

What Antarctica's past reveals about future climate

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Bella Duncan is researching Antarctica's past climate between 25 million and four million years ago, which includes the Miocene and Pliocene geological epochs.

"I cover a big range of time, during which Antarctica went through some pretty massive changes in the behaviour of its ice sheets," she says. "These were times when the ice sheets were often smaller and more dynamic than today."

To work out what was happening many millions of years ago, Bella measures samples taken from Antarctica which contain biomarkers—fossilised molecules of once-living material—which she then analyses to reconstruct past climates.

"I'm trying to find out temperatures, get information about hydrological cycles and establish what vegetation was present—these things help to inform us about potential future thresholds in the climate system with current [climate change](#)."

Bella says the history of Antarctica's climate is enlightening. "What happens in Antarctica has a massive impact on the rest of the world, especially in terms of things like sea level, and it also plays a big role in ocean circulation and general climate. If we can establish what was happening with Antarctica's climate in the past then that can tell us quite a lot about what the global climate was doing at that time also—for example, if there was ice in Antarctica then the global climate would have to have been cool enough to allow that."

Going back 20 million years, Bella says Antarctica would still be recognisable. "Geographically, Antarctica hasn't changed too much since that time. There would have usually been less ice, particularly in West Antarctica which would have often just had small ice caps on islands surrounded by ocean, and it would have been warmer. There also would have been vegetation ranging from tundra to southern beech trees."

Bella's research has seen her travel to the [ice](#) to gather samples. She also works with materials gathered by other researchers from different parts of Antarctica, which gives her a greater chronological and geographical range.

Bella was selected for the Scientific Committee on Antarctic Research (SCAR) fellowship, which gave her the opportunity to study at

Birmingham University, where she was able to process her samples in a laboratory. There is currently no facility in New Zealand to do that kind of testing, so she is hoping to establish a laboratory here in the future.

Bella says because Antarctica is such a useful gauge of [global climate](#), it's of vital importance to gather data from the past. "There's a lot of interest in trying to work out what might happen globally over the next few centuries," she says. "The only way you can predict that is through modelling, so you need good data to do that as accurately as possible."

Provided by Victoria University

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