

Geological relics point to Nullarbor climate shift

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"The pocket" and small caves of one of the pocket valleys on the Hampton Scarp. Credit: Matej Lipar

People travelling across the Nullarbor Plain nowadays would be used to the region's arid nature but it may surprise some to learn that climate conditions along the Nullarbor were exactly the opposite approximately 3-5 million years ago.

La Trobe University researcher Dr Matej Lipar and Anton Melik Geographical Institute researcher Dr Mateja Ferik came to this conclusion after spending three years walking hundreds of kilometres along Nullarbor escarpments searching for clues about the region's ancient hydrological history.

Their efforts bore fruit in the form of discovering 140 pocket valleys along the Hampton and Wylie scarps of the Nullarbor.

Pocket valleys are small steep-headed valleys formed by ancient underground water flows reaching an escarpment, pouring out of the underground system usually via a cave and then undermining the escarpment edge.

"We discovered the first real proof of pocket valley existence almost by accident" Dr Lipar says.

"We were sitting on an escarpment when we saw what looked like limestone rock but it was composed of big horizontally laminated crystals, showing that the rock had been originally formed in a cave—this was flowstone".

Flowstone—sedimentary rock deposited by flowing water—at the head of a valley is one of the key indicators for a pocket valley as it shows its relationship to ancient caves and consequently indicate a wetter climate.



A cave and flowstone deposit within the pocket valley on the Hampton Scarp.
Credit: Matej Lipar

They also discovered sediments (alluvial fans) deposited at the base of the valleys by ancient high rainfall events during progressively drier climate as well as a calcrete layer on top of the sediment, suggesting the region became increasingly arid until the present day.

"We can tell by dating the flowstone when the Nullarbor was much more humid than today," Dr Lipar says.

"The flowstone dating produced an average age of 3.6 million years which correlates well with other studies of stalagmites in the Nullarbor."



"The pocket" of one of the pocket valleys on the Wylie Scarp. Credit: Matej Lipar

While the sediments found at the base of the [valleys](#) were washed out of caves from high rainfall events which happened about one million years ago.

"The wash outs happen in a dryer period in which sporadic high rainfall events occur, so we can see about a million years ago the climate was becoming similar to the current climate, semi-arid with occasional high rainfall events," Dr Lipar says.

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