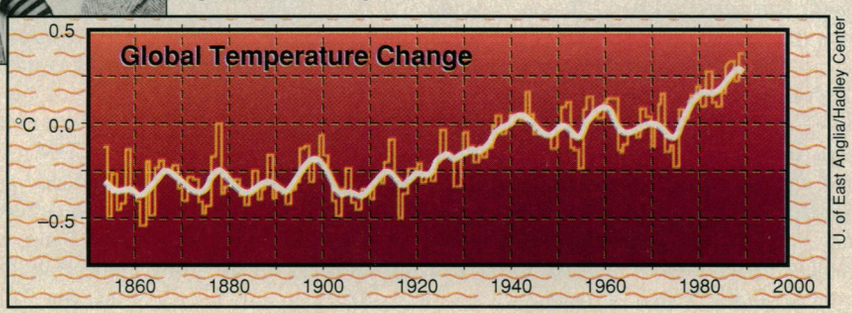
Global Temperature Hits Record Again

Experts debate last year's record warmth while James Hansen cashes in on his claim that the greenhouse is here

GREENHOUSE EXPERT JAMES HANSEN IS confident that the greenhouse warming is here, so confident in fact, that last summer he offered to bet all comers that one of the first 3 years of the 1990s would be the warmest ever recorded. He won that bet last week—and at his first opportunity. According to three major measures of global temperatures, 1990 was the hottest year on record.

But does Hansen's win mean he's right in believing that the accumulation of greenhouse gases is the cause of the modest temperature increase, amounting to a few tenths of a degree, that's occurred during the past 20 years? Ask a man who put his money where his mouth is. "I think he lucked out," says climatologist Hugh Ellsaesser of Lawrence Livermore National Laboratory, who's just written a $100 check to Hansen. "It doesn't change my opinion of what's going on," says the only researcher to take Hansen up on his bet. Ellsaesser still believes that it's too soon to conclude that greenhouse warming is here. The temperature increase seen so far, he points out, is still no greater than the natural year-to-year and decade-to-decade temperature variability.

A betting man. *Climate expert James Hansen believes increasing greenhouse gases are causing the current warm*



And Ellsaesser is not just being a sore loser. Most climatologists agree with him that a short and still modest warming cannot be conclusively linked to greenhouse gases. Reading significance into a particular year's temperature is even more foolhardy, they say. The 1990 record "doesn't relate one way or the other to whether we have a greenhouse warming going on," says climatologist Chester Ropelewski of the National Oceanic and Atmospheric Administration's Climate Analysis Center in Camp Springs, Maryland.

Hansen agrees that one year by itself, even one that set a new record, is unimportant, but he does see some significance in his win. His bet "was not 100% certain," he says, "but it was a good bet." Although he recognizes that global temperatures fluctuate, he maintains that it's now very difficult for the climate system to cool down for more than a few years because "it's being pushed pretty hard by greenhouse gases toward a warmer climate." The past year could have been a fluke, he says, but the underlying trend was on his side when he bet on at least one record in 3 years.

Buoyed by his confidence in this trend, Hansen, who is director of NASA's Goddard Institute for Space Studies in New York City, set stringent standards for winning the bet: All three sets of long-running global temperature observations—those going back at least three decades—had to hit new records. And they did.

Hansen himself keeps track of land surface temperatures, and he found that the globe was 0.45°C warmer than normal in 1990. (The normal is the average temperature during the period 1951 through 1980.) That's a whopping increase considering that the entire global warming of the past 100 years is thought to be only 0.4°C. Only around Greenland were the temperatures substantially below normal. Meanwhile, the eastern United States and Eurasia basked in temperatures more than 1°C above normal.

The records produced by the two other data sets proved to be less spectacular, but nonetheless sufficient to win Hansen's bet. Climatologists Philip Jones of East Anglia University in Norwich and David Parker of the Hadley Center for Climate Prediction and Research in Bracknell, England, include ocean surface temperatures as well as land temperatures in their analysis. By their reckoning, 1990 was 0.39°C above normal, clearly beating out the previous record of 0.35°C in 1988. And, clinching Hansen's bet, James Angell of NOAA in Silver Spring, Maryland, found temperatures between altitudes of 1.5 and 9 kilometers to be just 0.02°C above the previous record in 1988. The difference is not statistically significant, says Angell, but that was not necessary for Hansen to win.

In addition to 1990's record temperatures, there are other, more subtle signs that the buildup of greenhouse gases is behind the recent warming, Hansen says. The surface temperatures measured last year, especially over the land, roughly conform with projections of greenhouse warming made by Hansen's own climate model. Moreover, Hansen notes, the lower stratosphere has cooled during the past decade. Ironically, persistent stratospheric cooling would also be a sign that the greenhouse is here because stratospheric greenhouse gases radiate infrared energy to space. In fact, Angell found record cold in the lower stratosphere in 1990. The models also predict that the extensive oceans of the Southern Hemisphere should retard greenhouse warming there, but that hasn't occurred. Through most of the 1980s temperatures there had been increasing faster than those in the Northern Hemisphere. With the 1990 warming being particularly acute in the north, the Northern Hemisphere has now largely caught up, however.

Climatologists might debate the significance of these signs of a greenhouse warming, but there is one aspect of the 1990 climate that everyone finds intriguing. The temperature records of 1990 occurred without a contribution from El Niño, the surge of warm water that periodically appears in the equatorial Pacific and helps to raise global temperatures. The 1986–87 El Niño helped boost 1987, for example, to a record that 1988 only just surpassed. But 1990 hit even higher temperatures on its own. Moreover, the next El Niño boost could come soon. "Because an El Niño is expected [this year]," says Hansen, "it's likely that we're going to get still higher levels." Hold your money, though. No bets this time.

■ RICHARD A. KERR