



WORLD CLIMATE REPORT

Breaking news on the science and politics of global climate change



Feature/Testimony of Climate Reality

ver the years, WCR has accumulated a slew of names for us voices of reason in the climate change debate-all courtesy of some of our more concerned admirers. We recently heard the Green Politburo has dubbed us "the confusionists," with the notion that we are very effective at sowing doubt in the minds of poor, dumb voters. (At first we thought they meant "Confucianist," but then, if Confucius were alive today, he would likely be big on the Kyoto Protocol.)

The latest epithet follows hard on the heels of the recent "climate lobbyists" (from a 1997 editorial in Nature), which itself followed "climate lawyers"which for this issue's purposes, is our favorite. If only it were that simple: Climate lawyers presenting evidence before a jury who would judge a case on its merits and not media hype. This imagined scenario will prove that the jury is already "in" on climate change:

Exhibit A comprises the predictions for the next century from just about every climate model we can easily lay our lazy hands on. Each one of these models has an exponential (upward-curving) increase in the growth of greenhouse gases. Some grow them

too fast. Most (with the exception of the NASA models) add sulfate aerosols in to cool things down a bit.

Exhibit A demonstrates the Universal Law of Climate Models: Despite exponential greenhouse forcing, once greenhouse warming starts, it takes place at a constant rate.

Note that the model rates vary greatly. This collection, which is as representative of any we can find, gives a mean warming of 0.25°C per decade once warming starts. It doesn't matter whether it's the 1990s or the 2090s. A straight line is a straight line. Statistically, the two-thirds confidence limit about these trends is from 0.18°C per decade to 0.32°C per decade.

Exhibit B is the "global" temperature history from the United Nations Intergovernmental Panel on Climate Change. We have highlighted the temperature trend of the last three decades. It is right around +0.15°C per decade.

We now introduce our star witness, Dr. IPCC, to be interviewed by our advocate, a climate lawyer known as WCR:

WCR: Good morning, Dr. IPCC. Do you mind if I call

IPCC: Agree? I wrote it!

WCR: The whole world interpreted

that statement to mean that climate

was changing because of human



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MESQUITE NETTING More drought-resistant mesquite trees result from CO2 increases.

Deforestation for causes as much warming as CO2 emissions.

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Exhibit A: Output from seven different versions of GCMs. Hansen Scenario B has the midrange of exponential greenhouse effect changes. The NCAR, the HadCM2, and the GFDL all increase the effective greenhouse changes at a rate of 1 percent per year, which is clearly too high; we have adjusted these three to an increase of only 0.7 percent (dashed lines).

SOCIETY

NING EARTH

Page 3 THE FARMHOUSE EFFECT

influence on the greenhouse effect. Is that what you think? IPCC: [long pause] Uh, well, yes.

WCR: Let's look at Exhibit B. Is the observed rise in temperature in the last three decades a straight line with a warming of right around 0.15°C per decade?*

IPCC: It better be a straight line [laughs]! Otherwise all the models would be wrong!

WCR: And all these models have a constant, linear rise in temperature. So do the observations, correct? Tell me, how much does Exhibit B say the temperature will warm in the next 100 years?

IPCC: Well, it would be 10 times 0.15 degrees, or 1.5°C.

WCR: Excuse me, but isn't this the number that the so-called "skeptics" have been bandying about for years? I've got this 1989 Congressional testimony here...

IPCC: I think you're being unfair! I gave a range of from 1.5 to 4.5°C that same year. I was just being careful. I can't help it if the press always said "as much as 8°F." Though I have to say, it sure helped me push the Kyoto Protocol!

WCR: Now I direct your attention to Exhibit C [not shown], which shows winter vs. summer temperature histories. Are the rises in the last three decades also straight lines?

IPCC: Yes, just like the annual record.

WCR: Is it not true that the rate of change in the winter temperature is more than 40 percent larger than in the summer? What does that mean? IPCC: Well, it means that the human influence on climate is to warm the winters much more than the summers. If you work out the difference, it looks like winter temperatures will warm up about two degrees next century and summer temperatures only one. That is, of course, if you believe that the functional form of my models is correct.

WCR: You just told the court that the greenhouse effect is responsible for the warming of the last third of this century, and that most of the warming is in the winter. Just where is most of that warming?

IPCC: It's in Siberia! It appears that humans have warmed the coldest temperatures up there maybe two degrees, but we note very little summer change. The people there are very upset. They very much want to return to the climate of the Stalin era!

WCR: What you've said here is that the consensus of climate models is that the earth warms at a constant rate once it starts, and that human warming has started, and that it's a straight line, and that the "skeptics" were right after all, correct? In fact, one of them argued, years ago, that 1.5°C, mainly in the winter and at night, would be the end of the argument. You can still save face and say you were right—just at the low end. So everyone claims victory, is that it?

IPCC: No, we can't do that.

WCR: Why not?

IPCC: Do you know how many unemployed climate modelers that



Exhibit B. Observed global annual temperatures from 1960 through 1998, with the last 30 years' trend extended to 2100.

would leave? Don't you think the world owes them a living? / do! *This includes warming from all sources, among them greenhouse gases, solar brightening, land use changes, and so on.

Fight Drought, Add CO₂

Much of my home state of Arizona is suffering through a severe drought. Ranchers in the southern part of the state managed to get the governor to declare a drought disaster in an effort to import federal assistance. The grasslands have dried up, cattle and their ranchers are hurting, and more than a few reporters have called our office looking for "the cause." The disappearing La Niña was a popular culprit, but more than a few folks have asked about whether or not the latest climate calamity is somehow related to global warming.

Of course, droughts have come and gone for eons in this desert setting—with or without El Niño, La Niña, or any buildup of greenhouse gases.

The native desert plants in southem Arizona have suffered this type of water deprivation before, and they are well adapted to these variations in climate.

Among these desert flora is mesquite, a woody plant that has been made famous recently as a favorite charcoal for grilling meat. Steak houses throughout Phoenix and across the nation proudly advertise their mesquite-grilled specialties. And indeed, mesquite has become big business in the Great Southwest.

By Potien C. Sailing L. Ph.D Ancora State University

Mesquite appears in a recent issue of *Tree Physiology*, which reports that Polley and colleagues of the U.S. Department of Agriculture gathered seeds of the honey mesquite trees growing in the southwestern United States.

They planted the seeds and grew the plants in glasshouses with atmospheric carbon dioxide (CO₂) concentrations set at 370 parts per million (ppm) and 700 ppm for nine weeks in one experiment and 12 weeks in another. To simulate drought conditions, some of the seedlings were denied sufficient water, allowing the researchers to study the interactive effects of increased CO₂ and water stress.

Regular Greening Up readers can easily predict the results. Various measures of water-use efficiency revealed that elevated CO_2 increased the efficiency of the seedlings by 40 percent. Furthermore, the root and shoot biomass increased by 35 percent to nearly 50 percent due to the CO_2 enrichment. Finally, the elevated CO_2 more than doubled the survival rate of the mesquite seedlings exposed to the drought conditions.

The authors grew several different types of mesquite, but the results from their work varied little from one "family" to the next.

As many a national weather broadcast reminds us these days, droughts will be a part of the summer landscape for centuries to come. They neglect to remind us that droughts have been part of the summer landscape for millennia gone by.

Fortunately for the mesquite, CO_2 is rising, allowing plants to become more water efficient and less stressed by lower-than-normal soil moisture levels.

And since CO_2 causes a large increase in woody biomass, steak lovers worldwide can look forward to an abundance of mesquite to flavor up their favorite meals.

Reference:

Polley, H.W., et al., 1999. Growth, water relations, and survival of drought-exposed seedlings from six maternal families of honey mesquite (*Prosopis glandulosa*): Responses to CO₂ enrichment. *Tree Physiology*, **19**, 359–366.

What's Hot/

Land Cover Changes or Greenhouse Warming?

Human habitation has significantly altered the planet's surface, from the development of cities and suburbs to farms and range lands. To what extent have these land-cover changes influenced the observed trends in temperature over large regions?

Canadian researchers Walter Skinner and Jacek Majorowicz explored this question for northwestern North America, a region second only to Siberia in the size of its winter surface temperature increase over the last century.

When farms replace a forest, for example, the evapotranspiration and surface reflectivity change. This, in turn, affects the temperature and water content of the air, as well as the temperature of the land surface. Skinner and Majorowicz compared ground-surface temperatures (GST) taken from wells with near-surface air temperatures (SATs) collected from the historical records we commonly analyze.

When they compared the rates of temperature increase in the two data sets, they noted that "the climatic warming in this century in rural areas that have been subjected to land development has been greater than at the SAT sites than have not changed throughout the entire observation period." Their notion is that the SAT record is based on thermometers that have been sited in regions where the surroundings have changed little-thus, they record "atmospheric" warming plus some additional warming from large-scale land use changes. The GST record, on the other hand, is derived from regions where land use has changed significantly, mostly from the conversion of boreal forest or native grasslands to farm or range lands. These land-use changes have produced an added warming in the GST records as well as regional increases in SATs.

We take for granted that land use has some influence on temperature, but is the effect's magnitude even comparable to the impacts of increased carbon dioxide? Using a basic heat balance approach, it's easy to account for the various terms, including the transpiration rate of plants.

Recently, T.J. Lewis calculated that boreal forest transpiration uses from 2 to 6 Watts per square meter of energy. By comparison, the increase in radiative forcing from increasing greenhouse gases is about 2 Watts per square meter. When we convert these radiative forcings to actual temperatures, whereas greenhouse warming would produce about 0.6°C of warming, deforestation accounts for from 0.5° to 2.0°C. In other words, the impact of deforestation is at least comparable to if not greater than the greenhouse effect!

It's not possible at present to sort out the effects of land use vs. greenhouse warming. If these two forcings are comparable, land use changes will at least to some degree influence air temperature readings and could inflate the observed trends. That's no secret in city data analysis-but this new research reveals rural readings also evidence change. From this perspective, it's interesting that the largest regional warming is over Siberia, where significant deforestation has been occurring for some time.

Next time you see a global warming story attributing all of the high-latitude temperature increase to carbon dioxide, think about how the agricultural revolution also may have had a hand in it.

References:

Skinner, W.R. and J.A. Majorowicz, 1999, Regional warming and associated 20th-century land-cover changes in north-western North America. Climate Research, 21, 39-52.

Lewis, T.J., 1998, Geothermal evidence for deforestation induced warming: implications for the climatic impact of land development. Geophysical Research Letters, 25, 535-538.

Tree Rings False On Warming Signal

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Annual tree ring growth is frequently correlated to summer temperatures under the assumption that warm summers enhance tree growth. Scientists then use this correlation to reconstruct long-term temperature histories based on past tree-ring records.

Two recent studies, one led by Michael Mann and the other by Jonathan Overpeck, have relied on this correlation to extend annual global temperature records back many hundreds of years. But the temperature-tree-ring relationship seems to be stronger in the past than currently. Keith Briffa and colleagues, in a 1998 Nature article, found that during the last half of this century, temperatures as measured by thermometers have risen much more than the record of tree rings would have you believe. Briffa put forth a variety of explanations, including the possibility of increased summer droughts (although he could find no evidence of it), or perhaps that the long-standing relationship between tree rings and temperatures breaks down at high temperatures (although he could find no evidence for that one either). They never mentioned the possibility that perhaps the

thermometer measurements are a bit warm-biased due to land-use changes or other confounding influences.

Now comes a new study in Nature by E.A. Vaganov and four colleagues that provides an additional explanation.

When annual tree-ring widths are correlated with mean temperatures over consecutive five-day periods, it turns out the two are only significantly correlated in early summer (Figure 1). So while ring width is often interpreted as a proxy of summer temperature, it may be only a



Figure 1. Correlation between a tree-ring-width index and mean five-day temperatures at a site near the Ural Mountains in Russia. Statistically significant correlations occur when the bar extends above the horizontal line. At this site, tree-ring width correlates only with temperatures from mid-June through early July.

proxy for the temperature of a few weeks, not the entire season.

Snowfall, it turns out, complicates this relationship even further. Heavy snow in winter delays spring snow melt, and thus the beginning of the early summer growth spurt. To properly read tree rings, researchers must consider both snowfall and snow melt.

The authors propose this may account for the observed reduction in the sensitivity between high-latitude growth rates and summer temperatures over the past few decades. This just serves as another reminder that in studying global climate, things are never as simple as they might at first seem.

References: Briffa, K.R., et al., 1998, Reduced sensitivity of recent tree-growth to temperature at high northern latitudes. *Nature*, **391**, 678–682.

Mann, M.E., et al., 1999, Northern hemisphere millennial temperature reconstruction. *Geophysical Research Letters*, **26**, 759–762.

Overpeck, J.T., 1998, How unprecedented is recent Arctic warming?: A look back to the medieval Warm Period. Presented to the fall meeting of the American Geophysical Union, San Francisco, Calif.

Vaganov, E.A., et al., 1999, Influence of snowfall and melt timing on tree growth in subarctic Eurasia. *Nature*, **400**, 149–151.

Red Cross Morphs into Chicken Little

Look out, world," cried Chicken Little, "the sky is falling." Last month the International Federation of Red Cross and Red Crescent Societies (IFRC) issued an echoing cry of its own: the World Disasters Report 1999, predicting climate change will produce a decade of "super-disasters."

"In 1998," says the report, "natural disasters created more 'refugees'"—an alleged 25 million in all—"than wars and conflict." That is, if you lump soil fertility and deforestation with weather catastrophes.

Deforestation may indeed contribute to the buildup of greenhouse gases, but no one has argued that climate change reduces soil fertility or causes deforestation. Quite the contrary, a carbon dioxide increase promotes tree growth; a longer growing season also expands forests.

IFRC president Dr. Astrid Heiberg claims the combination of global warming and increasing poverty is producing a new scale of catastrophe. Poverty certainly makes people more vulnerable to natural disasters, but for three decades, world incomes have risen, while the number of people considered destitute has fallen. Only in Russia, following the collapse of the Soviet Union, and in parts of war-tom Africa have living standards declined.

Flood damage does stem from aboveaverage rainfall, but humans compound it by building on floodplain. Deforestation, poor housing practices, and a failure to prepare for abnormal precipitation cause the harm, not an hypothesized global warming. Even the IFRC report concedes the deforestation of the Yangtze basin caused the floods in China last year.

Heiberg says floods and earthquakes have caused a jump in Red Cross and Red

World Climate Report P.O. Box 455 Ivy, VA 22945 Crescent demand. We have yet to hear anyone, even Al Gore, claim that greenhouse gases cause earthquakes. Yet the IFRC portrays them as a danger to the "one-billion people [who] live in the world's unplanned shantytowns in cities located above dangerous earthquake zones."

The IFRC blames El Niño for the 1998 drought in Indonesia that led to huge manmade fires that fouled the air, dried up rice crops, and produced food riots in Jakarta. Although much of the 80 percent currency devaluation had other causes, the need to import rice helped push down the Indonesian rupiah's value. All tragic events, but nothing to do with global warming. After all, history shows this weather phenomenon dates back thousands of years, preceding any human fingerprint on the climate.

What about hurricanes? Global warming again, says the IFRC, though evidence suggests warming leads to fewer hurricanes (in fact, during the 1970s and 1980s, the number of intense hurricanes actually went down; 1991–1994 was the quietest period on record).

The IFRC publishes the World Disasters Report to raise funds. Whenever there is a major disaster somewhere, especially a media-intensive one, sympathetic donors flood the societies' coffers. Absent a currently compelling catastrophe, relief organizations' best strategy is to forecast major disasters. The more calamitous the future, the more people are likely to give. The specter of human-induced climate change adds a measure of guilt that promotes giving. Nevermind that past disasters for the most part have nothing to do with climate.

Without doubt the Red Cross and Red Crescent are worthy organizations that must be ready to move quickly when the next disaster strikes, as it inevitably will. In the interest of honesty, though, they should not claim that the sky is falling, that is, that their statistics "provide more proof" of the role of global warming in causing catastrophes.

Reducing growth in developing countries, where 96 percent of all deaths from natural disasters occur, can only compound global losses. Taking steps to meet the Kyoto Protocol would reduce energy use to the detriment of many Third World countries, which either rely on petroleum sales for their income or seek to improve their lifestyles by expanding the use of fossil fuels.

Curtailing economic growth makes people more vulnerable to natural disasters. The Kyoto Protocol would lower incomes and reduce growth for every country attempting to meet its goals. Even those poor countries exempt from the protocol's limits would suffer through the loss of exports. Indeed the entire globe would be made poorer and more vulnerable to diseases, earthquakes, storms, and floods.

The best way to mitigate disasters is to insure the infrastructure to prevent catastrophes is securely in place. Rich countries enjoy good roads, well-built structures, redundant food supplies, power, and water, all of which create a safer environment. Northerm California's 1989 Loma Prieta earthquake, for example, measured 6.9 on the Richter scale and caused 67 deaths. The year before a quake of the same size leveled Armenia, a very poor region of the world; huge numbers lost their homes and 25,000 to 45,000 died.

We must continually remind ourselves that richer is safer, richer is healthier, and richer is cleaner. Opposing steps that would lower people's living standards is a charitable action indeed.

Reference:

1999 World Disaster Report, International Federation of Red Cross and Red Crescent Societies, Geneva. Website: http://www.ifrc.org/pubs/wdr.



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