in Toronto, Canada, had asked Wiley to retract the paper because of the potential for abuse of facial-recognition technology, and the "racial overtones of the authors' language". One of the paper's co-authors is affiliated with Curtin University in Perth, Australia, which this month also requested that Wiley review the paper.

A spokesperson for Wiley said that the publisher was now re-evaluating the paper, following an initial review that found the journal had followed the existing guidelines.

In their September letter, the researchers noted that, according to guidelines laid down by the Committee on Publication Ethics, a London-based publisher-advisory body, papers can be rejected on ethical grounds even if they come with approvals from an ethics committee (as the Wiley paper did). The guidelines also say that journals should take special care when the research is conducted on "vulnerable groups", which Springer Nature has emphasized in its latest editorial policies.

Widespread concerns

There are numerous papers that report the use of biometric technology to study Uyghur and other minority ethnic groups in China. Moreau wrote in his opinion article that he had identified 40 articles co-authored by members of the Chinese police in 3 leading forensic-genetics journals — published by Springer Nature and by Elsevier — that describe the DNA profiling of Tibetans and people from Muslim minorities. A spokesperson for Elsevier said that the company is producing more comprehensive guidelines for the publication of genetic data, but that it was "unable to control the potential misuse of population data articles" by third parties after publication.

Springer Nature also said that it would tighten its oversight of the academic-conference proceedings that it publishes. Journalists have previously raised concerns about numerous conference papers that describe studying Uyghur groups, including manuscripts from a biometrics conference held in Xinjiang in 2018 that Springer Nature published as a book[5].

The Institute of Electrical and Electronics Engineers (IEEE) has also published conference proceedings describing facial-recognition analyses in Uyghur populations (see, for example, refs 6 and 7). "IEEE is committed to reviewing our policies to ensure more consistent application of this process across the full range of IEEE publications," IEEE president and chief executive José Moura wrote in an e-mail.

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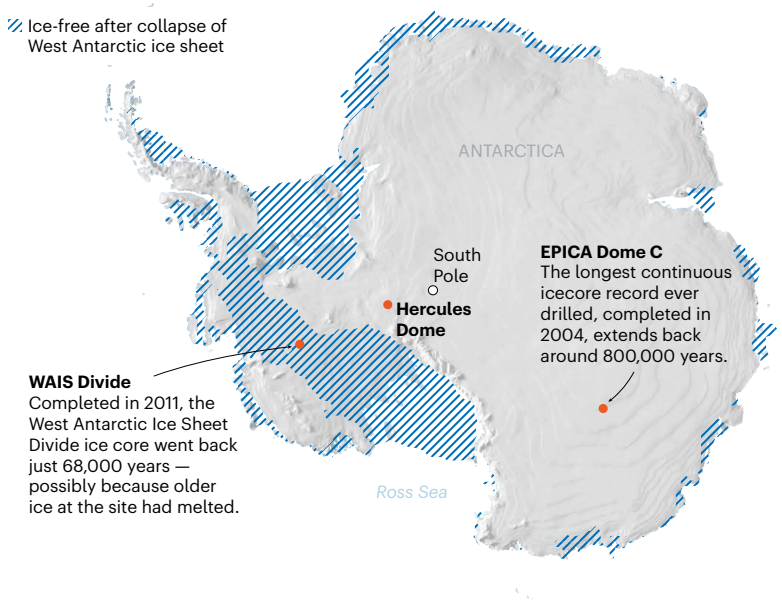
CLIMATE CLUES

The ice at Hercules Dome could help scientists confirm whether the West Antarctic ice sheet collapsed 130,000 years ago. That could help them assess the threat of a similar collapse in the coming centuries.



THE HUNT FOR ICE THAT WITNESSED WEST ANTARCTICA'S COLLAPSE

Ice at Hercules Dome site could reveal how susceptible the region is to warming.

By Jeff Tollefson

Sometime this month, scientists in Antarctica plan to start up their snowmobiles and begin radar surveys of a thick ridge of ice called Hercules Dome. The dome — which sits 400 kilometres from the South Pole, between East and West Antarctica — could provide crucial clues to the future of the continent's vast ice sheet.

The surveys are intended to guide the drilling of the United States' next deep ice core. Glaciologists hope to retrieve a detailed climate record of a period 116,000 to 130,000 years ago, when temperatures as little as 1 °C warmer than today's are thought to have driven the collapse of the ice covering West Antarctica.

A better understanding of what happened then could help scientists to predict the behaviour of West Antarctica as climate change intensifies. The pace at which the region's glaciers are flowing to the sea has increased in recent years, and many scientists fear that rising temperatures have triggered runaway melting. West Antarctica's ice contains enough water to raise sea levels by more than 3 metres.

"If the West Antarctic ice sheet collapsed, Hercules Dome would basically be waterfront property," says Eric Steig, a glaciologist at the University of Washington in Seattle who is leading the project. He is hopeful that scientists will be able to see the signal of the region's long-ago collapse in ice from the dome.

The US National Science Foundation (NSF) has given Steig and his colleagues nearly US$630,000 to conduct radar surveys of ice depth and structure across Hercules Dome. That work started in January. The $1.5-million drilling project could begin as soon as 2022, pending the agency's approval.

"There may well be ice that is two million years old at the bottom. I wouldn't be surprised."

"The Hercules structure will have served as witness to what the atmosphere and what the oceans were doing when the West Antarctic ice sheet collapsed," says Mary Albert, a glaciologist at Dartmouth College in Hanover, New Hampshire, and head of the US Ice Drilling

Program, which advises the NSF.

Bad weather and unexpectedly rough terrain made it difficult to land the NSF's Hercules cargo plane at Hercules Dome last year, limiting scientists' ability to conduct radar surveys. Nonetheless, the University of Washington team managed to identify two potential drilling sites where the depth of the ice ranges from 1.6 to 2.8 kilometres, says glaciologist Knut Christianson, who is leading the radar surveys.

This year, he and his colleagues plan to spend around 30 days collecting data — helped along by a newly groomed ice runway. Christianson's team is looking for ice that is solidly frozen all the way to Antarctic bedrock. That increases the odds that the researchers can recover air bubbles trapped in the oldest layers of snow and ice, which accumulated while Earth was cycling through ice ages.

These air bubbles can reveal how the levels of greenhouse gases, trace gases and aerosols in the atmosphere changed from decade to decade, helping researchers to reconstruct past climate. Data from ancient ice at Hercules Dome could help to reveal whether the West Antarctic ice sheet was intact 115,000 to 130,000 years ago, during a brief interlude between ice ages.

There is evidence that sea levels during that period were up to 9 metres higher than today's — a phenomenon that Steig says is hard to explain without the loss of West Antarctica's ice. But hard evidence for the ice sheet's collapse has been tough to come by.

A view of Antarctica's vast ice sheet.

MARIO TAMA/GETTY

Cold case

Glaciologists had hoped to capture that ancient warm period in an ice core that they finished drilling in West Antarctica in 2011 (see 'Climate clues'). But the core they extracted dated back only 68,000 years, possibly because the older ice had melted away. Models suggest there is little or no melting in the deepest ice layers at Hercules Dome, which are likely to be at least 150,000 years old.

"There may well be ice that is two million years old at the bottom," Steig says. "I wouldn't be surprised." But it's not clear how much information scientists can extract from such ancient, and often very compressed, ice.

One of the biggest questions at Hercules Dome is how the weather there changed when the climate warmed 130,000 years ago, says Jeffrey Severinghaus, a palaeoclimatologist at the Scripps Institution of Oceanography in La Jolla, California. Climate models suggest that the collapse of West Antarctica's ice changed air circulation across the region, creating stormier conditions at Hercules Dome.

Severinghaus's research has shown that the prevalence of isotopes of krypton and other trace gases deposited in ice varies with atmospheric pressure. This suggests that scientists should be able to see evidence of storms in ice from Hercules Dome.

Drilling there could provide an unprecedented opportunity to determine what happened during a crucial period of Antarctica's history, Severinghaus says. "This is a good analogue," he adds, "for where humanity is headed right now."