River of Facts

NASA INFO

Carbon dioxide is a heat trapping greenhouse gas which is released through deforestation, burning fossil fuels, respiration and volcanic eruptions.

The inexorable rise of carbon dioxide levels in the atmosphere

Ancient air bubbles trapped in ice enable us to step back in time and see what Earth's atmosphere, and climate, were like in the distant past. They tell us that levels of carbon dioxide (CO2) in the atmosphere are higher than they have been at any time in the past 400,000 years. During ice ages, CO2 levels were around 200 parts per million (ppm), and during the warmer interglacial periods, they hovered around 280 ppm. In 2013, CO2 levels surpassed 400 ppm for the first time in recorded history.

As of 2/2017, there was 405.61ppm of carbon dioxide measured in the earth's atmosphere.

The 10 warmest years (for the past 136 years) have occurred since 2000 (except 1998).

2016 ranks as the warmest year on record.

Since the beginning of the Industrial Revolution, the acidity of surface ocean waters has increased by about 30 percent. This increase is the result of humans emitting more carbon dioxide into the atmosphere and hence more being absorbed into the oceans. The amount of carbon dioxide absorbed by the upper layer of the oceans is increasing by about 2 billion tons per year.

Satellite observations reveal that the amount of spring snow cover in the Northern Hemisphere has decreased over the past five decades and that the snow is melting earlier

Ninety-seven percent of climate scientists agree that climate-warming trends over the past century are very likely due to human activities, and most of the leading scientific organizations worldwide have issued public statements endorsing this position.

The Greenland and Antarctic ice sheets have decreased in mass. Data from NASA's Gravity Recovery and Climate Experiment show Greenland lost 150 to 250 cubic kilometers (36 to 60 cubic miles) of ice per year between 2002 and 2006, while Antarctica lost about 152 cubic kilometers (36 cubic miles) of ice between 2002 and 2005.

Both the extent and thickness of Arctic sea ice has declined rapidly over the last several decades.9

Glaciers are retreating almost everywhere around the world — including in the Alps, Himalayas, Andes, Rockies, Alaska and Africa.

Global sea level rose about 17 centimeters (6.7 inches) in the last century. The rate in the last decade, however, is nearly double that of the last century.4

All three major global surface temperature reconstructions show that Earth has warmed since 1880. Most of the warming occurred in the past 35 years, with 15 of the 16 warmest years on record occurring since 2001. The year 2015 was the first time the global average temperatures were 1 degree Celsius or more above the 1880-1899 average.[6] Even though the 2000s witnessed a solar output decline resulting in an unusually deep solar minimum in 2007-2009, surface temperatures continue to increase. The oceans have absorbed much of this increased heat, with the top 700 meters (about 2,300 feet) of ocean showing warming of 0.302 degrees Fahrenheit since 1969.
The number of record high temperature events in the United States has been increasing, while the number of record low temperature events has been decreasing, since 1950. The U.S. has also witnessed increasing numbers of intense rainfall events.

"Global Climate Change: Evidence." NASA Global Climate Change and Global Warming: Vital Signs of the Planet. Jet Propulsion Laboratory / National Aeronautics and Space Administration, 15 June 2008. Web. 14 Jan. 2015. <http://climate.nasa.gov/evidence/>.

General Carbon Dioxide info from Wikipedia but with citations

The global annual mean concentration of CO2 in the atmosphere has increased by more than 40% since the start of the Industrial Revolution, from 280 ppm, the level it had for the last 10,000 years leading up to the mid-18th century,[4] to 399 ppm as of 2015.[5] The present concentration is the highest in at least the past 800,000 years[6] and likely the highest in the past 20 million years.

Eggleton, R. A. Eggleton, Tony (2013). A Short Introduction to Climate Change. Cambridge University Press. p. 52.
Jump up ^ Dlugokencky, E (5 February 2016). "Annual Mean Carbon Dioxide Data". Earth System Research Laboratory. National Oceanic & Atmospheric Administration. Retrieved 12 February 2016.
^ Jump up to: a b Amos, J (4 September 2006). "Deep ice tells long climate story". BBC News. Retrieved 28 April 2010.
^ Jump up to: a b c Climate Change 2001: The Scientific Basis

CORAL REEFS

Ocean acidification (a result of increased CO2): causes a reduction in pH levels which decreases coral growth and structural integrity.

A warming ocean: causes thermal stress that contributes to coral bleaching and infectious disease.

Climate change dramatically affects coral reef ecosystems

Contributing factors that increase greenhouse gases in the atmosphere include burning fossil fuels for heat and energy, producing some industrial products, raising livestock, fertilizing crops, and deforestation.

Climate change leads to:

A warming ocean: causes thermal stress that contributes to coral bleaching and infectious disease.
Sea level rise: causes increases in sedimentation that can lead to the smothering of coral.

Changes in storm patterns: leads to stronger and more frequent storms that can cause the destruction of coral reefs.

Changes in precipitation lead to increased runoff of freshwater, sediment, and land-based pollutants contribute to algal blooms and cause murky water conditions that reduce light.

Altered ocean currents leads to changes in connectivity and temperature regimes that contribute to lack of food for corals and hampers dispersal of coral larvae.

Ocean acidification (a result of increased CO2): causes a reduction in pH levels which decreases coral growth and structural integrity.

http://oceanservice.noaa.gov/facts/coralreef-climate.html
National Oceanic and Atmospheric Association, Department of Commerce
(National Ocean Service)