Global Warming Debate
William Schlesinger versus John Christy
John Locke Foundation
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Dr. William H. Schlesinger is the President of the Cary Institute of Ecosystem Studies. Before coming to the Institute, he served in a dual capacity at Duke University, as both the James B. Duke Professor of Biogeochemistry and Dean of the Nicholas School of the Environment and Earth Sciences.

Dr. John R. Christy is Professor of Atmospheric Science and Director of the Earth System Science Center at the University of Alabama at Huntsville, where he began studying global climate issues in 1987.

Video available online at

William Schlesinger

hopes 2009 takes us from talk to action; over 90% of publishing climate scientists have no difficulty saying Earth is warming and at least a significant portion of it is from human activity; we're beyond the point of debate; no last blood test will show the patient's fine

Five things he thinks we see reasonable agreement on in the scientific community:

1. CO2 rising since late 1800s, from about 270ppm to 385ppm now
2. CO2 is one of a suite of greenhouse gases, which warm planets; natural greenhouse effect shouldn't concern us, we need it; are we changing it?
3. Earth has been getting warmer in the last few decades, per satellite records, surface temperature records, changing migration times and patterns, etc.
4. Breakup of sea ice in Arctic and ice shelves in Antarctica some 10-15,000 years old, so new
5. Warming seems strongest at poles, at night, in winter, just as models predict; suggests blockage of outbound radiation rather than changes in incoming radiation causing
6. There have been significant changes in past, but in last 8-10,000 years, spanning entire record of humans living in organized society, climate has been remarkably stable until Industrial Revolution CO2 was remarkably stable.

Not finished with the science. Models will improve. But it's well past time when we ought to take action on this.

So will spend most of the time talking about impacts:

1. Model of world climate decade from now; most of polar and temperate regions much warmer, likewise high southern latitudes; all models show same general pattern and same

general magnitude; little warming along equator
2. Antarctic: ice sheet will melt and break up; e.g., Larsen Ice Shelf broke off and entered sea, so sea level will rise
3. SLR: e.g., Baltimore, rate increasing by factor of 4 in recent decades; Ben Colter's (sp?) map showing land loss for eastern NC to be flooded by average prediction of SLR by mid-century, includes all of outer banks; similar NYC; costs to taxpayers will be large
4. Some parts of US will get drier, some wetter over past century; models for future suggest likewise, with further southwestern drought, further eastern wetting; drought south-central Europe; drought in central plains of US will affect food prices
5. Insect ranges will change; e.g., corn borer range will increase considerably. Crops will be reduced thereby.
6. Malaria range will increase, including along Gulf coast and Eastern coast of US will begin getting malaria, becoming commonplace.
7. Ranges of various plants/trees will change; e.g., current prevalence of beech and maple forest in northern states will disappear, being replaced by oak, hickory, savannah. Owners of forest companies will be concerned about this. The trees you plant today might not grow there at high levels of productivity late in this century. So we allow the climate to change only at our economic peril, potentially threatening to us in our livelihood.

Stern report concluded that the cost of inaction vastly exceeds cost of action. Yet to now enthusiasm for significant action to reduce CO2 emissions lags. People hope to wake up tomorrow and find this was a bad dream, and CO2 has turned down, or we can engineer our way out of the problem, e.g., satellite reflectors to divert solar energy. It's highly unlikely that the problem will go away by itself. It will take much effort, and significant cost to every citizen of the planet. We're wedded to carbon fuels because they're cheap and abundant. Everything else, either not available now but known but more expensive, will cost money. But we need to take this seriously because there's a huge cost from inaction.

John Christy

Climate change by the numbers; "consensus is not science" (Crichton); consensus is a political notion, not a scientific one; all science is numbers.

Surface temperature measurement does show rise in last 30 years; CO2 has risen about 6% per year during that time; but CO2 is essential to all plant life, and 16% of increased crop yield is due to rising CO2.

Aim: test hypotheses about global warming. We build the data sets necessary to test models.

Hansen's 1988 hypothesis of future CO2 and temperature was badly wrong. Satellite measures show some warming trend, probably much due to CO2, but far less than feared.

Another test: climate models uniformly say greenhouse signal will be warming in tropical troposphere; but empirical observations show hypothesis false

Models predicted Sierra Nevada models would warm more than surrounding areas of California; actual data show opposite, indeed no warming in the mountains. Why is the valley warming so much? Because of agriculture. Irrigation changed the temperature. So if you want to return the climate to what it was, depopulate and de-irrigate.

Southeast: no climate model has reproduced cooling of SE US in last 115 years.

Greenhouse response of clouds: dominant greenhouse effect is water vapor and clouds; CO2 is small by comparison. Models say water vapor is positive feedback on surface warming by CO2; empirical data show, per Spencer, that though over 1000 climate model runs predict positive feedback, the reality is that they are negative. So theoretical models project rapid warming, but empirical models, based on real data, show much less warming.

Polar regions: Russian Arctic has ups and downs in last 1500 years, and yes, there's a rise in the last 100 years, it starts from the coldest point in the last 1500, and it's not yet as warm as it was 1000 years ago

Greenland borehole temperature shows 4000 year period when Greenland much warmer than today, and didn't melt.

Equator: East Africa, Kilimanjaro has lost ice since 1880, but its temperature didn't change, so glaciers are not good thermometers.

Antarctic sea ice: lots in winter, less in winter, cyclical; two weeks after Arctic reached its lowest extent in September 2007, Antarctic reached maximum, so globally same amount as before; and in last 30 years, sea ice expanding.

Polar bears: 1960s to today increased from about 6-10,000 to about 24,000, and Canada allows hunting kills of about 600 per year; no threatened.

SLR: rapid as Greenland melts? Rising since last Ice Age, about 1" per decade; that's not a problem; it's the 20' in hurricane storm surge; but no acceleration in recent decades, and no increase in recent years; Bangladesh has increased in land area over last 33 years.

Dangerous weather more frequent and more intense? All science is numbers. Tornadoes not, hurricanes not (reached all-time low a few months ago in intensity).

Don't demonize energy: without it, life is brutal and short. For Kenyans, forest is energy, backs of women are transmission system, burning in huts is use, costing 1.3 to 5.2 million child deaths per year. African parents love their children as much as we love ours. They won't stand for restricted energy access. The demand for energy will rise.

Dilemma: suppose you want to do something about climate change, reducing CO2 emissions and meeting rising energy demands. California focused on reducing emissions from vehicles, its regulations were adopted by 11 other states. Christy testified in trial related to it in 2007, for free. If entire country adopted, it would reduce temperature less than .01C in century; if whole world, less than .03C. Judge William Sessions III ruling 12 Sept. 2007: bill will have no impact on climate, but will raise car price about $4K per car.

What would do it? Build 1000 nuclear power plants, 1.4GW each; would reduce temp. 0.07C in century.

Main points: without energy, life is brutal and short; attempts to reduce CO2 will have no impact on climate; so making energy more expensive is not how to go for economic development.

The greatest climate change for the world is not physical change but impact on economy from climate change policies.

Our ignorance about the climate system is enormous, and policy makers need to know that. This is an extremely complex system, and thinking we can control it is hubris.

If you know so much about the climate system, then why can't you predict it?

Schlesinger response

Disagrees on lots of subjects. When a proposal is criticized as having trivial effect, it's because it doesn't attempt enough. We've not taken the difficulty of this issue seriously, and we need to before level of CO2 becomes irretrievable in impact on climate.

While he spent much time criticizing climate models, it was a climate model itself that allowed him to make his statements that there would be little impact on temperature from policies.

Nevertheless, important that he acknowledged that Earth is warming, that there is a CO2 effect on the planet's warming. Crichton is a fiction writer, and for him to say anything about science is inappropriate. The IPCC is the largest effort for scientists around the world, 2500, to get together and argue out the state of our knowledge on how the climate system works and what is the impact of rising CO2. There's more consensus in that group than 40 years ago that cigarettes cause lung cancer, yet we took action then, and rightly.

Waiting for yet another climate model to get the 0.1C agreement is like the cancer patient who's had 10 diagnoses consistent but wants one more before treatment. Inappropriate.

Rising CO2: some claim it's good as helping photosynthesis; there's a limit to its stimulus to plant growth, and at rate we're adding it to the atmosphere, we'll achieve 700ppm late in this

century shown deleterious to plant growth, especially crop plants; chloroplasts explode from too much photosynthate in their cells. When we reach those levels, there's little we can do to lower CO2. So the argument is shortsighted.

In Duke forest, 10 years, we exposed large area of forest to higher CO2, simulating concentration in 2050; trees grew about 10% faster; that would take up about 10% of emissions in 2050; so makes small but trivial impact on climate change and CO2 problem; but production by pollen tripled, and has been seen in wide variety of weeds, so hay fever, emphysema, and asthma sufferers will be hurt; and while trees grew about 12% faster, for first seven years poison ivy was the champion species and showed 70% growth increase, larger and twice as toxic; changes occur in plant chemistry and will have huge impacts on drug production, etc.

Throughout his talk, Christy made number of statements he'd contest:

1. IPCC climate models are wrong; no, this is the best 2500 climate scientists thought they could do.
2. Greenland ice pack didn't melt during 4000 year period. We have lots of evidence it's melting more rapidly today than before.
3. SLR flat last three years goes in face of all work of climatologists that should convince all of us that looking at 1-5 year record is meaningless. We need to look at long-term changes. Last 3 years insignificant.
4. We should not demonize energy, but fossil energy derived from carbon. There are lots of alternatives out there. Bright young chemical engineers ought to be able to deal with this problem. Roughly half could be done by improvements of efficiency; no excuse for not doing that other than that energy has been so cheap. Wind generated energy can be as cheap as from coal. Solar likewise. Southeastern US is Saudi Arabia of biomass; let plants help mitigate the problem by fixing CO2 and then using them as fuels.

Christy's response

IPCC appeal is argument from authority; look at the data, not the models or theory; I was a lead author, can assure it was political selection process, and more so because you can only be on it if you have certain views. Conclusions are predetermined.

Most rapid rate Greenland melted was 2005; slowed since; and that's 1.5" per century SLR; and last three years I showed because contrary to claim that SLR rate is rising, but this is a decreasing trend, so inconsistent with that.

Crichton M.D., did post-doc work in science. Consensus is not science.

Stern Review: Lomborg's work falsified it. Spending on micronutrients gives about $200 return on $1 spent, but CO2 reduction about 50 cents on $1.

Drought not increasing in US, it was tremendously worse in 12th century and others.

Corn borer moving up? Already wrong, because temp in SE has declined in last hundred years. In Alabama you can grow 240 bushel/acre corn, looking for 300 in the next few years; we can overcome insect problems.

World food production hasn't declined, it's still going up.

Poison ivy? Fun to mention that 1/6 of our plant food supply increase has been because of CO2 increase.

We test models. You can claim all you want, but a model is a hypothesis. We're one of the few groups in the world capable of creating the data sets to test, without saying whether you like the models or not. When we test them, they fail, time and time again, in most fundamental parts.

Malaria: used to be endemic to the Arctic circle. Temperature is irrelevant, it's public health infrastructure that eliminates it.

I don't want to demonize carbon-based energy. We're likely alive today because of carbon-based energy. Century ago, average life-span of American was about 47 years. Will we have new, different energy technologies? Yes, of course; we innovate. We're free. I can't predict what. But we will decarbonize our energy supply just as we de-horsified our transportation system in the last century. I'm optimistic about biofuels; in SE we can turn CO2 and sunlight and water into biomass and with initiatives in Alabama we can create much renewable biomass if we can reduce the cost a little more. Make energy expensive, you hurt yourself; come up with affordable ones, we all win.

Q&A:

Q: Christy, why do the models fail?
A: A model is a set of rules, and it turns out the rules don't explain, or quantify, how the world works; it's very complicated, and the rules don't express it well enough to forecast accurately.

Q: Schlesinger, of 2500 members of IPCC, how many are climate scientists, not political scientists, economists, sociologists, etc.?
A: Huge range of disciplines represented. Guess: about 20%?

Q: When will we know which of you is right? And if we're wrong, will we have time to try to counteract GW to maintain biodiversity?
A: I need a quantitative test. Right or wrong doesn't cut it in science. When will climate models reproduce the actual temperatures we see?

Q: Do the models get any of it right?
A: They get that it's warmer in summer and cooler in winter well, and jet streams, and where

deserts are, but you'd never use a climate model for regional projection. Even IPCC agrees. Two models, one projected SE becomes jungle, other semi-arid.

Q: Are there any modelers who realistically think at some point they'll get it right?
A: Modelers have huge pressure on them to tell us what's going to happen, but they're trying to express natural things with very crude tools. I think they'd prefer just to talk of today.

Q: Would increase of pollen not increase seed production?
A: It could increase seed production, but overlay that on where they'll fall and the climate they'll experience. Remember, pine is predicted not to be as productive as it is now, or even to occur in many areas where it occurs today.

Q: There is suspicion that government intends to tax cattle because of their methane production. Is it true, and reasonable?
A: Schlesinger: Cows generate methane, and it's more powerful greenhouse gas than CO2, and it's been suggested we could regulate their emission more easily than CO2, and I'm all for that, but in full greenhouse gas accord, if a country vastly increased its herd of cattle, you'd want to have some compensation for that.

Q: How confident are we about origins of methane on the planet?
A: Between 500 and 550 kg (?) per year. Termites produce some, but it's not among largest 3 in the budget. Are they responsible for GW? Not unless increase recently.

Q: Christy, has your opinion changed since you signed the AGU position statement?
A: I helped write that. It says that humans are having an effect on climate. It's inconceivable that with addition of aerosols, changes in land use, other air emissions, etc., that climate has not changed. Geller insisted that we're not going to quantify this, we'll just say there's some warming because of extra CO2. I was happy to sign, because agree it will cause some, but not much.

Q: What is correlation of sunspot activity and global temperature in last 1000 years?
A: Christy: There's a correlation, but the difficulty is figuring out the mechanism. Not just increased jules of energy, but something else must be working there.

Q: What is best online site for quantitative global temperature data, unbiased, actual, current?
A: Christy: UAH, but there are others. There are seven data sets, all very close. Warming about 0.14C per decade now.

Q: What's biggest challenge you face in communicating climate change to the public?
A: Schlesinger: It's not simple, there are sophisticated models, long-term data sets, geology involved, very complicated system with lots of people working from lots of disciplines. Second, public, one reason or another, has large number who don't want to believe, regardless of the data, that humans are having an impact; there's a deep-seated belief that this couldn't be or is God's will.

A: Christy: dealing with media that is very hard over on trying to alarm you and scare you with scenarios thrust in your face, and every new study is rock-hard evidence that we're all going to die. NYT admits editors require reporters to write stuff that sells papers. You have to be scary to get it in the newspaper. That's my biggest challenge. And who reads the newspapers? Congressmen. Legislators influenced by heavily biased media.

END

Notes taken by E. Calvin Beisner