# West Antarctic Ice Sheet nears irreversible collapse amid record ocean warming



Scientists are issuing stark warnings about the impending collapse of the West Antarctic Ice Sheet, which contains an astonishing 750,000 cubic miles of ice—enough to fill Wembley Stadium nearly three billion times. This vast reservoir of freshwater is critical, yet it is perilously close to a tipping point that could lead to an "irreversible" collapse. If triggered, this collapse could result in global sea-level rises of up to 13 feet (approximately 4 metres) over the next few centuries. David Chandler from the Norwegian Research Centre (NORCE) cautioned that even a minimal increase in deep ocean temperatures of just 0.25°C could initiate this catastrophic process. “With our present-day climate, the transition to the collapsed state will be slow, possibly spanning 1,000 years, but it could accelerate significantly with further global warming," he stated.

The implications of such a rise in sea levels are profound. Coastal cities may face devastating flooding, necessitating mass migrations inland. Small island nations could find themselves entirely submerged, forcing their inhabitants to seek refuge elsewhere. Moreover, the configuration of the West Antarctic Ice Sheet is particularly vulnerable; unlike its eastern counterpart, much of it sits atop the seabed, making it more susceptible to the warming waters currently impacting it. “West Antarctica is critical for two reasons: any significant ice melt could lead to devastating sea-level increases and the ice sheet itself plays a role in climate regulation. Thus, its loss could influence weather patterns as far away as Europe,” warned Chandler.

Recent studies paint an increasingly alarming picture. Research published in *Nature Climate Change* suggests that sections of Antarctica, particularly the Thwaites Ice Shelf, may undergo unavoidable melting—even if global temperature rise is capped at 1.5 degrees Celsius. This scenario could still result in sea levels rising by an estimated 1.8 metres across the coming centuries. Given that 2023 saw global temperatures reaching unprecedented heights—1.45 degrees Celsius above pre-industrial averages—scientists are increasingly concerned about the trajectory of global warming's impact on polar environments. The World Meteorological Organisation has issued a 'Red Alert,' highlighting the near-irreversibility of ocean heat and the alarming decline in Antarctic sea ice.

The current melting season in Antarctica has already outstripped historical norms, with increased melting observed mainly in the Antarctic Peninsula—extending an unusually long season by up to 40 days. Research indicates that while more precipitation may seem beneficial, it is the loss of ice anchoring points and the rise in underground melting that are accelerating the flow of land ice into the ocean, compounding the risks associated with global warming. A significant reduction in these anchoring points since 1973 has caused serious concerns among experts regarding future sea-level rise.

Simultaneously, a recent heatwave is gripping Antarctica, pushing temperatures as much as 28 degrees Celsius above normal averages for this time of year. This abnormal warmth, possibly linked to weakened polar vortex phenomena, may have long-lasting implications for the ice sheet's stability. Some scientists stress the need for immediate and ambitious actions to curb CO2 emissions, warning that as conditions continue to deteriorate, the threat of irreversible climate impacts intensifies.

In light of these catastrophic potentialities, researchers are exploring innovative intervention strategies to mitigate impending ice melt. Initiatives include real-time monitoring of ice conditions through NASA's upcoming NISAR satellite, which aims to gain a clearer understanding of ice dynamics in Greenland and Antarctica. Some scientists propose radical methods to preserve glaciers, such as draining subglacial water to potentially halt glacier flow and enhance ice stability. While fraught with logistical challenges, these interventions could represent a last-ditch effort to stave off dramatic sea-level rise.

The interplay of these variables showcases the urgent need for integrated global strategies to address climate change. With the stakes being extraordinarily high, the international community must navigate these scientific insights and technological potentials to protect vulnerable coastal ecosystems and human populations from imminent threats.

### 📌 Reference Map:

* Paragraph 1 – [[1]](https://www.dailymail.co.uk/sciencetech/article-14776065/West-Antarctic-Ice-Sheet-collapse.html?ns_mchannel=rss&ns_campaign=1490&ito=1490), [[4]](https://www.ft.com/content/deb66512-d866-43a6-bffa-3a37dbb48a8a)
* Paragraph 2 – [[1]](https://www.dailymail.co.uk/sciencetech/article-14776065/West-Antarctic-Ice-Sheet-collapse.html?ns_mchannel=rss&ns_campaign=1490&ito=1490), [[2]](https://www.apnews.com/article/946bb44fbef027186f80f8992ebfc064), [[5]](https://www.lemonde.fr/en/environment/article/2024/08/08/in-the-middle-of-the-austral-winter-antarctica-suffers-a-worrisome-heat-wave_6711070_114.html)
* Paragraph 3 – [[3]](https://www.reuters.com/business/environment/un-sounds-red-alert-world-smashes-heat-records-2023-2024-03-19/), [[6]](https://www.theatlantic.com/magazine/archive/2024/07/nasa-nisar-mission-glaciers-sea-ice-thwaites/678522/?utm_source=apple_news)

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## Bibliography

1. <https://www.dailymail.co.uk/sciencetech/article-14776065/West-Antarctic-Ice-Sheet-collapse.html?ns_mchannel=rss&ns_campaign=1490&ito=1490> - Please view link - unable to able to access data
2. <https://www.apnews.com/article/946bb44fbef027186f80f8992ebfc064> - A study published in *Nature Climate Change* indicates that a significant portion of Antarctica, particularly the ice shelves in the Amundsen Sea, will undergo unavoidable melting despite future reductions in carbon emissions. The research reveals that even if global warming is capped at 1.5 degrees Celsius above pre-industrial levels, it won't prevent the collapse of the West Antarctic Ice Sheet, potentially raising sea levels by 1.8 meters over the coming centuries. This highlights the vulnerability of the Thwaites ice shelf, known as the 'Doomsday Glacier,' to warm water melting from below, signifying a slow but inevitable collapse. The study underscores the need for continued climate action to protect other environmental areas from similar fates. ([apnews.com](https://apnews.com/article/946bb44fbef027186f80f8992ebfc064?utm_source=openai))
3. <https://www.reuters.com/business/environment/un-sounds-red-alert-world-smashes-heat-records-2023-2024-03-19/> - In 2023, the world experienced unprecedented climate changes, with average temperatures rising to the highest recorded in 174 years, reaching 1.45 degrees Celsius above pre-industrial levels. Additionally, ocean temperatures hit a 65-year peak, with over 90% of the seas experiencing heatwave conditions, adversely affecting food systems. The World Meteorological Organization (WMO) voiced significant concern, particularly regarding ocean heat and shrinking sea ice, marking the situation as a 'Red Alert.' WMO Secretary-General Celeste Saulo emphasized the near-irreversible nature of ocean heat and a dramatic decline in Antarctic sea ice, which contributed to accelerated sea-level rise. Climate change, driven by the burning of fossil fuels and the natural El Nino pattern, pushed temperatures higher, with 2024 expected to set new records. Saulo urged immediate and ambitious climate actions to mitigate the adverse effects and reduce suffering from extreme weather events. ([reuters.com](https://www.reuters.com/business/environment/un-sounds-red-alert-world-smashes-heat-records-2023-2024-03-19/?utm_source=openai))
4. <https://www.ft.com/content/deb66512-d866-43a6-bffa-3a37dbb48a8a> - Antarctica is being severely affected by climate change, with sea ice levels near historic lows and rapid melting of vast areas of its ice mass. The most recent melting season was more than a month longer than normal in some regions, especially in the Antarctic Peninsula, which experienced 40 additional days of melting compared to the long-term average. Scientists warn that global warming could destabilise Antarctica, resulting in sea-level rises of up to several metres by the end of the century. Despite an increase in precipitation and snowfall, the rise in underground melting and the reduction of underwater ice anchoring points are accelerating the flow of land ice into the ocean, worsening the situation. A recent study shows that ice anchoring points have significantly reduced since 1973, which could further accelerate Antarctica's contribution to sea-level rise. ([ft.com](https://www.ft.com/content/deb66512-d866-43a6-bffa-3a37dbb48a8a?utm_source=openai))
5. <https://www.lemonde.fr/en/environment/article/2024/08/08/in-the-middle-of-the-austral-winter-antarctica-suffers-a-worrisome-heat-wave_6711070_114.html> - Antarctica is facing an alarming heat wave during its winter, with temperatures averaging 10°C above normal and spiking 28°C higher on some days. This unusual warmth follows a study from September 2023 identifying Antarctica as the fastest-warming area globally. Normally, winter temperatures in the interior are between -50°C to -60°C, but recent recordings have been significantly higher, such as -40°C and -34°C. Experts attribute this to a potential weakening of the polar vortex, influenced by climate change. This phenomenon has led to unusual atmospheric conditions, possibly creating 'atmospheric rivers' that bring widespread moisture and precipitation. The longevity and extent of the heat wave are unprecedented, raising concerns about the long-term impacts on ice melt and sea level rise. Scientists emphasize the urgent need for action on CO2 emissions to mitigate further consequences. ([lemonde.fr](https://www.lemonde.fr/en/environment/article/2024/08/08/in-the-middle-of-the-austral-winter-antarctica-suffers-a-worrisome-heat-wave_6711070_114.html?utm_source=openai))
6. <https://www.theatlantic.com/magazine/archive/2024/07/nasa-nisar-mission-glaciers-sea-ice-thwaites/678522/?utm_source=apple_news> - In response to accelerating sea-level rise driven by the melting of glaciers, particularly Greenland's ice sheet and Antarctica's Thwaites Glacier, scientists are exploring novel intervention ideas. NASA's NISAR satellite will soon provide real-time monitoring of global ice with high precision. Greenland and Antarctic ice sheets hold the vast majority of Earth's ice, and recent studies highlight their fragility to warming temperatures. Thwaites Glacier, due to its topography and location, is especially vulnerable and could alone raise sea levels by up to 10 feet if destabilised. While the traditional scientific role has been observational, some researchers now advocate for intervention. Notably, Slawek Tulaczyk proposes an “ice preservation” scheme to halt glacier flow by draining subglacial water, enhancing friction, and triggering freezing feedback loops. Though still conceptual and logistically immense, the idea is gaining traction amid growing urgency. Competing interventions include thermal siphons and insulating fabrics, each with feasibility questions. Skeptics argue such efforts risk diverting focus and funding from emissions reduction. Nonetheless, pilot tests may soon commence on smaller glaciers. If executed with global cooperation and military-scale investment, these schemes might mitigate catastrophic sea-level rise. Given the stakes, some scientists believe it's essential to explore all options before it's too late. ([theatlantic.com](https://www.theatlantic.com/magazine/archive/2024/07/nasa-nisar-mission-glaciers-sea-ice-thwaites/678522/?utm_source=openai))
7. <https://www.science.org/doi/full/10.1126/sciadv.abf7787> - This study investigates the global sea-level changes following the collapse of the West Antarctic Ice Sheet (WAIS). The researchers modelled the meltwater distribution and its impact on sea levels, predicting an initial fall in sea level near the melting ice sheet due to elastic uplift and reduced gravitational pull. However, far-field sea levels are expected to rise by approximately 5.1 meters in the northeast Pacific Ocean and 5.0 meters in the Indian Ocean. Two thousand years post-collapse, viscous adjustments lead to localized subsidence around the periphery of WAIS, with a peak sea-level rise of about 31.4 meters. This research underscores the significant and prolonged impact of WAIS collapse on global sea levels, highlighting the need for comprehensive understanding and planning. ([science.org](https://www.science.org/doi/full/10.1126/sciadv.abf7787?utm_source=openai))