



# Media Release

25 July 2006  
Ref: 06/134

## Jenolan Caves 340 million years old: study

Cave-dating research published by Australian geologists has found that the Jenolan Caves, in central NSW, are the world's oldest discovered open caves.

In a study published in the June issue of the *Australian Journal of Earth Sciences* (Vol. 53, 377-405), scientists from CSIRO, the University of Sydney and the Australian Museum – in cooperation with the Jenolan Caves Trust – have shown that the limestone caves, which attract thousands of tourists each year, date back more than 340 million years.

Until 20 years ago most scientists thought the Jenolan Caves were no more than a few thousand years old. In 1999 geologists estimated that the caves might be between 90 and 100 million years old.

Dr Armstrong Osborne, a senior lecturer at the University of Sydney, has long suspected that the caves are older than had been widely recognised, but says he was surprised to find they dated back to the Carboniferous (290 to 354 million years ago).

"We've shown that these caves are hundreds of millions of years older than any reported date for an open cave anywhere in the world," Dr Osborne says.

"Even in geological terms, 340 million years is a very long time. To put it into context, the Blue Mountains began to form 100 million years ago; dinosaurs became extinct 65 million years ago, and Tasmania was joined to the mainland as recently as 10,000 years ago.

"Most people were convinced that caves were quite young, and those of us who thought they were really old couldn't find any evidence. But no one imagined that they would be more than 300 million years old. This was totally off the planet."

The study used clay-dating methods that CSIRO's Petroleum Resources division developed to help oil exploration companies find oil deposits. The technique is a variation of conventional potassium-argon dating, which can calculate the age of minerals by measuring levels of decay caused by radioactive potassium.

CSIRO Petroleum Resources researcher Dr Horst Zwingmann says the age of the caves was determined by dating the clay minerals that crystallised when volcanic ash entered the caves, and which now forms much of the mud in the Temple of Baal and Orient caves.

"We were able to provide evidence that the clays did form *in-situ* in the caves and that the sections regularly visited by tourists actually formed in the Carboniferous," Dr Zwingmann says.

"This study shows how industry-focused research techniques can also be used to solve more general geological mysteries."

The Australian Museum carried out initial studies using X-ray diffraction and scanning electron microscope imaging to identify clay minerals and their properties to see if they were suitable for dating.

**Images are available from CSIRO Media Liaison – Ph: 02 6276 6406.**

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