



Climate Change

What do ice cores from glaciers and a volcano in Hawaii have to do with climate change? Recent discussions on global warming have centered around the increase in greenhouse gases such as carbon dioxide (CO₂). CO₂ molecules reradiate heat back to the earth, so more CO₂ in the atmosphere can “trap” more heat. How do we know that CO₂ has increased over the past several years? Using ice cores, scientists have measured gases in air trapped in glaciers. They can estimate greenhouse gas concentrations in the atmosphere as far back as 160,000 years. The National Oceanic and Atmospheric Administration (NOAA) estimated that CO₂ concentrations were around 280 parts per million (ppm) before the Industrial Revolution.

Keeling Curve

More recently, a young scientist named Charles Keeling started direct measurement of atmospheric CO₂ in 1958. Keeling set up a CO₂ monitoring station at a place where he figured he could get the cleanest air possible — on top of the Mauna Loa volcano in Hawaii. His data, now known as the Keeling Curve, shows a gradual increase in CO₂ from around 315 ppm in 1958 to about 379 ppm in 2005. This was a 35% increase from pre-industrial times. Scientists figure that this increase in CO₂ comes from the burning of fossil fuels (coal and oil) over the past several hundred years.

After the start of the Industrial Revolution, fossil fuel use increased. The increasing demand for energy and more burning of coal and oil led to more greenhouse gas generation. Another factor creating greater energy consumption is increasing human population. The world population was

around 2.5 billion in 1950. By 2005, it had increased to more than 6.4 billion. The U.S. Census Bureau estimates that it will go to 9.4 billion by 2050. With increasing population, energy demand goes up dramatically.

Climatologists at the NASA Goddard Institute for Space Studies (GISS) stated that 2006 was the fifth-warmest year in the past century. GISS scientists estimated that the five warmest years on record were, in descending order, 2005, 1998, 2002, 2003, and 2006.

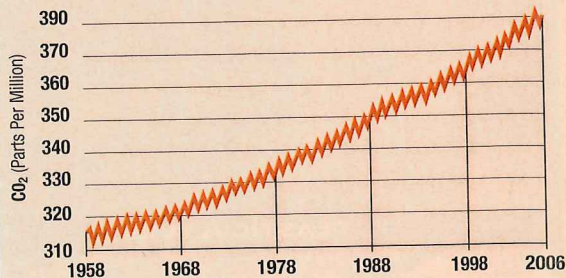
The 10 warmest years in the past century have all occurred since 1990. Much of the earth has warmed about 1°F, and sea level has risen about 6 to 8 inches worldwide in the past 100 years.

Getting Warmer

Scientists estimate that the average global temperature will increase 2°F to 6°F in the next 100 years. While this temperature increase may not sound like much, the temperature during the last ice age (about 18,000 years ago) was only 7°F colder than it is today. During that time, glaciers extended down into the U.S.

It has been estimated that 10% of emissions around the world come from cars and light trucks, and about 2% to 3% comes from airliners. Power plants account for about 40% of the greenhouse gas emissions. Other sources include industrial uses, heating of buildings, and land use changes. With normal driving of about 12,000 to 14,000 miles per year, an average SUV will emit a ton of CO₂ in 1,300 miles while the average

The Keeling Curve



SOURCE: Scripps Institute of Oceanography

The Keeling Curve, named after scientist Charles Keeling, indicates a gradual increase in atmospheric CO₂ from around 315 ppm in 1958 to about 379 ppm in 2005.

hybrid will produce the same amount of CO₂ in 6,000 miles.

How does this relate to Florida? The winter of 2006–2007 had temperatures ranging from 1°F to 3°F above normal. While there have been droughts before, the drought in the spring of 2007 was one of the worst in the past 50 years. South Florida was hit particularly hard. The level of Lake Okeechobee dropped to below 9 feet above sea level — a record low. Numerous forest fires in the southeast in May caused ash to fall in Gainesville and smoke to be noticed throughout much of Florida. The Climate Prediction Center predicts that Florida temperatures will be above average from June 2007 until March 2008.

The recent drought and warm temperatures are short-term weather conditions that can change. The prediction for the summer of 2007 is that there will be an active hurricane season and that would certainly affect rainfall levels. However, most scientists feel that over the long run, global warming is occurring, and it will have a strong impact on Florida. Glacial ice cores and air quality changes atop a Hawaiian volcano are not so far afield from what is happening in the Sunshine State after all.