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The Great Break Up



Antarctica's Larsen B Ice Shelf is likely to break into hundreds of icebergs before the end of the decade, according to a new NASA study

In just five years, Antarctica's Larsen B ice shelf is likely to disintegrate completely. This would cause the entire shelf to shatter into hundreds of icebergs, according to a new United States National Aeronautics and Space Administration (NASA) study in California published in the journal *Earth and Planetary Science Letters*. This is worrying news for the planet since ice shelves, thick plates of ice fed by nearby floating glaciers, act as important buffers helping to break the flow of glaciers moving towards the ocean. Without ice shelves, glacial ice enters the ocean faster and accelerates the pace of global sea level rise.

The Larsen B ice shelf reached headlines in 2002 when its northern section on the eastern side of the Antarctic Peninsula shattered, causing a plume of thousands of icebergs to be set adrift into the Weddell Sea. The Larsen B ice shelf existed for 10,000 years before it fell apart in 2002, and may soon be gone completely.



Ice shelves are particularly sensitive to changes in ocean temperature, with seven Peninsula shelves diminishing in size by about 13,500 km² (5,200 mi²) since 1974.

FEATURE ARTICLE

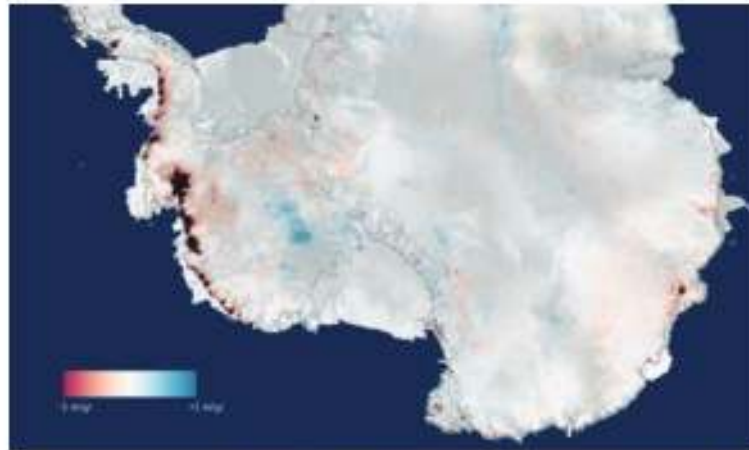


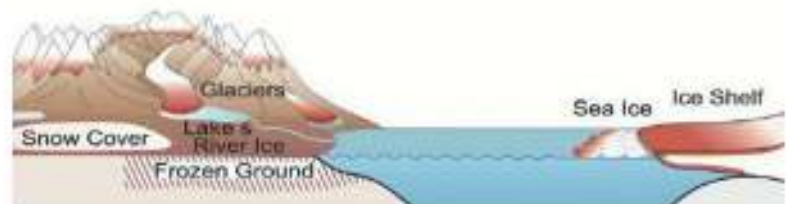
Diagram Source: Images from the CryoSat satellite showing ice loss along the western coastline of Antarctica and Antarctic Peninsula taken in 2014

On the other side of the planet, University of Cambridge researchers discovered that Greenland's ice sheet is less stable and more sensitive to climate change than previously thought. It covers 1.7 million km² and contains enough ice to raise sea levels worldwide by seven metres. The researchers say that an increase in snow lakes and deep layers of ice at higher elevations portends faster rates of melting that could send water cascading into the ocean, pushing global sea levels ever higher. Major destabilisation of the Greenland ice sheet would have serious consequences on global sea levels, and a massive influx of fresh water could even slow down the Gulf Stream.

Scientists point to the cryosphere, the planet's ice and snow regions, as a barometer of present climate change as well as a holder of information about past and future climatic conditions. The Intergovernmental Panel on Climate Change (IPCC) has warned the public about glacial and ice sheet

melt for many years. Its Fifth Assessment Report (AR5 2013) focuses on the cryosphere as one of its main themes. The report concludes with "high confidence" that over the last two decades glaciers have continued to shrink almost worldwide, the Greenland and Antarctic ice sheets have been losing mass and Arctic sea ice and Northern Hemisphere spring snow cover has continued to decrease

significantly. The report also shows multiple lines of data reflecting substantial Arctic warming since the mid-20th century, alongside meteorological data, aerial photos, and satellite images which indicate a



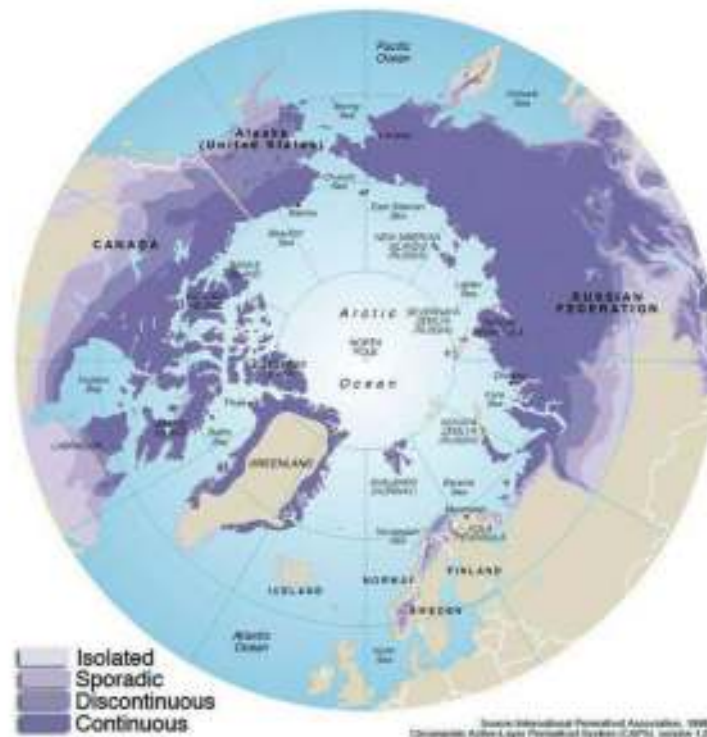
The cryosphere is components of the earth system that contain a substantial fraction of water in a frozen state such as sea ice, snow, glaciers, lake/river ice, ice sheets and frozen ground

continuing increase in permafrost thawing, which leads to the release of methane.

In other areas of the planet, such as subarctic Siberia and northern Canada, permafrost that stores massive amounts of carbon is in decline. Nearly 25% of the Northern Hemisphere's land surface is covered in permanently frozen soil, or permafrost, filled with carbon-rich plant debris and it is virtually certain that near-surface permafrost extent at high northern latitudes will be reduced as global mean surface temperature increases.

FEATURE ARTICLE

This is alarming since melting permafrost releases carbon dioxide and methane, which are powerful heat-trapping gases. In addition, permafrost is structurally important, and its melting has caused erosion, disappearance of lakes, landslides and ground subsidence.



Time is of the Essence

If greenhouse gas emissions continue to rise, the world may go through the threshold beyond which climate change becomes catastrophic and irreversible. That threshold is estimated as a temperature rise of 2°C (3.6°F) above pre-industrial levels, and on current emissions trajectories the earth is heading towards a rise of about 5°C. This is alarming since even small changes in temperature mean big differences for the Earth. Present research indicates that global emissions need to be halved or cut by 80% by 2050 and emissions would need to fall to zero later this century to stop any further

rise in the atmospheric concentration of CO₂.

De-carbonisation is feasible, though not easy and very complex, requiring detailed roadmaps as technologies evolve. Essentially there are two key steps. The first includes making buildings energy efficient as buildings reduce their needs for heating,

cooling and energy-intensive ventilation. The second involves switching away from fossil fuels to wind, solar, nuclear, hydroelectric, geothermal, and other non-carbon energy sources, or by capturing and storing the CO₂ produced by fossil fuels, a process known as Carbon Capture Storage (CCS). A key challenge is the practical large-scale implementation of converting power stations, infrastructure and building stocks to low-carbon technologies, and upgrading existing low-carbon technologies in a way that does not disrupt the energy-dependent world economy and is affordable.

That said, the cost of inaction is far more expensive - the *Stern Review*

on the Economics of Climate Change, written by a team of experts for the British Treasury, and other studies, make clear that the benefits of strong, early action considerably outweigh the costs of inaction.



FEATURE ARTICLE

2015 is a Key Year



Many have referred to 2015 as a 'generational opportunity' – a seminal moment to build a new international framework addressing interconnected global challenges of sustainable development and climate change. Around the world, a clarion call is coming from governments, civil society, the religious sector and business to urgently curb greenhouse gas emissions and adapt to climate change. In Paris during November and December 2015, all eyes will be on the signing of a universal climate agreement that includes a range of measures relating to reducing greenhouse gas emissions, adapting to climate impacts, technology and finance and a long-term goal to ensure that the global average temperature remains below 2°C (3.6°F) above the pre-industrial levels.

Taking Action

The biggest emitters have already committed to quantifiable, if inadequate, measures. The European Union will cut its emissions by 40%, compared with 1990 levels, by 2030. The United States will cut its emissions by 26% to 28%, compared with 2005 levels, by 2025 and China has agreed that its emissions will peak by 2030.

In June 2015, the Group of 7 Industrial Powers

(G7) is expected to acknowledge that in order to hold global warming below the 2°C limit, the world's economies must end their dependence on fossil fuels (coal, oil and natural gas). While such a commitment would be encouraging in sending a strong signal to developing countries ahead of the Paris talks, the G7 does not include many of the world's largest CO₂-emitting countries, including China, India and Russia. Meanwhile, expectations are less optimistic, with obstacles including developing a legal form for the treaty, fairly distributing emission reduction commitments and generating public finance for adapting to climate change. Clarity on legal aspects and signs of convergence on contentious issues like 'Common but Differentiated Responsibility' (CBDR) need to be ironed out to ensure success in Paris.

Finance, like everything, will be the key deal breaker as it will impact investment decisions on coal-based infrastructure, such as mines, railways, ports and power plants. In addition, how and by whom this money will be raised remains

contentious. At Copenhagen in 2009 (COP15), developed countries agreed to supply US\$30bn of "fast-start" financial assistance to poorer nations, and they guaranteed that by 2020, financial flows of at least US\$100bn a year would be provided. So far, the money has been slow in coming. A Paris climate agreement is still possible, but finance will be a major obstacle to a legally binding, fair and ambitious climate agreement.



PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21-CMP11

RECENT EVENTS

2 April 2013

Tim Luard

The Great Escape from Hong Kong



Well-known former BBC-China correspondent Tim Luard illustrated the daring 1941 escape through Japanese lines of one-legged Chinese admiral Chan Chak. Chak, along with his British

companions, who swam and sailed across Mirs Bay, then endured a brutal 5-month journey through occupied China to freedom. Mr Luard's photos and personal knowledge of their escape route made this a fascinating lecture.

14 April 2013

Guided Tour

Field Trip:

Visit to Mai Po



Members joined a guided tour of Mai Po marshes, home to an internationally-significant number of migratory birds.

16 April 2013

Marc Progin

Mongolia: Nomads, Caravans, and Migrations



Photographer and traveller Marc Progin described his journeys spanning 20,000 km across Mongolia by bicycle, foot and animal caravans. His fine photographs illuminated the striking beauty of this severe land.

17 April 2013

Paul Rose

Diving the World: Eight Thousand Dives in the Seven Seas



World-renowned diver and Vice-President of the Royal Geographical Society, Paul Rose, captured the wonder and mystique of the world's least explored frontier: the ocean. His arctic excursions and treacherous cave dives accorded him rare adventures, including swimming with manta rays and cooking eggs on underwater thermal vents. Mr Rose provided stories from behind the scenes of his BBC documentaries as he raised global ocean issues, giving the audience a glimpse into another world.

22 April 2013

Professor Arne Westad

The Restless Empire: China and the World since 1750

Professor Arne Westad of the London School of Economics examined the history of China and its fluctuation between dominance and subjugation, emulation and defiance. He argued that China's success ultimately hinges on its ability to engage with potential international partners while



simultaneously safeguarding its own strength and stability.