



**Geological Society of Australia (Victoria Division) and University of Melbourne
Media release – embargoed until 5am AEST, Monday 22 September 2008**

Australian scientists in major international discovery: ancient giant underwater reef found in outback Australia

In what is a major international discovery, three Australian scientists have located the upturned remnants of what was once a giant underwater reef – with an escarpment ten times higher than the Great Barrier Reef – in the Northern Flinders Ranges in outback South Australia.

The reef is about 650 million years old and is the only known reef complex of this age anywhere in the world. The next closest aged series of reefs found to-date are around 800 million years old and located in Arctic Canada.

And while they are yet to confirm it scientifically, the scientists – Mr Jonathan Giddings, Associate Professor Malcolm Wallace and Ms Estee Woon from the School of Earth Sciences at the University of Melbourne – believe that peculiar fossils of possible multi-cellular organisms found in the reef could be the earliest examples of primitive animal life discovered to-date.

Associate Professor Wallace, Mr Giddings and Ms Woon will describe their discovery to fellow scientists at the Geological Society of Australia's (Victoria Division) national Selwyn Symposium 2008, in Melbourne this Thursday.

Their discovery is particularly significant because the reef existed for 5-10 million years during a period of tropical climate squeezed between two major ice age events (the so-called 'Snowball Earth' events) where ice was present even at equatorial latitudes.

This extreme climate change from ice age to tropical conditions and back to ice age occurred approximately 750-550 million years ago (hundreds of millions of years before dinosaurs roamed the Earth) and is one of the most tumultuous climatic periods of Earth's history. It is a particularly intriguing period because it also coincided with the sudden and widespread appearance of very early primitive lifeforms.

"This reef is an internationally significant discovery because it provides a significant step forward in showing the extent of climate change in Earth's past and the evolution of ancient reef complexes – and it also contains fossils which may be of the earliest known primitive animals" Mr Giddings said.

"There is a good chance that the new fossils and organisms found in the reef will provide significant insight into the evolution of early multi-cellular life. It could prove that life took more complex forms much earlier in history than we previously thought.

"For these reasons, the discovery is already attracting significant interest from leading scientists around the world.

"A lot of people will be intrigued as to why this once underwater reef is now located in a very barren part of inland Australia. At this stage in Earth's history, the eastern coast of Australia extended north from where the Flinders Ranges now lie. The eastern part of the Australian continent, from the Flinders Ranges through to the current eastern seaboard, was still buried under the ocean.

"With the movement over millions of years of Australia's tectonic plates, the reef has now been turned 90 degrees skywards from its once horizontal position (a bit like turning the current Great Barrier Reef on its end). This has exposed the whole 1 kilometre depth of the reef, from what was once its shallow water section right down to its deep water section.

"In effect, these tectonic forces have resulted in very ancient history being pushed up to the present. Today's advances in satellite imagery are also helping us to see the reef very easily. Geologists had seen this mass before but had not really recognised it as once being a reef."

Associate Professor Wallace said: "The fact that the reef is exposed at ground level also makes it very easy for scientists to see what important geological history the reef holds – information that otherwise would need to be uncovered by expensive and invasive drilling techniques."

"The section of the reef showing at ground level is around 20 kilometres wide, demonstrating just how big this ancient reef was. This whole section can be driven or walked along, which makes it extremely easy for scientists to travel back through the reef's 5-10 million year history – in the space of minutes if you are driving."

"Unlike the Great Barrier Reef, this reef was not made by coral. It was instead constructed by microbial organisms and other more complex organisms that have not been previously discovered. And in terms of height, the reef escarpment would have been 1100 metres at its highest point (making this escarpment ten times higher than the Great Barrier Reef escarpment)."

"The giveaway it is a reef is that there's a large mass of carbonate which forms when organisms have grown together in a complex framework."

"From a climate change point of view, this reef provides an important record of what was happening in the ocean 650 million years ago. The chemistry of the reef and other sediments forming in the ocean at the same time show the ocean was poorly mixed, and this may have had an effect on Earth's climate at that time by allowing carbon to be trapped in the ocean's depths."

"Our main work now will be to undertake further analysis of the fossils and organisms we have found, to determine just what type and stage of lifeform they represent."

The scientists are referring to the reef as Oodnaminta Reef, given it is located near an old hut called Oodnaminta Hut. The Flinders Ranges are among a very small number of scientific sites worldwide renowned for the window they provide on Earth's ancient past.

Request to media: Please mention in any article / interview that the reef discovery is being outlined at the Geological Society of Australia's (Victoria Division) Selwyn Symposium 2008, at the University of Melbourne this Thursday. Promotion of the symposium – and the free public lecture which follows it that evening – would also be appreciated. **Please note that the reef discovery is being outlined at the symposium, not the public lecture.** Please find further details below.

Images are available of the ancient reef – please contact Jonathan Giddings on the number below.

Media interviews: Now available with Associate Professor Malcolm Wallace (tel: 03 9457 4479 hm or 03 8344 6526 wk) and Jonathan Giddings (0414 775 841). Interviews about the Selwyn Symposium and Lecture are available with Associate Professor Stephen Gallagher (0400 099 273).

Media contact: Patrick Daley (Patrick Daley Public Relations) on 0408 004 890.

Details about the Selwyn Symposium and Lecture 2008

(Both the symposium and lecture are free to media)

Geological Society of Australia (Victoria Division) Selwyn Symposium 2008

Neoproterozoic extreme climates and the origin of early life

Thursday 25 September 2008, 9am (registration from 8am)

Fritz-Loewe Theatre, McCoy Building, Earth Sciences, University of Melbourne,
(cnr Elgin & Swanston Streets)

Further information at www.vic.gsa.org.au/Selwyn/symposium.htm.

Geological Society of Australia (Victoria Division) Selwyn Lecture 2008 – free public lecture

The greenhouse effect, sea-level change, continental drift and the discovery of the glacial theory of Pleistocene ice ages – Professor Paul Hoffman, Harvard University

Thursday 25 September 2008, 6:30pm

* includes presentation of the Geological Society of Australia (Victoria Division) Selwyn Medal 2008 *

Copland Theatre, University of Melbourne

Further information at www.vic.gsa.org.au/Selwyn/symposium.htm.