Global warming definition geography

The globe is warming. Land and oceans are warmer today than they were when record-keeping began in 1880, and temperatures continue to rise. This rise in heat is global warming, in a word. Here are the exact figures, according to the National Oceanic and Atmospheric Administration (NOAA): Between 1880 and 1980, the world's annual temperature increased to a rate of 0.13 degrees Fahrenheit (0.07 degrees Celsius) per decade, on average. Since 1981, the rate of increase has accelerated to 0.32 degrees F (0.18 degrees C) per decade. This has led to an overall increase of 3.6 degrees F (2 degrees C) in the global average temperature today compared to the pre-industrial era. In 2019, the average global temperature on land and sea was 1.75 degrees F (0.95 degrees Celsius) above the 20th century average. This made 2019 the second warmest year on record, after only 2016. This increase in heat is caused by humans. The burning of fossil fuels has released greenhouse gases into the atmosphere, which trap heat from the sun and raise surface and air temperatures. How the greenhouse effect plays a roleThe main driver of the current warming is the burning of fossil fuels. These hydrocarbons warm the planet by the greenhouse effect, which is caused by the interaction between the Earth's atmosphere and the sun's incoming radiation. The basic physics of the greenhouse effect were understood more than a century ago by an intelligent guy using only pencil and paper, Josef Werne, professor of geology and environmental sciences at the University of Pittsburgh, told Live Science.That smart guy was Svante Arrhenius, a Swedish scientist and eventually Nobel laureate. In other words, solar radiation hits the Earth's surface and then bounces back to the atmosphere as heat. Gases in the atmosphere trap this heat, preventing it from escaping into the vacuum of space (good news for life on the planet). In an article presented in 1895, Arrhenius understood that greenhouse gases such as carbon dioxide could trap heat near the Earth's surface, and that small changes in the amount of these gases could make a big difference in the amount of heat trapped. Where greenhouse gases come from Since the beginning of the industrial revolution, humans have rapidly changed the balance of gases in the atmosphere. The burning of fossil fuels such as coal and oil releases water vapour, carbon dioxide (CO2), methane (CH4), ozone and nitrous oxide (N2O), the main greenhouse gases. Carbon dioxide is the most common greenhouse gas. Between about 800,000 years ago and the beginning of the industrial revolution, The presence of CO2 in the atmosphere amounted to about 280 parts per million (ppm, which means that there were about 208 CO2 molecules in the air per million air molecules). In 2018 (the last year in which full data are available), the average CO2 in the atmosphere was 407.4 ppm, according to the National Centres for Environmental Information. This may not seem like much, but according to the Scripps Oceanographic Institution, CO2 levels have not been as high since the Pliocene period, which occurred between 3 and 5 million years ago. At that time, the Arctic was ice-free for at least part of the year and significantly warmer than it is today, according to research published in 2013 in the journal Science. In 2016, CO2 accounted for 81.6% of all greenhouse gas emissions in the United States, according to an environmental protection agency (EPA) analysis. We know from high-precision instrumental measurements that there is an unprecedented increase in CO2 in the atmosphere. We know that CO2 absorbs infrared [heat] radiation and that global average temperature is rising, Said Keith Peterman, professor of chemistry at York College of Pennsylvania, and his research partner, Gregory Foy, associate professor of chemistry at York College of Pennsylvania, in a joint email. CO2 makes its way into the atmosphere through a variety of routes. Burning fossil fuels releases CO2 and is by far the largest contribution of the United States to the emissions that heat the world. According to the EPA's 2018 report, burning fossil fuels in the United States, including electricity generation, released just over 5.8 billion tons (5.3 billion metric tons) of CO2 into the atmosphere in 2016. Other processes — such as non-allergic fuel use, iron and steel production, cement production and waste incineration — increase total annual CO2 emissions in the United States to 7 billion tonnes (6.5 billion metric tons). Deforestation also contributes significantly to excess CO2 in the atmosphere. In fact, deforestation is the second largest anthropogenic (human-caused) source of carbon dioxide, according to a study published by Duke University. After the trees die, they release the carbon they stored during photosynthesis. According to the 2010 Global Forest Resource Assessment, deforestation releases nearly one billion tonnes of carbon into the atmosphere each year. Globally, methane is the second most common greenhouse gas, but it is the most effective at trapping heat. The EPA reports that methane is 25 times more effective at trapping heat than carbon dioxide. In 2016, gas accounted for about 10 percent of all greenhouse gas emissions in the United States, according to the EPA. Methane is the second most abundant and persistent greenhouse gas. Cattle are the single largest source of methane production. (Image credit: Shutterstock) Methane can come from many natural sources, but humans cause a large part of methane emissions through mining, gas use mass livestock farming and the use of landfills. Cattle are the largest single source of methane in the United States, according to the EPA, with animals producing nearly 26% of total methane emissions. There are encouraging trends in U.S. greenhouse gas emissions. According to the EPA 2018 report, these emissions increased by 2.4% between 1990 and 2016 but decreased by 1.9% between 2015 and 2016.Some of this was driven by a warm winter in 2016, which required less heating fuel than usual. But another important reason for this recent decline is the replacement of coal with natural gas, according to the Center for Climate and Energy Solutions. The United States is also moving from a manufacturing economy to a less carbon-intensive service economy. Fuel-efficient vehicles and energy efficiency standards for buildings have also improved emissions, according to the EPA. Effects of global warming Global warming does not only mean warming, which is why climate change has become the preferred term for researchers and policy makers. While the globe becomes warmer on average, this increase in temperature can have paradoxical effects, such as more frequent and severe snowstorms. Climate change can and will affect the globe in many ways: melting ice, drying up already arid areas, causing extreme weather and disrupting the delicate balance of the oceans. Melting icethe most visible effect of climate change to date is the melting of glaciers and sea ice. Ice caps have been retreating since the end of the last ice age, about 11,700 years ago, but the warming of the last century is eager for their demise. A 2016 study found that there is a 99% chance that global warming has caused the recent retreat of glaciers; in fact, research has shown that these ice rivers are 10 to 15 times the distance they would have if the climate had remained stable. Glacier National Park in Montana had 150 glaciers in the late 1800s. Today, he's 26. Loss of glaciers can result in loss of life when icy dams holding glacial lakes destabilize and break out, or when avalanches caused by unstable ice bury villages. At the North Pole, warming continues twice as fast as in mid-latitudes, and sea ice shows the strain. Fall and winter ice in the Arctic reached record levels in 2015 and 2016, meaning that the extent of ice was not giving way as much of the open sea as previously observed. According to NASA, the 13 smallest values of the maximum winter extent of Arctic sea ice have all been measured over the past 13 years. Ice also forms later in the season and melts more easily in the spring. According to the National Snow and Ice Data Center, the extent of sea ice in January has decreased by 3.15% per decade over the past 40 years. Some scientists believe that the Arctic Ocean will see ice-free summers within 20 or 30 years. In Antarctica, was a little less clear. The Western Antarctic Peninsula is warming faster than anywhere else than parts of the Arctic, according to the Antarctic and Southern Ocean Coalition. It was on the peninsula that the Larsen C ice shelf broke in July 2017, generating an iceberg the size of Delaware. Now scientists say a quarter of West Antarctic ice is in danger of collapse and the huge Thwaites and Pine Island glaciers are sinking five times faster than they did in 1992.La offshore sea ice is extremely variable, however, and some areas have actually reached record highs in recent years. However, this data could bear the fingerprints of climate change, as it may result from the movement of land ice to the sea as glaciers melt or changes related to wind warming. In 2017, however, this record ice pattern abruptly reversed, with the appearance of a record low. On March 3, 2017, Antarctic sea ice was measured at an extent of 71,000 square miles (184,000 square kilometres) less than the previous low, compared to 1997. Global warming will also change things between the poles. Many already dry areas are expected to become even drier as the world warms. The plains of the southwestern and central United States, for example, are expected to experience megadroughts that are decades harder than anything else in human memory. The future of drought in western North America is likely to be worse than anyone in U.S. history, Benjamin Cook, a climatologist at NASA's Goddard Institute for Space Studies in New York, who published research on these droughts in 2015, told Live Science. These are droughts that are so much beyond our contemporary experience that it's almost impossible to think about them. The study predicted an 85% probability of droughts of at least 35 years in the region by 2100. The main factor, the researchers found, is the increasing evaporation of water from warmer, warmer soils. Much of the precipitation that falls in these arid regions will be lost. Meanwhile, 2014 research has shown that many regions are likely to see less precipitation as the climate warms. Subtropical regions, including the Mediterranean, Amazon, Central America and Indonesia, are likely to be hardest hit, according to the study, while South Africa, Mexico, Western Australia and California will also dry out. Extreme weather Another impact of global warming: extreme weather. Hurricanes and typhoons are expected to become more intense as the planet warms. Warmer oceans evaporate more moisture, which is the driving force behind these storms. The United Nations Intergovernmental Panel on Climate Change (IPCC) predicts that even if the world diversifies its energy sources and transitions to a less fossil fuel-intensive economy (known as Scenario A1B), tropical cyclones are likely to be up to 11% more intense on average. This means more wind and water damage on the coasts Paradoxically, climate change can also cause more frequent extreme snowstorms. According to the National Centers for Environmental Information, extreme snowstorms in the eastern United States have become twice as frequent as they were in the early 1900s. Again, this change occurs because warming ocean temperatures lead to increased evaporation of moisture in the atmosphere. This moisture fuels the storms that hit the continental United States. Ocean Disruption Some of the most immediate impacts of global warming are under the waves. Oceans as carbon sinks, which means they absorb dissolved carbon dioxide. It is not a bad thing for the atmosphere, but it is not good for the marine ecosystem. When carbon dioxide reacts with seawater, the pH of water decreases (i.e. it becomes more acidic), a process known as ocean acidification. This increased acidity gnaws at the calcium carbonate shells and skeletons on which many ocean organisms depend to survive. These creatures include shells, tepods and corals, according to NOAA. Corals, in particular, are the canary of a coal mine for climate change in the oceans. Marine scientists have observed alarming levels of coral bleaching, events in which corals expel symbiotic algae that provide nutrients to coral and give them their bright colors. Bleaching occurs when corals are stressed, and stressors can include high temperatures. In 2016 and 2017, Australia's Great Barrier Reef experienced back-to-back shutouts. Corals can survive bleaching, but repeated bleaching events make survival less and less likely. One of the most visible effects of global warming is the prevalence of coral bleaching. (Image credit: Shutterstock) There has been no climate interruptionDespite an overwhelming scientific consensus on the causes and reality of global warming, the issue is politically controversial. For example, climate change deniers have argued that warming slowed between 1998 and 2012, a phenomenon known as the climate change hiatus. Unfortunately for the planet, the hiatus never happened. Two studies, one published in the journal Science in 2015 and the other published in 2017 in the journal Science Advances, reanalysised ocean temperature data that showed the slowdown in warming and found that it was a simple measurement error. Between the 1950s and 1990s, most ocean temperature measurements were carried out on research vessels. The water would be pumped into the pipes through the engine room, which eventually slightly heated the water. After the 1990s, scientists began using systems based on more accurate ocean buoys to measure ocean temperature. The problem came because no one corrected for the change in measurements between boats and buoys. These corrections showed that the oceans have warmed by an average of 0.22 degrees F (0.12 degrees C) per decade since 2000, almost twice as fast as previous estimates of 0.12 degrees F (0.07 degrees C) per decade. Fast Facts About Warming NASA: Carbon dioxide levels in the atmosphere are 412 ppm in 2020, their highest levels in 650,000 years. The global average temperature has been up 1.9 degrees F (3.4 degrees C) since 1880.The minimum extent of Arctic summer sea ice has decreased by 12.85% per decade since satellite measurements began, in 1979.La land ice has decreased at the poles by 413 gigatonnes per year since 2002.Global sea levels have increased by 7 inches (176 millimetres) over the past century. Additional resources: resources:

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