WWU faculty continue attack on Easterbrook

After a vicious character assassination attack on Dr. Don Easterbrook by the Geology Dept at Western Washington University (WWU) following his testimony at a Washington State Senate hearing, the attack continues this week from other WWU faculty (see http://www.bellinghamherald.com/2013/05/08/2997774/industrial-use-of-fossil-fuel.html
In the latest attack, John Hardy, a retired professor of Huxley Environmental College at WWU characterizes the Easterbroook data as *"selective half-truths chosen to support a pre-conceived idea, i.e. that humans are not having significant effects on the Earth's climate."*

Hardy states: "*yes it is true that there have been multiple periods of warning over the past 10,000 to 15,000 years (since the last ice age). And, yes, at times it was warmer than the present. Yes, this happened before the rise in atmospheric carbon dioxide from the burning of fossil fuel. What the author fails to explain (but surely knows) is that these warming periods are largely the natural result of the Milankovich Cycle, i.e. changes in the orbital configuration and distance between the Earth and sun that determines how much solar energy and consequent heat the Earth receives."* Two things are apparent in this statement: (1) Harding doesn't understand the basis for Milankovitch cycles—they involve much more than the distance between the Earth and sun, and (2) he didn't look at Easterbrook's data (see below). Milankovitch cycles are very, very slow, taking tens of thousands of years and could not possibly be responsible for the sudden, abrupt climate shifts of 20-30 years shown in Easterbrook's data.

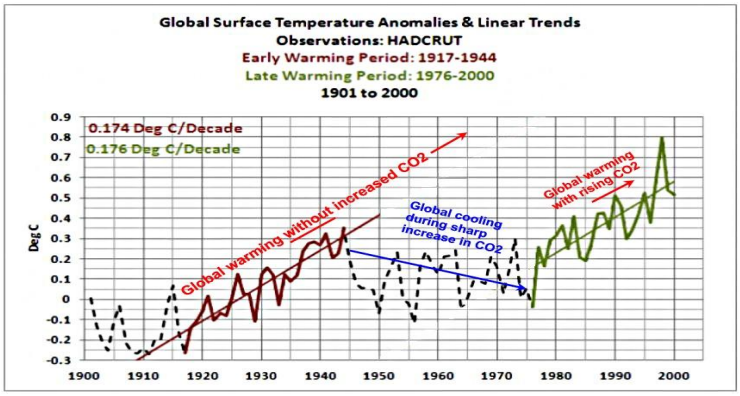


Figure 1 Two periods of global warming this century.

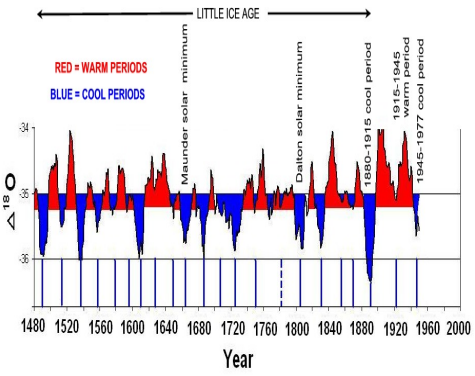


Figure 2. Twenty periods of warming in the past 500 years.

Figure 1 shows two periods of 20-30 year global warming this century, separated by a 30 year cool period. The first warming period (1915-1945) occurring *before* CO_2 emissions began to soar after 1945 so it cannot have been caused by rising CO2. From 1945 to 1977, while CO_2 emissions were soaring, the climate cooled, just the opposite of what should have happened if CO_2 causes global warming. Thus, CO_2 has little or no effect on climate.

Figure 2 shows 20 periods of global warming, each averaging 27 years, in the past 5 centuries. All of these occurred *prior* to significant increase in CO_2 so could not possibly have been caused by CO_2. Nor could they have been caused by Milankovitch cycles, which take many thousands of years. Thus, Harding's conclusion is demonstrably false.

Harding states: "*Past global temperature variations are also related to natural variations in atmospheric carbon dioxide. Global temperature rose five degrees Celsius 56 million years ago in response to a massive injection of greenhouse gases into the atmosphere from volcanic activity."* Temperatures were indeed warmer 56 million years ago, but there has never been any evidence to support the idea that they were due to increased CO_2 from volcanic activity. Volcanic eruptions typically cause global cooling, not warming, and last only a few years. The Eocene warm period lasted for tens of millions of years so could not be due volcanic eruptions.

Harding states: *"Today, burning of fossil fuel is releasing greenhouse gases to the atmosphere at 10 times that rate. Indeed, it is the speed of today's human-caused temperature increase that is more troubling than the absolute magnitude, because adjusting to rapid climate change will be difficult. For example, the natural warming since the last ice age 18,000 years ago to about 1850 (the beginning of the industrial revolution) was about 5 degrees Fahrenheit or less than 0.0003 degrees per year. The average global temperature increase from 1850 until now has been almost 2 degrees Fahrenheit, or 0.0122 degrees per year - a rate 41 times faster than the pre-industrial warming."* This statement is truly astonishing! Harding apparently (1) did not look at the Easterbrook data (see Fig. 3 below) and (2) apparently knows nothing about temperatures since the last Ice Age.

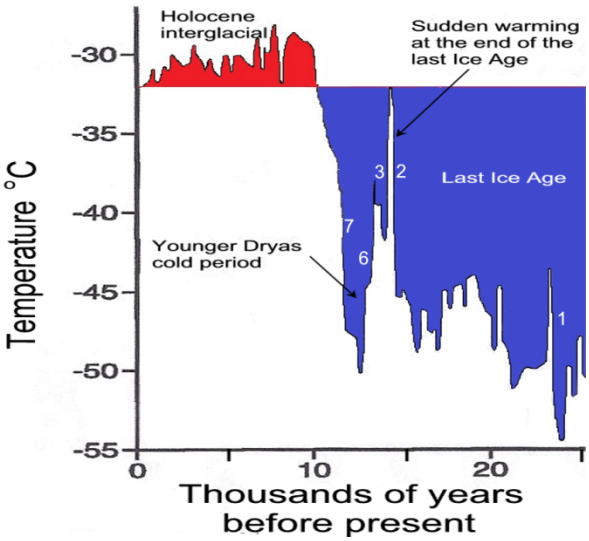


Figure 3 Temperatures from Greenland ice cores.

From 18,000 to about 10,000 years ago, temperatures warmed and cooled as much as 20 °F in a single century. Virtually all of the warming from the last Ice Age to recent times occurred abruptly in a very short period of time about 10,000 years ago at rates of tens of degrees per century. It didn't rise slowly over 18,000 years and to calculate an average over that whole period would not even be considered by any real scientist! Thus, Hardy's conclusion that temperatures over that time period rose "*less than 0.0003 degrees per year"* is totally absurd. And to conclude that warming since 1850 has occurred at "*a rate 41 times faster than the pre-industrial warming"* is so ridiculous (just look at Fig. 3) that it is hard to imagine any real scientist reaching such a conclusion

Harding states that temperature records for Bellingham show that average February temperatures rose 5 °F from the 1920s to the 1990s. This number is highly suspect since the 1930s were warmer than the past decade and the temperature change is therefore much smaller.

Harding states: *"Dr. Easterbook correctly notes that carbon dioxide makes up only a small percentage of our atmosphere. This does not mean it is irrelevant, in fact it shows just how powerful a greenhouse gas it is."* CO_2 makes up only 0.039% of the atmosphere, has increased only 0.008% during the most recent period of warming, and accounts for only 3.5% of the greenhouse gas effect. To conclude that this proves *"just how powerful a greenhouse gas it is"* can only be arrived at by first <u>assuming</u> CO_2 is the cause of warming. Since we know that CO_2 cannot cause more than about 0.1 degree of warming, that assumption is not plausible and his conclusion is meaningless.

Harding states that CO_2 "*has increased by 37 percent since the beginning of the industrial revolution."* But that is meaningless--if you double nothing, you still have nothing! But even more important, water vapor accounts for about 95% of the greenhouse effect and in order to make their climate models work, computer modelers include a large water vapor factor based on the assumption that water vapor increases in lock step with rising CO_2. Harding claims that water vapor "is now increasing due to increased ocean evaporation from the

warming itself." But is this really true? Figure 4 (below) shows atmospheric water vapor since 1948 at various level of the atmosphere and water vapor is not only not increasing, it is actually declining, thus making all of the model predictions worthless.

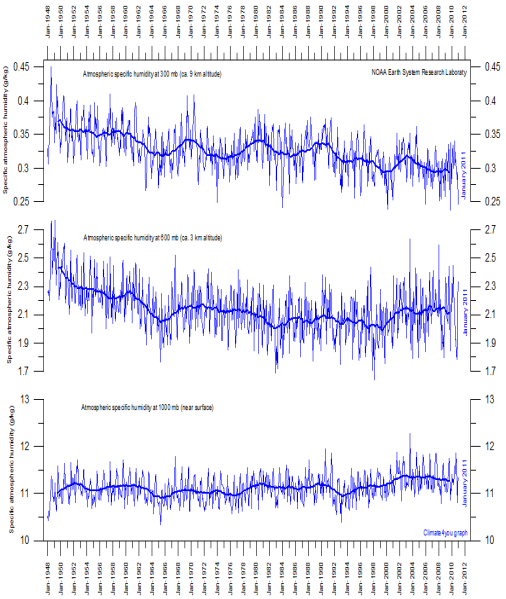
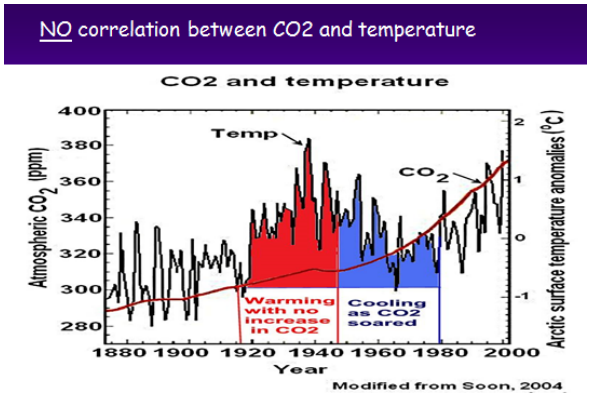


Figure 4. Atmospheric water vapor since 1948.

Harding states that *"The probability that the level of coherence between.CO2 concentration and temperature is due to chance alone is about 2 out of 1 million."* In other words, he claims that there is good correlation between temperature and CO_2 and that the odds of that being coincidence is only 2 out of 1 million. But is there really a good correlation between CO_2 and temperature? Figure 5 shows that there is no correlation at all between CO_2 and temperature! One wonders how any person calling himself a scientist could construe otherwise!



What we can conclude about all of this is that this could have been a real discussion of climate issues, but Harding's article contains no data and all of his unsupported assertions are contradicted by Easterbrook's data.