



## CLIMATE CHANGE

Climate change will cause sea level rise, air pollution, and more frequent and extreme weather events, such as heat waves, droughts, heavy rainfall events, flooding, massive snowstorms, and more intense storms with high winds, hail, and tornadoes.

The difference between weather and climate is a measure of time. Weather is what the atmospheric conditions are over a short period of time, whereas climate is how the atmosphere "behaves" over relatively long periods of time. They both represent the state of the atmosphere with respect to wind, temperature, cloudiness, moisture, and atmospheric pressure.

### **What is Weather?**

Weather is a short-term atmospheric condition occurring at a particular time and place. Rain, snow, wind, hurricanes, and tornadoes are weather events.

### **What is Climate?**

"Climate" describes the prevailing weather conditions occurring in a region over a 30-year period or longer. Snow is expected in the Northeast in January just as hot and humid conditions are expected in the Southeast in July.

### **What is Climate Change?**

Climate change is a non-random change in climate that is measured over several decades or longer. Climate change may be due to natural or man-made causes that alter the composition of gases in the atmosphere.

### **What are the layers of the Earth's atmosphere?**

The atmosphere consists of several layers: the troposphere, stratosphere, mesosphere, ionosphere, and exosphere. The troposphere, the layer we associate with weather, is closest to Earth. Most of the visible clouds in the sky are in the troposphere. Extending up to 10 miles above Earth's surface, the troposphere contains a variety of gases: water vapor, carbon dioxide, methane, nitrous oxide, and others. These gases help retain heat, a portion of which warms the surface of Earth (greenhouse effect). Changes in the composition of these atmospheric gases have a dramatic impact on Earth's climate.

Above the troposphere is the stratosphere, which extends from about 10 to 30 miles above the Earth's surface. It includes the ozone layer. Ozone molecules absorb ultraviolet radiation from the Sun, protecting us from its harmful effects.

Thirty to 50 miles above the surface is the mesosphere, the coldest part of the atmosphere. Above the mesosphere is a layer called the ionosphere (also called the thermosphere). Temperatures in the ionosphere, which extends about 50 to 180 miles from the surface of Earth, can reach up to several thousand degrees Fahrenheit. Beyond the ionosphere is the exosphere, which extends about 500 miles above the surface of Earth. This is the outermost layer of earth's atmosphere, the transition zone into space.

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## **What are temperature and precipitation extremes?**

Extreme temperatures are unusually high, such as extreme heat and heat waves; or unusually low, such as extreme, bitter cold. Precipitation extremes occur when there is excess rain, snow, hail, sleet, or ice, which can cause flooding; or when there are prolonged dry periods, causing droughts.

## **How do temperature extremes impact health?**

Extreme cold impacts the homeless and vulnerable populations such as the elderly, those with disabilities, and children, without protective clothing and shelter. Extreme cold weather is a dangerous situation that can bring on health emergencies in susceptible people, such as those without shelter, outdoor workers, and those who work in an area that is poorly insulated or without heat. What constitutes cold stress and its effects can vary across different areas of the country. Whenever temperatures drop decidedly below normal and as wind speed increases, heat can more rapidly leave your body. These weather-related conditions may lead to serious health problems.

Extreme heat events cause hospitalizations and death from heat stroke, cardiovascular disease, respiratory disease, and cerebrovascular disease. Greater numbers of hospital admissions for cardiovascular, kidney, and respiratory disorders occur during heat waves. The elderly, those with disabilities, and people with chronic health issues such as cardiovascular and respiratory diseases, are at risk for health problems caused by temperature extremes. If these groups live in urban areas, they are at increased risk of suffering from urban heat islands. The term "heat island" describes built up areas that are hotter than nearby rural areas.

Fortunately, some illness and death risks have diminished in recent years due to better forecasting, early warning systems, and greater access to air conditioning during periods of extreme heat and warmth during extreme cold conditions.

## **How do precipitation extremes impact health?**

Extreme precipitation and tropical storms cause severe flooding and flash floods. In these situations, public health measures are to help provide emergency shelters. Following a storm, standing and polluted water can cause waterborne disease outbreaks. Mold can grow in damp indoor environments, causing coughing, wheezing, an increase in asthma, and lower respiratory tract infections such as pneumonia, respiratory syncytial virus (RSV), and RSV pneumonia.

### Sources:

<http://www.eo.ucar.edu/basics/>

<http://www.cdc.gov/niosh/topics/coldstress/>

<http://climate.nasa.gov/>