Geological heritage of Australia: selecting the best for Geosites and World Heritage, and telling the story for geotourism and Geoparks.

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SUMMARY

Geological heritage in Australia includes fossil localities, stratigraphic exposures and mineral sites, and landforms such as those in our volcanic, coastal and desert regions. A proposed new inventory of Australian sites for UNESCO's Global Geosites program could assist with future selection of World Heritage sites, as well as local Geoparks.

With geotourism increasing in Australia, Geoparks provide a way to integrate geological heritage with botanical and zoological values, and cultural features such as local history, archaeology, art and music. The Volcanic Plains of Southeastern Australia could be one of Australia's first Geoparks, and help with the local growth of geotourism.

Key words: Geosites, inventory, World Heritage, geotourism, Geoparks, Australia

INTRODUCTION

Australia has a coastline around 32,000 km, with varying rock types and structure, coastal types and climates, and coastal sites form a significant part of the Australian catalogue. Major terrains include inland deserts (Simpson Desert dunefield), northern tropical savannah (Kakadu World Heritage Region), glacial and periglacial uplands in the south (Tasmania), broad inland riverine plains (Murray Basin), and the young volcanic province of southeastern Australia. There are also karst and cave sites (the Nullarbor Plain), and many palaeoweathering landforms in central Australia, as well as representative stratigraphic sites, rock and mineral sites, and structural and tectonic sites. Viewpoints are also important, and sites related to the history of geology (e.g. Charles Darwin and the Blue Mountains of NSW). Important fossil sites range from the Proterozoic stromatolites of the Pilbara of northwestern Australia to the World Heritage Tertiary mammal fossils of Riversleigh and Naracoorte.

A new inventory of geological and geomorphological sites planned for the continent of Australia will cover key sites and terrains on the Australian mainland, Tasmania, and Australian territories and islands. The inventory will be based on earlier listings by Cochrane & Joyce (1986), a short list prepared for GILGES & UNESCO in 1991, a later revised GILGES list, the Australian Heritage Commission's Register of the National Estate, and most recently Yeates' (2001a, b) review for the Australian Heritage Commission (AHC) of earlier work.

Figure 1. Devonian fossil fish beds outside the small town of Canowindra in New South Wales, which has an excellent Age of Fishes Museum (Photo E. B. Joyce).

GEOSITES

The Geosites program began in 1995 (Wimbledon 1996), and operated under the International Union of Geological Sciences (IUGS) until 2004 (Dingwall et al. 2005), with the aim of developing an international database based on a systematic inventory of the world's geological resources. The primary objective of the program was to provide a factual basis to support national and international initiatives to protect geological resources for research and education. An intended end-use of the database was also to provide advice to the IUGS, and other bodies such as UNESCO, on priorities for conservation of geological sites in a global context (Dingwall et al. 2005) and so the Geosites database was to be of potential benefit to the World Heritage Program. An IUGS Global Geosites Working Group (GGWG) was set up by the International Union of Geological Sciences.

Rather than using rigid classification systems, Geosites places emphasis on the development of *thematic frameworks* that enable sites to be selected as evidence of major geological events or processes, for example climate change, development of a volcanic province or an orogenic arc, Pleistocene glacial ice limits.

Any listing of Geosites in Australia must include the traditional fossil localities (Fig. 1), stratigraphic exposures,

geological structure, and rock and mineral localities, but also individual features and landforms such as those found in our volcanic, coastal and desert regions (Joyce, in press). More extensive landscapes which may contain a range of sites, features and landforms are also receiving attention as part of our geological heritage. Ecotourism in Australia is an important economic and educational form of tourism, and now includes geotourism, with its emphasis on landforms (Fig. 2), and the history of development of the landscape, as well as rocks, minerals, fossils, stratigraphy and structure. Recent government studies point to a growth in ecotourism and geotourism over the next few years.

GEOTOURISM

Geotourism is a relatively new term, and does not yet appear in dictionaries. It can be seen as an extension of tourism generally, and a part of ecotourism in particular. A working definition of geotourism could be "people going to a place to look at and learn about one or more aspects of geology and geomorphology".

The Australian government's recent Tourism White Paper discusses building niche markets as a priority, and geotourism would fit in that category. Geotourism might be seen as fitting into a similar niche to Indigenous Tourism (although in practice it can be difficult to present the two approaches together). An outcome of the White Paper has been the establishment of a National Tourism and Heritage Taskforce which has prepared a report "Going Places: Developing Natural and Cultural Heritage Tourism in Australia". Among the priorities given in the report is "Telling the Story – making heritage stories more effective in tourism".

A national government report on "Parks and Tourism: Pursuing Common Goals" examined National Parks and other protected areas of natural and cultural significance in Australia, and their relationships with the tourism industry. A Case Studies volume discussed access arrangements, infrastructure development, community-based conservation and indigenous (i.e. Aboriginal) development. The term "nature-based tourism" was used, suggesting the unfortunate but common emphasis in Australia on biology and environment, often to the exclusion of geology. However case studies discussed in the report, such as the Naracoorte Caves, Kakadu and the famous Twelve Apostles limestone rock stacks of the coastline Port Campbell National Park in Victoria (Fig. 2), indicate the scope for geotourism.

Australia has an unusual and extensive natural landscape which offers much to geotourists, whether local or from other countries. Tourism of geomorphological sites can be used in the future to harness the growing interest in environment and ecology, and educate the public in the story of the landscape. And at the same time geotourism can provide tourists with a better understanding of the whole environment, and by using links to cultural and historical aspects can better explain the place of humans in the landscape.

GEOPARKS

Geoparks is a new initiative supported by UNESCO which aims to identify nationally important geological sites, and lead to their use for local economic development, employment and geotourism. "As a logical extension to World Heritage List sites, UNESCO plans to launch Geoparks to increase international awareness of Earth Heritage sites" (Eder 1999). Geoparks will encompass one or more sites of scientific importance for geology, but often also sites of archaeological, ecological or cultural value; have a management plan that fosters sustainable geotourism and socio-economic development; provide a means of teaching geoscientific disciplines and broader environmental issues; and be part of a global network that demonstrates best practice in Earth heritage conservation and its integration into sustainable development strategies.

"Until recently, no international recognition of geological heritage sites of national or regional importance, and no international convention on geological heritage have existed. The initiative of UNESCO to support Geoparks responds to the strong need expressed by numerous countries for an international framework to enhance the value of the Earth heritage, its landscapes and geological formations, which are key witnesses to the history of life." (UNESCO 2006).

The concept of Geoparks has been sponsored by UNESCO since 1997 in Europe, and more recently in China. Geoparks provide a way to integrate geological heritage, especially landform and landscape, with other scientific values such as biology, and with cultural features such as local history, archaeology, art and music, and these may be expressed in museums displays, reserves, signboards, trails and so on, providing a comprehensive tourist attraction. The Volcanic Plains of Southeastern Australia provide an ideal area for an Australian Geopark, combining natural and cultural features into a tourist attraction, which can both educate the public, and provide assistance with promoting geological heritage management. "Geopark is a label attributed to an area where geological heritage sites are part of a holistic concept of protection, education and sustainable development" (UNESCO 2006).

In Australia the National Parks system is often a grouping of geological and geomorphological sites, landscapes and ecosystems to provide a convenient management area. The Australian Heritage Commission has developed a Themes approach to link heritage sites, for example "The onset of aridity in Australia" and "Young volcanicity and tectonics in an active Australian landscape". There is a need for new groupings of sites, and the concept of Geoparks could be usefully applied to such areas as the youthful Western Volcanic Plains of southeastern Australia, a closely settled agricultural region, and so not suitable for a National Park. Such new regions will have a role to play in future geotourism.

LISTINGS OF MAJOR GEOLOGICAL HERITAGE SITES (GEOSITES) FOR AUSTRALIA

A number of listings of Australian geological heritage sites have been prepared over the last twenty years.

1. In 1986 a summary based on the work of the Geological Society of Australia (GSA) at State levels was prepared for the AHC by Cochrane & Joyce (1986). This was the first report to list sites of International and National Significance for all of Australia, with 76 International sites.

2. In 1991 a list of 28 Australian geological sites of possible World Heritage significance was prepared for the UNESCO GILGES meeting in Paris in February 1991. Following discussion at that meeting, a revised list of 26 sites for Australia was published (see comments in Joyce, in press).

3. The Australian Heritage Commission commissioned an independent review of geological heritage sites in Australia, and provided from its resources a list of sites to be investigated. A two volume report was prepared, listing, describing and evaluating sites of possible International and National significance. The first volume covered 198 Australian rock and landform sites (Yeates 2001a), and a companion volume (Yeates 2001b) provided a similar assessment for 150 fossil sites.

4. The current World Heritage Area list for Australia (Environment Australia website) shows 16 properties of which twelve are major geological sites.

CONCLUSIONS

A new inventory of Geosites for the continent of Australia is proposed, based on an early listing by Cochrane & Joyce (1986), a list prepared for UNESCO in 1991, and a review for the Australian Heritage Commission by Yeates (2001a, b). Geosites will be described and evaluated using the methodology developed for the AHC by the GSA, which includes a modern geomorphological and landscape approach (see discussion in Joyce, in press). In this study only sites of International significance will be considered.

This new inventory is part of a process in which interested parties will be consulted to help define framework elements for Australian Geosites. The Geological Society of Australia and the Australian Heritage Commission have been the main bodies concerned with geological heritage in the past, and some thirty reports have been prepared by the GSA, covering sites in most parts of Australia. Many of these sites are listed on the Register of the National Estate. Groups to be consulted include the national government's geological survey, state government geological surveys and departments of environment and conservation, including the active forestry groups in Tasmania, and the national government's World Heritage section. The new inventory and thematic frameworks will help lead to a final selection of Geosites for Australia.

A web site has been set up through the Geological Society of Australia (Victoria Division) which will be used to provide the background to the proposed study, give details of the consultation process with interested parties, and also maintain a listing of geological heritage sites, updated from time to time, which eventually will lead to an agreed inventory of Geosites of Australia. The URL is: http://vic.gsa.org.au/geosites.htm

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Figure 2a & b. The famous Twelve Apostles rock stacks developed in Tertiary marine limestone, Port Campbell National Park, western Victoria, with active coastal erosion illustrated with before and after photos taken seconds apart at 9.16 am on 3rd July 2005 (Photos Parks Victoria).

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