Indications that Climate Is Changing Faster than Anticipated
A Sample of Peer-Reviewed Studies From 2007

The Intergovernmental Panel on Climate Change (IPCC) is an international body of 2,500 scientists dedicated to assessing the "risk of human-induced climate change." The IPCC's Assessment Reports are the most comprehensive and reliable statements of what the world's scientists currently know about climate change. This consensus document is produced through a rigorous three- or four- year process that requires the review of thousands of individual peer-reviewed articles by hundreds of scientists and editors, followed by a collaborative writing process to summarize them. In the case of the Fourth Assessment Report of 2007, that process required the IPCC to limit the literature reviewed to articles published or in press by the end of 2005. While that cut-off ensures the IPCC only reports on the science that has been broadly supported, it does limit consideration of the most recent scientific findings. The latest science shows that a number of the Earth's natural and physical systems are changing far more rapidly or intensely than previously thought. A number of these are listed and summarized below.

CO_2 Concentrations Rise as Emissions Increase, Sinks Decrease

Growth of Atmospheric CO_2 Faster than Expected

Atmospheric carbon dioxide growth has increased 35% faster than expected since 2000. Levels of greenhouse gases are rising about 2.5 times faster this decade than they did during the 1990s due to rapid economic growth, increases in carbon intensity and a decline in the efficiency of ocean and land CO_2 sinks.

"Contributions to accelerating atmospheric CO2 growth from economic activity, carbon intensity, and efficiency of natural sinks"
Publication of the National Academy of Sciences, October 2007[1]

CO_2 Saturation of Southern Ocean Will Increase the Rate of Rising Temperatures

Atmospheric CO_2 levels may rise faster and bring about rising temperatures more quickly than previously anticipated, according to a new analysis that finds the Southern Ocean (ocean areas below the 60˚S latitude), the earth's biggest carbon sink, has become CO_2-saturated. The ocean hasn't absorbed any additional CO_2 since 1981, but CO_2 emissions have increased by 40% since that year.

"Saturation of the Southern Ocean CO2 Sink Due to Recent Climate Change"
Science, June 22, 2007[2]

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North Atlantic Carbon Sink Has Reduced Uptake by Half

Oceans are leaving CO_2 in the atmosphere. Anthropogenic climate change has upset the ocean-processes that allow normal carbon uptake. Reduced heat loss has slowed North-Atlantic ocean circulation, which consequently inhibits absorption. Ocean sinks have increased in the past as atmospheric CO_2 increased. Study scientists said they knew this would slow, but they are surprised at the rate at which it has occurred.

"A variable and decreasing sink for atmospheric CO_2 in the North Atlantic"
Journal of Geophysical Research, Nov. 2007[3]

Rising Ozone Stifles Plant Absorption of CO_2

Rising levels of ozone pollution over the coming century will erode the ability of plants to absorb carbon dioxide from the atmosphere. Atmospheric CO_2 at higher levels increases the likelihood of expressed climate disruption.

"Carbon sinks threatened by increasing ozone"
Nature, July, 26, 2007[4]

Federal Insurers Fail to Face Fiscal Threat from Global Warming

A recent study by the General Accountability Office found that the Federal Crop Insurance Program and the National Flood insurance Program have not begun updating their risk assessment practices to account for changes in weather due to global warming. But private insurers are adopting new practices including controlling exposure by reducing policies in catastrophic areas, and re-pricing to account for harsher impact per event. These actions will transfer risk to the policyholder and the public sector, making federal analysis all the more necessary.

"Federal Risks to Federal and Private Insurers in Coming Decades are Potentially Significant"
United States Government Accountability Office, March 2007[5]

More Rainfall Linked to Increasing Global Temperatures

The total amount of water in the atmosphere will increase in correlation with global warming. Humidity and precipitation observations, show increases during the past 20 years at the same rate as global temperature increases, resulting in more rainfall than predicted by models. Crop-rotting and river flooding are two possible implications, while mid and low deserts will experience more temperature warming than rainfall (UNEP).[6]

"How Much More Rain Will Global Warming Bring?"
Science, July 13, 2007[7]

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[1] J. Canadell *et al*., "Contributions to accelerating atmospheric CO2 growth from economic activity, carbon intensity, and efficiency of natural sinks," *Proceedings of the National Academy of Sciences*, (October 2007), http://www.pnas.org/cgi/reprint/0702737104v1

[2] C. Le Quéré *et al*., "Saturation of the Southern Ocean CO2 Sink Due to Recent Climate Change," *Science* (May 2007), <http://lgmacweb.env.uea.ac.uk/lequere/publi/Le_Quere_et_al_Science_reprint_2007.pdf>.

[3] Ute Schuster and Andrew Watson, "A variable and decreasing sink for atmospheric CO_2 in the North Atlantic," *Journal of Geophysical Research* (Nov, 2006, vol. 112), <http://lgmacweb.env.uea.ac.uk/ajw/Reprints/Schuster_Watson_JGR_in_press.pdf>.

[4] Michael Hopkin, "Carbon Sinks Threatened by Increasing Ozone," *Nature*, 448, pp. 396-97 (2007), <www.nature.com/doifinder/10.1038/448396b>.

[5] United States Government Accountability Office, *Climate Change: Future Risks to Federal and Private Insurers in Coming Decades are Potentially Significant*, GAO-07-285, <www.gao.gov/new.items/d07285.pdf>.

[6] United Nations Environment Programme, "Deserts and Global Climate," (2006) <www.unep.org/geo/GDOutlook/045.asp>.

[7] Frank J. Wentz *et al*., "How Much More Rain Will Global Warming Bring?", *Science*, 317:5835 (July 13 2007), pp. 233-235, <www.sciencemag.org/cgi/content/abstract/1140746>.

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