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Sea level rise by 2100 'below 2m'

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Thames Barrier in the evening

A revamp of the Thames Barrier is likely as sea levels rise

Sea levels globally are very unlikely to rise by more than 2m (7ft) this century, scientists conclude.

Major increases would have to be fuelled by a faster flow of glaciers on the Greenland or Antarctic ice sheets.

But writing in the journal *Science*, a US team concludes that a rise of 2m would need glaciers to reach speeds that are "physically untenable".

However, even increases substantially less than 2m would cause major issues for many societies, they say.

"Even a sea level rise of 20cm (8in) in a century will have quite dramatic implications," said Shad O'Neel from the US Geological Survey (USGS).

Woe betide any government that thinks a 2m rise in sea level isn't something to take notice of

Dr David Vaughan
British Antarctic Survey

"This work is in no way meant to undermine the seriousness of climate change, and sea level rise is something we're going to have to deal with," he told BBC News.

Al Gore's documentary *An Inconvenient Truth* received some criticism for implying that a rise of 20ft (6m) was possible in the near future, although it did not give a definite timeframe.

By contrast, this latest research tallies broadly with the conclusions of other groups that have examined the question using different approaches.

Fast work

In its landmark assessment of climate change published last year, the Intergovernmental Panel on Climate Change (IPCC) concluded that sea level rise would probably fit in the range between 28 and 43cm over the century, although 59cm was a possibility.

The current rate is about 3mm per year.

But the IPCC specifically excluded the mechanism able to produce the biggest amounts of water quickly - acceleration in the flow of ice from the Greenland and Antarctic ice sheets, the world's two major ice masses that would between them raise sea levels by about 70m if they completely melted.

Most of the ice comes off in glaciers. Scientists know that many of the glaciers have accelerated in recent years - some quite spectacularly. The Jakobshavn glacier in Greenland, for example, doubled its speed in six years to about 12km per year.

Antarctic glacier



The acceleration of glaciers is not well understood

But the processes involved are poorly understood, and the IPCC concluded that on that basis it would be unreasonable to draw any conclusions about how far the acceleration might go.

Individual scientists, however, have not be so coy. The team behind the current research looked at what we do know about Greenlandic and Antarctic glaciers, about the rates of flow and the factors that might prevent acceleration.

"We don't really know a speed limit for glaciers," said Dr O'Neel, "but we can look at what we have today and ask 'what would happen if they all behaved like Jakobshavn?'

"It's been going fast for several years now and hasn't gone another marked increase in speed. Helheim had a brief period at 14km per year, Columbia at nine or 10; so that kind of figure, in the region of 10km/year, seems to be about as fast as it gets."

To achieve a 2m sea level rise by 2100, by contrast, every Greenland glacier would

have to increase its flow rate to at least 27km per year and remain at that velocity for the rest of the century.

'Scary' scenario

Antarctica is rather different. The West Antarctic Ice Sheet rests on rock that is mainly below sea level, meaning that warming seas could increase the rate of ice loss, though again the new analysis suggests this is also very unlikely to result in a catastrophic melt during this century.

David Vaughan from the British Antarctic Survey believes the US team has got its figures about right.

"The point is that whatever happens in this century can only start from present conditions and present rates of sea level rise, and that constrains the rise that can occur this century," he told BBC News.

"However, if you're looking further ahead than 2100 - and many governments are, including the Netherlands and the UK which are thinking about infrastructure that would last more than 100 years - then that second century still looks quite scary.

"I certainly don't disagree with them that we shouldn't be making outlandish statements about sea level rise, and some outlandish statements have been made; but the high end of the estimates here is still about 2m, and woe betide any government that thinks a 2m rise in sea level isn't something to take notice of."