

# Larsen ice crack continues to open up

By Jonathan Amos

BBC Science Correspondent

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## New crack in one of Antarctica's biggest ice shelves could mean a major break is near

By Chelsea Harvey

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The Larsen C ice rift is about 180km long. Photo / Nasa

Another branch has appeared in a huge crack on one of Antarctica's largest ice shelves, and scientists fear it's only a matter of time before a massive chunk -- potentially containing up to 5200sq km of ice -- breaks away. If this happens, the ice shelf may become increasingly unstable and could even fall apart.

Scientists have been closely monitoring the Larsen C ice shelf, located on the east coast of the Antarctic Peninsula, where a large rift in the ice -- now about 180km long -- has been advancing in

rapid bursts in recent years. Between the beginning of December and the middle of January alone, the crack lengthened by about 27km. And since 2011, it has grown by about 80km.

Over the past few months, scientists have noticed that the crack has stopped extending in length but has continued to widen at a rate of more than a metre a day. It's already more than 300m wide.

And now, scientists have noticed a worrying development: A new branch has split off from the main rift, about 10km below the tip of the original crack, and has splintered off in the direction of the ocean. The new branch is about 15km long. Altogether, only about 20km of ice now stands in the way of the whole chunk splitting off into the sea.

Researchers from Project Midas, a British-based Antarctic research project based at Swansea University and Aberystwyth University, observed the new crack in satellite images on May 1.

The biggest concern is not whether the chunk will break off -- that seems to be inevitable at this point -- but what will happen after it does. The break will sweep away about 10 per cent of the ice shelf's total area, and scientists have previously speculated that the shelf will become increasingly unstable after this point.

"We have previously shown that the new configuration will be less stable than it was before the rift, and that Larsen C may eventually follow the example of its neighbour Larsen B, which disintegrated in 2002 following a similar rift-induced calving event," Swansea University professor Adrian Luckman, a leader at Project Midas, said in a statement.

Larsen B was a nearby ice shelf that came to a sudden and dramatic end in 2002 after particularly warm Antarctic summers that caused the ice to melt and splinter. Ultimately, more than 3100sq km

of ice collapsed over the course of just one month. Another neighbour, Larsen A, collapsed in 1995.

The collapse of Larsen C, should it occur, has the potential to unleash enough ice to raise sea levels by, at most, about a centimetre.

The ice shelf itself -- which can be thought of as a kind of floating ledge jutting out from the edge of the continent -- is resting on the surface of the ocean and wouldn't contribute to any sea-level rise by itself, if it were to break off.

But ice shelves generally serve as a kind of stopper at the edges of glaciers, stabilising and containing all the ice behind them. When they break, they have the potential to unleash a flood of ice from the continent that can significantly contribute to rising sea levels.

Whether this is what happens at Larsen C remains to be seen. While researchers have explored several possible scenarios for the ice shelf's future, its ultimate fate may still depend on a number of factors. Some scientists have expressed scepticism about how serious the consequences of a break might end up being.

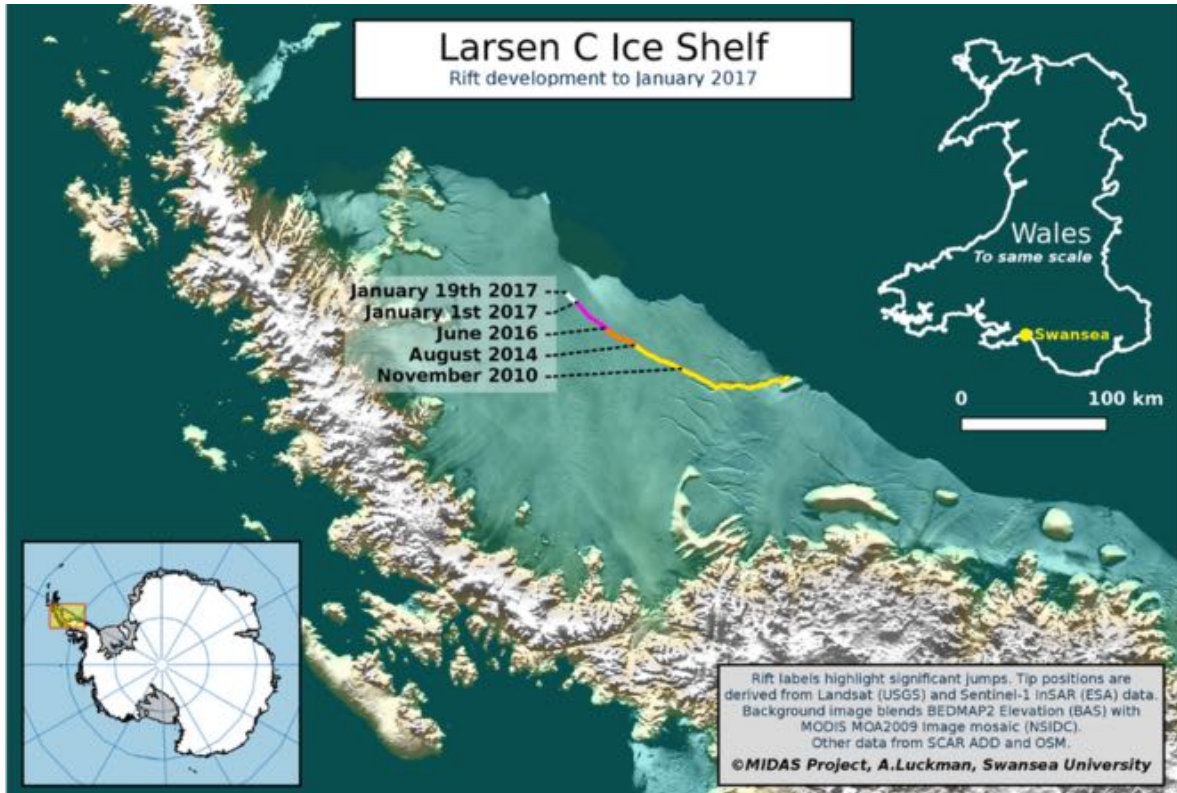
One recent study points out that the key question is whether the ice that's lost from the shelf will be "passive ice", which doesn't play a significant role in holding back the flow of the glacier behind it, or whether the break will remove ice from a critical stabilising zone, unleashing a flood of ice.

For now, continued close monitoring will be the key. In January, some scientists speculated that a calving event could occur within a year -- meaning it may not be long before the region's destiny becomes clear. In any case, Luckman noted in his statement that the event, when it happens, is likely to "fundamentally change

the landscape of the Antarctic Peninsula".

- **Washington Post**

By Chelsea Harvey



**The crack that looks set to spawn a giant iceberg in the Antarctic has continued to spread.**

The rift in the Larsen C Ice Shelf has grown a further 10km since 1 January.

If the rift propagates just 20km more, it will free a tabular berg one-quarter the size of Wales.

That would make it one of the biggest icebergs ever recorded, according to researchers at Swansea and Aberystwyth universities, and the British Antarctic Survey.

News of the lengthening crack in the 350m-thick floating ice shelf on the eastern side of the Antarctic Peninsula comes from the EU's Sentinel-1 satellite system.

Comprising two spacecraft, this orbiting capability can continuously monitor Larsen C no matter what the weather is doing because its radar sensors see through cloud.

Their data indicates the fissure now extends for some 195km. But just how long it will take before the 5,000 sq km block finally breaks free is anyone's guess, says Swansea's Prof Adrian Luckman.

"The rift tip has just entered a new area of softer ice, which will slow its progress," he told BBC News.

"Although you might expect any extension to hasten the point of calving, it actually

remains impossible to predict when it will break because the fracture process is so complex.

"My feeling is that this new development suggests something will happen within weeks to months, but there is an outside chance that further growth will be slow for longer than that.

"Sometimes rift growth is triggered by ocean swell originating elsewhere, which is also hard to predict."



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NASA

Image caption

Images taken in November last year illustrate the scale of the rift

When the berg splits away, interest will centre on how the breakage will affect the remaining shelf structure.

The Larsen B Ice Shelf further to the north famously shattered following a similar large calving event in 2002.

The issue is important because floating ice shelves ordinarily act as a buttress to the glaciers flowing off the land behind them.

In the case of Larsen B, those glaciers subsequently sped up in the absence of the shelf. And it is the land ice - not the floating ice in a shelf - that adds to sea level rise.

If Larsen C were to go the same way it would continue a trend across the Antarctic Peninsula.

In recent decades, a dozen major ice shelves have disintegrated, significantly retreated or lost substantial volume - including Prince Gustav Channel, Larsen Inlet, Larsen A, Larsen B, Wordie, Muller, Jones Channel, and Wilkins.

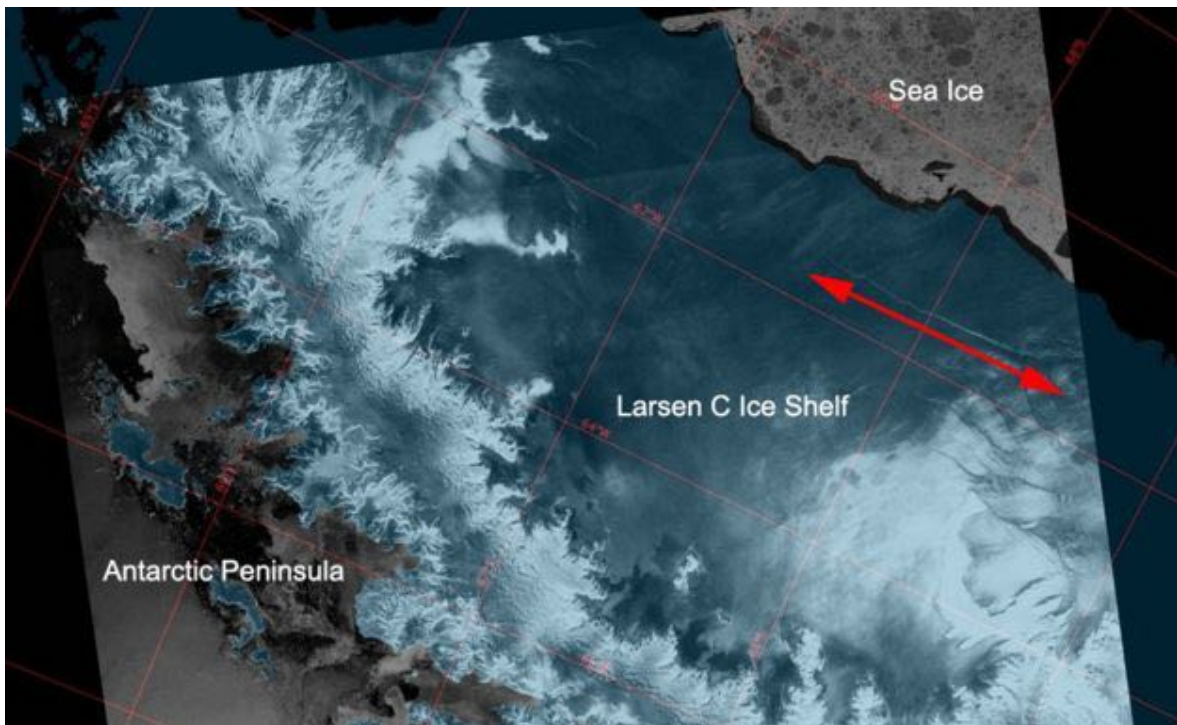


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Image caption

How the rift appeared to Sentinel-1 at the beginning of the month

Another development to watch will be the behaviour of the free floating berg, and its progress away from the Antarctic.

"Sea ice in the region circulates clockwise with the Weddell Gyre, rather than remaining in one place, and icebergs can be carried with this, sometimes out into the Southern Ocean," explained Prof Luckman.

"It all rather depends on how soon the iceberg breaks up, and how the iceberg draft compares with ocean depths.

"Ocean depths are not perfectly known in the region precisely because the near continuous ice cover makes ship operations difficult."

Many of the big tabular bergs produced in this region of the Antarctic get swept up in currents that **eventually take them north towards the British overseas territory of South Georgia.**

There, they can be caught in shallow waters to gradually wither away.

This ocean conveyor is the same one exploited by Ernest Shackleton to get his crew to safety when their ship, the Endurance, was crushed in thick sea-ice in the Weddell Sea in 1916.



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Image caption

The remnants of many such bergs end up at South Georgia