

Antarctic ice sheet is an 'awakened giant'

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- Jenny Hogan, Exeter

The massive west Antarctic ice sheet, previously assumed to be stable, is starting to collapse, scientists warned on Tuesday.

Antarctica contains more than 90% of the world's ice, and the loss of any significant part of it would cause a substantial sea level rise. Scientists used to view Antarctica as a "slumbering giant", said Chris Rapley, from the British Antarctic Survey, but now he sees it as an "awakened giant".

Rapley presented measurements of the ice sheet at a major climate conference in Exeter, UK. Glaciers on the Antarctic peninsula, which protrudes from the continent to the north, were already known to be retreating. But the data Rapley presented show that glaciers within the much larger west Antarctic Ice sheet are also starting to disappear.

If the ice on the peninsula melts entirely it will raise global sea levels by 0.3 metres, and the west Antarctic ice sheet contains enough water to contribute metres more. The last report of the Intergovernmental Panel on Climate Change, published in 2001, said that collapse of this ice sheet was unlikely during the 21st century. That may now need to be reassessed, Rapley warned.

Cork from a bottle

Changes on the peninsula, where 75% of the 400 mountain glaciers are in retreat, have provided new insights into the ways that ice sheets may disintegrate.

In March 2002, a huge floating ice shelf known as Larsen B shattered into icebergs. This turned out to have an effect akin to pulling a cork from a bottle. With Larsen B no longer impeding movement, the ice floes that fed the shelf began moving faster towards the sea and started to thin. The finding took scientists by surprise when revealed in September 2004 and now modellers are now working to include such mechanisms in their predictions.

Climate records derived from the analysis of sediments show that ice shelves off the peninsula have been absent in several earlier eras, when natural variability warmed the world. But the break-up is affecting ice closer to the pole than ever recorded, said Rapley. "It's like the Heineken effect," he said, referring to the beer adverts that claim Heineken "reaches the parts other beers cannot reach".

Indications that climate change may be affecting the west Antarctic ice sheet comes from three glaciers, including Pine Island and Thwaites. Data reveal they are losing more ice - mainly through the calving of icebergs - than is being replaced by snowfall. According to a preliminary analysis, the difference between the mass lost and mass replaced is about 60%.

Whether the loss of mass by the glaciers is due to natural variation or is caused by human-influenced warming of the oceans is not known for sure.

Scientists are now making more field measurements to assess the causes, but warming is a likely culprit, said Rapley: "The fact that three of them are simultaneously accelerating suggests that is the case." The melting of these three glaciers alone is contributing an estimated 0.24 millimetres per year to sea level.