

Three Degrees of Consensus, *Science*, August 13, 2004

Researchers have convinced themselves that the world has indeed warmed by 0.6° C during the past century. And they have concluded that human activities—mostly burning fossil fuels to produce the greenhouse gas CO₂—have caused most of that warming.

But how warm could it get? How bad is the greenhouse threat anyway?

Increasingly sophisticated climate models seem to be converging on a most probable sensitivity. Almost all the evidence points to 3 degrees C as the most likely amount of warming for a doubling of CO₂. That kind of sensitivity could make for a dangerous warming by century's end, when CO₂ may have doubled.

At the same time most attendees doubted that climate's sensitivity to doubled CO₂ could be much less than 1.5 degrees C. That would rule out the feeble greenhouse warming espoused by some greenhouse contrarians.

But at the high and especially dangerous end of climate sensitivity, confidence faltered; an upper limit to possible climate sensitivity remains highly uncertain.

Already the Day After Tomorrow?

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Hansen, et al.

The concern raised by Hollywood of thermohaline circulation (THC) has become a public theme. In the present-day ocean, THC drives the overflows, which together with the entrained water feed most of the North Atlantic Deep Water Flow.

This is the reason why people worry about a possible weakening of the THC. In the coming decades, global change via atmospheric pathways is expected to increase the freshwater supply to the Arctic. This will reduce the salinity and hence the density of surface waters, and thereby may reduce ventilation. Even if the ventilation comes to a total halt, this will not stop the overflows immediately, because the reservoir of dense water north of the Ridge stabilizes the overflow. Instead the supply of NADW would diminish in a matter of decades.

The potential weakening of the THC would affect the deep waters of the world ocean in the long run, but would have a more immediate effect on the climate of some regions.

