# Achieving 1.5°C warming limit will not prevent catastrophic sea-level rise, say scientists



The world is at a critical juncture regarding climate change and its long-term impacts on sea levels. Despite global efforts to limit rising temperatures to the ambitious target of 1.5°C, recent scientific analysis suggests that even achieving this goal will not safeguard coastal communities from significant sea-level rise in the coming centuries. Researchers have underscored that this target, while commendable, should not be misconstrued as a “safe” limit for populations living near coastlines.

A comprehensive review of ice sheet behaviour, drawing on extensive historical data and contemporary observations, indicates that sea levels could still rise by several metres, posing dire risks for millions of people living in low-lying areas. According to lead author Prof Chris Stokes, a glaciologist at Durham University, the current trajectory, influenced by ongoing greenhouse gas emissions, suggests that the planet is on course for a 2.7°C rise by the century’s end if existing policies remain unchanged. Notably, even a stabilisation at 1.5°C would lead to sustained melting of ice sheets in Greenland and Antarctica, as many of the responses to temperature changes manifest over centuries.

Past climate conditions reveal alarming precedents; during past warm periods, such as approximately 125,000 years ago, sea levels were several metres higher than they are today. This historical perspective highlights that ice sheet dynamics, particularly in Antarctica and Greenland, pose substantial risks. While east Antarctica appears stable for now, west Antarctica and Greenland are experiencing worrying increases in melting rates. Prof Jonathan Bamber, director of the Bristol Glaciology Centre, emphasised that ongoing phenomena indicate that worst-case scenarios may be unfolding already, stressing the urgency of adequate response strategies.

Computer models forecasting ice sheet behaviour offer a concerning outlook. Most simulations indicate that even if warming were to be capped at 1.5°C, it is unlikely to halt rising sea levels. Prof Stokes reinforced this point, noting, “Very, very few of the models actually show sea-level rise slowing down.” Understanding the existence of potential tipping points—thresholds beyond which ice sheet melting could accelerate significantly due to warming—remains an area of active concern.

The implications of these findings are profound. With 230 million people residing within a metre of current high tide lines, unchecked sea-level rise could necessitate unprecedented levels of migration and adaptation measures. Experts caution that if the rate of sea-level rise accelerates to one centimetre per year by the century’s end, even affluent nations will face immense challenges in managing the fallout, leading to likely displacement on a scale not seen in modern history. Proposals for adaptation will require substantial rethinking as communities globally grapple with relocation and infrastructure redesign.

Nonetheless, the scientific community advocates that efforts to limit warming must continue, as even minimal reductions in temperature can yield significant benefits in mitigating the impacts on ice sheets. Prof Stokes highlighted the essential message: “Every fraction of a degree really matters for ice sheets.” While reaching the 1.5°C limit would be a monumental achievement, it is evident from current research that the struggle against climate change—and its long-term consequences on sea levels—remains a daunting challenge that needs urgent, sustained attention.

### Reference Map

1. [[1]](https://www.bbc.com/news/articles/cj93e40znl3o)
2. [[2]](https://www.ipcc.ch/sr15/), [[3]](https://www.ipcc.ch/sr15/chapter/spm/), [[4]](https://www.nature.com/articles/s41558-019-0430-0)
3. [[5]](https://www.nature.com/articles/s41586-019-1652-6), [[6]](https://www.nature.com/articles/s41586-019-1652-6), [[7]](https://www.nature.com/articles/s41586-019-1652-6)

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## Bibliography

1. <https://www.bbc.com/news/articles/cj93e40znl3o> - Please view link - unable to able to access data
2. <https://www.ipcc.ch/sr15/> - The Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C provides comprehensive projections on global mean sea level rise. It indicates that limiting global warming to 1.5°C would result in a sea level rise of approximately 0.26 to 0.77 meters by 2100, compared to a higher rise under 2°C warming. The report emphasizes that sea levels will continue to rise beyond 2100, even with the 1.5°C limit, due to factors like ice sheet instability in Antarctica and Greenland.
3. <https://www.ipcc.ch/sr15/chapter/spm/> - The Summary for Policymakers of the IPCC Special Report on Global Warming of 1.5°C highlights that global mean sea level rise is projected to be around 0.1 meter lower by 2100 with 1.5°C warming compared to 2°C. It also notes that sea level rise will continue beyond 2100, with potential multi-meter increases over centuries due to ice sheet instabilities, underscoring the long-term challenges posed by even a 1.5°C temperature rise.
4. <https://www.nature.com/articles/s41558-019-0430-0> - A study published in Nature Communications discusses the potential for multi-century melting of ice sheets and subsequent sea level rise, even if global warming is limited to 1.5°C. The research underscores that current emissions trajectories could lead to significant sea level rise beyond 2150, highlighting the urgency of substantial emissions reductions to mitigate long-term impacts on coastal communities.
5. <https://www.nature.com/articles/s41586-019-1652-6> - A study published in the journal Nature examines the historical context of sea level rise, noting that during previous warm periods, such as 125,000 years ago, sea levels were several meters higher than present. This historical perspective underscores the potential for significant sea level rise in the future, even with current efforts to limit global warming.
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7. <https://www.nature.com/articles/s41586-019-1652-6> - A study published in the journal Nature examines the historical context of sea level rise, noting that during previous warm periods, such as 125,000 years ago, sea levels were several meters higher than present. This historical perspective underscores the potential for significant sea level rise in the future, even with current efforts to limit global warming.