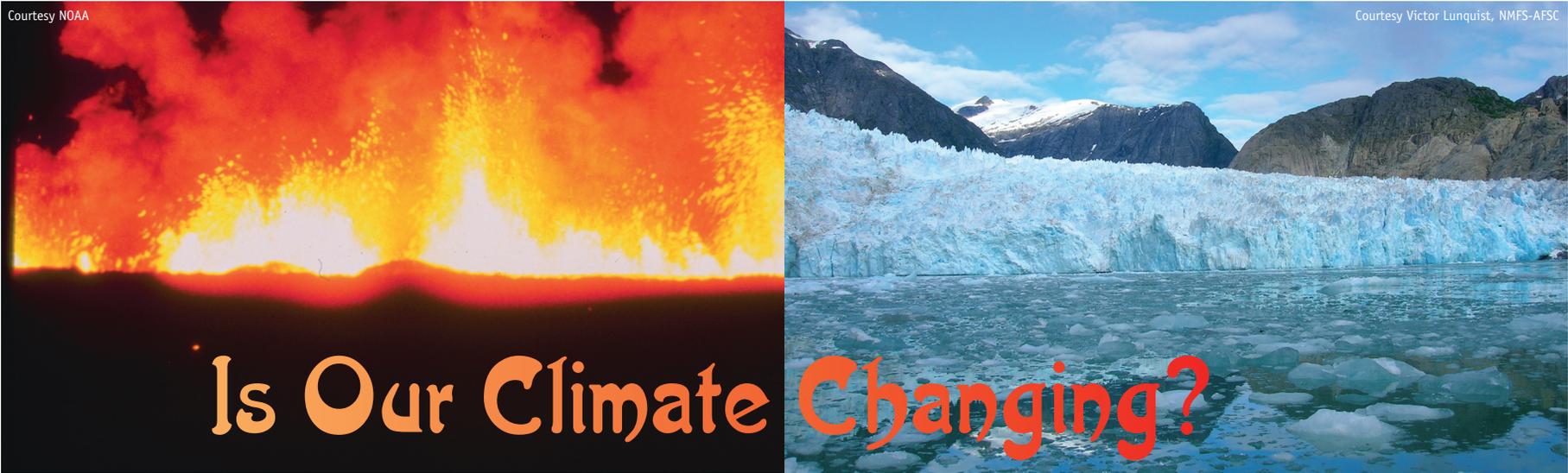


Courtesy NOAA

Courtesy Victor Lunquist, NMFS-AFSC



# Is Our Climate Changing?

**We hear and read a lot about climate change. What does this mean? Is it really happening?**

## What's the difference between weather and climate?

*Weather is what is happening in the atmosphere right now. Climate is what the weather is likely to be in a particular place over a long period of time. If you want to know the temperature in your community today, you're talking about weather. If you want to know what the temperature is likely to be a year from now, you're talking about climate. In other words, climate is what we expect, weather is what we get.*

*Climate usually involves the average weather conditions in a particular place or geographic region (for example, the northeastern United States) over a period of 30 – 50 years. So if your parents say that winters were colder when they were growing up, they are saying that the weather they experienced then was different from the weather they expect today, and this is what we call a change in climate.*

## Some Facts About Earth's climate

- Since the middle of the 1800's, Earth's average temperature has warmed about 1°F.
- 1°F doesn't sound like much, but it's important to realize that Earth's average temperature is warmer now than it has been at any time since at least 1400 AD. We say "at least" because 1400 AD is as far back as scientists have good estimates of temperatures. There is other evidence that suggests Earth's temperature is warmer now than it has been in many thousands of years, maybe nearly 100,000 years.
- On Earth today, mountain glaciers are melting, springtime snow cover is reduced, the temperature of the ground has been increasing, and sea levels have risen by several inches in the last 100 years.

### Why is This Happening?

There are several possible explanations:

- The Sun may be getting brighter;
- Maybe it's just part of natural cycles in Earth's climate; or
- Human activities that release carbon dioxide, methane and other gases into Earth's atmosphere are increasing the natural "greenhouse effect" that keeps Earth's surface warm.

### Scientists investigating these possibilities have found that

- If the Sun were getting brighter, this would warm Earth's surface as well as the lower and upper atmosphere. But the upper atmosphere is cooling and the Sun hasn't gotten a lot brighter.
- Natural cycles would warm some regions and cool others, back and forth at different times. But the warming has been going on for a long time, and the pattern of warming doesn't change very much.
- The amount of climate change that would be expected from human activities closely match the changes that have actually happened.

### So Earth is Getting Warmer - So What?

- Sickness and deaths due to heat stress will increase during summer months;
- Tropical diseases will be able to spread farther north and south of the equator;
- Heating bills will go down, but air conditioning costs will increase;

- Earlier springtime warming will help farming in some regions, but hotter and drier summers will likely reduce agricultural production in other places;
- Changes in storm systems and snowfall will affect water supplies;
- Rising sea levels will require levees to protect cities, coastlines will move inland, and some islands will have to be abandoned;
- Changing temperatures and rainfall patterns will disrupt forest and grassland ecosystems;
- Melting polar ice caps may eliminate the habitat of arctic species and lead to the extinction of animals such as polar bears.

So, the world will not end, but it will be different from the world we know today.

### What Can We Do About Climate Change?

Coal, oil, and natural gas provide more than 80% of the world's energy and produce many of the gases that contribute to climate change. Right now, there is no way to completely replace these fuels, but there is still a lot that can be done. Three important steps are:

- Use energy more efficiently;
- Choose products that reduce energy use; and
- Participate in recycling.

In addition, we need to use products that require less energy to produce, and find ways to use other sources of energy like wind and solar power.



### For More Information

[www.climate.noaa.gov/](http://www.climate.noaa.gov/) — Web site for NOAA's Climate Program Office

[www.climate.noaa.gov/education/](http://www.climate.noaa.gov/education/) — Education Resources from NOAA's Climate Program Office

[www.ngdc.noaa.gov/paleo/ctl/index.html](http://www.ngdc.noaa.gov/paleo/ctl/index.html) — Web site for the Climate TimeLine with information on the causes and effects of climate change, and how they are related to our everyday lives and to human history; from NOAA's National Climatic Data Center, Paleoclimatology Branch

[www.climatescience.gov](http://www.climatescience.gov) — Web site for the U.S. Climate Change Science Program

[www.usgcrp.gov](http://www.usgcrp.gov) — Web site for the U.S. Global Change Research Program

*This overview is based on "Is the Climate Changing? Indeed It Is," by Michael MacCracken, Director of the Office of the U.S. Global Change Research Program, and Tom Karl, Senior Scientist, National Climatic Data Center, NOAA; <http://www.usgcrp.gov/usgcrp/documents/mbralmnac.html>*