

Sea levels 'rising faster than predicted'

Climate-change figures since 1990 offer test of IPCC projections.

Michael Hopkin



Rising tide: data from the last 16 years shows a surge in sea levels.

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Climate factors such as sea-level rise may be changing more rapidly than predicted, according to a new survey of global trends since 1990. The figures suggest that the Intergovernmental Panel on Climate Change (IPCC), which publishes a fresh assessment of climate change tomorrow, may have previously underestimated the changes that lie ahead.

Researchers led by Stefan Rahmstorf of the Potsdam Institute for Climate Impact Research in Germany studied the most recent data for atmospheric carbon dioxide, global temperatures and sea level. They calculate that carbon dioxide levels are rising in line with predictions, but that temperatures are rising in line with the upper limit predicted by the IPCC, and that sea-level rises are on the very edge of the worst-case predictions of climate models.

Satellite data show that, since the early 1990s, sea levels have been rising by an average of 3.3 millimetres per year. The IPCC's Third Assessment Report, published in 2001, predicted that the annual rise was likely to be around 2 millimetres.

Global average temperatures have risen by 0.33 °C since 1990, which is towards the upper limit of the IPCC's predictions of the rate of global warming. The rise in carbon dioxide levels in the atmosphere has almost exactly followed its predicted trajectory.

Looking back

"We wanted to compile and document the most recent climate observations, mainly with those in mind who claim that the IPCC has been exaggerating the climate problem. The data so far suggest that this is simply not the case. If anything, the IPCC has been conservative," Rahmstorf says.

The IPCC's projections used data to chart possible climate trends starting from 1990. Rahmstorf and his colleagues have now looked at the 16 years of subsequent data (from 1990 to 2006) to see whether those climate predictions are coming true. The results are published in *Science*¹.

Rahmstorf and his colleagues calculate that sea-level rise over the past 20 years has been 25% faster than for any other 20-year period for more than a century. But they accept that this could be due simply to natural variations over decadal timescales. "Sea-level rise has been tracking along the uppermost limit for 16 years now, but it could still be decadal variability, so we don't predict that this will continue," Rahmstorf says.

Another study published last month² suggests that sea-level rises during the twentieth century were indeed very variable. According to calculations by Simon Holgate of the Proudman Oceanographic Laboratory in Liverpool, UK, sea levels rose by an average of more than 2 millimetres per year in the first half of the century, but by less than 1.5 millimetres per year on average in the latter half.

John Christy, a climate-change researcher at the University of Alabama in Huntsville, says the data do not span a meaningful length of time. "You don't make climate judgements based on a 16-year period, and you don't do it in a 16-year period in which the largest volcano eruption in modern times occurred," he says. The huge eruption of Mount Pinatubo in 1991 spewed out a fog of dust that cooled the world until 1993. Temperatures then bounced back at a faster rate than would otherwise have occurred, he argues.

It remains to be seen whether this week's release of the IPCC's Fourth Assessment Report will contain elevated predictions of sea-level rise. "IPCC experts are well aware of those data," Rahmstorf says.

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References

1. Rahmstorf S., *et al.* *Science*, doi:10.1126/science.1136843 (2007).
2. Holgate S. J., *et al.* *Geophys. Res. Lett.*, doi:10.1029/2006GL028492 (2007).