Global warming research

* Desertification
* Increased melting of snow and ice
* Sea level rise
* Stronger hurricanes and cyclones

ATMOSPHERIC CARBON DIOXIDE CONCENTRATIONS are higher today than at any time in at least the past 650,000 years. They are about 35% higher than before the industrial revolution, and this increase is caused by human activities, primarily the burning of fossil fuels.

There are several lines of evidence. We know approximately how much carbon dioxide is emitted as a result of human activities. Adding up the human sources of carbon dioxide — primarily from fossil fuel burning, cement production, and land use changes (e.g., deforestation)

Several factorsaffect how much of the sun's energy reaches Earth's surface and how much of that energy gets absorbed. Those include greenhouse gases, particles in the atmosphere (from volcanic eruptions, for example), and changes in energy coming from the sun itself.

Evidence of rising temperatures is pervasive and striking: Thermometer records kept over the past century and a half show Earth's average temperature has risen more than 1 degree Fahrenheit (0.9 degrees Celsius), and about twice that in parts of the Arctic.

That doesn’t mean temperatures haven't fluctuated among regions of the globe or between seasons and times of day. But by analysing average temperatures all over the world, scientists have demonstrated an unmistakable upward trend.

This trend is part of climate change, which many people consider synonymous with global warming. Scientists prefer to use “climate change” when describing the complex shifts now affecting our planet’s weather and climate systems. Climate change encompasses not only rising average temperatures but also extreme weather events, shifting wildlife populations and habitats, rising seas, and a range of other impacts.

All of these changes are emerging as humans continue to add heat-trapping greenhouse gases to the atmosphere.

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