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Antarctic ice melt could push sea levels to rise 1.5 metres by 2100

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14/02/2020



Melting Antarctic ice could cause sea levels to rise 58 centimetres by the end of the century under a worst-case climate scenario, an increase three times bigger than the world saw in the 20th century from all sources.

Adding other sources of sea level rise as the world warms, including Greenland ice melt and global [water expansion](#), and seas could climb about 1.5 metres by 2100, according to researchers.

“Antarctica is potentially the biggest contributor [to sea level rise] and 58 centimetres is so far the highest number we’ve got,” says Anders Levermann at the Potsdam Institute for Climate Impact Research in Germany, who led an international team modelling future melting of ice shelves.

“We know sea level is going to consume eventually a number of coastal cities and regions we hold dear. That will likely be in a few hundred years. What we show here is this could come earlier than we thought,” says Levermann.

His team combined 16 ice sheet models – up from just three in a similar exercise six years ago – with uncertainties in how the world will warm in response to carbon emissions, and how ocean currents will transport heat to the Southern Ocean.

The group found that if carbon emissions go largely unchecked and temperatures rise by almost

5°C by 2100, [Antarctica](#) would have a more than 90 per cent likelihood of causing sea level rise between 6 and 58 centimetres by the end of the century. The median was 17 centimetres.

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This analysis assumed ice in Antarctica retreats in a linear fashion, rather than in ways that accelerate the collapse, such as the creation of [unstable ice cliffs](#). As such, the projections could be an underestimate.

Andy Smith at the British Antarctic Survey, who wasn't involved in the research, says the new projections seem reasonable, when considered with previous findings.

"If we really get 58 centimetres from Antarctica then it's very likely we get 1.5 metres [in total]," he adds.

Levermann says the upper estimate is a "significant increase" on the 37 centimetres of sea level rise he modelled in 2014, a calculation based on the high-emissions scenario known as RCP8.5.

Asked if a worst-case scenario of a 5°C warmer world was unrealistically bad, as some climate scientists have argued recently, he said recent trends in global carbon emissions indicate it is still possible. "We are far from being able to say RCP8.5 won't happen."

If the world acts and keeps warming below 2°C as the Paris climate deal requires, then it is very likely the range of sea level rise will be between 4 and 37 centimetres. "This is another wake-up call to get to zero emissions," says Levermann.