

Human cause of global warming is near certainty, UN reports

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By absorbing much of the added heat trapped by atmospheric greenhouse gases, the oceans are delaying some of the impacts of climate change. Credit: WMO/Olga Khoroshunova

Global warming is unequivocal, human influence has been the dominant cause since the mid-20th century, and atmospheric concentrations of greenhouse gases, already at levels not seen in at least 800,000 years, will persist for many centuries, the final version of the latest United Nations report on climate change warned today.

"Continued emissions of [greenhouse gases](#) will cause further warming and changes in all components of the climate system," according to the report, which finalizes a summary of findings by the UN-backed Intergovernmental Panel on Climate Change (IPCC) issued in September, outlining a litany of threats from the melting of the Greenland and Antarctic ice sheets to rising oceans to extreme weather events such as cyclones and heat waves.

"Limiting climate change will require substantial and sustained reductions of [greenhouse gas emissions](#)," it stresses, using the term "extremely likely" for human causality since the mid-20th century, meaning there is a 95 to 100 per cent probability that humankind, and not naturally occurring phenomena, are to blame, a 5 percent increase from the 90 to 100 per cent "very likely" probability of if the IPCC's last report in 2007.

Even if emissions of [global warming](#) carbon dioxide (CO₂) emissions are stopped, most aspects of climate change will persist for many centuries. "This represents a substantial multi-century [climate change](#) commitment created by past, present and future emissions of CO₂," the report warns.

"Human influence has been detected in warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea level rise, and in changes in some climate extremes," it says.

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The report says it is extremely likely that more than half the observed increase in global average surface temperature from 1951 to 2010 was

caused by the increase in [greenhouse gas](#) caused by humans and other human causes. Some of the major warming emissions caused by humankind since the birth of the industrial era 250 years ago – CO₂, methane (CH₄), and nitrous oxide (N₂O) – have all increased since 1750 due to human activity.

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"Concentrations of CO₂, CH₄, and N₂O now substantially exceed the highest concentrations recorded in ice cores during the past 800,000 years. The mean rates of increase in atmospheric concentrations over the past century are, with very high confidence, unprecedented in the last 22,000 years."

It notes that each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850, changes in many extreme weather and climate events have been observed since about 1950, the frequency of heat waves has likely increased in large parts of Europe, Asia and Australia.

There are also likely more land regions where the number of heavy precipitation events has increased than where it has decreased and the frequency or intensity of heavy precipitation has likely increased in North America and Europe. Likely means a 66 to 100 per cent probability.

On the cryosphere (cold regions) the report notes that annual mean Arctic sea ice decreased over the period 1979 to 2012 at a rate very

likely in the range 3.5 to 4.1 per cent per decade and in the range 9.4 to 13.6 per cent per decade the summer sea ice minimum (perennial sea ice).

There is very high confidence that the extent of Northern Hemisphere snow cover has decreased since the mid-20th century, decreasing by an average 1.6 per cent per decade for March and April, and 11.7 per cent per decade for June, over the 1967 to 2012 period.

There is also high confidence that permafrost temperatures have increased in most regions since the early 1980s. Observed warming was up to 3° Celsius in parts of Northern Alaska and up to 2°C in parts of the Russian European North, where a considerable reduction in permafrost thickness and areal extent has been observed over the period 1975 to 2005.

As for the sea level, the rise since the mid-19th century has been larger than the mean rate during the previous two millennia, its global mean level rising 0.19 metres over the period 1901 to 2010.

Global surface temperature change for the end of the 21st century is likely to exceed 1.5°C relative to 1850 to 1900 for most scenarios studied by IPCC, and likely or "more likely than not" to exceed 2°C for some of them. Warming will continue beyond 2100 under all scenarios except one, will continue to show inter-annual-to-decadal variability and will not be regionally uniform.

It is very likely that Arctic sea ice cover will continue to shrink and thin and that Northern Hemisphere spring snow cover will decrease during the 21st century as global mean surface temperature rises. Global glacier volume will further decrease, the report adds.

Global mean [sea level](#), meanwhile, will continue to rise during the 21st

century, very likely exceeding the rate observed during 1971 to 2010 due to increased ocean [warming](#) and increased loss of mass from glaciers and ice sheets.

Provided by UN News Centre

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