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New National ASTER maps show land surface mineralogy

The ASTER Geoscience Maps of Australia are the first public, web-accessible continental-scale maps of the Earth's land surface mineralogy. The maps have applications for mineral mapping and exploration, soil mapping, as well as environmental and agricultural management. These applications range from local (~1:25 000 scale) to continental scales and include:

- mapping the regolith, especially transported versus in situ materials
- recognising alteration mineral footprints
- locating productive soils, especially those that hold moisture and nutrients
- managing soil loss through dust and water erosion, especially exposed areas of mobile clays characterising water catchments, especially where rainfall will either recharge groundwater aquifers or add to surface run off
- cataloguing natural sources and sinks of carbon, such as carbonates in rocks and soils.

Japan's ASTER (Advanced Spaceborne Thermal Emission and Reflectance Radiometer) is an imaging instrument onboard NASA's Terra satellite which was launched in 1999. This space-platform is the first and to date only, operational satellite-borne system designed specifically for geoscience applications, namely the mapping of mineral groups such as clays, iron oxides and quartz. Key materials that can be identified include clays and magnesium/iron/aluminium oxyhydroxides, as well as information on mineral composition, abundance and physicochemistry. ASTER has now acquired over 2.23 million scenes (each covering an area 60 kilometres by 60 kilometres): enough to cover the Earth's land surface more then three times.

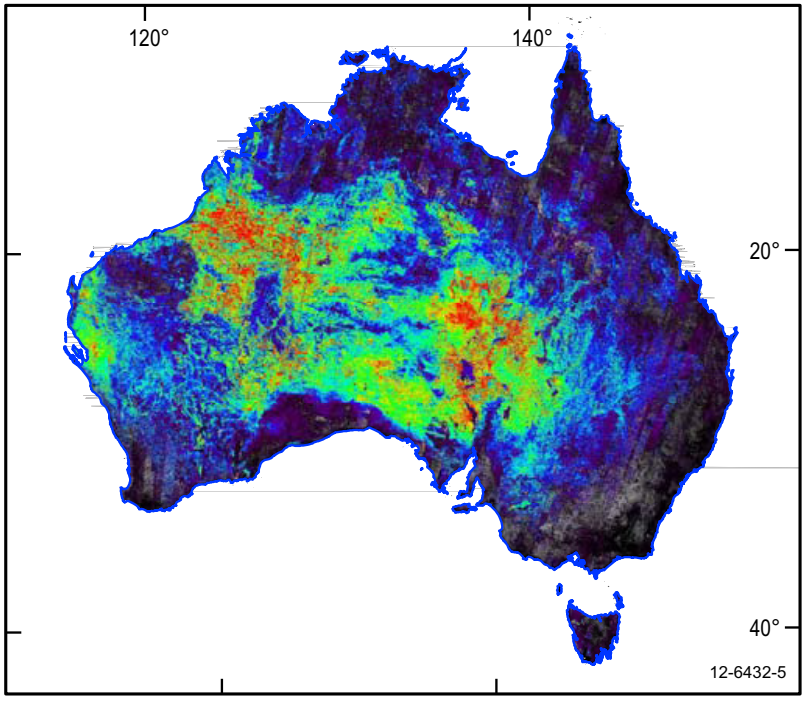

Figure 1. National ASTER map measuring the broad content of silicates. The red areas indicate a high content and the blue areas indicate a low content.

Approximately 3500 ASTER scenes across Australia were selected from an archive of over 35 000 scenes to produce the National ASTER mosaic. Seventeen GIS compatible geoscience products were generated from ASTER's 14 spectral bands in the visible, near-infrared, shortwave infrared and thermal infrared wavelength. Both the reflectance mosaics and the derived geoscience products were cross-calibrated and validated using hyperspectral imagery from the Hyperion sensor on NASA's EO-1 (Earth Observation) satellite.

The National ASTER project represents a successful collaborative Australian initiative, led by CSIRO's Western Australian Centre of Excellence for 3D Mineral Mapping and state, territory and Australian Government agencies, including Geoscience Australia, along with international partners in Japan and the United States.

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Related articles/websites

View the ASTER maps using World Wind
www.ga.gov.au/aster-viewer

View and download the ASTER maps
http://portal.auscope.org/portal/gmap.html or
http://c3dmm.csiro.au

Order ASTER maps on external hard drive from the GA Sales Centre
www.ga.gov.au/products-services/how-to-order-products/sales-centre.html

Order ASTER data
http://gds.aster.ersdac.jspacesystems.or.jp/gds_www2002/index_e.html

Learn more about the science behind ASTER
http://asterweb.jpl.nasa.gov

Learn more about the Australian ASTER Geoscience Initiative
http://c3dmm.csiro.au

For more information

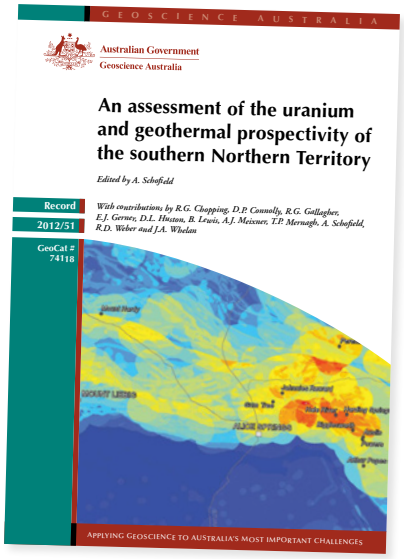
email ausgeomail@ga.gov.au

Northern Territory Energy Assessment

Geoscience Australia has recently released a report, together with associated maps and digital data, examining the uranium and geothermal energy potential of the southern Northern Territory. This report is the third investigation undertaken of its kind, with previous studies completed in northern Queensland and east-central South Australia.

Assessments for four uranium mineral systems were undertaken, including sandstone-hosted deposits and uranium-rich iron oxide-copper-gold mineralisation. This was done using existing data and a mineral systems approach which considered key questions related to mineralisation, such as the sources of metals and fluids, drivers for the flow of metal-bearing fluids and their pathways, and favourable uranium deposition sites. Although locations of known mineralisation were not used to identify prospective areas, the study successfully reproduced the location of recognised deposits and highlighted several areas prospective for previously unrecognised uranium systems, including a number of areas beneath recent sedimentary cover.

The potential for hot rock and hot sedimentary aquifer geothermal energy systems was also examined during the investigation. The analysis for geothermal systems was undertaken in a three-dimensional environment, with temperatures predicted at-depth using a range of geological, geochemical and geophysical inputs. Potential for hot rock geothermal energy systems was overall low to moderate in the study area. Geothermal energy from hot sedimentary aquifers was highest in the southeast of the study area, including moderate to high potential in the Pedirka Basin.



Related websites

An assessment of the uranium and geothermal prospectivity the southern Northern Territory
https://www.ga.gov.au/products/servlet/controller?event=GEOCAT_DETAILS&catno=74118

An assessment of the uranium and geothermal potential of north Queensland
https://www.ga.gov.au/products/servlet/controller?event=GEOCAT_DETAILS&catno=69711

An assessment of the uranium and geothermal prospectivity of east-central South Australia
www.ga.gov.au/products/servlet/controller?event=GEOCAT_DETAILS&catno=72666

For more information

email ausgeomail@ga.gov.au

New and updated Basin Lithostratigraphy charts for 2012

Geoscience Australia has just published four new and updated lithostratigraphic charts for Australian Basins.

These charts are available for free download from the

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Geoscience Australia website. These charts use the International Geological Time Scale and include updated local biozonation schemes, summaries of hydrocarbon shows, and comprehensive lithostratigraphic schemes developed by Geoscience Australia basin research projects, and local experts.

The new charts cover the Gippsland Basin, Perth Basin, offshore North Perth Basin and a revision of the 2009 Bight Basin lithostratigraphic chart. These charts add to the series published in 2010, and between them, cover most of the prospective basins in offshore Australia. Future work will include updating older charts to the 2012 International Geologic Time Scale standard, and extending coverage to include prospective onshore basins.

Related articles/websites

Basin Biozonation and Stratigraphy Charts 2012

www.ga.gov.au/products/servlet/controller?event=GEOCAT_DETAILS&catno=73734

Basin Biozonation and Stratigraphy Charts 2010

https://www.ga.gov.au/products/servlet/controller?event=GEOCAT_DETAILS&catno=70371

Geoscience Australia Biostratigraphy

www.ga.gov.au/energy/disciplines-techniques/biostratigraphy.html

For more information

email ausgeomail@ga.gov.au

New geophysical datasets released

Datasets from six new geophysical surveys have been released since June 2012.

Airborne Magnetic – Radiometric - Elevation Surveys

Survey	Date	1:250 000 Map Sheets	Line Spacing (m), terrain clearance (m), orientation	Line Km	Contractor
Murchison 2 (Perenjori)	October 2011 – April 2012	Yalgoo (pt), Perenjori (pt), Geraldton (pt), Dongara (pt).	200 m 50 m east – west	121 383	GPX Surveys Pty Ltd
South Officer 2 (Waigen – Mason)	June 2010 – November 2011	Lennis (pt), Waigen (pt), Wanna (pt), Mason (pt).	400 m 60 m north – south	113 000	Thomson Aviation Pty Ltd.
South West 2 (Corrigin)	January 2012 – June 2012	Pinjarra (pt), Corrigin (pt).	200 m 50 m east – west	113 956	GPX Surveys Pty Ltd
Perth Basin 1 (Perth Basin North)	June 2011 – July 2012	Ajana (pt), Geraldton (pt), Dongara (pt).	400 m 60 m east – west	95 161	Fugro Airborne Surveys Pty Ltd
South West 1 (Moora)	June 2011 – February 2012	Moora (pt), Perth (pt), Bencubbin (pt), Kellerberrin (pt).	200 m 50 m east – west	138 874	UTS Geophysics Pty Ltd
South West 3 (Collie)	March 2011 – January 2012	Collie (pt), Pemberton (pt).	200 m 50 m east – west	108 898	Fugro Airborne Surveys Pty Ltd

Related articles/websites

Geophysical Archive Data Delivery System (GADDS)

www.geoscience.gov.au/gadds

For more information

email ausgeomail@ga.gov.au

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Shaping a Nation: A Geology of Australia

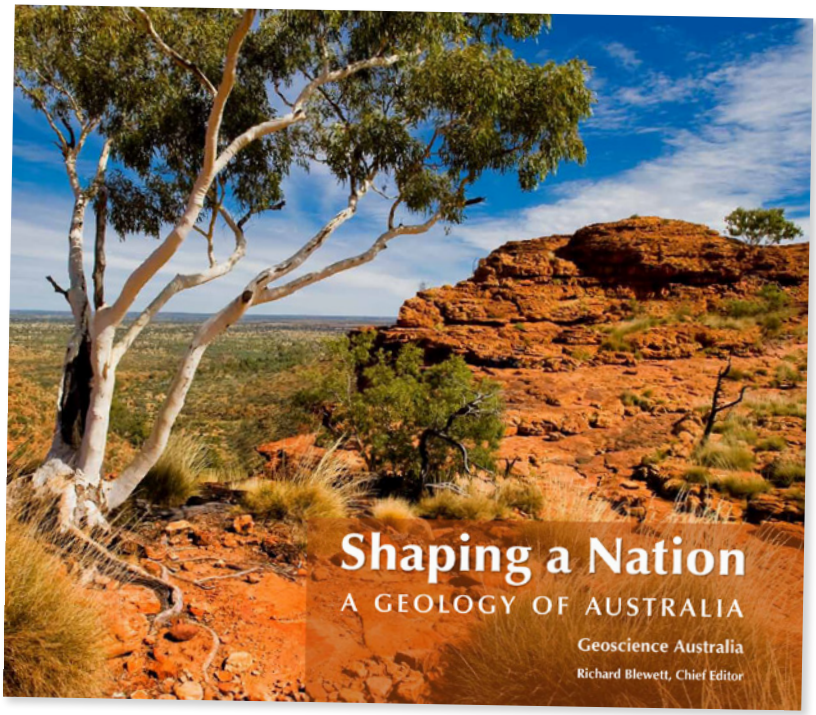
Shaping a Nation: A Geology of Australia is the story of a continent's geological evolution as seen through the lens of human impacts. Exploring the geology, resources and landscapes of Australia, the book reveals how these have helped to shape this nation's society, environment and wealth. Presented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

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

In presenting the latest geoscientific knowledge, *Shaping a Nation* is vividly illustrated by technical drawings and figures and accompanied by stunning photography that reveals the extraordinary beauty of Australia's geology and landscapes.

For the avid reader, an accompanying DVD hosts extensive appendices, including supplementary reading and reference material, maps, movies and an interactive 3D model showcasing many geoscience datasets.

Shaping a Nation: A Geology of Australia is published by the Commonwealth of Australia (Geoscience Australia) and ANU E Press. A free PDF version is available on the ANU E Press website.



Printed copies are available for $70.00 AUD incl GST (plus shipping), from the Geoscience Australia Sales Centre.

Related articles/websites

Shaping a Nation: A Geology of Australia

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

Geoscience Australia Sales Centre

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

ANU E Press

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

For more information

email ausgeomail@ga.gov.au

The geology of Uluṟu and Kata Tjuṯa uncovered

The spectacular shapes of Uluṟu and Kata Tjuṯa dominate the surrounding desert and are the product of geological events stretching over millions of years. These amazing geological features are the subject of *Uluṟu and Kata Tjuṯa: a geological guide* which was recently released by Geoscience Australia.

The book includes an authoritative account of the geological history of this World Heritage listed landscape as well as a guide for visitors seeking to explore and appreciate the scenic beauty and geological features of Uluṟu and Kata Tjuṯa.

The Aṉangu people, the traditional owners of Uluṟu-Kata Tjuṯa National Park who have occupied the area for thousands

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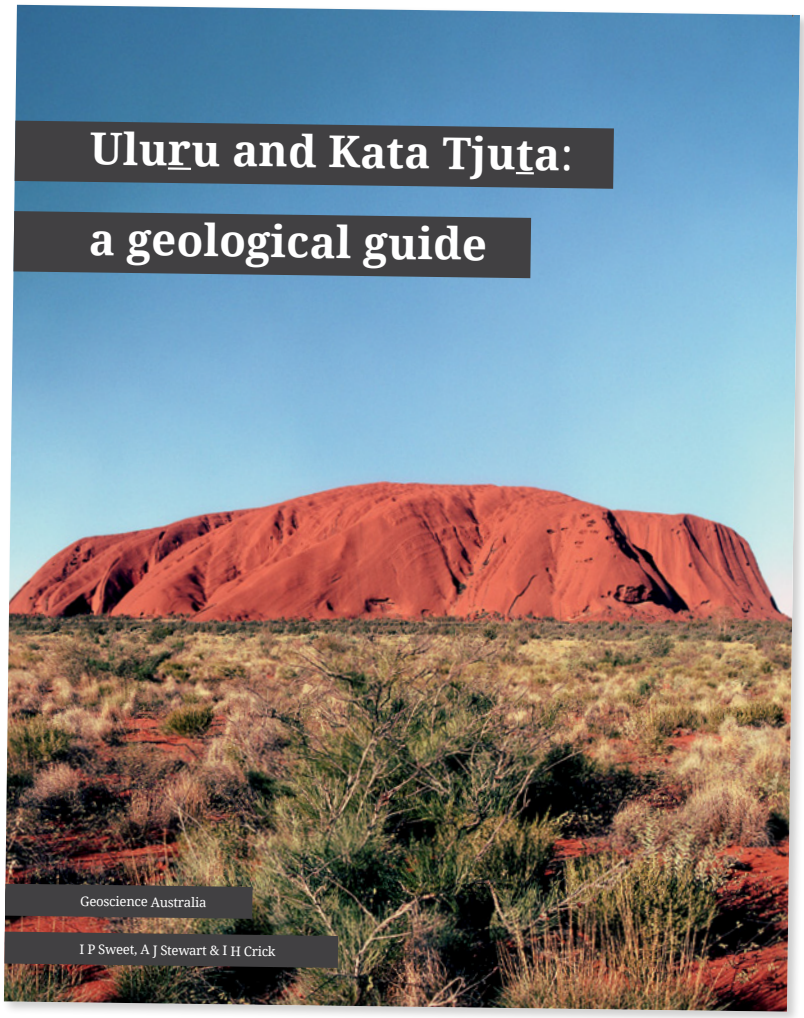
of years, have complex explanations for the landscape features which complement those provided by modern geological studies.

Uluṟu and Kata Tjuṯa are also amongst some of the oldest landforms on Earth. The rocks making up Uluṟu and Kata Tjuṯa have been dated at around 540 to 550 million years old. The stark outcrops we now see began to stand out as features in the landscape about 100 million years ago.



Geologically speaking, Uluṟu is just the exposed tip of a huge vertical body of rock otherwise known as an inselberg which is literally 'island mountain' or monolith. This rock extends far below the surrounding plain for between three and five kilometres.

The book includes many photographs highlighting the features that can be seen during a walking tour around Uluṟu and Kata Tjuṯa as well as a glossary of geological terms. It is available from the Geoscience Australia Sales Centre for $16.50 AUD incl GST (plus shipping).

Related articles/websites

Uluṟu and Kata Tjuṯa: a geological guide
https://www.ga.gov.au/products/servlet/controller?event=GEOCAT_DETAILS&catno=73105

Geoscience Australia Sales Centre
www.ga.gov.au/products-services/how-to-order-products/sales-centre.html

For more information

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