

New digital geological map of Australia

Seamless national baseline dataset released

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A new seamless, digital, surface geology dataset covering Australia at 1:1 million scale was released during simultaneous launches across the country on 16 December 2008 (figure 1). The map, which has fully integrated depiction of geological features across borders, will provide an invaluable baseline dataset for national and regional evaluation of resources as well as environmental management and land use decision-making.

The compilation of a seamless surface geology map of Australia at 1:1 000 000 scale commenced in 2001. Since then, more than twenty geologists, GIS technicians and stratigraphic indexers have combined their efforts to produce the most detailed, informative and consistent national geology coverage available (figure 2). The new data replaces the 1:2 500 000 scale digital map published by Geoscience Australia in 1998. The improved coverage in the new dataset is exemplified by an increase from 8 000 to 247 000 polygons, and the increase from 200 to around 5 900 described geological units in the new data.

In the past, geological information frequently failed to match up across jurisdictional boundaries because of differences in data acquisition methods and geological interpretations that could have been published decades apart. This national project was undertaken

with the full co-operation of the geological surveys of each Australian state and the Northern Territory who provided their most recent map data for the national compilation as well as their advice in resolving stratigraphic issues.

Initially, it was planned to compile the map from existing regional geological maps between 1:500 000 and 1:2 000 000 scale. However, it became apparent early in the project that these regional maps were usually fairly old (1970s and 1980s) and that the geological information on them was of poor quality considering the geological mapping programs undertaken by the federal, state and Northern Territory geological surveys in the last 20 years. Consequently, much of the new Australian geology dataset has been compiled from the most recent 1:250 000 scale mapping. In some areas where the 1:250 000 maps were out of date, the compilers used 1:100 000 or even 1:50 000 scale source maps. Although compiled from these detailed geological maps, the national data have been simplified for use at 1:1 000 000



Figure 1. Geoscience Australia CEO Neil Williams launching the new seamless geology of Australia dataset at Geoscience Australia on 16 December 2008.

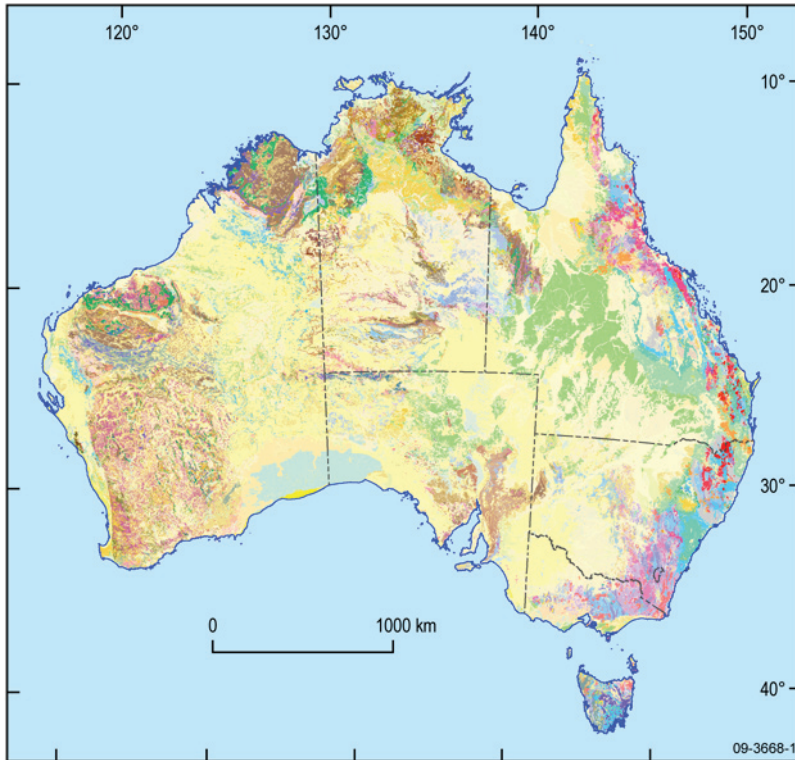


Figure 2. An overview of the new digital surface geology of Australia dataset.

scale and generally have a spatial accuracy of between 200 metres and one kilometre depending on the quality of the original source data.

An important and time-consuming task for the compilation team was matching the geological information between more than 400 source maps which could be up to 40 years apart in age. Considerable time had to be invested in resolving stratigraphic mismatches across map tile and jurisdictional boundaries. Sometimes satellite imagery and geophysical data, such as gamma-ray spectrometry and magnetics, were also used to resolve edge-matching discrepancies and to reposition poorly located geological data on the oldest maps.

The standardisation of unit classification and descriptions was particularly important for the unconsolidated regolith materials which cover a large proportion of the Australian continent. Regolith mapping has advanced considerably over the last few decades, particularly with the advent of remote sensing imagery. A simple standard scheme for regolith unit compilation, based largely on the classification of Grimes (1983), was used for the new national map.

The new dataset contains comprehensive descriptions of around 5900 lithostratigraphic units (figure 3). These unit descriptions include a unique stratigraphic name and number which provides a link to the Australian Stratigraphic Units Database, which is the authoritative repository of Australian geological unit descriptions.

Other digital attributes include a stratigraphic parent-child hierarchy, a text description of the unit, maximum and minimum ages, and lithological classifications. Faults and stratigraphic boundaries are also coded in the database. The dataset also includes comprehensive metadata describing the origins of the source data.

The new data are designed primarily as a digital tool for GIS applications. It is not planned to issue a printed map—a paper map of Australia at 1:1 000 000 scale would be almost 4 metres tall! The Australian geology data are also available to view on the OneGeology portal website. This international project aims to provide national scale geology data freely via the internet for users across the world using agreed international digital data standards. The data is currently displayed as a Web Map Service (WMS) with the national geological coverage of many other nations. Geoscience Australia will be moving towards providing the data as a Web Feature Service (WFS) using the GeoSciML data standard (GeoScience Markup Language; Simons et al 2008) in the near future.

The new 1:1 000 000 scale data is available for free download from the Geoscience Australia website in shapefile and ESRI export formats. The data is packaged for internet delivery

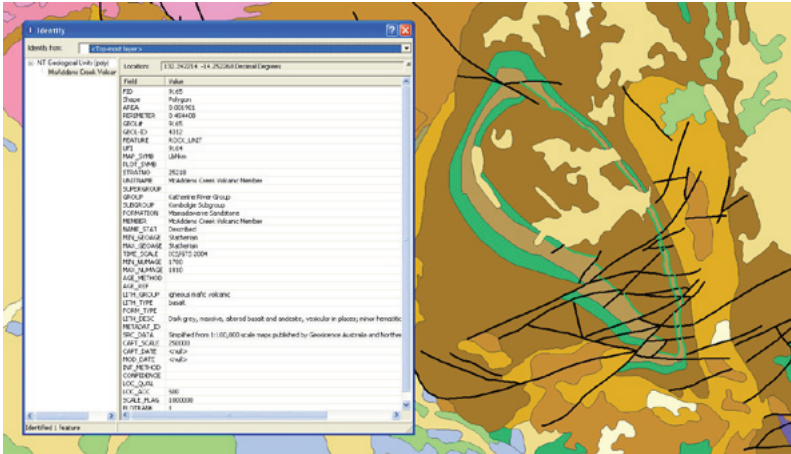


Figure 3. An example of attribute data for a geological unit in the 1:1 000 000 scale surface geology of Australia dataset.

in individual state and territory portions because of the large size of the whole-of-Australia dataset. The data can also be ordered on DVD from the Geoscience Australia Sales Centre. Individual state-wide portions of the national dataset were released as they were completed, commencing with Tasmania and Victoria in 2004. Updated editions of some of the previous releases (Tasmania, Victoria, New South Wales and Queensland) were released as compilation standards improved during the project.

For more information

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References

Grimes KG. 1983. Map presentation of morphostratigraphic units – a proposed standard. In Wilford GE (ed). *Regolith in Australia: Genesis and Economic Significance*. Bureau of Mineral Resources Record 1983/27.

Simons BA, Bellier C, Brodaric B, Cox SJD, Fusejima Y, Janjou D, Johnson BR, Laxton JL, Raymond O & Richard SM. 2008. *GeoSciML 2.1.0: Significant changes and additions to the CGI-IUGS geoscience data model*. Abstracts, 33rd International Geological Congress, Oslo.

Related websites/articles

- Surface geology of Australia 1:1 000 000 scale
www.ga.gov.au/minerals/research/national/nat_maps/nat_geol_maps.jsp
- Australian Stratigraphic Units Database
www.ga.gov.au/oracle/stratnames/index.jsp
- OneGeology portal website
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