif.

Medium: Available free online and CD-ROM (fee applies).



GEODATA COAST 100K 2004

Product Code: G3

GEODATA Coast 100K 2004 is a vector representation of the topographic features depicting Australia's coastline, and State and Territory borders. The data have been derived from the 1:100 000 scale National Topographic Map Series and contain the coastline as depicted by the Mean High Water, seaward islands shown on the source material and State land borders.

The coastline includes the main outline of the land and includes bays, the outer edge of mangroves and closes-off narrow inlets and watercourses at or near their mouths.

Features of the 2004 release include:

- Change of datum to GDA94;
- Provision of a national coverage in addition to State coverages; and
- Additional points on the SA/VIC border.

Coverage: Australia.

Currency: Varies and is based on reliability date of 1:100 000 scale map.

Coordinates: Geographical.

Datum: GDA94.

Format: ArcInfo Export, ArcView Shapefile and Mapinfo mid/mif.

Medium: Available free online and CD-ROM (fee applies).

Commonwealth Fisheries 2002

The data is a digital representation of the boundary of each of the Commonwealth Fisheries around Australia and its external Territories (except for the Australian Antarctic Territory), as set out in the Fisheries Management Regulations 1992 and/or relevant Management Plans administered by the Australian Fisheries Management Authority (AFMA).

Coverage: Australia.

Currency: 2002.

Coordinates: Geographical.

Datum: GDA94.

Format: ArcInfo Export, ArcView Shapefile and Mapinfo mid/mif.

Medium: Available free online and CD-ROM (fee applies).

MAPS OF EXTERNAL TERRITORIES

Australia's seven external Territories comprise Norfolk Island, the Territory of Heard and McDonald Islands, the Australian Antarctic Territory, the Territory of Cocos (Keeling) Islands, the Territory of Christmas Island, the Coral Sea Islands Territory, as well as the Territory of Ashmore Reef and Cartier Island.

Conventional and/or poster maps covering most of these Territories are available. Please contact Geoscience Australia Customer Support and Map Shop. Freecall 1800 800 173.

Antarctic Maps

- Antarctica (1:20 million scale) $9.25.
- Antarctica (1:10 million scale) $9.25.
- Antarctic topographic maps (1:1 million & 1:250 000 scale — partial coverage) $9.25.
- Antarctic satellite image maps (1:500 000, 1:100 000 & 1:50 000 scale — partial coverage) $16.40.
- Australian National Antarctic Research Expeditions 1947–1966 (1:5 million scale) $16.40.
- Cape Denison Historic Site-Commonwealth Bay (1:3 300 scale) $16.40.

Southern Ocean

- Heard and McDonald Islands (1:50 000 scale) $9.25.
- Heard and McDonald Islands Satellite Image Map (1:50 000 scale) $12.85.

Indian Ocean

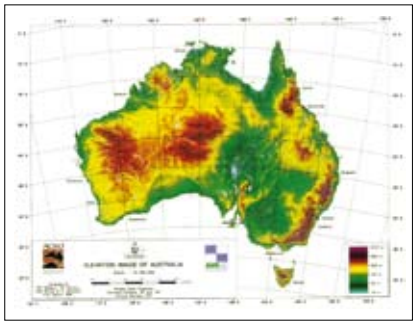
- Christmas Island (1:25 000 scale) $9.25.
- Cocos Island Satellite Image Map $9.25.
- Cocos (Keeling) Islands (1:50 000 scale) $9.25.

Pacific Ocean

- Norfolk Island (1:15 000 scale) $9.25.

POSTERS AND IMAGES OF AUSTRALIA

Elevation Image of Australia 1.5 Million Scale and 1:25 Million Scale



This is an attractive representation of the relief of Australia, with north-west illumination. The elevation image was derived from Geoscience Australia's GEODATA 9 Second Digital Elevation Model (DEM) Version 1.

Size: 91cm x 84cm and 29.7cm x 21cm.

Coverage: Australia.

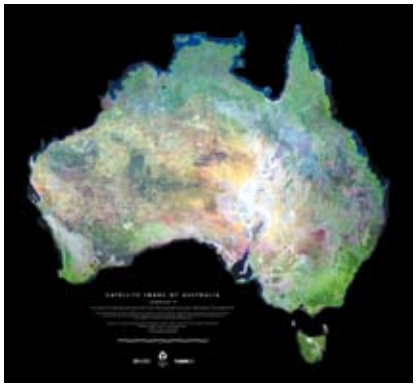
Currency: 1997.

Coordinates: Geographical.

Datam: GDA94.

Projection: Simple Conic on two standard parallels 18°S and 36°S.

Recommended Price: $9.25 and $2.45.



Satellite Image of Australia — Landsat 7 Mosaic

This mosaic was created by the Australian Greenhouse Office as part of their national carbon accounting project. It comprises 369 scenes acquired from the Landsat 7 satellite and shows land cover across Australia in pseudo-natural colours (sensor bands 2,4,7). In general, forests are shown as dark green, healthy crops and pasture lands as light green, bare earth and dry vegetation in red, brown and yellow tones, water as blue. It is presented in on high quality paper with a gloss finish.

Scale: 1:5 Million approx.

Size: 93cm x 84cm.

Currency: July 1999 to September 2000.

Recommended Price: $16.40.

Canberra: A View from Space Satellite Image

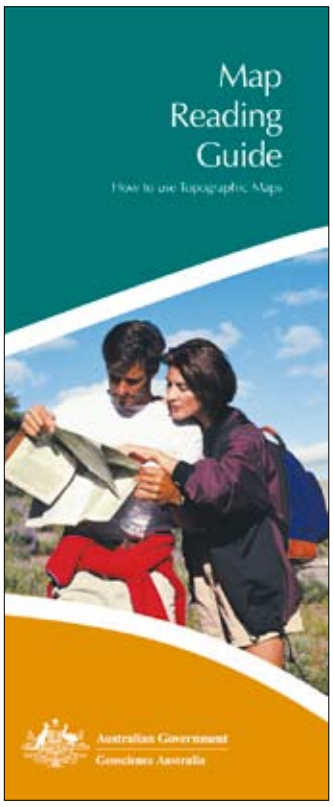
A satellite image poster that gives a view of the city of Canberra and the surrounding countryside. Derived by merging datasets from the Landsat Thematic Mapper and SPOT satellites that periodically pass over Australia, the poster provides a wealth of information as well as a pleasing visual image.

Scale: 1:60 000 approx.

Size: 60cm x 84cm

Currency: 1998.

Recommended Price: $9.25.



Map Reading Guide: How to Use Topographic Maps

The *Map Reading Guide* provides an introduction to topographic maps that is suitable for everyone. The guide also includes a transparent map reading card. The card has scales marked along each edge, a grid reference guide, a compass rose and a bearing guide. The book and card are an ideal map reading manual and tool for a wide range of map users.

Recommended Price: $2.50. Bulk discounts apply.

GEOLOGICAL AND GEOPHYSICAL INTERPRETATION PRODUCTS

Geoscience Australia is responsible for producing a diverse range of geoscience products as a consequence of its nation-wide research programs.

These products include standard and thematic maps, GIS datasets, databases, reports and publications at both the regional and national scale in support of Australia's resource industries, management of the environment and the safety and wellbeing of its citizens.

Many of these products are non-standard and incorporate the results of multi-disciplinary studies.

GEOLOGICAL MAPS

Geoscience Australia has a variety of standard geological maps at various scales, formats and prices.

Geology at 1:100 000 Scale

Most 1:100 000 geological maps are available only as printed maps. Maps produced since about 1990 may be available as print-on-demand colour plots or in various digital formats.

Coverage: Incomplete. State Geoscience agencies (see State agencies listing) can often provide more recent, detailed and complete coverage.

Currency: Reflected by the reliability of the printed map.

Coordinates: Geographic, AMG or MGA.

Datum: AGD66, WGS84, GDA94 depending on map vintage.

Projection: UTM.

Recommended Price: $9.90 (if in stock) or $22.00 (print on demand).

Geology at 1:250 000 Scale

Geoscience Australia and its counterpart State bodies have produced the 1:250 000 scale geological map series over many years.

Coverage: Most of Australia. State Geoscience agencies (see State agencies listing) can often provide more recent, detailed and complete coverage.

Currency: Reflected by the reliability of the printed map.

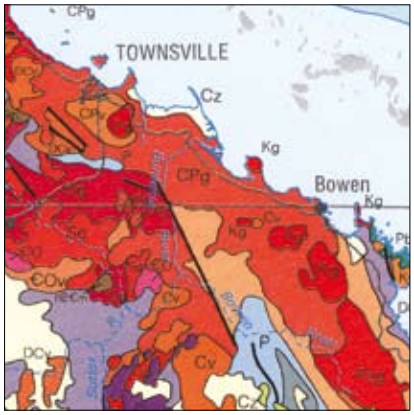
Coordinates: Geographic, AMG or MGA.

Datum: AGD66, WGS84, GDA94 depending on map vintage.

Projection: UTM.

Recommended Price: $9.90 (if in stock) or $22.00 (print on demand); or free online – scanned images of maps can be downloaded from www.geoscience.gov.au/geoportal/250/. *Note: images are not geo-referenced.*

Online format: JPEG.



Geology at 1:5 Million Scale

Size: A0 (119cm x 84cm).

Coverage: Australia.

Currency: Reflected by the reliability of the printed map.

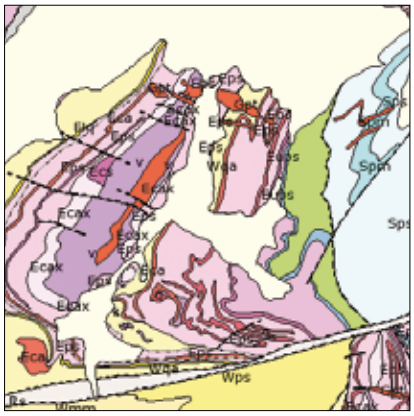
Coordinates: Geographic.

Datum: AGD66 (GDA compliant at this scale).

Projection: Lambert Conformal Conic on two standard parallels 18°S and 36°S.

Format: Paper, 1 sheet.

Recommended Price: $9.90.



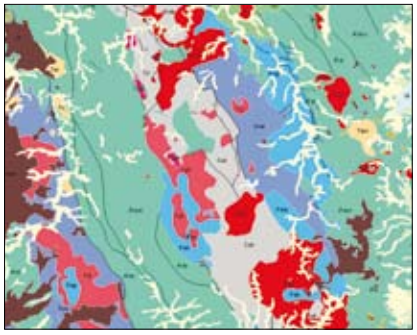
Digital Geology and GIS Data – Regional Studies and Mineral Systems

Mapping data from minerals related projects have been compiled into regional datasets which are now available on CD and online. Various scales, themes and formats are available online for the following regions:

- Yilgarn Craton, WA
- Broken Hill, NSW/SA
- Kimberley Arunta, WA
- Lachlan Fold Belt, NSW
- North Queensland
- Pilbara, WA
- Gawler Craton, SA
- Mount Isa Block, QLD
- Pine Creek Geosyncline, NT
- Tanami Granites Block, NT/WA.

The most up to date information for each of these areas is available free of charge on the GA wesite at www.ga.gov.au/rural/projects/#rsms.

Recommended Price: $99.00 per CD (several CDs available for some regions).



Digital Geology at 1:1 Million Scale

Format: GIS (digital) data in ArcInfo, ArcView and MapInfo formats.

Coverage: Proposed for all of Australia – currently available for Tasmania, Victoria and most of Queensland.

Currency: Reflected by the reliability of the printed map.

Coordinates: Geographic.

Datum: GDA94.

Projection: Geodetic.

Recommended Price: Available on CD-ROM at cost of transfer ($99.00 per CD), or free online for download from www.ga.gov.au/products/index.jsp.

Note: Digital geology at 1:250 000 scale is also available for the Northern Territory and for some areas in Queensland, Western Australia and South Australia.

GEOPHYSICAL PRODUCTS

Geoscience Australia is the custodian of the most comprehensive, publicly available Australian aeromagnetic, radiometric and gravity databases.

Airborne Geophysical Data

Geoscience Australia offers products and services that are used by the organisation for geological mapping, mineral province studies, sedimentary basin studies and land use and environmental projects, as well as exploration companies, educational institutions and other government departments.

Geophysical Archive Data Delivery System (GADDS)

Geophysical data is now available free online using GADDS, a data delivery system which provides magnetic, radiometric, gravity and digital elevation data via the Internet. Data from Geoscience Australia's geophysical data archives is available at www.ga.gov.au/gadds.

National Airborne Geophysical Database

The National Airborne Geophysical Database contains magnetic, gamma-ray, elevation and electromagnetic data from more than 900 airborne geophysical surveys conducted by or for the Commonwealth government. They comprise more than 19 million line kilometres of mainly total magnetic and gamma-ray spectrometric data. Line elevation data derived from GPS recordings made during airborne geophysical surveys and electromagnetic data is also available for some areas. This repository of geophysical information is a valuable national asset with importance to government and industry to assess resource potential, determine land use and environmental management policies, and aid in the planning of more detailed exploration activities.

Data for individual surveys usually covers one or more 1:250 000 sheet areas. Prior to 1990, most of the surveys had a flight line spacing of 1 500m and many were conducted as part of the former Bureau of Mineral Resources (a predecessor of Geoscience Australia) first-pass airborne geophysical reconnaissance of Australia. From 1990, surveys have usually been conducted employing flight line spacings of 400m or less.

Coverage: Australia.

Currency: Continually updated.

Coordinates: Geographic.

Datum: GDA94.

Format: Point located (vector) and gridded data.

Recommended Price: Available free online using the Geophysical Archive Data Delivery System (GADDS), or available on CD-ROM at a cost of $99.00 per CD.

National Gravity Database

The database contains about 1 200 000 point gravity observations on the Australian mainland which have been collected from 1 814 gravity surveys dating back to 1937.

The 2004 release has approximately 28 000 gravity stations additional to the 2001 release. The database is available on CD-ROM and includes the ER Mapper gravity grid of Australia, produced at a cell size of 0.5 minutes of arc (equivalent approximately to 800 metres), previously released in June 2001.

Coverage: 9°S to 44°S and 112°E to 154°E.

Currency: Continually updated.

Coordinates: Geographical.

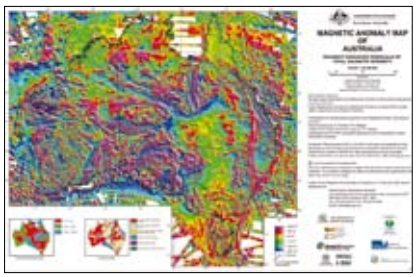
Datum: The gravity data is based on the IGSN71 datum and ISOGAL84 scale.

The gravity unit used is micrometres per second squared. The height data is given in metres based on the Australian Height Datum (AHD). Gravity positions are given in datum GDA94.

Format: ASCII.

Recommended Price: Available free online using the Geophysical Archive Data Delivery System (GADDS), or available on CD-ROM at a cost of $99.00 per CD.

Geophysical Maps



Magnetic Anomaly Map of Australia (Fourth Edition)

This pixel-image map is derived from about 19 million line-km of TMI data held in the National Airborne Geophysical Database that contains data from surveys from a wide variety of sources. Geoscience Australia flew most surveys with some carried out by airborne geophysical companies operating under contract to Geoscience Australia and State and Territory Geological Surveys. The data was subsequently purchased by Geoscience Australia and released into the public domain.

The fourth edition of the map was compiled from 684 individual grids that have been matched and merged into a composite grid to produce the image for the map. The image was generated from the natural colour palette (magenta high, blue low); and the application of histogram equalisation has maximised the available colour range. To emphasise the expression of anomalies attributable to near-surface geology, a Horn filter was used to produce an artificial sun-angle 'illumination' from the Northeast.

Note: Digital data (grids) for the Magnetic Anomoly Map of Australia can be downloaded for free via the internet using the Geophysical Archive Data Delivery System (GADDS) at www.ga.gov.au/gadds.

Scale: 1:5 000 000 and 1:25 000 000.

Size: A0 (119cm x 84cm) and A4.

Coverage: Australia.

Currency: Fourth edition, November 2004.

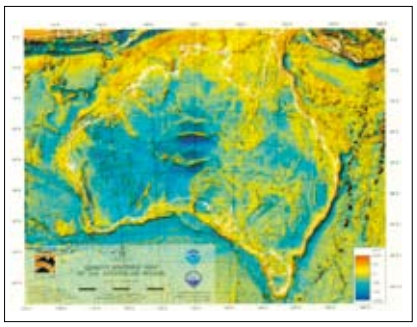
Coordinates: Geographic.

Datum: GDA94.

Projection: Lambert Conformal Conic on two standard parallels 18°S and 36°S.

Format: Paper, 1 sheet.

Recommended Price: Available free online.



Gravity Map of the Australian Region

The map combines accurate onshore gravity measurements with worldwide satellite gravity coverage over marine areas. The onshore gravity coverage of Australia and neighbouring islands comprises 700 000 point gravity observations with a point to point spacing ranging between 11 kilometres and 25 metres. The satellite data sample spacing is approximately 2 minutes of arc. The onshore data as well as the satellite data were gridded onto a 2.5 kilometre mesh covering the area of the map.

The image displayed on the map shows Bouguer gravity anomalies calculated at a density of 2.67 tm^{-3} onshore and free air gravity anomalies offshore. The pixel colour hue was chosen from the natural colour palette (red high, purple low). The map projection is simple conic with standard parallels at 18° and 36° S latitude and scale of 1:5 000 000 for the full size map and 1:25 000 000 for the A4 size map.

Gravity anomalies effectively show the density variations in the Earth's Crust with high anomalies indicating areas of above average crustal density or a thinner crust (the crust is lighter than the underlying mantle) and low anomalies showing below average crustal density or thicker crust. The depth of the crustal bodies having the anomalous density is indicated by the anomaly wavelength: finer, sharper anomalies indicating shallow bodies and broader, diffuse anomalies indicating deeper bodies.

Scale: 1:5 000 000.

Size: A0 (119cm x 84cm).

Coverage: Australia.

Currency: Second edition, 1997.

Coordinates: Geographic.

Datum: Not known.

Projection: Simple Conic on two standard parallels 18°S and 36°S.

Format: Paper, 1 sheet.

Recommended Price: $9.90.

A Reference Text for Airborne Magnetic and Radiometric Surveys

A thematic issue of the AGSO Journal of Australian Geology & Geophysics (Vol. 17, No. 2) focuses on a series of invited papers by specialists in the various facets of airborne magnetic and radiometric surveys. Although this publication is not a textbook in the traditional sense, it does provide detailed explanations of the techniques for acquiring, processing, presenting and interpreting airborne magnetic and radiometric surveys. The level of the papers is such that the material will be useful as both introductions to the topics and as revision for experienced geophysicists. Numerous colour images are included.

Recommended Price: $32.45.

Note: Individual papers from this publication are also available free online from the GA website at www.ga.gov.au/rural/projects/JAGG_17_2_index.jsp.

MINERALS DATABASES AND DATA

Australian Geological Province Database

The Australian Geological Provinces Database contains descriptions and polygon outlines of geological provinces of the Australian continent and surrounding offshore regions. The provinces are mapped at a nominal 1:1 million scale.

The database can be interactively queried, and the results retrieved as reports and maps. Attributes include igneous, sedimentary and structural characteristics, age limits, parent and constituent units, relations to surrounding provinces, and mineral and petroleum resources.

This database is available online at www.ga.gov.au/oracle/provinces.

OZCHEM National Whole Rock and Stream Sediment Geochemistry Database of Australia

OZCHEM is Geoscience Australia's national whole-rock and stream sediment geochemical database. This release of OZCHEM contains more than 50 000 analyses of rocks and stream sediments from many regions of Australia. Each analysis includes a geographic location and a geological description, which includes the host stratigraphic unit, where known, and the lithology. Most samples have been collected by Geoscience Australia's field parties.

The dataset is also bundled with detailed documentation which explains the database structure and includes definitions of the database tables and columns (attributes). The documentation includes summaries and highlights of all the regional datasets that comprise OZCHEM and is available in both Acrobat reader and Microsoft word document formats.

Geoscience Australia has developed a free on-line plotting system called Plot-It at www.ga.gov.au/gda/index.jsp which allows data to be extracted from OZCHEM, filtered, sorted, grouped and plotted as a number of graph types.

Coverage: Australia excluding external territories.

Currency: 2000.

Coordinates: AMG, Geographical.

Datum: GDA94.

Format: Microsoft Access, ASCII, Arcview and Mapinfo.

Recommended Price: $99.00 on CD-ROM or available free online.

OZMIN

Coverage: Australia excluding external territories.

Currency: Jan 1994 – Mar 2001.

Coordinates: AMG, Geographical.

Datum: GDA94.

Format: Microsoft Access, ASCII, Arcview and Mapinfo.

Recommended Price: $99.00 on CD-ROM or available free online.

This data represents the OZMIN Oracle relational database containing geological and resource information for Australian mineral deposits. OZMIN has been compiled from published references and has been designed so that attribute information can be retrieved and analysed in relation to spatial data contained in geographic information systems. The mineral deposits dataset contains data on over 1 000 major and historically significant mineral deposits for 60 mineral commodities (including coal).

Selected data from OZMIN can be accessed through the Australian Atlas of Mineral Resources, Mines and Processing Centres at www.nationalminesatlas.gov.au.

MINLOC

Coverage: Australia excluding external territories.

Currency: Jan 1994 – Mar 2001.

Coordinates: Geographical.

Datum: Not available.

Format: Microsoft Access, ASCII, Arcview and Mapinfo.

Recommended Price: $99.00 on CD-ROM or available free online.

This dataset has more than 73 000 mineral occurrences, providing information on the name, lat/long, map sheet name and number, commodities of interest and source reference for each occurrence.

Mineral occurrence information will be available free on-line through the Geoscience Portal set up by the Australian and State/NT governments at www.geoscience.gov.au/.

OZCHRON National Geochronology Database

Coverage: Australia excluding external territories.

Currency: 1999.

Coordinates: AMG, Geographical.

Datum: GDA94.

Format: Microsoft Access, ASCII, Arcview and Mapinfo.

Recommended Price: $99.00 on CD-ROM or available free online.

OZCHRON is a database of physical age determinations of Australian rocks and the radiogenic isotope ratios used in determining their ages. OZCHRON datasets comprise bibliographic references, analytical data and pooled results for samples derived using the Rb-Sr, SHRIMP, U-Pb and Sm-Nd age determination methods.

A map-based interface has been added to the OZCHRON database to enable users to search free on-line for geochronology data and related field information and generate time-space plots. (www.ga.gov.au/oracle/ozchron/).

Australian Stratigraphic Units Database

Coverage: Australia including external territories.

Currency: 2002 (updated annually).

Coordinates: The database does not include coordinates.

Datum: Not available.

Format: ASCII.

Recommended Price: $99.00 on CD-ROM.

This is the national register of stratigraphic names, including unit name, rank (eg. member, formation and group), usage, history, currency, geological province, time range, parent unit, underlying and overlying units, boundary relations and geographic locations.

The most up to date version of this information is also available free of charge on the GA website at www.ga.gov.au/oracle/stratnames.html.

STATE GEOSCIENCE AGENCIES

The national geoscience Internet portal aims to provide a link to information from all Australian geoscience agencies and is an initiative of the Chief Government Geologists Conference. Go to: **www.geoscience.gov.au**.

New South Wales

Information and Customer Services Counter
New South Wales Department of Mineral Resources
29-57 Christie Street, St Leonards NSW 2065
PO Box 536, St Leonards NSW 1590
Ph: (02) 9901 8269
Fax: (02) 9901 8247
Email: orders@minerals.nsw.gov.au
Web: www.minerals.nsw.gov.au/

Northern Territory

Northern Territory Department of Mines and Energy
Geoscience Information Branch
Department of Business, Industry and Resource Development
3rd Floor, Centrepoint Building
Smith Street Mall, DARWIN NT 0800
GPO Box 3000, DARWIN NT 0801
Ph: (08) 8999 5281; 5327; 5282 or 5202
Fax: (08) 8999 5221
Email: Geoscience.Products@nt.gov.au
Web: www.dme.nt.gov.au/ntgs

Queensland

Queensland Department of Natural Resources and Mines
Level 5, 61 Mary Street, Brisbane QLD 4000
GPO Box 194, Brisbane QLD 4001
Ph: (07) 3237 1435
Fax: (07) 3221 9517
Web: www.nrm.qld.gov.au/

South Australia

South Australian Department of Primary Industry and Resources
Office of Minerals and Energy Resources, SA
7th Floor, 101 Grenfell Street, Adelaide SA 5000
GPO Box 1671, Adelaide SA 5001
Ph: (08) 8463 4154
Fax: (08) 8463 4155
Web: www.pir.sa.gov.au/mer

Tasmania

Mineral Resources Tasmania
30 Gordons Hill Road
Rosny Park TAS 7018
PO Box 56, Rosny Park TAS 7018
Ph: (03) 6233 8377
Fax: (03) 6233 8338
Email: info@mrt.tas.gov.au
Web: www.mrt.tas.gov.au/

Victoria

Department of Natural Resources and Environment
7th and 8th Floor, 240/250 Victoria Pde
East Melbourne VIC 3002
PO Box 500, East Melbourne VIC 3002

NRE Customer Service Centre
Ph: 136 186
Email: customer.service@nre.vic.gov.au
Web: www.nre.vic.gov.au/

Western Australia

Western Australia Department of Mines and Energy
1st Floor, Mineral House
100 Plain Street (corner Adelaide Terrace)
East Perth WA 6004
Ph: (08) 9222 3409 (08) 9222 3459 (Publications)
Fax: (08) 9222 3444
Web: www.doir.wa.gov.au/

PETROLEUM DATA

Geoscience Australia houses one of the world's largest collections of petroleum data, located at Symonston, ACT. Much of this data is "Open file" and is available to the public, the petroleum industry and research organisations.

The collection is comprised of the following data:

- Analogue seismic field data
- Digital seismic field data
- Digital seismic processed data
- Digital seismic image data
- Seismic sections
- Survey observers logs and paper data
- Digital well log data
- Hard copy well logs
- Digital navigation and other geophysical data
- Reports submitted under legislation
- Destructive analysis reports
- Drill core and cuttings
- Gravity core and grab samples
- Fluid and gas samples
- Mineral specimens
- Field rock samples
- Palaeontological samples.

Much of this data is available to the public for use in exploration or scientific research. For data to be held in the Data Repository it must be either:

- required for lodgement with the Commonwealth Government under the Petroleum Search Subsidy Act 1957 or the Petroleum (Submerged Lands) Act 1967
- collected by Geoscience Australia during project work
- accepted as a special collection or donation from external sources.

The vast majority is data lodged with the Commonwealth Government under the Petroleum Search Subsidy Act 1957 or the Petroleum (Submerged Lands) Act 1967.

The digital data in the collection is on media such as 3 590 cartridges, 3 480 cartridges, DLT cartridges, 8mm cartridges, 4mm cartridges, 9 track tapes and 21 track tapes.

The majority of the data, in physical volume, is on 9 track tapes and 21 track tapes. There are approximately 500 000 magnetic tapes in the collection.

The Data Repository holds over 10 000 well and survey reports. The survey reports are from gravity, magnetic or seismic surveys.

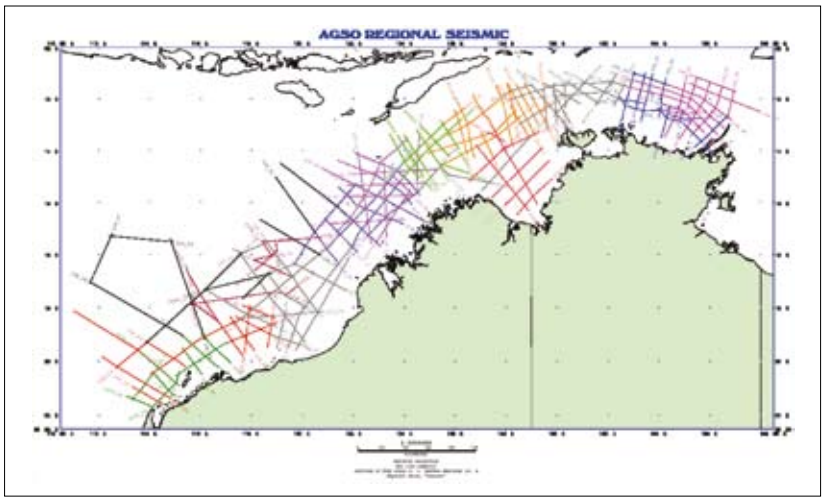
The Data Repository holds in its collection catalogued cores and cuttings, SWC's, fluids and gases, thin sections and other prepared samples from petroleum exploration conducted since the 1930s and are archived on over 30 line kilometres of shelving. Included in the collection are stratigraphic drill holes and some water boreholes which pre-date the 1930's. There are over 150 000m of down hole core drilling and over 3 million metres of down hole drill cuttings from over 5 500 wells. In addition, over 1 200 open file destructive analysis reports (DAR's) are available.

For more information on the
Data Repository please contact:
Email: ausgeodata@ga.gov.au
Phone: (02) 6249 9222

MARINE DATA

Interpretations of Geoscience Australia's Regional Seismic Data, Offshore Northern and Northwestern Australia

As part of its 1999 petroleum promotion program, a consistent digital interpretation was acquired of the entire N+NW regional seismic grid. This interpretation builds on previously published studies of parts of the grid (eg. papers in Purcell & Purcell, 1994). This regional grid also ties to high-resolution seismic studies in the region that were sponsored by Geoscience Australia, such as the Carnarvon Tertiary Tie (CTT), the Yampi Shelf Tie (YST), Vulcan Sub-basin Tertiary Tie (VTT) and the Browse Basin High-Resolution (BBHR). This series of 13 CDs provides a consistent digital interpretation of the entire N+NW regional seismic grid.



GEOCAT No.: 35232, 35234, 35237, 35239, 35240, 35241, 35242, 35243, 35244, 35245, 35247, 35248, 35249.

Coverage: Offshore Northern and Northwestern Australia.

Currency: 2001.

Coordinates: Not available.

Datum: Not available.

Format: p701 and ASCII for Geoquest, MS Word.

Recommended Price: $99.00 per CD. Set of 13 CDs — one for each survey.

Line drawings of Geoscience Australia's Regional Seismic Profiles, Offshore Northern and Northwestern Australia

This CD provides in a graphical form, line-drawing interpretations of all 13 surveys (168 lines) made by Geoscience Australia, making up the N+NW regional seismic grid. In addition to interpreted horizons and faults, the line drawings show ties to key petroleum exploration wells and line intersections. They provide a rapid and convenient overview of the structural and stratigraphic architecture of the region.

GEOCAT No.: 36353.

Coverage: Offshore Northern and Northwestern Australia.

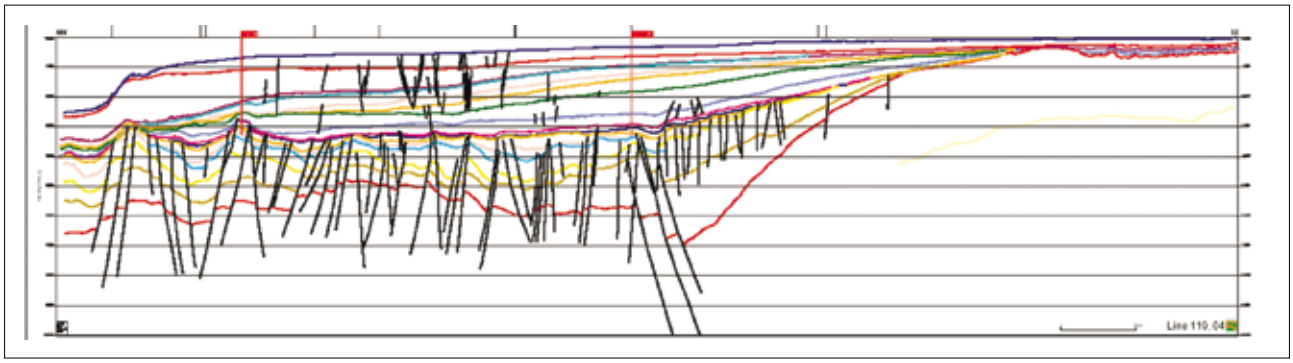
Currency: 2001.

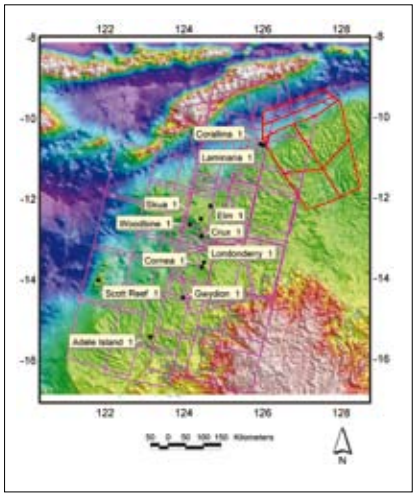
Coordinates: Not available.

Datum: Not available.

Format: PDF for Adobe Acrobat Reader version 4.0 or later.

Recommended Price: $99.00. One CD-ROM.





Hydrocarbon Migration and Seepage in the Timor Sea and Northern Browse Basin, North West Shelf, Australia

This study is a comprehensive interpretation of 55 Synthetic Aperture Radar (SAR) satellite scenes acquired over the Timor Sea region (minimum dual coverage, up to five-fold coverage in some areas). This data was used to map areas of interpreted oil seepage (in time series) and integrated with other key remote sensing datasets including:

- Water column geochemical sniffer data (approx 18 000 linekm)
- Three vintages of Airborne Laser Fluorosensor (ALF) surveys.

The study is in GIS format (ArcView), with the GIS containing all data and results, including images of key SAR scenes. Also included on the second CD is an interpretation report comprising text, maps and images, tabulated data of all SAR and ALF anomalies and presentations of all salient data, results and interpretations.

GEOCAT No.: 35246.

Coverage: Northwest Shelf Australia — Timor Sea and Northern Browse Basin.

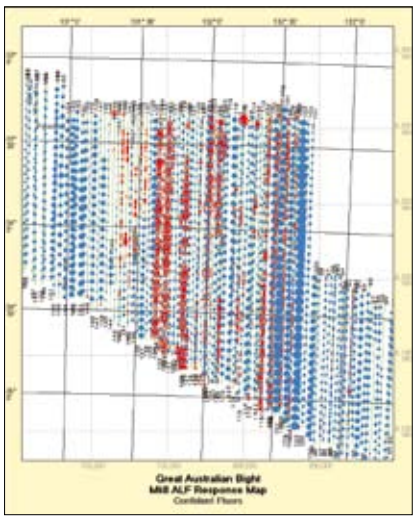
Currency: September 2001.

Coordinates: Geographical.

Datum: WGS84.

Format: ArcView raster (BIL) and vector (shape) formats.

Recommended Price: POA. A two CD-ROM package.



Airborne Laser Fluorosensor (ALF) Surveys

Geoscience Australia and SignalWorks Pty Ltd have carried out comprehensive studies on 17 legacy BP Mkll, Mklll and Geoscience Australia Airborne Laser Fluorosensor (ALF) surveys from across offshore Australia. This included reprocessing of the original datasets, interpretation reports and display of results. All are contained on the CD-ROMs. The areas studied are:

Great Australian Bight; Perth Basin; North-West Shelf; Laminaria High; Bonaparte Basin; Nancar Trough; Bonaparte Basin; Yampi Shelf; Browse Basin; Vulcan Sub-basin; Browse Basin; Skua; Vulcan Sub-basin; Yampi; Vulcan Sub-basin; Barrow and Dampier; Timor Sea; Browse Basin; Bonaparte Basin; Barrow Sub-basin; Carnarvon basin; Arafura Sea; WA-260-P; Timor Sea; Bonaparte basin; Timor Sea

GEOCAT No.: 34395, 35927, 31783, 31784, 31803, 31804, 31806, 31807, 31808, 34393, 34394, 35634, 35635, 35738, 35926, 35929, 35930.

Coverage: Northwest Shelf Australia, see title.

Currency: Range from 1994 to 2001.

Coordinates: Geographical.

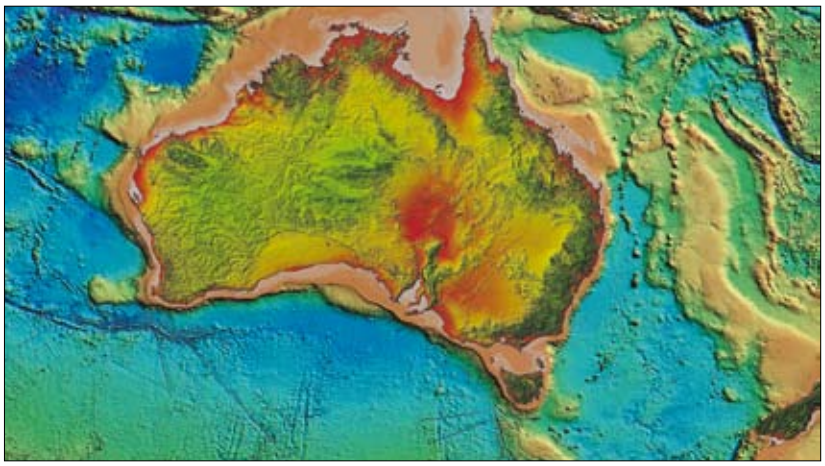
Datum: WGS84.

Format: MS Excel, MS Access, ASCII.

Recommended Price: $99.00 per CD. A total of 17 CD-ROMs, one per survey. Each sold separately.

Australian Bathymetry, Magnetics, Gravity and Topography Grid

The grid is a compilation of all data accessed by Geoscience Australia both onshore and offshore. The data includes levelled ship-track data, swath bathymetry, onshore data from land-based and airborne measurements, data from analogue sources and bathymetry and gravity from satellite altimetry. The data was sourced from Geoscience Australia's own acquisition program since 1963, as well as exploration companies, other government agencies and overseas research institutions. The grid cell size is 0.01° (approx. 1km). A higher resolution magnetic anomaly is available for continental Australia from airborne sources. Higher resolution bathymetry is available on request for selected regions where the data density is sufficient.



An example of combined topography and bathymetry.

GEOCAT Nos: 38713, 38820, 38953 respectively.

Coverage: Australia Region.

Currency: January 2002.

Coordinates: Lat Long.

Datum: WGS84.

Format: ASCII and raster.

Recommended Price: $99.00 per CD-ROM. Total of three CD-ROMs, sold separately.

Onshore Deep Seismic Traverses

The dataset shows where Geoscience Australia has carried out deep seismic reflection traverses in Australia. It is generated from a database containing coordinates of all onshore seismic traverses recorded since 1964. Selected scanned seismic sections from most of the seismic surveys are also available with this dataset.

Coverage: Australia excluding external territories.

Currency: Continually maintained.

Coordinates: Geographical.

Datum: WGS84.

Format: ArcView vector coverages, MapInfo tables.

Recommended Price: Available free online.

Deep Seismic Marine Data Navigation Tracks from RV Rig Seismic

The dataset shows the navigation tracks of marine deep seismic lines from RV Rig Seismic. It is generated from a database containing coordinates of all Geoscience Australia's seismic traverses. Cross section data from these lines is available from Geoscience Australia.

Coverage: Australia including external territories.

Currency: Continually maintained.

Coordinates: Geographical.

Datum: WGS84.

Format: Arc/Info and Arcview vector coverages, MapInfo tables.

Recommended Price: Available free online.

GEOHAZARDS

Project Reports and Projects

The National Geohazards Vulnerability of Urban Communities Project

The National Geohazards Vulnerability of Urban Communities Project (The Cities Project), was established in 1996 by Geoscience Australia to undertake research directed towards the mitigation of the risks faced by Australian urban communities that are posed by a range of geological hazards. It formed a significant part of Australia's contribution to the International Decade for Natural Disaster Reduction (IDNDR) in the 1990s and continues to be a focus for Commonwealth community risk research.

These reports have been developed as a primary resource for those responsible for the management of those risks. In addition to local and district emergency managers, this includes elected officials, asset managers, engineers and planners. The ultimate objective is to improve the safety of communities and consequently make them more sustainable and prosperous.

Each product consists of a summary booklet together with a CD-ROM containing several hundred pages of the comprehensive report, along with graphs, charts and detailed figures.

Size: A4, 14-24 pages.

Media: Paper and CD-ROM.

Coverage: Cairns, Mackay and South East Queensland.

Currency: 1999–2001.

Recommended Price: From $35.00 to $45.10.

Note: Specialist reports are being produced on the effects of the Newcastle earthquake and on landslide risk in Wollongong.

The Geomagnetism Project

The Earth's magnetic field is used as a basis for navigation, surveying and mapping, mineral exploration, probing the Earth's crust and deep interior, and understanding solar-terrestrial relationships. In support of these applications, Geoscience Australia maintains a national network of geomagnetic observatories, which are also part of the global network, and an ongoing repeat station survey. We also promote public safety through the provision of compass and magnetometer calibration information, and help to mitigate the hazardous effects of magnetic storms to radio and satellite communications, radar, GPS, spacecraft, powerlines and pipelines.

Geomagnetic Data and Indices

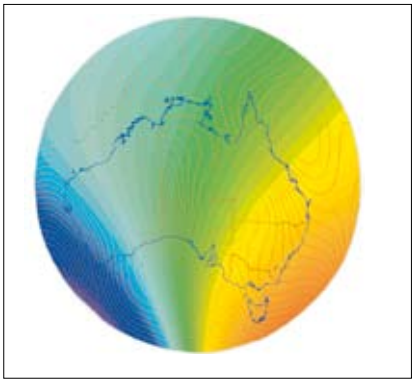
These data sets are available on the Geoscience Australia website (www.ga.gov.au), INTERMAGNET and World Data Centres.

Australian Geomagnetism Report Series

Recent reports are available on the GA website (www.ga.gov.au) and INTERMAGNET.

Products

Australian Geomagnetic Reference Field Model (software)

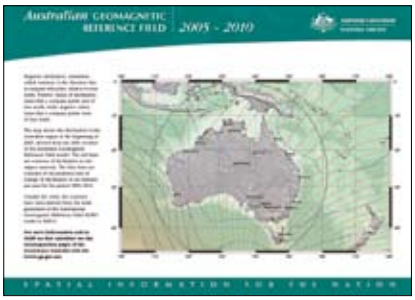


This is an executable program to evaluate the undisturbed magnetic field in the Australian region. It includes FORTRAN77 source code.

Currency: 2005 – 2010.

Datum: WGS84.

Australian Geomagnetic Reference Field Flyer



Colour chart of magnetic declination for Australia and the world.

Size: A4.

Medium: Paper.

Currency: 2005 – 2010.

Recommended Price: Available free online.

Earthquake Hazard Risk Contour Map

The Earthquake Hazard Risk Contour Map for Australia is a dataset based on earthquake measurements taken from the Geoscience Australia Earthquake Database. It shows the acceleration coefficient (a) 10 percent chance of being exceeded in the next 50 years. Thus a value of 0.05 as an example means that in any 50-year period, there is a 90% chance that the peak ground acceleration will not exceed 0.05. Where peak ground acceleration is a dimensionless coefficient of acceleration that is used by civil engineers to estimate forces on structures. High values of this calculation represent higher risk areas of earthquake occurrence.

Coverage: Australia including external territories.

Currency: 01 September 1998.

Format: Arcview vector coverages. Mapinfo tables.

Coordinates: Geographical.

Datum: WGS84.

Recommended Price: Available free online.

Spatial Representation of the World Earthquake Database

The dataset is a spatial representation of the Geoscience Australia Earthquake Database. The dataset contains recorded magnitudes for earthquakes on and near Australia. Local events of magnitude of four and above and regional events of magnitude six and above are displayed.

Coverage: Australia including external territories.

Currency: Continually updated.

Format: ArcView vector coverages. Mapinfo tables.

Coordinates: Geographical.

Datum: WGS84.

Recommended Price: Available free online.

Earthquake Information and Seismograph Waveform Data

This data is available on the Internet, Earthquake Information from 2002 to present and Seismograph Waveform Data available for the last 90 days from the Australian National Seismograph Network (ANSN).

Spatial Representation of Landslides, Australian Landslide Database

The dataset is a spatial representation of a database of landslides occurring within Australia, based on published and unpublished information and field observations.

Coverage: Australia including external territories.

Currency: Continually maintained.

Format: ARCVIEW vector coverages. Mapinfo tables.

Coordinates: Geographical.

Datum: WGS84.

Recommended Price: Available free online.

PUBLICATIONS

Research Publications

The results of Geoscience Australia research over the last 50 years can be found in a comprehensive collection of Bulletins, Reports, Journals and Records. Some recent examples that demonstrate the range of material available are described in this catalogue.

Bulletin 246 — Geology and Economic Potential of the Palaeoproterozoic Layered Mafic-Ultramafic Intrusions in the East Kimberley, West Australia

The bulletin provides a framework for the prospectivity and resource potential of the layered mafic-ultramafic intrusions in the Halls Creek Orogen of the East Kimberley, one of the most extensively mineralised igneous associations of their type in Australia. They contain a range of magmatic and hydrothermal deposits of platinum-group elements, chromium, nickel, copper, cobalt, titanium, vanadium, iron and gold.

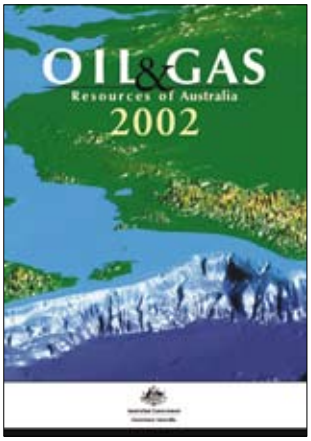
Size: A4, 469 pages.

Coverage: East Kimberley.

Currency: Published 2000.

Recommended Price: $93.50.

Oil and Gas Resources 2002



This publication is the latest in the series and is the definitive reference on exploration development and production of Australia's petroleum resources. It provides the background for much of the advice on petroleum resources given to the Australia government and is a key source for petroleum exploration, production and service companies, petroleum engineers and geologists, energy analysts, stockbrokers and share investors.

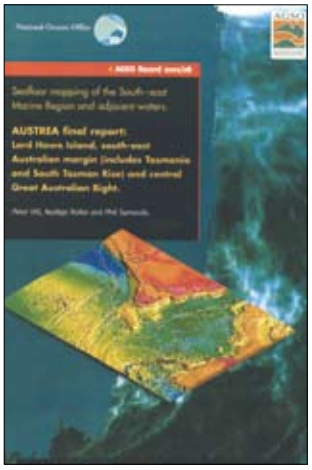
It covers exploration, reserves, undiscovered resources, development, production and supporting information and statistics. It includes a forecast of Australia's crude oil and condensate production from 2001 to 2015, and sustainability indicators for petroleum resources.

Size: A4, 241 pages.

Coverage: Australian onshore and offshore territories.

Currency: 2000.

Recommended Price: Available free online (PDF).



Record 2001/08 Seafloor Mapping of the South-East Marine Region and Adjacent Waters — Austrea Final Report

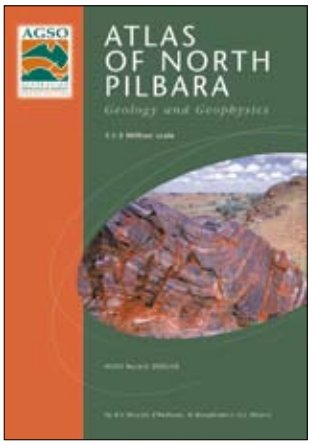
Based on data gathered from two major swath-mapping and geophysical surveys off southeast Australia and on the Macquarie Ridge, this report was completed mainly for marine zone planning and management, for assessment of seabed living and non-living (petroleum and mineral) resources and geological and biological research. Some of the features described include the volcanic slopes of Lord Howe Island, the continental margin off the NSW coast, the Bass Canyon complex off southeast Victoria, the Tasmanian Seamounts Marine Protected Area and the Great Australian Bight Benthic Protection Zone of the GAB Marine Park.

Size: A4, 139 pages.

Coverage: Offshore south east Australia.

Currency: 2001.

Recommended Price: $33.00.



Atlas of North Pilbara: Geology and Geophysics

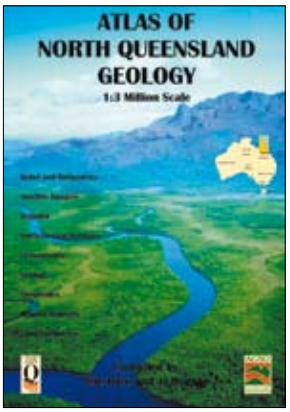
This 36-plate, A3 sized, full colour atlas illustrates the richness of the Pilbara's geology. There are many geophysical plates including a number of variations of the magnetics, gravity, and gamma-ray spectrometry. A solid geology map and derivative maps, mineral deposits, geological events, 3D shapes and Landsat 5 TM provide additional views.

Size: A3, 41 pages.

Coverage: North Pilbara region.

Currency: 2000.

Recommended Price: $110.00.



Atlas of North Queensland Geology

Contains 45 full colour plates and foldouts that cover the following themes:

- Relief, climate, vegetation, culture and land categories
- Geology (regions, basins, provinces, time slices)
- Mineral deposits
- Geophysical images

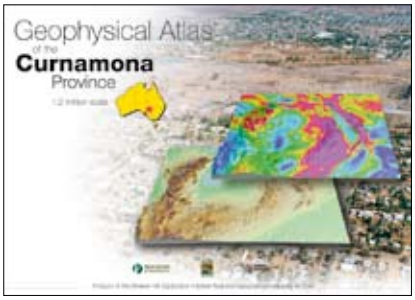
Size: A3, 48 pages.

Coverage: Cape York, North Queensland.

Currency: 1997.

Recommended Price: $77.00.

Geophysical Atlas of the Curnamona Province



This 1:2 million scale atlas is the companion volume to the Broken Hill Exploration Initiative (BHEI) final data CD and covers the area in the Broken Hill region, spanning the border between South Australia and New South Wales. It contains geophysical images from high quality data collected over the province as part of BHEI and is intended as a starting point for modern and effective resource exploration.

Size: A3, 23 pages.

Coverage: Curnamona Province, NSW/SA.

Currency: 2000.

Recommended Price: $132.00.

An Australian Phanerozoic Timescale

This book gives a new perspective on the Phanerozoic timescale by bringing together extensive Australian and overseas research on biostratigraphy, geochronology and magnetostratigraphy. It provides an essential framework for resource exploration, geologic modelling, and reconstruction of past environments and land-sea configurations during the last 545 million years. There are 12 biostratigraphic charts included with the book.

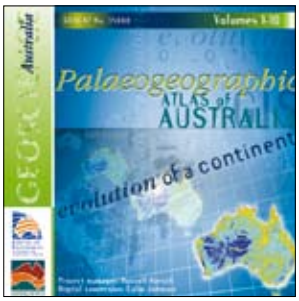
Size: 180mm x 256mm, includes 12, A0-size biostratigraphic charts.

Coverage: Australia.

Currency: 1996.

Recommended Price: $85.25.

Palaeogeographic Atlas of Australia

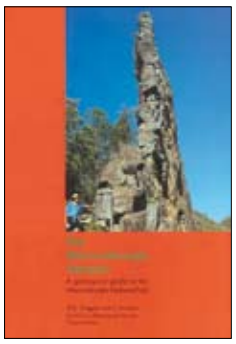


Recently released in digital format, this series of atlases provides valuable insights into the formation of the Australian continent. While only six hard copy atlases were originally published (Cambrian, Ordovician, Silurian, Permian, Jurassic and Cainozoic), the complete set including the Devonian, Carboniferous, Triassic and Cretaceous is now available in ArcInfo format on CD. Also included is a Microsoft Powerpoint slide presentation and approximately 140 digital maps, metadata and documentation.

Recommended Price: $99.00 for complete set on CD, $110.00 each for hard copy atlas.

Guidebooks

Geoscience Australia has published a range of guidebooks for well-known Australian geological features and settings. These books were produced to help the general public understand the formation and evolution of some of the most magnificent sites in our landscape.



The Warrumbungle Volcano

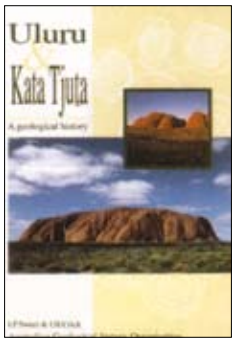
The formation of volcanoes is discussed with particular reference to the evolution of the broad strip parallel to the eastern coast, which has been affected by volcanic activity. There are descriptions of the geological formations along 12 walks through the Warrumbungle National Park and a glossary of relevant geological terms.

Size: B5, 51 pages.

Coverage: Warrumbungle National Park, NSW.

Currency: 1993.

Recommended Price: $9.25.



Uluru and Kata Tjuta, A Geological History

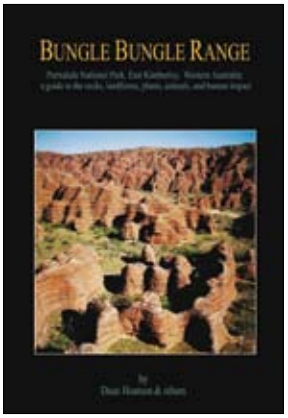
The fascinating story of geological events over hundreds of millions of years that has resulted in the spectacular shapes of Uluru (Ayers Rock) and Kata Tjuta (The Olgas). A tour around each formation describes the many interesting geological features.

Size: A4, 27 pages.

Coverage: Uluru National Park, NT.

Currency: 1992, reprinted in 1994 with minor revisions.

Recommended Price: $11.00.



Bungle Bungle Range

The Bungle Bungle Range of the Purnululu National Park, in the remote East Kimberley of northern Western Australia, is famous for its spectacular beehive-shaped towers of banded sandstone and its deep gorges. This publication describes the geology, landforms, plants, animals and human occupation of this remarkable place.

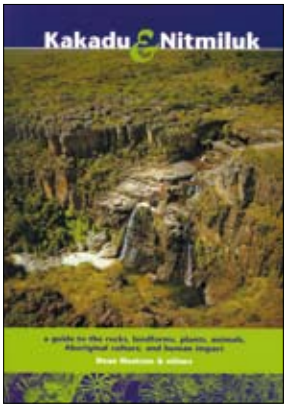
The guidebook illustrates and explains many features of geological interest along the main access tracks and all the walking trails in the park. The descriptions of the walking trails are complemented by specially drawn coloured maps and also by corresponding scale colour aerial photographs. Suggested itineraries for visits lasting from one day to several days are included.

Size: A4, 82 pages.

Coverage: Purnululu National Park, WA.

Currency: 1997.

Recommended Price: $24.00.



Kakadu and Nitmiluk

This award-winning guidebook describes the geology and geomorphology of both parks and the surrounding region; the strong relationships between geology, landform, soil, climate, flora, and fauna; local Aboriginal cultures; and the exploits of the explorers and pastoralists. It includes 48 walking trail guides.

The full-colour guidebook also contains the latest information on camping facilities, commercial tours, and helpful hints on getting the most from your visit. Easy to read maps, colourful diagrams, and 160 high-resolution ground and aerial photographs taken by some of Australia's premier landscape photographers feature throughout this essential reference.

Size: A4, 120 pages.

Coverage: Kakadu and Nitmiluk National Parks, NT.

Currency: 2000.

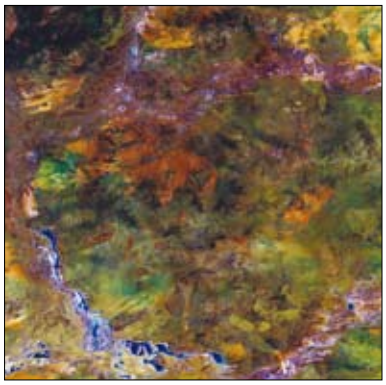
Recommended Price: $30.00.

ACRES SATELLITE IMAGERY

Geoscience Australia's Centre for Remote Sensing (ACRES) offers a range of satellite imagery and has an international reputation for receiving, processing and distributing remotely sensed satellite image data in Australia.

An extensive archive of satellite imagery over the continent dating back to 1979 is available.

Beyond topographic mapping, the main users of satellite imagery are mining companies searching for mineral and petroleum deposits, scientists studying changes to our environment, agronomists predicting crop yields, planners and developers working in the built environment, and emergency services monitoring natural disasters.



A Landsat image of The Granites, northwest of Alice Springs, NT.

A Landsat image of Alice Springs, NT.

Geoscience Australia directly acquires data from satellites owned by other countries including the USA and Canada.

It operates receiving stations in Alice Springs and Hobart, where the data is captured and delivered daily to Canberra for processing into a wide range of digital products.

Satellite image data is currently acquired from Landsat 5 and 7, Aqua, TERRA, NOAA 12, 15 and 16, RADARSAT 1 and ERS 2.

An extensive archive of around 600 000 scenes extends to previously acquired image data from Landsat 2, 3 and 4, ERS 1 and JERS 1.

Satellite image data of Australia and overseas areas is available. This includes Landsat ETM+, TM and MSS from the USGS EROS Data Centre, RADARSAT from RADARSAT International and ASTER from ERSDAC.

Up-to-date satellite image coverage of Australia is also an essential element of the Australian Spatial Data Infrastructure and for updating Geoscience Australia's topographic maps.

HOW TO PURCHASE ACRES PRODUCTS

ACRES products are available through our network of distributors in each State and Territory, who offer expertise in various uses of the data, including agriculture, mining and exploration, environmental monitoring, mapping and land development and planning.

Look up the Geoscience Australia website or contact us direct for a complete list of ACRES distributors.

Customer Services
FREECALL (within Australia): 1800 800 173
Tel: + 61 2 6249 9779
Email: acres@ga.gov.au

TRADING CONDITIONS

Special copyright conditions apply to the sale of satellite data.
To acknowledge these copyright conditions, customers are required to sign a Satellite Data End User Licence prior to the purchase of any data.

ABOUT REMOTE SENSING

WHAT IS REMOTE SENSING?

Remote sensing is the science of gathering data using an instrument that is not in contact with the object being studied. It forms the basis of most Earth observation.

A variety of sensors on satellite platforms collect data concerning the Earth. Data collected by these sensors provides a powerful source of information. Remotely sensed data can provide information that is difficult, if not impossible, to obtain from the ground. This could be the primary source of information or as a complement to other types of information.

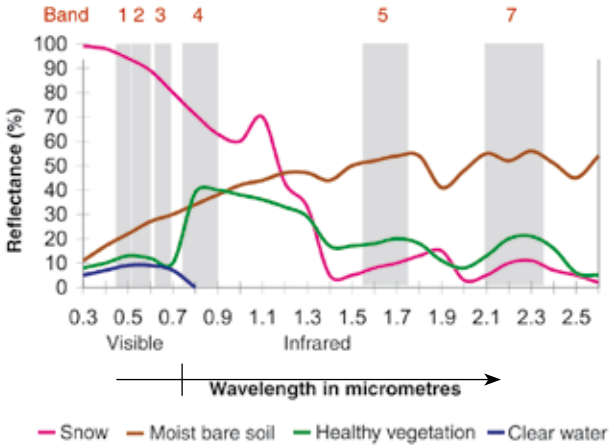
Users of remotely sensed data have the option to choose from a broad range of products designed to meet specific information needs.

The two key characteristics that introduce differences in the data products generated from various satellite sensors are *spectral* and *spatial* resolution.

SPECTRAL AND SPATIAL RESOLUTION

Satellite data products are often described in terms of spatial and spectral resolution. These two characteristics also determine the product that best suits a given application. The ability of the sensor to detect the energy reflected by surface features within specific segments of the electromagnetic spectrum is referred to as *spectral* resolution. While the human eye is capable of detecting only a portion of the electromagnetic spectrum, ie. the visible portion, remote sensing instruments detect electromagnetic energy from across the whole range of the spectrum, ie. ultraviolet, visible, infrared, thermal and microwave regions.

The size of the smallest object that can be seen by the sensor is commonly referred to as *spatial* resolution. A sensor with a spatial resolution of 20 metres for example, cannot clearly detect objects that are smaller than 20 metres. However, there are exceptions due to the interplay of spectral and spatial resolution. An object's radiometric or light-reflecting characteristics may contrast sharply with the surrounding area, enabling its detection contrary to expectations based on spatial resolution alone.



Graph 1: Landsat ETM+ Bands and reflectance of landcover types.

TYPES OF SENSORS

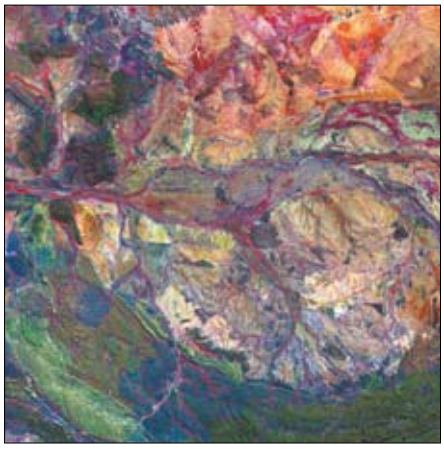
Remote sensing data is often named after the sensor that acquired it. Sensors can be classified by the following types:

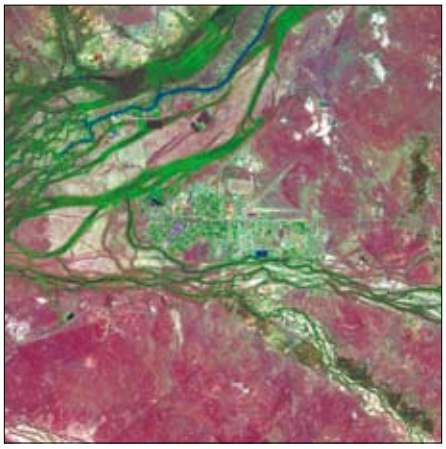
Multispectral (Colour)

Multispectral sensors record reflected or emitted energy levels in several discrete bands of the electromagnetic spectrum, usually less than 10 bands (more than 10 spectral bands is referred to as hyperspectral). All objects reflect light differently. The unique pattern of reflection by different objects helps identify them in a multispectral analysis of the data. (See Graph 1).

Panchromatic (Black & White)

Panchromatic (pan) sensors, unlike multispectral sensors, record the energy level from one wide band in the visible region of the electromagnetic spectrum. However, the width and location on the spectrum of pan bands may vary depending on the design of the sensor. Pan data is frequently used where the spatial information is more important than the spectral (colour) information because pan data normally offers a higher spatial resolution.





Far left: ASTER satellite image in vicinity of Yarrie Mine Camp, east of Port Hedland, Western Australia, acquired 2 May 2002.

Left: Landsat 7 ETM+ image over the town of Longreach in western Queensland, using bands 1,4,7 (BGR).

Synthetic Aperture Radar (SAR)

SAR sensors operate in the microwave region of the electromagnetic spectrum. They are active, meaning they transmit pulses of microwave energy in the direction of interest and record the strength and orientation of the energy that bounces back from the target.

They are capable of recording information under virtually all weather and light conditions.

OPTICAL VERSUS RADAR DATA

Like the human eye, multispectral and pan sensors do not produce their own light source to illuminate the objects that they detect.

Because of their similarity to the human eye, data from these passive sensors is often referred to as 'optical data'.

In contrast, *active* systems generate their own illumination, ie. radar signals, for detecting surface features.

Because radar signals can penetrate clouds that block the view of passive systems, SAR sensors can obtain imagery under all weather conditions and during darkness.

STEREOSCOPIC DATA

Stereoscopic data can be generated using data from multispectral, pan or SAR instruments, but it requires two instruments recording data over an area from two different angles.

By comparing two images or stereoscopic pairs of an area, information about elevation (or height) can be derived.

Contours and Digital Elevation Models (DEM) can then be produced from stereoscopic imagery.

DIGITAL VERSUS HARD COPY DATA

Satellite imagery is generally perceived as being a photographic print or a simple pictorial image in digital format (such as tiff, gif or jpeg). Although these prints and simple files can be produced from the data acquired by the satellite, a much more powerful form of imagery is the true digital form. This allows the data to be viewed and manipulated in a variety of ways to permit the extraction of more information.

ACRES distributors offer image processing, analysis, interpretation and printing services.

MORE INFORMATION

ACRES products and pricing are regularly revised in response to customer needs, government policy and ACRES capacity. As a result, detailed product descriptions and prices are best accessed through our regularly updated web pages. For more detailed information on LANDSAT, MODIS, RADARSAT, ERS, JERS, ASTER and NOAA, please see www.ga.gov.au/acres/prod_ser/index.htm.

The ACRES ground receiving station near Alice Springs in the Northern Territory acquires data directly from satellites passing over the continent.

An example of a Synthetic Aperture Radar (SAR) image over Newcastle, New South Wales, acquired by the RADARSAT satellite. © Copyright Canadian Space Agency.

AERIAL PHOTOGRAPHY

Geoscience Australia is the custodian for Commonwealth vertical and oblique aerial photography, which began in 1928. The photos are an important adjunct to spatial information because they provide an accurate historical record of the land. They are of tremendous value to:

- Geologists
- Mining and exploration companies
- Land developers
- Planners
- Environmentalists
- Farmers
- Soil conservationists, and
- Landcare groups.

In 1997, production and delivery of aerial photography products were outsourced to United Photo & Graphic Services (UPGS) of Melbourne. The Commonwealth has retained policy control, including pricing and copyright.

SELECTING PHOTOS

Aerial photography is recorded on flight line diagrams which show aircraft paths (also known as runs), the centres of the photos in relation to ground features and film reference numbers.

Each photograph has a photo title strip with information relative to the film number; aircraft run number; photo number; time and date of photo; and altitude of aircraft/ scale.

You can use an online catalogue of Flight Line Diagrams to select your photos. See **www.ga.gov.au**.

PRODUCT RANGE

The product range includes:

- Contact prints (from the whole photo).
- Enlargements to a specific scale, such as 1:50 000, or by ratio, such as 2x or 4x (from the whole photo or part of it).
- Diapositivies transparencies on stable based film.
- Photos taken on colour film — which can be reproduced as black and white.
- Photo mosaics — which involve joining together several aerial photos to form a single, nonrectified image. Generally, the mosaic is re-photographed and enlarged to your specifications. This enables large areas to be covered by one image similar to a satellite image.
- Orthophotos — photo mosaics with some text annotation, available over selected areas.
- Prints — which may be ordered individually or in blocks to give either plain cover or stereoscopic cover.

TO ORDER

To place an order or to seek advice on how to select your photo, contact:

United Photo & Graphic Services
Unit 4, 2 Apollo Court
Blackburn VIC 3130
PO Box 407
Blackburn VIC 3130

Tel: +61 3 9877 3922
Fax: +61 3 9894 2971
Email: info@unitedphoto.com.au
Internet: www.unitedphoto.com.au

GEODETIC DATA PRODUCTS

Geodesy is the study of:

- **the size and shape of the Earth and its gravity field**
- **the measurement of the position and motion of points on the Earth's surface, and**
- **the configuration and area of large portions of the Earth's surface.**

Geodesy is a dynamic application of scientific methods in support of many professional, economic and scientific activities and functions, ranging from land titling to mineral exploration; from navigation, mapping and surveying to the use of remote sensing data; and from the construction of dams and drains to the interpretation of seismic disturbances.

One of Geoscience Australia's most popular online geodetic services is its astronomical information, which allows you to calculate the rising and setting times of the sun or moon in any location on any particular day. This information has been used as evidence in traffic accident cases through to planning weddings.

Similarly, the AUSPOS Online GPS Positioning Service for surveyors is a popular tool that enables them to obtain highly accurate survey points at no cost for processing the data.

Geodetic information is used for a range of such professional and personal purposes and is also fundamental to Australia's geographic coordinate system and the spatial industry. It provides Australia's contribution to the international terrestrial reference frame, which is the basis of a highly accurate, global coordinate system.

Using a network of GPS receivers across Australia and the Antarctic Territory — and satellite laser ranging stations in the Australian Capital Territory and Western Australia — Geoscience Australia monitors the horizontal and vertical motion of the continent and its offshore territories. The Australian Regional GPS Network (ARGN) is the basis of all spatial coordinates in Australia. Its data is also used to help measure Earth processes such as crustal dynamics and sea level rise.

The satellite laser ranging stations at Mt Stromlo in the ACT and Yarragadee in WA are ranked amongst the best in the world. They measure precise distances to satellites by timing the reflected flight of laser beam pulses. These measurements allow the calculation of precise orbits for artificial satellites and measure the variation of the Earth's axis.

Geoscience Australia is the Commonwealth focal point for coordination of geodetic information and data and works with international geodesy organisations, State agencies, the Intergovernmental Committee on Surveying & Mapping (ICSM) and industry groups towards the provision of the best possible spatial information.

CONTACT

Internet: **www.ga.gov.au**
FREECALL (within Australia): 1800 800 173
Tel: + 61 2 6201 4328
Email: geodesy@ga.gov.au

Astronomical Information

Data for astronomical phenomena for the sun and moon.

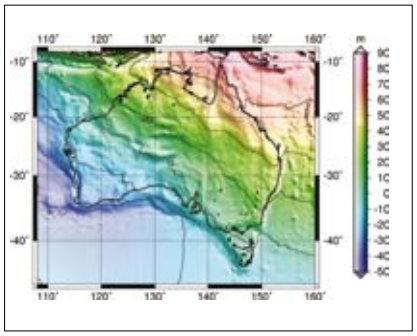
On the Internet you can:

- Compute your own sunrise and sunset times
- Compute your own moonrise and moonset times
- Compute your own sun and moon positions
- Browse moon phase data.

Coverage: Global.

Format: Text, Digital.

Recommended Price: Available free online.



AUSGeoid

AUSGeoid98 is the latest in a series of national geoid models for Australia. AUSGeoid98 consists of a 2 minute by 2 minute grid (approximately 3.6km) of geoid-ellipsoid separations (N Values) in terms of the GRS80 ellipsoid, which is also used for the new Geocentric Datum of Australia (GDA94).

These values are suitable for use with GPS and will significantly improve the achievable accuracy of AHD height transfer using GPS.

Coverage: Australia.

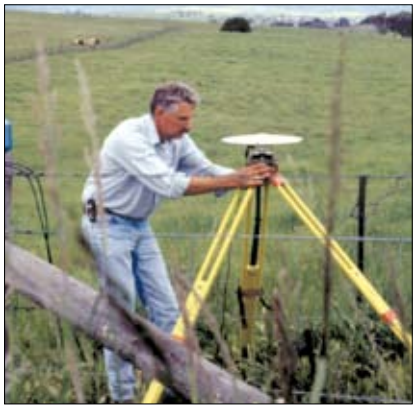
Currency: 1998.

Coordinates: GDA94.

Datum: GDA.

Format: Text.

Recommended Price: Available free online.



AUSPOS — Online GPS Processing Service

AUSPOS enables users to submit dual-frequency, geodetic-quality GPS RINEX data, observed in a 'static' mode, to the on-line GPS processing system and receive by email, rapid turn-around GDA94 and ITRF coordinates. This service takes advantage of both the IGS product range and the IGS GPS network and works with data collected anywhere on Earth.

Coverage: Worldwide.

Coordinates: GDA94 and ITRF.

Datum: GDA94 and ITRF.

Format: RINEX (submitted) and PDF (returned).

Recommended Price: Available free online.

Australian Regional GPS Network (ARGN)

The ARGN consists of 15 permanent geodetic quality GPS receivers on geologically stable marks in Australia and its External Territories. These sites provide the geodetic framework for the spatial data infrastructure in Australia and its External Territories. Data from these sites contributes to the International GPS Service (IGS) and provides input for the measurement of earth processes, such as crustal dynamics and sea level rise.

Coverage: Australia, its Antarctic Territory, Cocos Island and Macquarie Island.

Currency: Updated daily.

Format: RINEX.

Recommended Price: Available free online.

Geocentric Datum of Australia (GDA) — Technical Manual

The *GDA Technical Manual replaces the Australian Geodetic Datum Technical Manual*. The new *Geocentric Datum of Australia Technical Manual* is designed to explain all facets of the new Geocentric Datum of Australia, and continues the tradition of providing complete formulae and worked examples- now in computer spreadsheets.

It is produced on behalf of the Intergovernmental Committee on Surveying & Mapping (ICSM).

Coverage: Australia.

Currency: 2002.

Format: PDF.

Recommended Price: Free download available from **www.anzlic.org.au.**

Australian Height Datum (AHD)

On 5 May 1971, the then Division of National Mapping, on behalf of the National Mapping Council of Australia (NMC), carried out a simultaneous adjustment of 97 230 kilometres of two-way optical levelling. This levelling was constrained to mean sea level.

Mean sea level for 1966–1968 was assigned the value of zero on the Australian Height Datum at 30 tide gauges around the coast of Australia. The resulting datum surface, with minor modifications in two metropolitan areas, is the Australian Height Datum (AHD). Geoscience Australia maintains an archive of the fundamental AHD network. State and Territory agencies can supply recent and additional information for their area of responsibility.

See the National Tidal Facility website at www.ntf.flinders.edu.au.

Coverage: Australia.

Coordinates: Approximate.

Datum: AHD.

Format: Text.

Recommended Price: Available free online.

Located in Tasmania, this tide gauge (the verticalwhite cylinder) is part of the National TidalFacility network, with a GPS antenna (domeshape) attached on the right.

Left: The location of AHD tide gauges.

National Geodetic Database (NGDB)

The NGDB is a national archive of about 23 000 geodetic survey marks of national interest, in Australia and its external territories (including Antarctica).

Coordinates of these marks are held in terms of the Geocentric Datum of Australia (GDA) as well as the two previous versions of the Australian Geodetic Datum, (AGD66 and AGD84) and some earlier Australian coordinate systems.

Coordinates in the offshore territories are in terms of the International Terrestrial Reference Frame (ITRF). Not all stations have coordinates in all datums.State and Territory agencies can supply recent and additional information for their area of responsibility.

Coverage: Australia and Territories.

Currency: 1966–2002.

Coordinates: AGD/AMG, GDA/MGA.

Datum: GDA, AGD, ITRF.

Format: Text, CSV.

Recommended Price: Available on request.

Satellite Laser Ranging (SLR) Network

Geoscience Australia operates satellite laser ranging stations at Mount Stromlo in the Australian Capital Territory and Yarragadee in Western Australia. It coordinates their activities and liaises with the International Laser Ranging Service (ILRS) to define observing programs and quality requirements.

Laser ranging provides global satellite laser ranging data and related products to support geodetic and geophysical research activities as well as International Earth Rotation Service (IERS) products, which are important to the maintenance of an accurate International Terrestrial Reference Frame (ITRF).

Coverage: Global.

Currency: Updated daily.

Recommended Price: Free download available from **ftp://cddisa.gsfc.nasa.gov/pub/slr/slrql/**

Standards and Practices for Horizontal and Vertical Control Surveys

The Standards and Practices for Control Surveys, frequently referred to as Special Publication 1 (SP1), is produced on behalf of the Intergovernmental Committee on Surveying and Mapping (ICSM). There have been several editions since this publication was first produced in 1966, resulting in the current version.

It provides clear standards of accuracy for control surveys. SP1 aims to achieve uniformity of standards throughout all national and State control networks in Australia.

Coverage: Australia.

Currency: 2001.

Format: PDF.

Recommended Price: Free download available from **www.anzlic.org.au.**

Space Geodesy Analysis

The Geoscience Australia Space Geodesy Analysis Centre processes and analyses several types of geodetic observations. The results are provided to the appropriate international geodetic services to contribute to the monitoring of Earth processes and the maintenance of the International Terrestrial Reference Frame.

Solution types include:

- GPS submitted to the International GPS Service (IGS);
- Satellite Laser Ranging, submitted to the International Laser Ranging Service;
- DORIS, submitted to the International Doris Service;
- VLBI, submitted to the International Earth Rotation Service (IERS) and the International VLBI Service (IVS);
- Accurate local survey measurements, connecting co-located geodetic equipment, submitted to IERS to allow combinations of all types of solutions.

Coverage: Australian and Antarctic Regions.

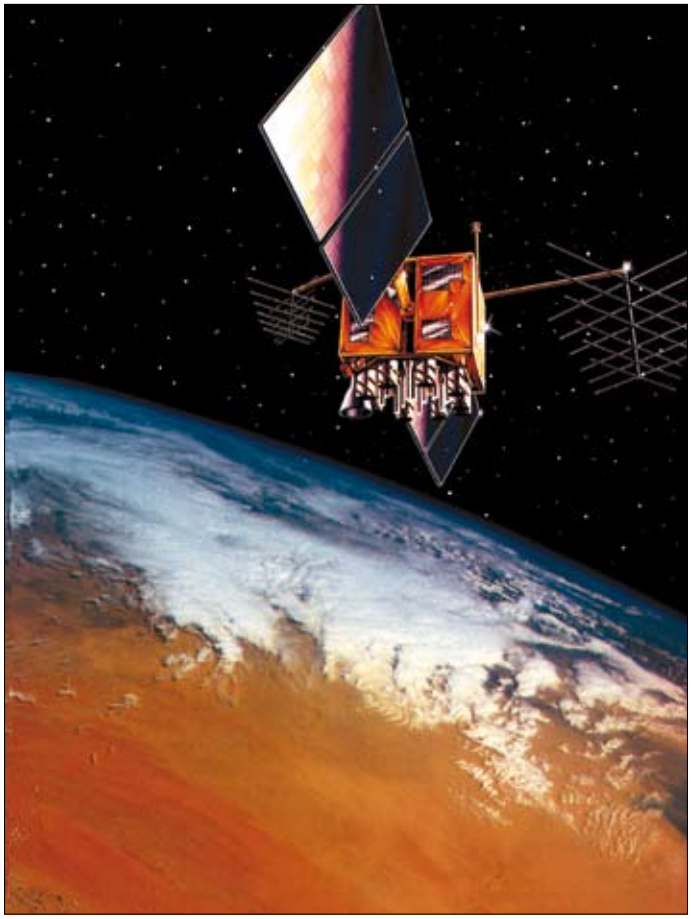
Currency: Daily-Weekly.

Coordinates: ITRF.

Datum: ITRF.

Format: SINEX, time series analysis and other.

Recommended Price: Available free online.



EDUCATION RESOURCES

NATURAL HAZARDS

Earthquakes (Primary 6 and Secondary 7–9)

What are earthquakes and how are they caused? How do we locate and measure earthquakes? Where have the world's most destructive earthquakes occurred and how do they compare to Australia's worst earthquakes? This informative booklet includes maps of Australian earthquakes and Australia's earthquake risk. Explore important concepts about earthquakes using practical student activities.

- 52 page booklet.
- Four activities with photocopiable masters.
- Suggested answers.

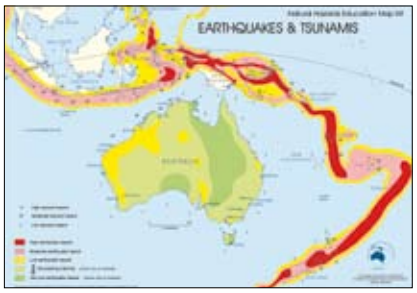
Recommended Price: $11.00.

Tsunami! (Secondary 7–10)

Located on the Pacific Rim, Australia is in a tsunami danger zone. On average Australia experiences one tsunami every two years — we should educate students about this natural hazard. Find out where tsunamis occur, what causes them and how we measure their size. Identify signs of an approaching tsunami and what warning systems exist. Carry out practical activities that reinforce key concepts about tsunamis.

- 36 page booklet.
- Three activities with photocopiable masters.
- Suggested answers.

Recommended Price: $11.00.



Australian Natural Hazards Kit (Primary 5–6 and Secondary 7–8)

Developed in consultation with Emergency Management Australia (EMA), this kit defines and maps major hazards affecting Australia — earthquakes, tsunamis, landslides, volcanoes, severe storms, cyclones, bushfires, droughts and floods. This kit helps students and teachers recognise risks from different natural hazards and the practical steps we can all take to reduce their effects.

- Eight colour A3 poster maps with descriptive text.
- Eight blackline A4 map masters.
- Background information on each hazard.
- Student activities.
- EMA Hazard Action cards.

Recommended Price: $11.00.

VOLCANOES

Volcanoes (Primary 5–6 and Secondary 7–10)

Volcanoes is an invaluable resource for Science, Geography and SOSE. Where are active volcanoes found and why? What types of volcanoes exist? What dangers do volcanoes pose? What causes volcanic eruptions and what different materials are produced? Learn how hot spots influenced Australia's volcanic past. Can volcanoes benefit people? Activities cover the science of eruptions and their impact on people. Run a realistic scenario where students monitor a hazardous volcano as part of scientific monitoring teams.

- 60 page booklet.
- Three activities with photocopiable masters.
- Suggested answers.

Recommended Price: $11.00.

Stratovolcano 3D Model (Primary K–6 and Secondary 7–10)

Help bring volcanoes to life with this simple 3D model. Stratovolcanoes are classic, steep-sided volcanoes that can erupt explosively, such as Mount Fuji. Students can study a volcano's inner structure, plot the path of surface lava flows and predict risks faced by local towns.

- Class set of thirty A4 paper models.

Recommended Price: $11.00.

Pdf download available.

Shield Volcano 3D Model (Primary K–6 and Secondary 7–10)

Make your own model of a gently sloping, broad Hawaiian-style shield volcano built up from very fluid, runny lavas. Great for discussing Australia's own shield volcanoes and to compare with the classic stratovolcano model.

- Class set of thirty A4 paper models.

Recommended Price: $11.00.

Pdf download available.

PLATE TECTONICS

Plate Tectonics (Secondary 7–12)

Unsure about plate tectonic theory? This classic resource reviews Earth's internal structure, the theory of plate tectonics and different types of plate margins. Examine evidence for plate tectonics such as fossils, geological structures, earthquake patterns and patterns of sea floor magnetic anomalies. Activities include mapping plate boundaries, modelling a mid-ocean ridge, demonstrating the formation new sea floor crust and investigating 'Tectonicland'.

- 56 page booklet.
- Five activities with photocopiable masters.
- Suggested answers.

Recommended Price: $11.00.

This Dynamic Earth: The Story of Plate Tectonics (Secondary 7–12)

Published by the Unites States Geological Survey, this comprehensive book is a thorough review of plate tectonics theory. Excellent colour graphics and clear, detailed text describe fundamental concepts of Earth. This book covers a wide range of topics including types of plate margins, deep ocean vents, magnetic anomalies, sea floor spreading, magnetic pole reversals, Australia's polar dinosaurs, earthquake distribution and developing rift valleys. Individual essays review major contributions to plate tectonic theory. Also included are the effects on people of natural hazards due to plate tectonics. A must for every secondary school library!

- 78 page full colour book.

Recommended Price: $11.00.

This Dynamic Planet — Poster Map (Secondary 7–12)

Searching for ways to help students understand where and why tectonic events happen? This comprehensive poster maps the Earth's continents and plate boundaries, locates extinct, dormant and active volcanoes, maps the size, depth and location of modern earthquakes of magnitude 4.0 or greater, and shows the direction and speed of plate movements. For display in your classroom all year round!

- Large 104cm x 141cm colour poster map, folded.

Recommended Price: $19.25.

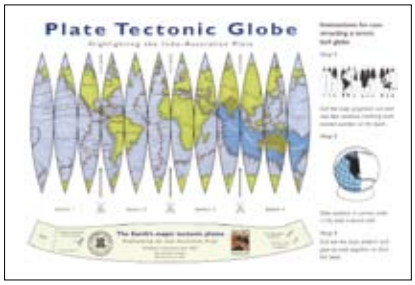


Plate Tectonic Globe 3D Model (Primary 5–6 and Secondary 7–12)

See the world's plates in 3D. Plate tectonics makes much more sense using this innovative model. Construct actual 3D globes that show the location of major plate boundaries and highlight our own Indo-Australian plate. A simple, yet practical resource for teaching about our active Earth.

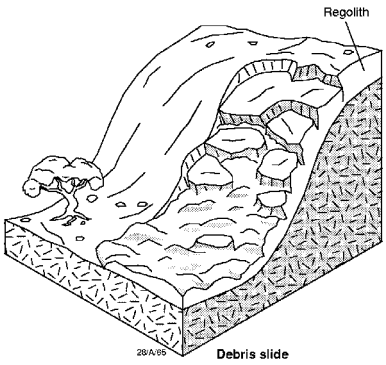
- Class set of thirty A4 paper models.

Recommended Price: $11.00.

Pdf download available.

LANDSLIDES

Landslides (Secondary 7–12)



Did you know landslides in Australia have killed more people than earthquakes? Sudden landslides devastate the landscape, people and property. Encourage your students to understand landslide hazards and how to reduce landslide risk using this booklet of informative activities. Learn the signs of past and potential landslides, check the causes of slides, investigate property insurance in risk areas, and carry out a hazard assessment on a town.

- 44 page booklet.
- 11 activities with photocopiable masters.
- Suggested answers.

Recommended Price: $11.00.

Landslide 3D Paper Models (Primary 5–6 and Secondary 7–12)

Watch as the earth slides before your eyes! Study the movement of landslides and their effects using this interactive 3D model. See a hypothetical landslide's impact on natural and human landscapes. The straight-line movement of a landslide can be contrasted with that of the slump model.

- Class set of thirty A4 paper models.

Recommended Price: $11.00.

Pdf download available.

Slump 3D Paper Models (Primary 5–6 and Secondary 7–12)

Thredbo's two ski lodges were devastated by a slump. Show a slump's curved motion using this interactive 3D model. See the effect on a nearby town and its infrastructure. A useful model to contrast with the straight-line movement of the landslide model.

- Class set of thirty A4 paper models.

Recommended Price: $11.00.

Pdf download available.

AUSTRALIAN GEOLOGY

Australia: Evolution of a Continent (Primary 5–6 and Secondary 7–12)

This fascinating publication fills a large gap in the literature. Clear, simple palaeogeographic maps summarise the last 590 million years of Australia's evolution into 70 time slices, from the Cambrian to Quaternary. Includes sections on geological time, plate tectonics, the break up of Gondwana, climate change, sea level change, evidence for ancient environments and Australia's geological framework. See the extent of ancient inland seas. Discover where and when Australia was volcanically active. Where and what environments did fossils form at different times? An invaluable reference for staff and students.

- 96 page full colour book.
- 70 palaeogeographic maps.
- Foldout legend.
- Six page glossary of relevant terms.

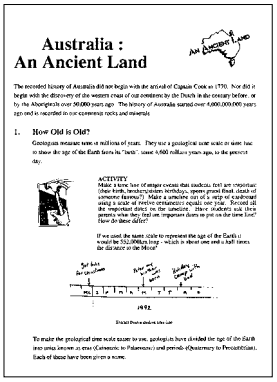
Recommended Price: $16.50.

Weathering and Erosion (Primary 5–6 and Secondary 7–12)

Without weathering, erosion and deposition, we would not have our mountains, river valleys, sandy beaches or the soil to grow our food. Using well known examples, this booklet outlines different types of weathering, erosion and transport. Introduces the concept of regolith an important new way of looking at weathering in the landscape. Reproducible activities help students understand the processes that shape our Earth.

- 50 page booklet.
- Eight activities.
- Suggested answers.

Recommended Price: $11.00.


Australia :
An Ancient Land

1. How Old is Old?

ACTIVITY

1492.

Australia: An Ancient Land (Primary K–6)

Australia: An Ancient Land provides simple introductions to dating, geological time, timescales, plate movement, Australia's past hot spot volcanoes and our only active volcano, ice ages, rocks, the formation of fossils and Australia's most common fossils. Discover the age and geological history of well-known Australian sites such as Wilpena Pound and Uluru. Seven hands-on activities make geoscience fun and relevant: make your own fossils, erupt a volcano and find out when your school will reach the Equator!

- 18 page booklet.
- Seven student activities.

Recommended Price: $11.00.

AUSTRALIAN GEOLOGY

Geology of Australia Map (Primary 5–6 and Secondary 7–120

What really lies beneath your feet? Explore Australia's major geological regions with this large 1: 5,000,000 poster map. Explore why Western Australia is so hilly. Why did the 1850s gold rush occur in south eastern Australia. Where would palaeontologists look for Jurassic and Cretaceous-aged dinosaurs? A perfect accompaniment to Australia: evolution of a continent.

- 1: 5 000 000 scale poster map. **Recommended Price:** $9.25.

Sydney Basin 3D Model (Primary 4–6 and Secondary 7–12)

Students can create their own colour 3D model of NSW's Sydney Basin; this simple, revealing look at the major geology, stratigraphy and landmarks of the basin extends westward from Sydney into the Blue Mountains beyond Katoomba. Includes the surface and sub-surface distribution of major geological units; Carboniferous granite, Lambie Group, Berry Formation, Illawara Coal Measures, Narrabeen Group and Hawkesbury Sandstone. Help your students visualise underground geology in 3D with this easy to assemble model.

- Class set of thirty A4 paper models.

Recommended Price: $11.00. Pdf download available.

FOSSILS AND GEOLOGIC TIME

Fossils (Primary 3–6 and Secondary 7–10)

Teaching fossils in your classroom? What is a fossil? How are fossils formed? What living things become fossils? Extensively illustrated with fossil examples from around the world but emphasising Australian examples, this new resource includes 24 informative reproducible fact sheets covering a variety of vertebrates, invertebrates, plants and trace fossils - a useful adjunct to teaching your students about classification. Fascinating fossil facts will delight students and teachers alike! Includes fun and educational student activities.

- 60 page booklet.
- 24 fact sheets A4.
- Six activities with photocopiable masters.
- Suggested answers.

Recommended Price: $11.00.

Trilobite 3D Model (Primary K–6 and Secondary 7–10)

Extinct for 250 million years, what better way for students to study these creatures than by making their own 3D paper model! Examine a trilobite's gills, antenna and compound eyes. Work out how they moved. A great adjunct to our Time and Life and Fossils booklets.

- Class set of thirty A4 paper models.

Recommended Price: $11.00. Pdf download available.

Nautiloid 3D Model (Primary 5–6 and Secondary 7–10)

Build your own model of these elegant sea creatures. Nautiloids have been extinct for 100 million years but students can recreate them in 3D in your own classroom!

- Class set of thirty A4 paper models.

Recommended Price: $11.00. Pdf download available.

Pterosaur 3D Model (Primary K–6 and Secondary 7–10)

These Ornithocheirus were flying reptiles that cruised Australia's Mesozoic skies, soaring over dinosaurs and other creatures that lived below. Use our 3D models to create fun mobiles in your classroom!

- Class set of thirty A4 paper models.

Recommended Price: $11.00. Pdf download available.

Serendipaceratops 3D Model (Primary 5–6 and Secondary 7–10)

Introduce your students to one of Australia's more recently discovered dinosaurs with a class set of this 3D model. Ceratopsian dinosaurs first appeared about 120 million years ago. Serendipaceratops is one of the earliest known ceratopsian dinosaurs, an important clue that these dinosaurs might have evolved in, or near, Australia.

- Class set of thirty A3 paper models.

Recommended Price: $11.00. Pdf download available.

Triceratops 3D Model (Primary 5–6 and Secondary 7–10)

These famous North American dinosaurs were herbivores that used their bristling horns for defence. Each paper model creates a fun 3D animal. Make your own Triceratops herd!

- Class set of thirty A3 paper models.

Recommended Price: $11.00. Pdf download available.

Time and Life (Secondary 7–10)

Finding it difficult to teach the concept of geological time? Learn how scientists use different dating techniques and under what circumstances they are used. Summary fossil notes also help to identify major groups of fossil organisms in your school collection, and in the field. Student activities include geological time, radioactive decay, the importance of fossils in dating our Earth and fossil time ranges.

- 60 page booklet.
- Eight student activities.
- Suggested answers.

Recommended Price: $17.60.

Gas, Energy and Change (Secondary 9–12)

Using numerous illustrations this detailed resource defines energy, energy sources, energy transformations, chemistry of hydrocarbons, geological settings for gas and oil formation, geological traps, oil and gas in the geological time scale and how commercial oil and gas deposits are found and recovered. Includes uses of natural gas (including domestic), Australia's natural gas potential and environmental issues such as Greenhouse gases. Student activities explore many key concepts including the use of fossils to date drill cores and interpreting seismic sections.

- 104 page booklet.
- 15 student activities as photocopiable masters.
- Suggested answers.

Recommended Price: $17.60.

OCEANS AND COASTS

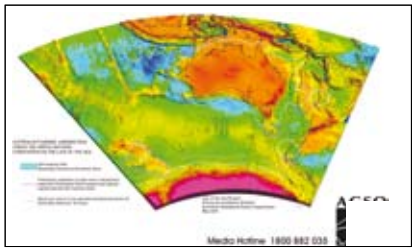
Coasts (Secondary 7–10)

This resource describes natural and human-induced processes affecting coasts, provides background information on erosional and depositional coastlines and includes a special section on estuaries. Reproducible activities develop student understanding of key concepts such as longshore drift, sea level change, estuary analysis and a dune survey. Also includes a detailed Gold Coast case study and web-based research task. Associated CD-ROM is Mac and Windows compatible and includes a range of images of coastal landforms and coastal environments.

- 47 page booklet.
- CD-ROM images of different coastal features and case study.
- Nine student activities.
- Suggested answers.

Recommended Price: $17.60.

Law of the Sea (Secondary 8–12)



Did you know that Australia will have more offshore territory than onshore by 2004? This comprehensive teacher's guide reviews the history and development of the UN Convention on the Law of the Sea (UNCLOS) and its application to Australian jurisdiction with case studies on Antarctica, the North West Shelf and Orange Roughy. The Law of the Sea has been written by Geoscience Australia, an organisation conducting vital research for Australia's 2004 UN submission. Find out the impact of UNCLOS on marine areas to which Australia has access. Includes a detailed review of methods used by coastal countries eg. geophysics, to define areas of extended continental margin and marine zones such as the Exclusive Economic Zone. Practical activities are invaluable to geography, geology, environmental education and general science students in middle and senior secondary classes.

- 108 page booklet with extensive glossary.
- Nine student activities.
- Suggested answers.

Recommended Price: $17.60.

GOLD

The Science of Gold (Primary K–6 and Secondary 7–8)

Need the answers to those common questions; where do we find gold? Where should I look for gold? Incorporate easily understood aspects of science and technology into your Gold Rush lessons. Fun activities will keep students involved. What is their weight in gold worth? Just take care they don't catch 'Gold Fever'!

- 18 page booklet.
- Six student activities.

Recommended Price: $11.00.

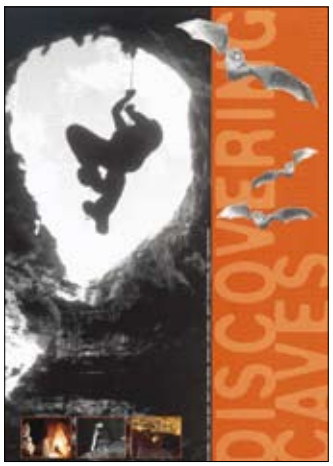
CAVES AND CLIMATE

Climate Change Throughout Earth History (Secondary 7–12)

Examine the dynamic nature of Earth's climate in the past and its many influencing factors. Learn about fluctuations that occur naturally over the life of our planet including ice ages and global warming. Discover evidence of past climatic change such as fossils, palaeomagnetism, cave speleothems, oxygen isotope evidence, ice cores and tree rings. Reproducible activities lead students through concepts of changing climate. If you teach about climate change, this booklet is a must!

- 92 page booklet.
- Five student activities.
- Suggested answers.

Recommended Price: $17.60.



Discovering Caves Kit (Primary 4–6 and Secondary 7–9)

Australia boasts over 10,000 caves! Caves are a great way to introduce common scientific and geographic concepts to your students. This kit includes fact sheets on cave formation, the chemistry of limestone dissolution, the science behind cave decorations, dating cave deposits and decorations, caves as clues to past climates, karst landscapes, cave animals, cave fossils, cave use and management and Australian cave facts. A separate booklet includes curriculum linked, fun student activities. Grow your own stalactites. Make a 3D cave model. Map a cave. Also includes large full colour 'Discovering Caves In Australia' map poster. Sensational value!

- Seven reproducible student activities.
- 18 fact sheets.
- 108cm x 78cm full colour map poster.

Recommended Price: $17.60.

CAVES AND CLIMATE

Discovering Caves in Australia — Poster (Primary 4–6 and Secondary 7–9)

This large poster map shows the location of all Australian show caves, and many other cave regions. Includes 24 informative full colour images covering aspects of Australian caves.

- 108cm x 78cm full colour map poster.

Recommended Price: $8.80.

CRYSTALS AND CHEMISTRY

Silicate Chemistry (Secondary 10–12)

A detailed look at the elements in the Earth's crust, the nature of silicon and the silicon tetrahedron building block, the role of aluminium in silicate structures, silicate mineral characteristics and their formation. Includes activities to explore key features of silicates. Introduce your students to ternary and phase diagrams through practical activities. Systematically covers the inorganic chemistry of Earth's rock-forming minerals.

- 40 page booklet.
- Five student activities.

Recommended Price: $17.60.

NATIONAL PARKS

Uluru and Kata Tjuta: A Geological History (Secondary 7–12)

An invaluable full colour A4 guide to Uluru and Kata Tjuta. Learn about the environment 550 million years ago when the rocks of Uluru and Kata Tjuta formed. Examine fossil pollens that prove inland Australia was once much wetter. An illustrated section describes weathering and erosion processes that created marvellous landforms rising above a landscape of red sand. Find out their extent below the surface. Includes a guide to walks around Uluru and Kata Tjuta and an informative glossary.

- 27 page A4 book. **Recommended Price:** $9.25.

Bungle Bungle Range Guide Book (Secondary 7–12)

Clifton Pugh, Australian artist, said of the Bungle Bungles; "In all my Australian travels I've never seen anything like this; I'm overjoyed." Geoscience Australia, in association with the Geological Survey of Western Australia and the Department of Conservation and Land Management, produced this excellent guide book on the wonders of the Bungle Bungles. Discover this unique landscape, its formation, 1,880 million year geological history, its animals and plants and the relationship between vegetation communities and landforms. Investigate Aboriginal culture, European exploration, the subsequent search for gold and other human impacts. Includes stunning photographs, satellite imagery, informative maps and diagrams, a glossary and guides to popular walking trails.

- 82 page A4 full colour book. **Recommended Price:** $22.00.

Kakadu and Nitmiluk Guide Book (Secondary 7–12)

A comprehensive guide to the geology, landforms, plants, animals, Aboriginal culture, European exploration and human impact on the Northern Territory's Kakadu and Nitmiluk National Parks. Fully illustrated with photographs and detailed maps, this book includes an extensive guide to the parks' six main ecosystems and the region's 2500 million year geological history. Geological and other natural features of 47 popular walks are outlined with accompanying maps. Includes distance, time and grades of each walk, as well as habitats encountered.

- 110 page A3 full colour book. **Recommended Price:** $24.75.

The Warrumbungle Volcano (Secondary 7–12)

Planning a visit to Warrumbungle National Park? This informative geological guidebook outlines the spectacular geological features of this park and their origins. Discover the volcanic evolution of the Warrumbungles over the last 17 million years and how different structures formed. Learn what affects lava viscosity. Find out about minerals and the rocks in which they occur. Concise maps of eastern Australia locate extinct volcanoes including the Warrumbungles. Amply illustrated with cross-sections, photographs and maps and includes a glossary of relevant terms. Suggested walking trails are shown along with their geological features and points of interest on the road through the Park.

- 51 page A5 book. **Recommended Price:** $11.00.

MAPPING

As Australia's national mapping agency, Geoscience Australia is able to offer teachers a broad range of mapping products. Many Geoscience Australia maps are also available at your local authorised map retailer.

Topographic Map Kit (Secondary 7–12)

Looking for innovative ways to introduce topographic maps to students? Using this class set of 20 topographic maps and nifty map reading cards, students encounter sixteen fun and challenging tasks; pilot a submarine, land a plane in distress, engineer a dam and help train a football team! Help your students learn or review mapping skills such as latitude and longitude, legends, scale and distance, contours, cross-sections, grid referencing, vertical exaggeration and bearings. We've even included a practical map exam!

- 10 copies each Jacobs River and Rockhampton 1:100 000 maps.
- 10 map reading cards 1:100 000.
- 66 page booklet.
- 16 student activities and examination.
- Suggested answers.

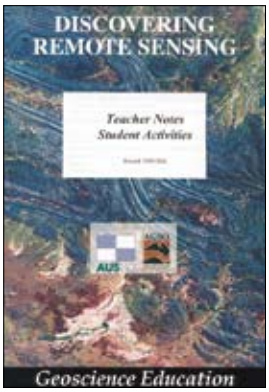
Recommended Price: $44.00.

Map Reading Guide (Secondary 7–12)

The Map Reading Guide provides an introduction to topographic maps and is suitable for everyone. This booklet is an ideal map reading resource for a wide range of map users. A transparent map reading card is also included at combined 1:100,000 and 1: 250,000 scale to assist students to read latitude, longitude, bearings, distance and grid references.

- $2.00 per booklet (+ map reading card).
- $15.40 for set of 10 booklets (each with card).
- $15.40 for set of 20 map reading cards (no booklet).

Discovering Remote Sensing Kit (Secondary 8–12)



Introduce the world of remotely sensed data with this comprehensive kit — includes reference notes, student activities and ten sets of information cards. Images used include NOAA, LANDSAT, TM and SPOT platforms. Straightforward activities cover concepts of resolution, scale, radiation and spectral bands, reflectance, ternary diagrams, satellite platforms and false colour. Links to our web-based satellite image processor to complete an activity introducing image processing.

- 122 page booklet.
- 12 student activities.
- Suggested answers.
- 10 sets of five student A4 cards.

Recommended Price: $44.00.

On line services

More and more maps and related data are becoming available online. Simply visit our web site www.ga.gov.au and select Satellite Remote Sensing or Topographic Mapping for interesting facts and images for remote sensing and mapping.

OTHER MAPPING AND REMOTE SENSING RESOURCES

Geoscience Australia has a range of topics that teachers and students find useful:

Thematic maps

Choose from our range of 1:5 million reference maps of Australia. At 100cm x 80cm these make great classroom displays. Titles include soil, vegetation, geology, land tenure, Railways, Aboriginal Australia, maritime zones, postcodes. Australian external territories maps include Antarctica (general, topographic, satellite image, ANARE expeditions), Norfolk, Heard and MacDonald, Christmas and Cocos (Keeling) Islands.

Recommended Price: from $9.25.

Topographic Paper Maps

We provide full topographic map coverage of Australia at 1:250 000, 1:1 million, 1:2.5 million and 1:5 million scale. Many maps are also available at 1: 50 000 and 1:100 000 scale.

Recommended Price: $9.25.

Australia Compact Reference Map — 1:9 million scale

Discover more about Australia at a glance with our compact topographic map. It includes a colourful array of information about Australia's people, flag, language, national anthem, birds and animals, parliamentary system and more. Order from 15 different language versions, including English. Great for language classes, ESL students, international visitors and home reference.

Recommended Price: $6.80.

Acres Landsat 7 Mosaic of Australia on DVD (Secondary 9–12)

Individual LANDSAT satellite images have been joined together to create this stunning and inexpensive digital mosaic map of Australia on DVD. Using recent images (1999-2000) the mosaic displays ground features in photographic-like perspective. Your school can now access digital imagery that until recently was only available to spatial data specialists. Includes ER Viewer software, therefore no additional viewing software is required.

System requirements: Pentium II processor, 32Mb RAM, 26Mb free disk space, DVD-ROM drive.

Recommended Price: $99.00.

Jervis Bay Territory Map

This comprehensive geoscience and environmental map explores links between many of the unique features of Jervis Bay. A geology map at 1:30,000 includes helpful cross-sections. Smaller-scale inset maps include useful information about vegetation patterns, coastal geomorphology, sites of geological and environmental interest, hydrogeology and regional geophysics. The text includes the geological history of the area and the evolution of the coastline, accompanied by LANDSAT imagery and colour photos.

- Folded colour map.

Recommended Price: $13.20.

Kosciusko Geology Map

Discover the geology underlying Kosciusko National Park with this excellent 1:250,000 colour geological map. Extending from Tumut in NSW south to the Victorian border, this map shows major features; rock types, faults, rivers, human features such as roads and towns and features associated with the Snowy Mountains hydro scheme. An additional 1:100 000 inset geology map highlights recent glacial features around Mount Kosciusko, Smiggin Holes and Thredbo Village.

- Folded colour map.

Recommended Price: $13.20.

GLOSSARY

ACRES: Australian Centre for Remote Sensing.

ANZLIC: This spatial information council is the peak intergovernmental organisation providing leadership in the collection, management and use of spatial information in Australia and New Zealand.

Australian Geodetic Datum (AGD66): The Australian Geodetic Datum (AGD) was adopted by Australia in 1966. Defined by the paremeters of the Australian National Spheroid and the coordinates of the Johnston Geodetic Station. This datum is used for the determination of coordinates from some Geoscience Australia products. Superseded by the Geocentric Datum of Australia (GDA94).

Australian Height Datum (AHD): The datum used for the determination of elevations in Australia. The determination used a national network of benchmarks and tide gauges and set mean sea levels as zero elevation.

Australian Map Grid (AMG): A Cartesian coordinate system based on the Universal Transverse Mercator Projection and the Australian Geodetic Datum. The unit of measure is the metre.

Datum: A mathematic surface from which heights or positions are referenced.

Geocentric Datum of Australia (GDA94): Geocentric Datum of Australia 1994. The set of geographic coordinates based on the Geocentric Datum of Australia. It is compatible with Global Positioning Systems (GPS). Adopted in 1994 and implemented in the year 2000. Used in production of new editions of 1:100 000 and 1:250 000 NATMAPs.

GEODATA: The name of Geoscience Australia's high quality digital data products for use in Geographic Information Systems (GIS).

Geographical Coordinates: A position given in spherical coordinates commonly known as latitude and longitude.

Georeference: Georeferencing is the process of aligning a map image or a map feature with a particular geographic coordinate system.

Intergovernmental Committee on Surveying and Mapping (ICSM): Organisational committee made up of representatives from all the Australian States and Territories, the Commonwealth and New Zealand.

Latitude: The latitude of a feature is its angular distance on a meridian, measured northwards or southwards from the terrestrial Equator.

Longitude: An angular distance measured east or west from a reference meridian (usually Greenwich) on the earth's surface.

Map Grid of Australia (MGA) 1994: A coordinate system based on the universal Transverse Mercator Projection and the Geocentric Datum of Australia 1994. The unit of measure is the metre.

Mercator Projection: The conformal cylindrical projection tangential to the Equator, possessing the additional valuable property that all rhumb lines are represented by straight lines. Used extensively for hydrographic and aeronautical charts.

NATMAP: The name of Geoscience Australia's popular topographic map range.

Projection: Any systematic way of representing the meridians and parallels of the earth upon a plane surface or map.

Raster Data: Raster data is made up of picture elements, or pixels, each having a discrete value and ordered together in a regular grid. In terms of spatial data, each pixel represents an area of the earth's surface at a specific location.

Transverse Mercator Projection (TM): A conformal cylindrical map projection, originally devised by Gauss, also known as the Gauss-Krauer Projection. It is constructed on the same principle as the Mercator Projection, the only difference being that the Great Circle of tangency is now any nominated meridian. Meridians and parallels are curved lines, except for the central meridian or a specified zone (meridian of tangency), which remains a straight line. Projection zones are established about the central meridian and vary in width from two degrees to six degrees of longitude, with some overlap between zones. The amount of scale distortion may become unacceptable at distances greater than about 1.5 degrees in longitude from the central meridian. In a modified form, the projection is in general use for topographic mapping at scales of 1:250 000 and larger. See Universal Transverse Mercator.

Universal Transverse Mercator Projection (UTM): A worldwide systematic application of the Transverse Mercator Projection applying to the region between 80ºS and 84ºN latitude. The UTM is a modified TM projection whereby the natural scale of the central meridian is scaled by a factor of 0.9996 to enable a wider area to be mapped with acceptable distortion. Each zone is six degrees of longitude in width with a half-degree of overlap within the adjoining zone and having a true origin at the intersection of the central meridian of that zone and the Equator.

Vector Data: Vector data uses points and straight lines (vectors) to describe features on, or characteristics of, the earth's surface. Vector data can also include polygons, which are areas enclosed by a number of vectors. To record additional information, data attributes can be attached to individual vector features.

WGS84: World Geodetic System 1984. A geocentric datum developed by the United States Department of Defense for use with GPS. For most practical purposes it is equivalent to GDA94.

COPYRIGHT AND LICENSING

COPYRIGHT AND OWNERSHIP OF DATA

In general terms, copyright is the exclusive right given to an author by the Copyright Act 1968 (and amended in 1980 and 1984) to reproduce, publish, perform, broadcast and adapt a work.

Geoscience Australia is the custodian of the copyright of the products it produces on behalf of the Australian Government, ie. the Commonwealth. Geoscience Australia does not give away copyright. Rather, it grants a right to use its products as specified in any application, ie, a licence.

In the case of all satellite image products, with the exception of Landsat products, the Satellite Operator holds the copyright of the imagery. However, Geoscience Australia is authorised to license the data on behalf of the Operator.

LICENSING

Rather than selling the actual data, Geoscience Australia sells a licence to use the data.

For most digital products this requires a signed licence agreement to be completed by the customer before a licence is granted. For some products, a licence is granted upon a gesture signifying agreement to the licence conditions, for example breaking the seal on a product or registering on the Internet.

Geoscience Australia Customer Support staff will be able to advise you on the requirement for individual products.

CONDITIONS OF USE OF DATA AND IMAGERY

Geoscience Australia supplies data products to customers under a licence. Copyright is retained in any data made available to another party, even if no licence fees or royalties are sought, and even if the other party is extended very liberal rights in the use of the data.

For example there is no licence fee for most products that can be downloaded from the Geoscience Australia Internet site. However, the Commonwealth still retains Copyright to the data and the users must abide by the conditions of the license which is provided as part of the download.

A copyright notice must accompany the distributed product. Full details of the conditions of use of Geoscience Australia data products are contained in the licence agreements.

EXCLUSION OF LIABILITY

Geoscience Australia gives no warranty regarding a product's accuracy, completeness, currency or suitability for any particular purpose. Geoscience Australia's liability for breach of any statutory warranty is limited to replacement of the product or refund of the purchase price. Geoscience Australia disclaims all other liability for all loss, damages, expense and costs incurred by any person as a result of relying on the information and data in the product.

COMMERCIAL APPLICATIONS

Geoscience Australia encourages the widest possible use of any material over which it administers copyright within the provisions of the Copyright Act.

Minimal restrictions apply to the value-adding or commercial use of fundamental spatial data (ref. Spatial Data Access and Pricing Policy, June 2001). The restrictions include completion of a licence and inclusion of a copyright notice with the distributed product as well as maintenance of distribution records which can be accessed by the Commonwealth.

Commercial use of data and map **products *not* included in the Spatial Data Access and Pricing Policy** will require a special licence. Information or requests for a commercial licence should be made to:

Geoscience Australia Copyright Officer
Geoscience Australia
GPO Box 378
Canberra ACT 2601
Tel: + 61 2 6249 9966
Fax: + 61 2 6249 9660
Email: copyright@ga.gov.au

Specific conditions apply to a commercial licence and they include payment of royalties. The royalty required will depend upon the recommended retail price of the publication or product, the size of the publication, the proportion of Geoscience Australia material in the product compared to its total size, the proposed production or print run, type of product and method of distribution or access to the value added product and other information which will enable the licence to be determined.

Geoscience Australia undertakes to give prompt consideration to all requests for use of Geoscience Australia copyright material. All requests are treated as strictly Commercial-in-Confidence.

VALUE-ADDED RESELLING OF DATA

Value-added reselling of data and map products not included in the Spatial Data Access and Pricing Policy is defined as the use of a Geoscience Australia product in the provision of another product or service to a third party whether or not a fee is charged for that service or product.

Value-added resellers (VAR's) are required to purchase a licence (at the normal list price) to use the data for a particular VAR application plus pay a royalty fee for each use of that data in the application.

Royalty payments are usually negotiated on a case by case basis.

For more information about value adding FREECALL 1800 800 173 and ask for VAR Enquiries or email: sales@ga.gov.au

REPLACEMENT AND REFUND GUARANTEE

Geoscience Australia is committed to providing quality products and services. In the unlikely event you are provided with a defective product, we guarantee to promptly provide either:

- a replacement, or
- a full refund.

A replacement or refund will be provided only where:

1. The product is returned within 30 days of purchase and includes the complete product (ie. all data, software, media, documentation and packaging) to Geoscience Australia or the place of purchase where the product has been purchased through Geoscience Australia's registered network of retailers. You may retain no copy of the product or anything derived from the product (Other conditions pertaining to termination, which are specified in the Licence Agreement, also apply).
2. Proof of purchase is provided with the returned product.
3. Geoscience Australia agrees the product is defective and has not been purposefully or wilfully damaged.
4. The product has been damaged during shipment.

Geoscience Australia will not replace or refund products where the product cannot be proven to be defective.

Published by Geoscience Australia,
Department of Industry, Tourism and Resources

Internet: www.ga.gov.au

Cnr Jerrabomberra Ave and Hindmarsh Drive
SYMONSTON ACT 2609
GPO Box 378
CANBERRA ACT 2601
ABN: 80 091 799 039
Tel Domestic 02 6249 9111
Tel International +61 2 6249 9111
Fax Domestic 02 6249 9999
Fax International +61 2 6249 9999

The prices set out or referred to herein are recommended prices only and there is no obligation to comply with the recommendations. Prices correct at time of publishing. Geoscience Australia reserves the right to changes prices at any time.

Geoscience Australia assumes no liability resulting from any statements, errors or omissions in this publication or from the use of the information contained in this catalogue.

Acknowledgements
The use of proprietary products in this catalogue is not an endorsement of the product.

- ARC/INFO is the registered trademark of Environmental Science Research Institute, Redlands, California, USA.
- ATLAS is the registered trademark of Strategic Mapping Inc, San Jose, California, USA.
- DXF is a trademark of Autodesk Inc.
- GINA is the registered trademark of GeoVision Inc of Ottawa, Canada.
- MapInfo is the registered trademark of MapInfo Corporation, New York, USA.
- MS-DOS is a registered trademark of Microsoft Corporation.

Satellite imagery is copyright,with this copyright vested in the respective satellite operator and/or the Commonwealth of Australia.

- Landsat images copyright Commonwealth of Australia.
- SPOT images copyright CNES.
- RADARSAT images copyright Canadian Space Agency.
- ERS images copyright ESA.