

Carbon dioxide already in danger zone, warns study

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A group of 10 prominent scientists says that the level of globe-warming carbon dioxide in the air has probably already reached a point where world climate will change disastrously unless the level can be reduced in coming decades. The study is a departure from recent estimates that truly dangerous levels would be reached only later in this century. The paper appears in the current edition of the *Open Atmospheric Science Journal*.

"There is a bright side to this conclusion," says lead author James E. Hansen, director of the Goddard Institute for Space Studies, part of Columbia University's Earth Institute. "By following a path that leads to lower CO₂, we can alleviate a number of problems that had begun to seem inevitable." Hansen said these include expanding desertification, reduced food harvests, increased storm intensities, loss of coral reefs, and the disappearance of mountain glaciers that supply water to hundreds of millions of people.

The scientists say now that CO₂ needs to be reduced to the level under which human civilization developed until the industrial age—about 350 parts per million (ppm)—to keep current warming trends from moving rapidly upward in coming years. The level is currently at 385 ppm, and rising about 2 ppm each year, mainly due to the burning of fossil fuels and incineration of forests. As a result, global temperatures have been creeping upward. The authors say that improved data on past climate changes, and the pace at which earth is changing now, especially in the polar regions, contributed to their conclusion. Among other things,

ongoing observations of fast-melting ice masses that previously helped reflect solar radiation, and the release of stored-up "greenhouse" gases from warming soils and ocean waters, show that feedback processes previously thought to move slowly can occur within decades, not millennia, and thus warm the world further. Once CO₂ gas is released, a large fraction of it stays in the air for hundreds of years.

The scientists, from the United States, United Kingdom and France, are optimistic that current atmospheric CO₂ could be reduced if emissions from coal, the largest contributor, are largely phased out by 2030. Use of unconventional fossil-fuel sources such as tar sands also would have to be minimized, they say. They predict that oil use will probably decline anyway as reserves shrink. So-called "geoengineering" solutions that would remove CO₂ from the air have been proposed by others, but the group is skeptical; they estimate that artificially removing 50ppm of CO₂ from the atmosphere would cost at least \$20 trillion, or twice the current U.S. national debt. They suggest that reforestation of degraded land and use of more natural fertilizers could draw down CO₂ by a similar amount.

"Humanity today, collectively, must face the uncomfortable fact that industrial civilization itself has become the principal driver of global climate," says the paper. "The greatest danger is continued ignorance and denial, which would make tragic consequences unavoidable."

The paper, "Target Atmospheric CO₂: Where Should Humanity Aim?" is at: www.bentham.org/open/toascj/openaccess2.htm, pages 217-231 .

Source: The Earth Institute at Columbia University

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