Unearthing the history of the Naracoorte Caves

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(Phys.org) —Flinders University researcher Amy Macken has discovered the age of sedimentary layers in the Naracoorte Caves using a cutting-edge computer modelling technique that has never before been used on an Australian fossil site.

As part of her PhD, Ms Macken studied two fossil sites – Wet Cave and

Blanche Cave – located within South Australia's Naracoorte Caves World Heritage Area to determine the age of the deposits, thereby providing greater clarity on climatic changes and mammal communities in the region.

While the traditional method for dating archaeological and paleontological materials, known as radiocarbon dating, provided estimated age ranges for the two sites overall, Ms Macken said there were numerous information gaps on the age of the individual sedimentary layers.

"The caves are within 400 metres of each other and there was some pre-existing evidence that showed they were of similar age but the multiple layers within the sites were not well documented," Ms Macken, based in the School of Biological Sciences, said.

"I took all the information that was available on both the age of the sites and the characteristics of the sedimentary layers and used a new statistical modelling technique – one that has never been applied to an Australian fossil site before – to make predictions on how old parts of the deposits were that we didn't have dates for," she said.

"For example, the modelling showed one layer in Wet Cave was 18,000 to 16,000 years old so I did the same test in Blanche Cave to see if any of its layers were the same age."

Ms Macken said the overarching aim of her research was to understand if and how the community of small mammals living within the region of the caves changed through the last glacial cycle (50,000 to 10,000 years ago).

"The reason the modelling was so important was because it provided a foundation for testing whether the fauna characteristics in one site were

mimicked in the other site. To do that I had to make sure I was comparing layers of the same age.

"There were lots of gaps in the pre-existing data that we couldn't resolve so the modelling provided a means of statistically filling that knowledge gap and providing a more robust picture."

Besides embarking on an Australian-first study, Ms Macken said a highlight of the project was the opportunity to work with researchers from the Oxford Radiocarbon Accelerator Unit at Oxford University in the UK.

"For me it was a wonderful project to be involved with because I was not only working with my supervisor here at Flinders who is a world-leading palaeontologist but researchers on the other side of the world," she said.

More information: Amy C. Macken, Richard A. Staff, Elizabeth H. Reed, Bayesian age-depth modelling of Late Quaternary deposits from Wet and Blanche Caves, Naracoorte, South Australia: A framework for comparative faunal analyses, *Quaternary Geochronology*, Volume 17, June 2013, Pages 26-43, ISSN 1871-1014, dx.doi.org/10.1016/j.quageo.2013.03.001.

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