

Decisive action needed as warming predictions worsen, says expert

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Greenhouse gases in the atmosphere are rising more rapidly than expected, increasing the danger that without aggressive action to reduce emissions the climate system could cross a critical threshold by the end of the century, warns a leading member of the Nobel Prize-winning Intergovernmental Panel on Climate Change. Studies indicate that greenhouse warming could trigger a vicious cycle of feedback, in which carbon dioxide released from thawing tundra and increasingly fire-prone forests drives global temperatures even higher.

Chris Field, director of the Carnegie Institution's Department of Global Ecology and co-chair of the IPCC Working Group 2, will address these issues at a symposium titled "What Is New and Surprising since the IPCC Fourth Assessment?" at the annual meeting of the American Association for the Advancement of Science (AAAS) in Chicago.

The IPCC Fourth Assessment, for which Field was a coordinating author, was published in 2007. As co-chair, Field will oversee the Working Group 2 Report on the predicted impacts of climate change for the IPCC Fifth assessment, scheduled to be published in 2014. The Fifth Assessment will incorporate the results of new studies that predict more severe changes than did previous assessments.

"The data now show that greenhouse gas emissions are accelerating much faster than we thought," says Field. "Over the last decade developing countries such as China and India have increased their electric power generation by burning more coal. Economies in the

developing world are becoming more, not less carbon-intensive. We are definitely in unexplored terrain with the trajectory of climate change, in the region with forcing, and very likely impacts, much worse than predicted in the fourth assessment."

New studies are also revealing potentially dangerous feedbacks in the climate system that could convert current carbon sinks into carbon sources. Field points to tropical forests as a prime example. Vast amounts of carbon are stored in the vegetation of moist tropical forests, which are resistant to wildfires because of their wetness. But warming temperatures and shifting rainfall patterns threaten to dry the forests, making them less fireproof. Researchers estimate that loss of forests through wildfires and other causes during the next century could boost atmospheric concentration of CO₂ by up to 100 parts per million over the current 386 ppm, with possibly devastating consequences for global climate.

Warming in the Arctic is expected to speed up the decay of plant matter that has been in cold storage in permafrost for thousands of years.

"There is about 1,000 billion tons of carbon in these soils," says Field.

"When you consider that the total amount of carbon released from fossil fuels since the beginning of the Industrial Revolution is around 350 billion tons, the implications for global climate are staggering."

"The IPCC fourth assessment didn't consider either the tundra-thawing or tropical forest feedbacks in detail because they weren't yet well understood," he says. "But new studies are now available, so we should be able to assess a wider range of factors and possible climate outcomes. One thing that seems to be certain, however, is that as a society we are facing a climate crisis that is larger and harder to deal with than any of us thought. The sooner we take decisive action, the better our chances are of leaving a sustainable world to future generations."

Source: Carnegie Institution

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