

## WHITE HOUSE INITIATIVE ON GLOBAL CLIMATE CHANGE

 

### Climate Change Over the Past 100 Years

[President & First Lady](#)[Vice President & Mrs. Gore](#)[Record of Progress](#)[The Briefing Room](#)[Gateway to Government](#)[Contacting the White House](#)[White House History](#)[White House Tours](#)

Global surface temperature has been measured since 1880 at a network of ground-based and ocean-based sites. Over the last century, the average surface temperature of the Earth has increased by about 1.0° F. The eleven warmest years this century have all occurred since 1980, with 1995 the warmest on record. The higher latitudes have warmed more than the equatorial regions.



Beginning in 1979, satellites have been used to measure the temperature of the atmosphere up to a height of 30,000 feet. The long-term surface record and the recent satellite observations differ, but that fact is not surprising: the two techniques measure the temperature of different parts of the Earth system (the surface, and various layers of the atmosphere). In addition to this, a variety of factors, such as the presence of airborne materials from the 1991 eruption of the volcano Mt. Pinatubo, affect each record in a different way. Satellite observations were initially interpreted as showing a slight cooling, but more recent analyses accounting for natural, short-term fluctuations imply warming, just as the ground-based measurements have indicated over a longer time period. As more data from the satellite record become available, and as the quality of measurements is improved, comparison of these two records should yield additional insights.



What does warming do? A warmer Earth speeds up the global water cycle: the exchange of water among the oceans, atmosphere, and land. Higher temperatures cause more evaporation, and soils will tend to dry out faster. Increased amounts of water in the atmosphere will mean more rain or snow overall. We may be seeing the first signs of changes in the water cycle. Since the beginning of the century, precipitation in the United States has increased by about 6 percent, while the frequency of intense precipitation events (heavy downpours of more than two inches per day) has increased by 20 percent. Such events can cause flooding, soil erosion, and even loss of life. In some midcontinental areas, increased evaporation has led to drought because the heavy rains fell elsewhere.

There is also evidence that ecosystems are reacting to warming. Between 1981 and 1991, the length of the growing season in the northern high latitudes (between 45° and 70° N) increased by a total of up to twelve days, as documented by satellite imagery. Greening in spring and summer occurred up to eight days earlier, and vegetation continued to photosynthesize an estimated four days longer.

Global mean sea level has risen 4 to 10 inches over the last 100 years, mainly because water expands when heated. The melting of glaciers, which has occurred worldwide over the last century, also contributes to the rise. Formerly frozen soils (permafrost) in the Alaskan and Siberian arctic have also begun to melt, damaging both ecosystems and infrastructure. Melting and tundra warming will also lead to decay of organic matter and the release of trapped carbon and methane, creating an additional source of greenhouse gases.