

STUDY FINDS WARMING TREND THAT COULD RAISE SEA LEVELS

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ABSTRACT (ABSTRACT)

The seven atmospheric scientists predict a global warming of "almost unprecedented magnitude" in the next century. It might even be sufficient to melt and dislodge the ice cover of West Antarctica, they say, eventually leading to a worldwide rise of 15 to 20 feet in the sea level. In that case, they say, it would "flood 25 percent of Louisiana and Florida, 10 percent of New Jersey and many other lowlands throughout the world" within a century or less.

Their conclusion that the climate has warmed by almost one degree in the last century is based on a re-analysis of global observations, paying special attention to the Southern Hemisphere. "The common misconception that the world is cooling," they say, "is based on Northern Hemisphere experience to 1970."

As "an appropriate strategy," the report proposes emphasis on energy conservation and development of alternative energy sources while using fossil fuels "as necessary" in the coming decades.

FULL TEXT

A team of Federal scientists says it has detected an overall warming trend in the earth's atmosphere extending back to the year 1880. They regard this as evidence of the validity of the "greenhouse" effect, in which increasing amounts of carbon dioxide cause steady temperature increases.

The seven atmospheric scientists predict a global warming of "almost unprecedented magnitude" in the next century. It might even be sufficient to melt and dislodge the ice cover of West Antarctica, they say, eventually leading to a worldwide rise of 15 to 20 feet in the sea level. In that case, they say, it would "flood 25 percent of Louisiana and Florida, 10 percent of New Jersey and many other lowlands throughout the world" within a century or less.

Workings of Greenhouse

The forecast, which also envisions widespread disruption of agriculture, is the fruit of analyses and computer simulations conducted by the Institute for Space Studies of the National Aeronautics and Space Administration. The institute, which is in New York City, is part of the space agency's Goddard Spaceflight Center in Greenbelt, Md. The forecast is in an article in the Aug. 28 issue of the journal Science.

Carbon dioxide in the atmosphere, which is primarily a result of mankind's burning of fuels, is thought to act like the glass of a greenhouse. It absorbs heat radiation from the earth and its atmosphere, heat that otherwise would dissipate into space. Other factors being equal, the more carbon dioxide there is in the atmosphere, the warmer the earth should become, according to the theory.

A century ago the amount of carbon dioxide in the air was 280 to 300 parts per million. It is now 335 to 340 parts per million and it is expected to be at least 600 parts per million in the next century.

The possibility that the greenhouse effect could alter the earth's temperature has long been debated. Scientists have agreed that carbon dioxide is increasing, but disagree on whether temperatures are also increasing.

The major difficulty in accepting the greenhouse theory "has been the absence of observed warming coincident with the historic carbon dioxide increase," the scientists wrote.

Researchers were further confounded by an apparent cooling trend since 1940. As a result, many atmospheric scientists concluded that the climatic effects of increased carbon dioxide might not become detectable for many decades. But the Government scientists say they see clear evidence that carbon dioxide added to the atmosphere since the Industrial Revolution has already warmed the climate.

If fuel burning increases at a slow rate with emphasis on other energy sources, the study predicts a global temperature rise in the next century of about 5 degrees Fahrenheit. If fuel use rises rapidly, which some believe may occur as the developing countries industrialize, the predicted rise is from 6 to 9 degrees.

Even the more moderate rise of 5 degrees, the authors say, would result in higher average temperatures than were reached in the period between the last two ice ages. At that time sea levels were 30 feet higher than they are today, probably because West Antarctica was ice free. The climate "would approach the warmth of the Mesozoic, the age of dinosaurs," the report says.

The study's conclusions are likely to be challenged on two counts: their detection of a trend of temperature increase and linking it with a carbon dioxide increase, and their projections of the consequences of the increase.

A leading participant in past carbon dioxide studies has been Dr. Stephen H. Schneider of the National Center for Atmospheric Research in Boulder, Colo. Reached by telephone there, he said the conclusions about the extent of warming and how quickly it will occur would be reasonable if the assumptions on which they are based prove valid, but that many can be challenged.

One of these is the space agency group's contention that a cooling trend in recent decades was caused by dust from volcanic eruptions high in the atmosphere. If that was not the case, their model might be seriously flawed.

Other assumptions open to challenge include such uncertain factors as population growth rates, energy-consuming trends in the developing world, new developments in solar energy and other alternative energy sources, trends in energy conservation and lack of knowledge regarding the extent to which oceans might remove carbon dioxide from the air.

These uncertainties are, to a large extent, recognized in the new report, signed by Dr. James Hansen and six colleagues at the space studies institute.

In their analysis, the scientists seek to respond to an outspoken skeptic regarding the carbon dioxide threat, Dr. Sherwood B. Idso, a climate specialist with the Federal Department of Agriculture in Phoenix. Last March he circulated an analysis saying that a doubling or tripling of atmospheric carbon dioxide would have little effect except to increase global agricultural productivity by 20 to 50 percent.

Plants grow by converting carbon dioxide and water into carbohydrates and other compounds, aided by solar energy. One proposed strategy to limit the growth of atmospheric carbon dioxide would be to plant extensive forests.

Dr. Hansen and his colleagues cite the observed surface temperatures of Mars and, particularly, Venus as support for their predicted greenhouse effect. The surface of Venus, with an atmosphere formed largely of carbon dioxide, is at about 900 degrees Fahrenheit.

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Illustration

graph of changes in global mean temperature

DETAILS

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