

C has begun a long decline that will inevitably end in its total collapse. How soon that could come after the iceberg breaks off is an open question.

The effects of a collapse could be felt far beyond Antarctica. The glaciers that flow into Larsen C contain enough water to raise the global sea level by about a centimetre — and they are likely to flow faster to the ocean in the absence of an ice shelf. In comparison, global sea levels are rising by about 3 millimetres a year, and a recent study estimated that one-third of that comes from ice loss in Antarctica and Greenland³.

Satellite images show that Larsen C has been receding since the 1980s, and radar measurements suggest that its ice is thinning, Rignot says. Scientists have also seen meltwater ponds forming on the ice shelf's surface⁴; similar ponds probably hastened the disintegration of Larsen B by carving holes in the ice and expanding cracks.

The ice sheet is protected, to some degree, from rapid collapse by favourable sea-floor geometry. A pair of underwater ridges that surround Larsen C create friction that slows the flow of ice to the ocean.

Still, the parallels with Larsen B's decline are striking, says Adrian Luckman, a glaciologist at Swansea University, UK, who heads a team that has monitored the Larsen C ice crack for several years. Larsen B experienced a major iceberg-calving event in 1995, followed by gradual retreat and then complete collapse seven years later. Larsen C may follow a similar pattern, he says, although it's not clear how soon collapse might follow the imminent calving event.

For now, researchers are anxiously watching the expanding ice rift. Chris Borstad, a geophysicist at the University Centre in Svalbard, Norway, is particularly interested in Larsen C's 'suture zones' — areas where glacial ice flows off land and merges. The ice is softer in these areas, which are often held together by ice that freezes from below.

Dozens of significant cracks run into one of these zones on Larsen C, and then stop, he says. The current crack was among them, but it somehow broke through in 2014 and has continued to expand ever since. It's not clear why the crack made it through the soft ice, and whether other rifts will follow suit in the coming years.

"We don't know why, but there's something very effective about these boundaries for stopping cracks, and that may be the key," Borstad says. "To answer that question, we really need to get out there into the field." ■

1. Rignot, E. *et al. Geophys. Res. Lett.* **31**, L18401 (2004).
2. Scambos, T. A., Bohlander, J. A., Shuman, C. A. & Skvarca, P. *Geophys. Res. Lett.* **31**, L18402 (2004).
3. Forsberg, R., Sørensen, L. S. & Simonsen, S. B. *Surv. Geophys.* **38**, 89–104 (2017).
4. Luckman, A. *et al. Antarct. Sci.* **26**, 625–635 (2014).

POLICY

Science-adviser delay boosts Brexit worries

Policy experts want science input on post-Brexit decisions.

BY DANIEL CRESSEY

Two government departments charged with managing the United Kingdom's departure from the European Union have not yet appointed chief scientific advisers (CSAs) — and might not do so. That is starting to concern science-policy experts, who worry that scientists won't be at the table when the government makes key decisions on issues such as environmental protection and membership of international collaborations.

The United Kingdom has for years embraced the CSA model, in which highly qualified researchers are appointed to senior advisory roles and embedded in government departments. But neither the Department for Exiting the European Union (DExEU) nor the Department for International Trade (DIT), both of which were created after the United Kingdom's decision to leave the EU, has yet appointed, or committed to appointing, a CSA.

Last October, government ministers told a hearing of the House of Commons science select committee that DExEU was recruiting for a CSA, but this statement was later withdrawn. Then, in a letter sent to the committee on 3 February, a DExEU minister Robin Walker said that the department is still considering whether it needs a CSA.

The letter came in response to questions from the select committee, whose chair, Stephen Metcalfe, is concerned about a lack of scientific advice in DExEU. "I can't really understand why there is such resistance to appointing a CSA," he says.

Metcalfe has also raised concerns about the broader CSA system. On 9 February, his committee sent a letter to the government's CSA, Mark Walport, who leads the network of departmental CSAs and is supported by the Government Office for Science. The letter notes the absence of CSAs in at least six departments; the apparent impending absence in a seventh; and confusion over the role in an eighth.

Science-policy experts are paying close attention. "When you've got a lot of jobs lying vacant, when you've got really quite a lot of departments saying they don't have a CSA and don't have plans to have one, that really does start to raise questions about whether or not the government has reduced the emphasis it places on scientific advice," says Graeme

Reid, a science-policy researcher at University College London.

The letter from Metcalfe's committee calls on the government CSA — either Walport, who recently accepted a major new role overseeing UK research funding, or his replacement — to bring the system back to full strength. The Office for Science says that it will reply to Metcalfe's criticisms soon, and that the UK system for scientific advice is "internationally recognized" and "not just strong in its breadth across government but also in its depth".

But Reid and Mike Galsworthy, programme director of the group Scientists for EU, which was set up to campaign against Brexit, say that the lack of a CSA at DExEU might already have affected how the government handled its January announcement that the United Kingdom would leave the European Atomic Energy Community (Euratom).

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That could jeopardize UK participation in the world's largest fusion experiment, the International Thermonuclear Experimental Reactor (ITER) in southern France, and curtail operations at the Joint European Torus (JET), a nuclear-fusion facility in Culham, UK.

The disclosure, which shocked physicists, was made in brief notes published alongside a parliamentary bill on Brexit. "The Euratom fiasco is a clear case of where some science person in the core Brexit team could have averted the sudden crisis of confidence from the science community," says Galsworthy.

Reid is particularly concerned about getting a CSA at the DIT, which will be responsible for negotiating international trade deals after Brexit. These deals can determine, for example, the patents given to different drug types, levels of environmental protection or how genetically modified organisms are regulated. "All the substance of a trade agreement is underpinned by scientific detail," says Reid. "That's why it's so important the Department for International Trade has a chief scientific adviser."

DExEU declined to elaborate on whether it plans to appoint a CSA. The DIT has said that it is working with Walport and his office to "provide advice on the specification for any such role". ■