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Sea levels rising twice as fast as predicted

By Michael McCarthy, Environment Editor

Melting ice sheets in Greenland and Antarctica force UN scientists to issue dramatic warning

Sea levels are predicted to rise twice as fast as was forecast by the United Nations only two years ago, threatening hundreds of millions of people with catastrophe, scientists said yesterday in a dramatic new warning about climate change. Rapidly melting ice sheets in Greenland and Antarctica are likely to push up sea levels by a metre or more by 2100, swamping coastal cities and obliterating the living space of 600 million people who live in deltas, low-lying areas and small island states.

Low-lying countries with increasing populations, such as Bangladesh, Burma and Egypt, could see large parts of their surface areas vanish. Experts in Bangladesh estimate that a one-metre rise in sea levels would swamp 17 per cent of the country's land mass. Pacific islands such as Tuvalu, where 12,000 people live just a few feet above sea level, and the Maldives, would face complete obliteration.

Even Britain could face real challenges in lower-lying areas along the east coast, from Lincolnshire to the Thames estuary, with a much greater risk of catastrophic "storm surges" such as the great flood of 1953 that killed 307 people.

Yesterday's urgent wake-up call to governments about global warming – telling them the data on which they are basing their official advice is flawed – came from four scientists from the US, Australia, France and Germany, who gave a press conference at a scientific meeting on climate change in Copenhagen, Denmark.

Professor Konrad Steffen, from the University of Colorado, Dr John Church, of the Centre for Australian Weather and Climate Research in Tasmania, Dr Eric Rignot, of Nasa's jet propulsion laboratory in Pasadena, and Professor Stefan Rahmsdorf, from the Potsdam Institute for Climate Impact Research, are all experts in sea-level rise. Their views represent the mainstream opinion of researchers in the field, taking account of the most recent data.

Only two years ago, the UN's Intergovernmental Panel on Climate Change (IPCC) said in its Fourth Assessment Report, or AR4, that the worst-case prediction for global sea-level rise was 59cm by 2100. But the scientists in Copenhagen suggested that the 2007 report was a drastic underestimation of the problem, and that oceans were likely to rise twice as fast.

Yesterday's meeting was a scientific overture to the global conference on climate change, which takes place in the Danish capital in December. The four researchers underlined how critical it is that world leaders act to slash the emission of carbon dioxide and other greenhouse gases from industry and transport which are causing the atmosphere to overheat.

Advance negotiations begin in three weeks in Bonn. On pages 20 and 21, we illustrate in detail just how great the task is, profiling the main emitters of CO₂ and what they are doing – or not doing – to cut back. Yesterday's alarm call was clearly intended to inject more urgency into the process.

Rising sea levels are caused by the thermal expansion of the ocean – where water increases in volume as it warms. But although the melting of ice already floating in the sea does not add to the level, because it is already displacing its own mass, melting into the sea of land-based ice most definitely does.

It is the accelerated melting of the vast, land-based ice sheets in Greenland and Antarctica, caused by rapidly rising temperatures at high latitudes, which is now speeding up the increase beyond anything previously forecast. The

Greenland ice sheet, in particular, is not simply melting but melting "dynamically" – that is, it is collapsing in parts as meltwater seeps down through crevices and speeds up its disintegration. Critically, the four scientists said, this process was not taken into account in the AR4 report, leading to estimates of sea-level increase which were far too low.

They revealed remarkable figures showing just how fast it is now happening. Professor Steffen said Greenland was losing 200 to 300 cubic-kilometres of ice into the sea each year – about the same amount as all the ice in Arctic Europe. This on its own is causing the global sea level to rise by more than a millimetre a year, he added, whereas a decade ago Greenland's contribution to sea level rise was non-existent.

Dr Church said that the most recent satellite and in situ data showed seas were now rising by more than 3mm a year – more than 50 per cent faster than the average for the 20th century.

"As a result of improved estimates of the observed rise, the thermal expansion, the melting of the glaciers and of the ice sheets, we now have a much better quantitative understanding of why sea level is rising," he said. "Without significant, urgent and sustained emissions reductions, we will cross a threshold which will lead to continuing sea level rise of metres."

Professor Steffen added: "What we have learnt in the past three or four years is that the ice dynamic is much stronger than the models indicated, and the prediction has to be revised up to a metre or more – which is enormous if you look at the impact."

Britain's Environment Agency was apparently unique when it discarded the IPCC's 2007 advice as flawed. Based on its own estimates, it is planning flood defences for 2100 on the basis of a one-metre rise in sea levels – with a "worst-case scenario" of 2.7 metres.

"These startling new predictions spell disaster for millions of the world's poorest people," said Rob Bailey, Oxfam's policy adviser on climate change. "Poor coastal communities in countries such as Bangladesh are already struggling to cope with a changing climate, and it can only get worse. This must be a wake-up call for rich countries who are not doing anywhere near enough to prevent these cataclysmic predictions from becoming a reality."



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