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Burlington, Washington
Dr. Don J. Easterbrook, Professor Emeritus Geology, Western Washington University, author of 8 books, 150 journal publications with focus on geomorphology; glacial geology; Pleistocene geochronology; environmental and engineering geology.

Don J. Easterbrook: Some people say that global warming skeptics think the moon shot was staged and the earth is flat…
Ken L. Coffman: Funny you should mention that, here it is, I have the exact quote.

Al Gore: You're talking about Dick Cheney. I think that those people are in such a tiny, tiny minority now with their point of view, they're almost like the ones who still believe that the moon landing was staged in a movie lot in Arizona and those who believe the world is flat. ... That demeans them a little bit, but it's not that far off.

- CBS-TV, 60 Minutes, March 30, 2008

KLC: I was going to ask for your opinion on it…
DJE: Online, you will find ten talking points about what Gore has said and it essentially points out that what he's saying is a bunch of hogwash. It's been refuted by the scientists who work in such things.
KLC: I wanted to talk to you about Al Gore because you seem, in general, to have been supportive of him.
DJE: Actually, I'm not. The irony is that I voted for him [in 2000]; I'm neither a Democrat or a Republican. I dislike the Democrats only slightly less than I dislike the Republicans, so I'm one of those independents who think the government is totally corrupt in both parties. The point being, simply, I don't have a political agenda one way or the other.
KLC: In some of the stuff I've read, you seemed to be defending him. Like you said, you voted for him…
DJE: Actually, it's not that at all. For a number of interviews, especially in the national news media, they ask 'Are you a Republican?' and I say 'No, I'm not, as a matter of fact, I voted for Al Gore. I don't want to pick on him because he's not a scientist.' The nonsense he spews comes from the IPCC [United Nations Intergovernmental Panel on Climate Change], so in a sense I don't condemn him as much as I do the so-called climatologists like [James] Hansen, who says things that are idiotic. They're the ones giving him all this stuff. He's a propagandist, not a scientist, so I cut him a little slack. But, the things he does, the things he says, are so outrageous, I don't forgive him anymore. For example, when he says things like *'people like me are right in there with the flat earth theory'*. He says the debate is over. The debate is not over—it's just getting started. There's a huge uproar in the scientific world because in the last ten years, the climate has cooled slightly, but the media won't tell you that. This year is a big downturn, you can't miss it. Global warming simply ended in 1998, but the public doesn't know it.
KLC: I could draw it myself, you have a peak in '98 and it's been flat or declining since then. The trend depends on where you start. They love starting in 1850…

DJE: That doesn't work because there are 30-year cycles. The chairman of the IPCC admits we've had global cooling for at least eight years, and there are sources on the Internet, you've probably seen them, that show the IPCC folks are panicking.
KLC: Talk about an inconvenient fact…
DJE: On the temperature curve, 1998 was the high point, and this year, we've cooled dramatically. It's been kind of flat for ten years, sort of a plateau, but if you take 1998 as your starting point, it's down slightly, not soaring as predicted by IPCC.
KLC: Playing the devil's advocate, if you start in the early 90's, you would still have a positive trend.
DJE: If you want to be really honest about this, the curve should rise from 1977 and end after 1998. It depends on what you want to show and how you want to filter it. You can filter it with a two-year average, a five-year average, or over whatever period you want and you'll get a differently-shaped curve. The point is, it has not gotten warmer since 1998; it has not continued to warm in the last ten years.
KLC: How can that be if CO_2 is increasing?
DJE: You can take ground data or satellite data; they are not exactly the same, but close. I took all the data, satellite and ground, averaged it, and plotted a single curve from the average to show the trend and the temperature stopped rising in 1998.

Look at history, where we are in 2008, and where we've been. If you go back to the beginning of the century, there was a really deep cold period from about 1880 to 1910, and then it warmed until about 1945. Most of the global temperature records are set in the middle of the 1930's when it was warmer than now. And the same is true in Greenland--the temperatures in the 1930's were warmer than they are now. In ~1945, we did a flip to thirty years of global cooling. The time of maximum CO_2 emissions started in 1945 and temperatures should have shot up, but we cooled off. That's an anti-correlation. In 1977, we got warmer and warmer. If we look back 500 years, the trend of 1977 to 1998 is not unique to this century. For about 500 years we have 30–year periods where it gets warm/cold, warm/cold.

We've been warming up about a degree per century since the Little Ice Age in about 1600. We've been warming for 400 years, long before human–generated CO_2 could have anything to do with the climate. If we project the previous century into the coming one, my projection is that we will have about a half-a-degree of cooling from 2007 (plus or minus three to five years) to about 2040. Then it will start getting warmer as we enter the next warm cycle, followed by cooling again. By the end of the century, we'll have less than a half a degree temperature increase, instead of the ten degrees or so predicted by IPCC. A huge differenc. The IPCC projection says that by 2011 we should be one-degree warmer than where we were in 2005. But, we're getting colder. We declined about 0.7 degrees in one year. We're going in the opposite direction. With IPCC data and their graph, by 2011, the difference between my projection and theirs is about one-degree and that's huge. Now, they have to increase a degree in three years. If that doesn't happen, their projection is wrong and mine is right. By 2038, the difference between their prediction and mine is two degrees.
KLC: Around 2001 you predicted global cooling. That must have been a tough thing to come out in public and say in those times.
DJE: I was a lone wolf howling in the wind in 1998. I gave a paper in 2001 in Boston at the national GSA [Geological Society of America] meeting and you should have seen the

stunned look on people's faces. We'd just had the 1998 warm peak and people were astonished. I said, look at the data and forget CO_2. You know how much change there's been in atmospheric CO_2 since the advent of big man-made emissions?
KLC: Maybe 100 PPM [Parts Per Million]…
DJE: Normally it's been about 280 PPM. It crept up to about 300 by 1945, which is not much–it had been naturally that high before, but in 1945 it took off. Emissions went straight up. However, the total change was not much compared to the volume of CO_2 already in the atmosphere. Water vapor is the main greenhouse gas and one of the things you won't hear anywhere is that in order to get the global warming projected, the CO_2 people can't get there with only CO_2 because the effect isn't big enough, so they say it will change the water vapor. They rely on water vapor to get their climate change, not CO_2—CO_2 is just enough to nudge it and water vapor does the rest.
KLC: At Real Climate [www.realclimate.org], I've said that the idea of CO_2 being a 'forcing' and water vapor being a 'feedback' is great marketing, but bad science. You can imagine what response you get from something like that.
DJE: Look at the difference. Man contributed eight one–thousandths of one percent to the total CO_2 that was present before the big upshoot. It is instructive to think about emissions added to atmospheric content. From 1870 to 1900, we had global cooling, then we had significant global warming from about 1910 to 1945. That global warming is not accompanied by any significant rise in CO_2, so you can't blame CO_2. Then CO_2 increased while we had global cooling. You can't blame *that* on CO_2. It's only been the last 30 years there's been correlation between CO_2 and global warming. Everything before was uncorrelated. There's no doubt there's been warming as we came out of the cold period from 1880 and 1910. The 1930's were warm, then we cooled from 1945. 1977 was a turnaround year when temperatures started up and now we're headed down again. We're right where we ought to be.

As an aside, you know the big news from the Antarctic about the Wilkins Ice Shelf breaking up? The headlines in some news media was something like 'Antarctic Ice Sheet Collapses'. It's not the ice sheet, which is 15,000 feet thick. What we're talking about is really thin shelf ice along the margin which has been warmed by ocean water. We've had thirty years of global warming, and the water has gotten getting warmer. So what? The truth is, the main Antarctic *ice sheet* is getting colder. The snow records show the same thing. The ice is not shrinking, it's growing. Al Gore says it's 40 degrees down there and everything is going to melt and the sea level will rise. Hansen has said the sea level could rise as much as 250 feet. It's insane! Absurd!
KLC: They love talking about the area that sticks out into the Pacific-Atlantic intersection.
DJE: The shelf ice is really thin. In terms of total volume, it's nothing, a fraction of one-percent. It doesn't mean anything. It's what you'd expect if you have warm ocean water. It's impressive because it has a broad area, but it is really thin. The climate is not warmer down there, the surrounding ocean is warmer. Al Gore was quoted as saying something about talking to somebody who said it was thawing in Antarctica where it was something like 40 degrees. Someone bothered to look up the temperature. At that point on the ice cap it was 47 below zero. The caller was down on the coast someplace by the nice warm ocean water.

Look at Greenland. Both Gore and Hansen talk about glaciers *"sliding into the sea."* That's crazy. No glaciologist in the world would subscribe to that nonsense. Glaciers don't do that. Two-mile thick ice, almost three-miles thick in Antarctica, flows like really thick taffy, and it doesn't slide anywhere. It's like saying Pike's Peak is going to slide into the Gulf of Mexico—it isn't going to happen.

KLC: They can't talk about the Arctic, they have to talk about ice on land, Greenland for example.

DJE: There are no glaciers in the Arctic. There's a big noise that Gore and Hansen made about melting in Greenland. There is melting along the edges, but the ice is growing in the middle, like Antarctica. To discuss Greenland temperatures—we had global warming from the turn of the century to the 1940's, then Greenland experienced the same global cooling that everyone else did from 1945 to about 1977 and it's been warming since then. The interesting thing is, it was warmer in Greenland in the 1930's than it is right now. They're saying it's never happened before? It happened in the 1930's.

KLC: Speaking of Greenland, I'm curious about your take as a geologist about what you see as a driving factor. From my reading I know you believe there is a correlation with solar cycles, but I'm curious about the geothermal heating.

DJE: The temperature is too variable to be accounted for by volcanic activity. Aerosols from eruptions last about two years, and then they're done. With regard to geothermal heating, there is geothermal activity in Greenland that may be contributing to the melt, but I suspect the root cause of melting around the edges is ocean surface temperature. We're in a global warming period, so what do you expect to happen?

I plotted a curve from isotopes in Greenland. Oxygen isotope ratios give us ambient air temperature in the snowfall. The isotope signature doesn't change, so you can core ice and examine annual dust layers that mark the ablation surface in the summer when the dust settles on it. You can identify the melt season very accurately and go back for thousands of years with one or two year accuracy. The chronology is very accurate. We don't have it in the Antarctic, but we have it in Greenland. I plotted the Oxygen 18 ratios and they show times when the temperature was warmer and colder. The cool periods-are about 30 years apart, which means the same thing we saw in the last century has been going on for 500 years. It's nothing new.

Let's discuss today versus the past. During the Medieval Warm Period [MWP], about 900AD to about 1300AD, climates were warmer than they are now. One thing Gore talks about is the so-called hockey stick, a curve made by [Michael] Mann, a tree ring specialist. He essentially shows flat temperatures until we get to the increase in CO_2 where the temperature takes off, so it looks like a hockey stick. His data was examined by a panel of scientists and found to be totally spurious; they said it is not scientifically sound and threw it out. The reality is, temperatures go up and down in a regular pattern; Temperature isn't flat.

Fagan [Brian M. Fagan, The Little Ice Age: How Climate Made History 1300-1850] wrote about the Little Ice Age and the Medieval Warm Period. He confirms much of the evidence about glaciers that had been way down–valley, then retreated way up-valley in the Medieval Warm Period, which was warmer than now. Then the temperature plummeted about four degrees in about 20 years. Boom! They went from a time when people in Europe were thriving; for example, there were colonies in Greenland and they made a lot of wine in England and shipped it to France. Suddenly, we're in this Little Ice

Age and a third of the population perished in Europe, not all from starvation–there was plague and a lot of other things that were made worse by the famine.

We were warm from 900 to about 1300 when we started the Little Ice Age. In 1609, Galileo perfected the telescope and could see sunspots for the first time so scientists began recording sunspot numbers. The number was very small. There is a direct correlation between sunspots and solar irradiance, the energy we get from the sun. The current sunspots are in Cycle 23. Astronomers predict the start of Solar Cycle 24 soon but they keep shifting the curve because it's not happening. Normally you have more than a hundred sunspots per year and we're near zero right now. Cycle 24 was supposed to begin in March, then they pushed it back to May and some people are saying they'll push it back until September or even 2010.

KLC: What do you think, Don?

DJE: I don't know and there is no way to predict it. Look what's happening to sunspots and to temperature. There is good correlation between sunspots and global temperatures.

How do you explain increasing atmospheric CO_2 when we had global cooling from 1950 to 1977? Prior to that, you go from cooling to warming without any change in CO_2 at all.

Here's the answer to the hockey stick: temperatures from the Greenland ice cores take us back about 15,000 years and show our current period, the Little Ice Age and the Medieval Warm Period. We have had increases of up to 23 degrees in a century and the same amount of cooling, and another increase of 20 degrees of warming in a century. The idea we've never seen changes in global temperature like recent changes is totally fraudulent. But Gore still says it. There was a big dip 8,200 years ago, showing about 2 per mil Oxygen 18 change, which is equivalent to a few degrees cooling, but nothing like the Ice Ages. There was a cold period that peaked in 1890. The isotopes follow the recorded temperature, which is a check on how accurate the isotope readings are.

In 1609 when Galileo perfected the telescope, allowing sun spots to be observed for the first time. Generally, the sun will have 50 to 100 sunspots, but during the Maunder Minimum, virtually no sunspots were recorded. During the global cool period from 1945 to 1977, the warm period of the last thirty years, and the 1890 cold period, sunspot activity mirrors global temperatures almost exactly. The curves dance together. I can't imagine anything tighter.

KLC: What about the claim by Hansen and others that TSI [Total Solar Irradiance] has been unchanged for 80 years, thus it cannot explain recent global warming?

DJE: Not true. If you look at the data coming out, you see a strong correlation between global temperature and irradiance. If you plot irradiance versus sunspots, you again get the same kind of curve, and the inference is you can connect these curves to recognize a link between global temperatures and the sunspot cycle. We only have satellite measurements back to about 1970, thirty-some years of data, and the change is about a tenth of one-percent. That's more than the eight one-thousandths of a percent of CO_2 change, so they say the TSI change is not enough?

The argument I make is that the correlation between sunspot activity and temperature is not fortuitous–it can't be. There must be a cause and effect relationship. We don't know what the connection is, but it is obvious that a small change in solar irradiance produces a big climate change. It's leveraged by something, maybe by water vapor. We're not sure. The argument that it's not big enough? A friend of mine has a

saying which I love. *"If it happened, then it must be possible."* Well, it happened, so it must be possible.
KLC: The AGW crowd uses the same argument, CO_2 rose and temperatures increased. It happened.
DJE: Only in the last 30 years–before that you have the opposite of correlation. There is correspondence between solar activity and global climate. We don't understand the connection and the leverage and it doesn't seem like it should be enough, but it *is* enough. The Little Ice Age overlaps the Maunder Minimum low solar irradiance, not measured directly because we don't have direct measurements of solar irradiance from back then, but when you have a change in solar irradiance, you change the amount of Beryllium-10 and radiocarbon produced in the upper atmosphere, so you can use those measurements in ice cores as a proxy for solar irradiance and sunspot cycles. Correlation over the known period of observation establishes the linkage. Fluctuation in radiocarbon and Beryllium-10 from the upper atmosphere shows the change in the amount of solar radiation. The Dalton Minimum occurred in about 1830. 1890 had a TSI minimum and then here's 1945 to 1977, the correlation is there too. No one argues that the LIA [Little Ice Age] was not caused by a change in solar irradiance represented by the Maunder Minimum. If that's certain, then why not the others, including the current warming period? There is a strong case for solar control. At a symposium in Oslo in August, a scientists will present papers spelling out the relationship between global climate change and solar changes. A growing number of scientists, especially astrophysicists, are convinced the climate driver is solar, not CO_2.

The IPCC predictions are up to ten degrees hotter by the end of the century. My predictions show a rise of about half a degree. Let's place a checkpoint at 2011. IPCC needs to see another degree of increase or they're wrong.
KLC: They'll move the prediction around…
DJE: Every year they recalibrate their computer model and put in the observed temperature. So, as they go along, the curve that trails behind is perfect. It's like predicting the morning's weather at six-o'clock in the evening.
KLC: They call it hind-casting. It's clever. Use the same model, but reset the starting point each year.
DJE: They published their projection, so I'll hold them to it.
KLC: They're slippery. I look at it from an engineering standpoint and so much of it seems absurd. I don't understand how they get away with it. Mass psychology and herd instinct?
DJE: Do you know what drives them? Money.
KLC: You're talking about research grant money?
DJE: I'm talking about money, period. Before he started all this, Al Gore was reported to be worth a few million dollars. Now he is reported to be worth 100 million dollars and is reported to have a slush fund of about five billion dollars. If you're in the press and you want to attend one of his lectures, you can't. Not only can you not ask questions, they won't let you in. Because the debate is over, you see. You'd just be a troublemaker. You know about the Bali-100? [A letter disputing the findings of the IPCC sent to the UN Secretary-General and signed by 100 scientists]
KLC: Yes.

DJE: You know about the 400 consensus breakers? [400 scientists voicing objections to so-called "consensus" on human-caused global warming. These scientists are listed in a report issued by Sen. James Inhofe, R-Okla, who is on the U.S. Senate Environment and Public Works Committee]
KLC: Yes.
DJE: There's a new one called the Manhattan Declaration… [The Manhattan Declaration comes from the 2008 International Conference on Climate Change and suggests world leaders reject views expressed by the IPCC and that all taxes, regulations, and other interventions intended to reduce emissions of CO2 be abandoned]
KLC: Don, you know they're all in the pocket of big-oil. They believe in a flat earth.
DJE: I get so much Bush oil money that I'm embarrassed to go to the bank. I push a wheelbarrow.
KLC: I note you're carrying a Conoco–Phillips bag…
DJE: So I am. It's from a GSA meeting. It also has Halliburton on it. For the record, I've never taken a nickel from any industry. It's the first thing interviewers ask. I'm making a lot of new friends to the right of political center because they love what I have to say. The thing they love most is that I've never taken a nickel from industry and I'm not a Republican, so I must be pure of heart.
KLC: It's too bad it has to be so political. I'm just interested in the science.
DJE: Al Gore makes a hundred-million dollars? He has five-billion in his slush fund? Look at [U.S. Senator] Barbara Boxer, she sponsored a bill for carbon cap and trade [Sanders/Boxer Global Warming Bill S.309]. Who will benefit from hundreds of billions of dollars for administering a scheme like that?

The other thing is research funding. The U.S. spends about two-billion dollars a year on research. Right now, if you submit anything that says CO_2 is not the bad guy, you won't have a chance of getting funding. It all goes to the CO_2 people who build little fiefdoms; they have grant money coming out of their ears. They mimic Al Gore and say the debate is over. The last I heard, the U.S. plans to increase its research spending to 3.5 billion dollars, virtually all of which goes into CO_2 research.

The last part of this equation is the news media and money being made by people like National Geographic who recently put out a show called Six Degrees of Global Warming [Six Degrees: Our Future on a Hotter Planet, by Mark Lynas] and how many people watched that and watched the ads that went with it? How much money did they make doing it? How much money would they have made if they'd said 'Oh, it's not CO_2, it's solar?' Doom and gloom is easy to sell. Herman Goebbels said in World War II, and said it right, that if you tell a big enough lie often enough, people will eventually believe it.
KLC: With regard to Al Gore's comments, what is your response?
DJE: It reminds me of what went on with the Pope and Galileo. The Pope didn't like the idea that the earth was round or that it went around the sun and that the earth was not the center of the universe. At that point the Pope declared that the debate was over and anybody that disagreed would get burned at the stake. Today is like that, total hogwash. Gore made a statement that less than a half-dozen people in world don't believe that CO_2 causes AGW. That's totally nuts.
KLC: You'd agree there is a small effect of CO_2; the insulating blanket effect.
DJE: That's why we have a nice, warm, cozy planet.

KLC: They're careful in the way they parse words. Everyone believes CO_2 affects our surface temperature.
DJE: That's why we have a warm planet.
KLC: The question is, how much? Is it significant?
DJE: The CO_2 effect is tiny. The eight one-thousandths of one-percent contributed by human activity won't do much. Human–caused warming is dogma, pure and simple. That Al Gore won't debate scientists, won't talk to the press, and all he'll say is *'The debate is over, stupid,'* says a lot for the validity of the argument. There is a list of ten things in his movie, *The Inconvenient Truth*, that are totally false. I have verified those myself—the Gore assertions are false. To be unkind, they are lies he won't back off from. Hansen, his principal advisor, is upping the ante by saying the sea level change might not be twenty feet, instead, it might be 250. Al Gore will go probably down in history as the guy who claimed to have invented the Internet and human-caused Global Warming, and they're both bogus claims. It's a hoax, frankly.
KLC: Seymour Garte wrote an optimistic book called *Where we Stand* about the state of our planet. He gives you good news that the air has gotten cleaner, the water has gotten cleaner, then he gives you the bad news, I wanted to get your response to this paragraph titled The Bad News.

The major bad news for environmental quality is found in a trend that has been discussed first by scientists and then by activists for many years. Global warming, caused by an excess of carbon dioxide (CO_2) and other gaseous byproducts of industrial human society, has been controversial in the past, but it is no longer. The evidence that we are entering a strong and dramatic period of global climate change has been mounting on a continuous basis to the point where it is now certain. There are still many questions about how bad things will get and how reversible the climate-change trends are. But the fact that the climate is changing is quite real. I prefer the term *climate change* to *global warming* because even though it is warming that causes the climate change, we are already feeling the climate change, even if the warming itself is still hard to detect for the average person.

- Where We Stand, A Surprising Look at the Real State of Our Planet, Seymour Garte, PhD.

DJE: Certain, ha. The question I have for people like this is, 'please tell me what is the real**,** physical evidence that CO_2 is the cause of AGW?' Tell me. There isn't any. There is no correlation between CO_2 and warming temperatures in the historical record except for the last 30 years which is an absolute coincidence. For 30 warm/cold cycles before that, with far greater amplitude than what we're seeing now, there's no correlation. Why read anything into the last 30 years? It's like saying there's a full moon tonight and it's clear, so the full moon must cause clear skies, right? They occurred together. It doesn't prove anything. There are two lines of evidence used to say human-caused global warming is certain. One is that CO_2 has gone up in the last 30 years and so has temperature, but that does not prove anything. The second claim, based on computer modeling, they can reproduce what's happened in the past, and they can project into the future, and clearly show CO_2 as the driving factor. They don't tell you, that, in their computer models, it's assumed that CO_2 drives global warming. In other words, you assume the result and say

the computer model proves we were right. It's garbage in, garbage out. If you don't program the computers to cause temperatures to rise with CO_2, then you have nothing.
KLC: It's a perfect circular argument.
DJE: It is. In other words, if it is so damned certain, what's the *proof*? I've asked this question in debates with CO_2 people, and asked that they show the evidence. There isn't any. It's guilt by association. They say the last 30 years proves it.
KLC: We have fields of expertise. This guy's a good toxicologist, but in his book, he ventured away from his expertise, and instead of exploring the science himself, he takes the things being said at face value.
DJE: I arranged a global warming symposium along with the national meeting of the Geological Society of America in Denver and we invited a half-dozen eminent scientists, all world-class people, to give papers with data to show what's going on. The idea was to get away from the hype and look at the data and see what's going on. When it was all over, one guy stood up and said *'How dare you contradict Al Gore, don't you know the debate is over?*' And another guy stood up and said *'Why are you pointing out all of this data to cast doubt? You're just going to confuse our students.'* Guilty!

Anytime you deal with dogma, where people say 'shut up, you can't argue anymore because we're right and there's nothing you can say that will change anything, therefore, you're wrong', attacking the dogma will invariably get you in trouble.
KLC: Here's something new**.** This is that Six Degrees guy, Martin Lynas. I would like your response. This cute, hand-drawn plot was captured from an ABC news clip, which shows history, today, and talks about the warming pipeline. No matter what we do, we'll get warming to about 2050 where the tipping point appears. The tipping point is the point where actions now can still influence warming at the end of the century.
DJE: The strength of any assertion is only as strong as the foundation it's built upon. This has no foundation. This assumes that CO_2 drives the temperature increase. If it's not, then this means absolutely nothing. You have to prove the basic tenet that CO_2 drives temperature before this means anything at all.

You might as well be talking about the moon being made of green cheese. Until you go there and look at it and see what's there, you can say whatever you want. If you look at the reality of what has happened in the past, which is what I do, and transfer that into the future, you don't get this at all. It turns out that, again, time is on my side, because we're getting closer and closer to my projection and farther and farther away from the IPCC's. We're diverging from this Lynas plot. They predict by 2050 we should be two degrees warmer than today. In three years they say we'll be one degree warmer than today**.** Well, that's not happening. This may be an unusually cold year, not necessarily typical of what we have to look forward to, for the simple reason this is a La Nina year, so it probably tacks on a little extra cooling, but the interesting thing is that we haven't had this low a sunspot cycle since the Maunder Minimum. There are astrophysicists, Russian, Canadian, Willie Soon and other Americans who say 'Look out' because we haven't seen this since the Little Ice Age, about 4 degrees colder than it is right now. That's one scenario, a possibility.

Another possibility is that the coming cold period that I've projected will be more like the last one from 1945 to 1977, which was half a degree colder than now. Or, it might be more like the one from 1880 to 1910 which was deeper. We might be headed toward one of the deeper ones, like the turn of the last century, but there's no evidence

prove it, so we'll have to wait until we get there to see. We have the possibility of another LIA, the last time we had so few sunspots. Or we have the possibility of a cooling spell like 1890, or one like we had between 1945 and 1977, which was mild. Or, we might have nothing at all. Or, we might have soaring temperatures. Of those options, I think we'll have something deep like 1890. But, we don't know and we're not going to know until we get there.

The other thing, which is what the Manhattan and Bali Declarations are all about, is, when we get to 2050, the IPCC predicts two additional degrees of warmth, and the population will increased by up to three billion people. We're projected to be nine billion by 2050. What are we going to do with three billion more people demanding resources? If there is a two degree temperature change, that will be a big problem. So, my view is that, the population explosion is a way bigger problem than a half a degree of temperature change. We need to get control of the population, and we're not doing it.

By the time we get to 2050, we'll have so many more demands for natural resources that, even if the two degree temperature change doesn't happen, if we're flat or cooler, we still have a really big problem. Instead of spending trillions of dollars on reducing carbon, which does nothing, we should prepare for the population that's coming. My view has always been that we need to plan ahead. We may have a thirty year grace period when things cool off. If it's only half a degree of cooling, we have breathing space to get ready for what's coming. By my projection: we'll be a half a degree warmer from about 2040 to 2070, but the population will be 50 percent bigger, so it's going to be a way bigger problem than what we're looking at today.

Forget about the CO_2 trap. If you bet all of your resources, trillions of dollars, on stopping global warming by not putting carbon into the atmosphere, we lose when we get to 2050. In other words, it's a consequential bet. You'll hear the CO_2 people saying *'Well, just to be safe, we've got to do it this way'*, but that's not true because if you put all the money into curbing CO_2 and you don't do any of the other things necessary to get ready for increasing population, you have a bigger problem than global warming. That's what the Manhattan Declaration is about. We need to get ready. We should reduce pollution– There are far more bad things going into the atmosphere via emissions than CO_2−Sulfur compounds, all kinds of stuff. We ought to reduce those. On that, I'm on the same side of the coin as Al Gore.

Suppose that we totally stop CO_2 emissions, take it not to the Kyoto limit but to zero. No heavy breathing. No cars. Would that stop global warming? Will that stop global warming? The answer is 'No.' It takes five-hundred years or thereabouts for the atmosphere to equilibrate with the oceans. Even Hansen will admit that. There's nothing we can do by stopping CO_2 emissions that will affect climate in the next several hundred years. Nothing. We should bring emissions down, but not for that reason.

KLC: Take Lynas for example. He's says we have to act now with expensive programs, or else.

DJE: The consensus among scientists who think as I do is that the tipping point scenario is invalid. It assumes that CO_2 causes significant warming. A lot of people will make a lot of money if we do the carbon cap and trade program.

KLC: My thought, from talking to you today, is, if we want to do something useful for the climate, we should pray for sunspots.

DJE: Or pray for very few sunspots. You got it. That would work.

KLC: At least the idea won't bankrupt us.
DJE: I see you have a printout of Mann's hockey stick. That is totally discredited now.
KLC: I like the idea someone came up with of 'treenometers'.
DJE: Treenometers? I like that. Al Gore makes the statement that if we go back far enough in time we see ups and downs in temperature and the CO_2 goes up and down too, which is absolutely true, but what he didn't tell you is, that the temperature change *precedes* the CO_2 change by about 800 years. He makes it sound like the CO_2 causes temperature changes, which is totally bogus. No geologist, no scientist I know, believes that. But, he's still says it and won't back off on any off it.
KLC: If you want to scare me, show me a plot where we're warm for very little and then cold, during ice ages, for a very long time. That's not good for humankind.
DJE: Actually, it's probably the other way around−the glacial periods are probably shorter than the interglacials.
KLC: When can we expect the next ice age?
DJE: There's a really strong correlation between wine production, wheat production, all kinds of things, especially in Europe, correlated to climate which is correlated to sunspot activity.
KLC: Highly correlated to health and societal unrest…
DJE: Absolutely. There is an idea that the French Revolution was brought on by the stress caused by starving people because of climate change and that's what led to the overthrow of the royal family.
KLC: Let them eat cake…
DJE: Here's a snippet I found interesting. The Farmer's Almanac predicted it would be a cold winter**.** And how do they do that? Do they talk to squirrels or something? It turns out, they apparently look at sunspot cycles. Their projections are apparently based on sunspot cycles!
KLC: Online, I said I'd rather believe in Farmer's Almanac predictions instead of the IPCC, at least they have an algorithm, but I didn't know what it was.
DJE: Somebody behind the scenes said 'Yeah, we use the sunspot cycles to make the long term prediction in the Almanac.'
KLC: Looking at this plot, there are regular changes in the ocean level between more than 100 feet higher than now and 300 feet lower than now.
DJE: The rising and falling reoccurs, there is no doubt about that.
KLC: I see areas where the climate is good to us and other areas where it's not.
DJE: These illustrate the Milankovich cycles, though it was not Milankovich that originated the idea, it was actually a Scot, James Croll–Milankovich applied numbers to the earlier idea, so they're widely known as Milankovich cycles. Milankovich cannot explain the Younger Dryas climate changes because the Milankovich cycles occur on the scale of tens of thousands of years…
KLC: Yes, about 100-thousand years—
DJE: But in the Younger Dryas period you go from an ice age to a non–ice age in a hundred years. This can't be explained by orbital forcing. Milankovich does not work for the Younger Dryas cooling period so why should it work for any of the others? So you start to think, if it's not Milankovich, what is it? The first isotope measurements on ice cores in Antarctica showed sudden temperature changes and blew us all away. Boom−one minute it's hot then it's cold, clearly not explainable by orbital forcing. The

idea came up that it all starts in the North Atlantic with the deep current being turned on and shut off. The question is, if this drives the Ice Ages, quick changes observed in the Northern and Southern Hemispheres should have a lag. It would take 500 to 2,000 years for the effect in the North Atlantic to be felt in the South Pacific or the North Pacific, because it has to go all around the world. You can't transmit heat or cold across the tropical low of the equator via the atmosphere. If glaciations in the Northern Hemisphere are exactly synchronous with glaciations in the Southern Hemisphere, the North Atlantic current theory doesn't work.

Most of my research has been in various parts of North America, New Zealand and South America and what we've found is that the glaciations are not only synchronous, they're almost exactly synchronous. They are way more sensitively tuned in both hemispheres to occur simultaneously than we ever imagined. It blows the North Atlantic Current theory out of the water, which means you can no longer use current theory tacked onto Milankovich Cycles. It suggests Milankovich Cycles are not right either. Most glacial geologists would tell you the debate is over, but a number of people doing the kind of research I do that say the facts don't work. What we see is unexplained, so there must be something else.

Yes, there's something else. A growing number of us think the climate driver is solar. If you plot temperature versus time, it's warm now and 10,000 years back, it was cold. The temperature goes up and down. If we look at the production rate of Carbon-14 and Beryllium-10, it follows temperatures for 10,000 years, not just the last 100 years, or the last 500 years. There was an anomaly at the time of the Younger Dryas, which lasted about a thousand years, and led to a return to the Ice Age. Then it melted like crazy, then it flipped back into cold. The significance of this is when you plot the isotopic values, the isotopes do the same thing and you can't get simultaneous glaciations in both hemispheres if you have to rely on the North Atlantic deep current. The historic climate changes are probably driven by changes in solar activity.

There's not enough data to make any kind of argument for still earlier climate cycles. We need more Beryllium-10 data. You can get carbon data out of the ice bubbles in the ice cores, but once you get beyond about 100,000 years, there's very little data. You can't prove anything one way or another. In a nutshell, I don't believe in orbital forcing as a cause of glaciation. Most glacial geologists do, but I don't for the reasons I just explained. The data doesn't fit. A growing number of scientists realize this.

KLC: Here's a chart that shows ocean levels spend a lot of time 300 feet lower than they are now and 100 feet higher than they are now. Does this match what you know about ocean levels?

DJE: Oceans rise and fall depending on how much ice there is on land. There's a clear connection. In order to get significant change in ocean level, you have to tie up a lot of water in ice on the continents. The continental glaciers covered almost all of North America, clear down to Ohio, Kentucky and it was like the Antarctic ice cap, 10 to 15 thousand feet thick. Huge volumes of ice. The same thing in Europe, the same thing in Russia, Siberia. If you melt all of that ice, you get about 120 meters of sea level rise. That's the difference. The fluctuation of 100 meters of sea level can be explained very nicely by ice volumes found during the Ice Age. People made calculations to see how much water was tied up in the glaciers, and what that should do to sea levels and so on. In

terms of amount, a sea level change between 20 meters and 100 meters is what you'll get during an interglacial period.
KLC: There's so much talk about sea level changes, particularly increasing. Where are we in the one-thousand or five-thousand year cycle?
DJE: Nobody knows. There are suggestions. If the main driver is solar, there are long term solar cycles, but the trouble is long term solar cycles are hard to find because they don't leave much evidence behind, unless it's climate. Then you argue: 'How do you know the root cause is solar?' The lesson here is, until you solve the problem of what causes the ice ages, you won't be sure about where we're headed in the future. In my opinion, the odds are that the climate changes are driven by solar influences because of the isotope records, since correlation doesn't work for North Atlantic Current theory and Milankovich Cycles. If recent climate changes aren't caused by orbital forcing or deep ocean current or solar radiance, then what is it? You run out of options. It used to be that physicists would tell us that solar output was immutable, never changing, forever. Now physicists say they were wrong and solar constants aren't constant, they really do change. You can get good correlation to 11-year sunspot cycles and solar irradiance. They are right on top of each other. They follow each other beautifully. When is the next ice age coming? Who knows?
KLC: For the record, Don, if you gave a gift to the world and controlled the thermostat, where would you place us with regard to climate history?
DJE: If I had to pick a climate that was good for the whole world, the perfect climate would be around the Medieval Warm Period…
KLC: Which is similar to where we are now…
DJE: We're slightly below it. It depends on who you believe. When the Mann hockey stick curve was all the rage, they said the MWP didn't happen. But we know it did happen. During this time, civilizations flourished in Europe because of the long growing season and other things. There is good reason to believe if you're in that range, the growing season is longer, you can grow more food, you can grow more food in Northern latitudes, and you'll support a more robust civilization. People will have more free time because they're not starving to death, they can do more things, like art—
KLC: And study the climate—
DJE: Right, like study the climate, that sort of thing. If I had to pick a climate that would be a nice thing for the whole world, I'd say somewhere close to the MWP.
KLC: A little bit warmer than now…
DJE: Yes, a little bit warmer than now, but not much. There's an interesting parallel. If you look at the temperature curves, we've been coming out of the LIA for about 400 or 500 years at a rate of a degree a century. Will we do this forever? A degree a century? We have the thirty-year wiggles in there, but when do we top out and start cooling again? During the early part of the Holocene, it was warmer than now. In fact, during the Climactic Optimum; it was warmer than it is now. If we are on an overall rising temperature curve coming out of the LIA, when we get to the temperature of the MWP, will we get another LIA, something really big or something in–between, like the 1880-1910 cooling? The answer is, we don't know, we'll have to wait and see. Until we have a better understanding of what causes climactic fluctuations, solar or not solar, and if it is solar, what the impact of solar fluctuations are, there are a lot of things we don't know.

Until we understand the mechanisms better, we don't know. I don't know. I don't know anybody who does know.

KLC: I had a bias going in. I didn't believe any of the AGW-crap, but I was challenged to study and follow the arguments. I said, 'I'll open my mind as much as I can, see what they're saying, and accept that maybe I'm wrong in my bias.' But, that's not the conclusion I came to.

DJE: If I were hard-pressed to give my overall assessment of the whole Gore-phenomenon, I would say two things, A, that it's an out-and-out hoax, and B, it is probably the biggest scientific boondoggle since the days of Galileo. There is so much dogma and pressure put on scientists. Gore has so little proof, it's disgraceful to the scientific world.

KLC: I think it's more than that. There is self-loathing, they believe that man's works are inevitably bad, so they contort to prove that result.

DJE: Follow the money. It's big bucks. We're talking about billions of dollars. If we're headed toward catastrophic global warming, we have to do all these things they want. It will prove to be the biggest boondoggle since the religious dogmas of Galileo's time.