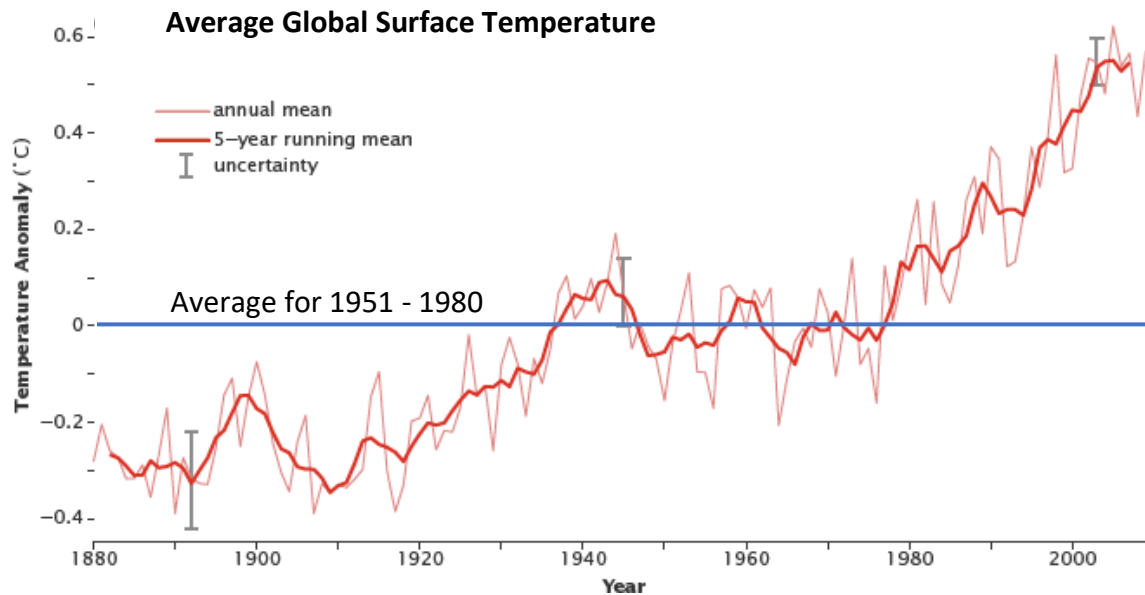


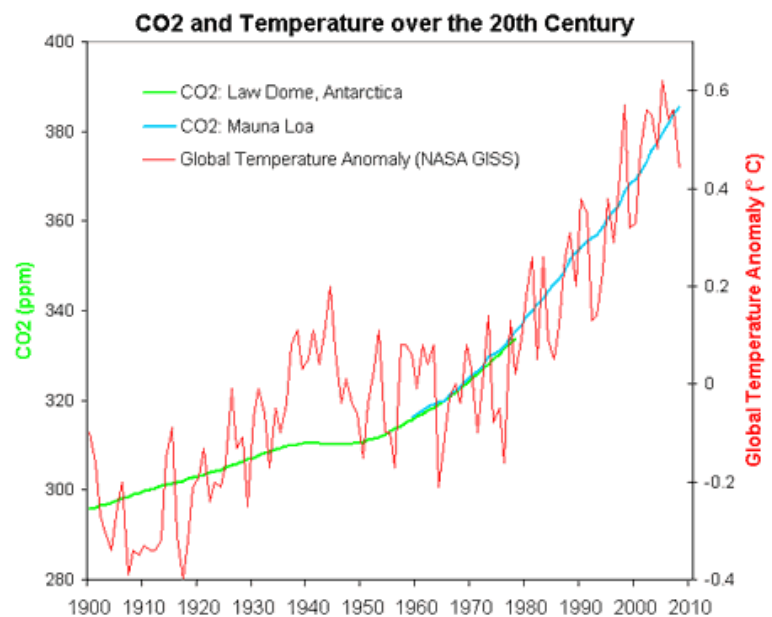
Global Warming and Climate Change

The greenhouse effect allows Earth to be a comfortable average temperature of 15°C. However, over the past 260 years the temperature of the Earth has been rising at an extremely unusual rate. Despite ups and downs from year to year, there is a clear pattern of increasing temperatures. By 2001, Earth's temperature was roughly 0.5 degrees Celsius above the average for 1951–1980.



This graph shows the difference of the average global annual temperature (the pink line) from the 1951-1980 average (the blue line) as well as the the running 5-year average. There is a clear increase in temperature since the 1950s-80s. NASA figure adapted from Goddard Institute for Space Studies Surface Temperature Analysis

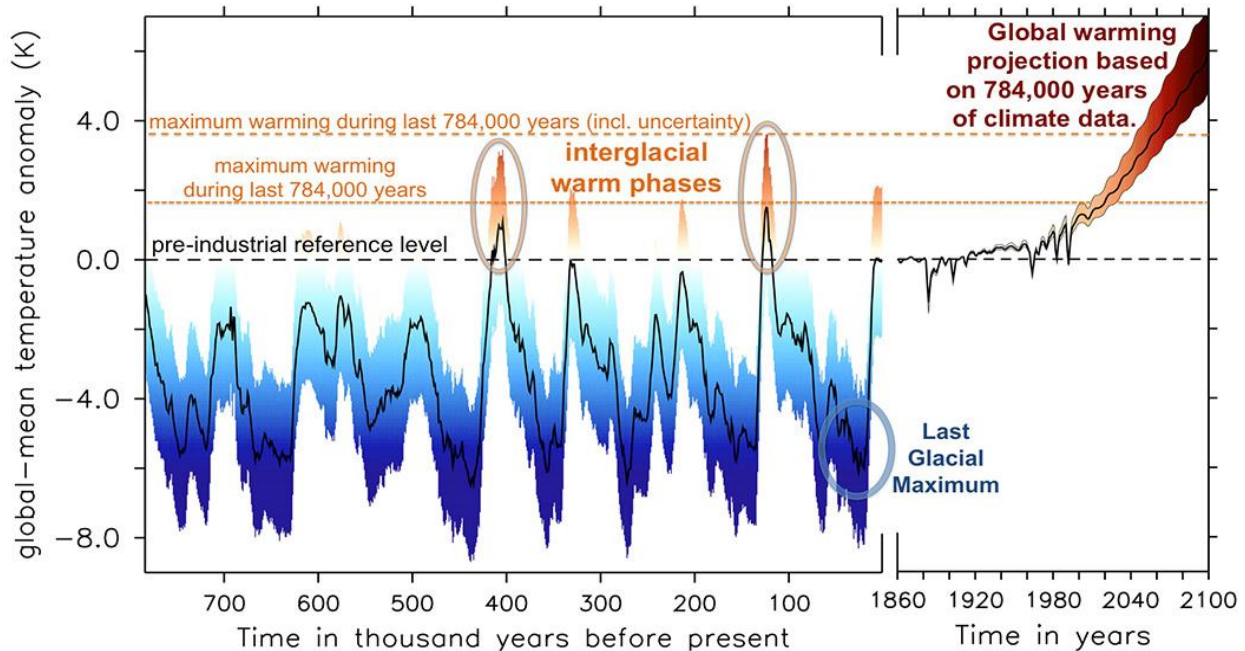
This increase in temperature coincides with the human-caused increase in greenhouse gas in the atmosphere, mostly through carbon dioxide (CO₂) in pollution released into the air from industries burning oil, natural gas, and coal, and from vehicles. Increasing atmospheric CO₂ concentrations cause an imbalance in the Earth's heat budget: more heat is retained than expelled, which in turn generates global surface warming. Cutting down forests has also contributed because living trees take carbon dioxide out of the atmosphere to build into wood. Since 1750, carbon dioxide in the atmosphere has increased by 45%. Methane, another important greenhouse gas, has increased by 150%.



This graph shows how the rise in global temperature (the red line) follows closely with the rise in atmospheric CO₂ (the blue and green lines). <https://skepticalscience.com/The-CO2-Temperature-correlation-over-the-20th-Century.html>

Global Warming

By looking at data from marine sediment cores, ice cores, and computer simulations covering the last eight glacial cycles, we know that in the past, it would take over 1,500 years for an increase of 1°C; we have now seen this rise happen in only 100 years. Global warming is used to describe this unusually rapid increase in Earth's average surface temperature. It has risen by just a little less than 1°C since 1901 and the rate at which temperature is increasing has nearly doubled since 1975. Never in the last 784,000 years has there been an increase in temperature that happened so quickly.



This graph shows the difference of the global temperature from before the industrial revolution (1850-1900) reconstructed from information in marine sediment cores, ice cores, and computer simulations covering the last eight glacial cycles. It also shows the Global warming projection to 2100 based on newly calculated paleoclimate sensitivity. <https://phys.org/news/2016-11-climate-sensitive-atmospheric-co2.html>

Climate Change

Climate Change is the phrase used to describe the changes that we are experiencing here on Earth because of global warming. The increase in temperature is leading to a variety of changes in Earth's climate like more extreme weather, more storms, more winter rain, and changes in the length of seasons. These changes are impacting a variety of Earth's systems and the people that rely on them. We are already observing more intense fires, more flooding, changes on the land, impacts on animals and plants, and periods of drought. Human health, food security, infrastructure and transportation are also being affected.

