Climate Change and Global Warming

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The geographer Harm de Blij points out, in his book Why Geography Matters, that we are in an ice age, which is a long-term climate condition that been in effect for about a 100 million years. Within this ice age there have been numerous glacial and interglacial periods. We are currently approaching the apogee of one of the interglacial periods. The last interglacial period ended around 80,000 years ago. At that time, the temperature peaked at above current levels and sea level was 15 feet above current levels. In that most recent peak, there can be little doubt that humans had very little if any impact on the climate cycle. Further, there also appears to be a shorter-term cycle of approximately 1500 years, which is also currently moving toward its apogee. The bottom of this cycle was the little ice age experienced a few hundred years ago. In short, our current conditions are probably mostly due to the unfolding of natural cycles that have been going on for a very long time. If anything, human activity may speed the cycles up somewhat or even slow them down somewhat. It is, however, very unlikely that we can stabilize the climate. Of course, we should exercise caution in activities likely to affect climate. Unfortunately, natural variations in climate are often catastrophic and largely beyond our control.

Anyone who thinks we can stop global warming is operating from a static conception of climate and is ignorant of or ignoring the dynamic nature of climate throughout the history of this planet. We might be able to marginally slow down the rate of warming, provided everyone, including developing countries like India and China, got on board with the program. A really concerted effort by everyone to employ methods advocated to slow global warming (e.g., Kyoto Protocol) would have an almost imperceptible effect. An atmospheric physicist, S. Fred Singer (Professor Emeritus of Environmental Sciences at the University of Virginia and former director of the U.S. Weather Satellite Service) estimates that such an effort would decrease the average global temperature by .083 (1/12th) of a degree by mid-century. The natural cycle seems to be that the warming phase triggers the events that contribute to the next cooling phase. One factor in this process may be the melting of the polar ice, which puts cold water into the oceans that change ocean currents and water temperature. Change in water temperature and currents are believed to affect weather cycles. The next glacial period in the climate cycle will make surviving global warming look like a picnic. Slowing down the rate of global warming buys a little time but doesn't change the longer-term outcome. Even if the entire effect of human activity could be subtracted from the long-term cycle, it would only slow, not stop, the increase in temperature and rise in sea level. This cycle has been rising and falling for millions of years and human activity has only been a factor in the last couple of hundred years. To think that humans are the prime movers in this cycle is nothing but hubris.

One of the assertions that has been a problem for me is the proposed connection between CO2 levels and temperature increases often illustrated by the infamous “hockey stick” graph. This graph shows a strong concurrent correlation between CO2 levels and temperature increases. One thing that bothers me about this correlation is that it seems to be offered as evidence of a cause-and-effect relationship when anyone at all familiar with statistics knows that one cannot infer cause from correlation, only association. Another thing that bothers me about this proposed connection is the ice core data for the past one-half million years. The initial analysis of this data indicated a 800 year lag between an initial rise in temperature and a subsequent rise in CO2 levels. A number of climate scientists were not “happy” with this

relationship and did additional analyses and finally reported they were able to tweak the gap downward to a 200 year gap instead of a 800 year gap. It is nevertheless still a significant gap and one that has temperature increasing before CO2 levels.

Recently, I read a proposed explanation for the gap. The proposal is that in past cycles when temperature begins to rise, this ultimately raises the temperature of ocean water. The long lag found in the ice cores is likely due to the amount of time it takes to raise the temperature in a huge volume of water. It should also be noted that there was no explanation offered for what exactly causes cyclic increases and decreases in global temperatures, which no doubt is involved in the climate cycles mentioned at the beginning of this essay. However, the proposal goes on to indicate that as water temperatures rise this causes locked up CO2 to be released from the ocean. As more CO2 is released into the atmosphere, it adds to the temperature increase that is already in progress and speeds it up since there are now, at least, two inputs. Thus, human produced CO2 and other greenhouse gases such as methane and nitrous oxide could very well represent a third input into this process. The additional input from human sources could conceivably increase the speed and the upper limit of the effect. However, assuming that you subtracted all the human input, the likely result would, at best, be a return to the underlying natural cycle, not a return of conditions to a hypothetical stable state.

As the table at the end of this essay indicates, the human contribution of CO2 is the largest contribution of the greenhouse gases generated by man. To flesh this out a bit, the estimated amount of CO2 in the atmosphere is about 400 pp. The total amount of CO2 in the atmosphere accounts for 3.618% of the total greenhouse effect. The proportion of naturally occurring CO2 contributes 3.502% to the total greenhouse effect. Thus, the proportion attributable to human sources accounts for .117% of the total greenhouse effect. Note that the largest contributor to the greenhouse effect is water vapor, which makes a 95% contribution while the human contribution to water vapor in the atmosphere is minuscule, coming in at .001%.

Water vapor is the most significant greenhouse gas of all (see table at end). Water vapor is not usually factored into the computer models used to predict global climate at all, because it is too poorly understood and represents a very complex variable to model. It is roughly like trying to predict the peak price of wheat without taking into account the supply likely to be available when demand peaks. The principle way in which water vapor comes into play is through cloud formation. The more cloud cover there is the more sunlight is reflected back into space and the cooler the global temperature. Conversely, the less cloud cover the more sunlight reaches the surface of the earth and the higher the global temperature.

Recent research has shown that a significant factor in cloud formation is the interaction of cosmic rays with particles of water vapor. Thus, fluctuations in the amount of cosmic rays reaching the earth will have significant effects on cloud formation and cover. The largest source of cosmic rays is our sun and other suns in our galaxy. Short-term cosmic ray fluctuations are related to cyclic activity in the sun, which is affected by other planetary bodies in the solar system such as Jupiter. When large bodies of mass approach and recede from the near vicinity of the sun, its activity is affected. Long-term cosmic ray fluctuations are believed to be related to the movement of our solar system through its orbit in our galaxy. In the course of moving through this orbit, we enter regions where stars are more densely concentrated and where they are less densely concentrated. Since other stars like our sun are major producers of cosmic rays, one would expect that cosmic ray bombardment of the earth

would increase in regions where star concentrations are more dense and decrease when they are less dense. There is some speculation that this may be a major contributor to long-term climate cycles mentioned earlier that have been going on for millions of years and can be measured in tens of thousands of years.

In conclusion, I would say that, yes, we are experiencing climate change related to a warming trend, but there isn't anything new about that. Climate has been going through cycles of warming and cooling since long before man came onto the scene. Thus, it seems to me impossible to seriously argue that human activity is the cause of climate cycles. Could human activity be contributing to existing climate cycles? It seem likely that human activity could be a contributing factor. Trying to protect the environment from degradation seems like a reasonable goal regardless of its impact on climate. In addition to trying to reduce human emissions of CO2, there seems to me to be other initiatives that could be taken.

One initiative might be to develop methods for extinguishing underground coal fires. There are hundreds of these unintentional fires burning around the globe. These fires can last for decades to hundreds of years before they consume all the available fuel. One of these has been estimated to have been burning for 6000 years. It has been estimated by one environmental group that such fires contribute approximately 2-3% of all the carbon emissions in China where around 20 million tons of coal is consumed by such fires each year. Another initiative might be projects to reverse desertification. It is well known that desert areas are increasing around the world. When foliage dies off and large areas become deserts, a huge carbon capture process is destroyed. One researcher (https://www.savory.global/) has argued that if we could regain the carbon capture lost through desertification, then atmospheric carbon levels could be reduced to pre-industrial levels without doing anything else. Third, initiatives are needed to stop the huge problems caused by chemical runoff from agriculture. This runoff is producing large dead zones in rivers, lakes and oceans. These dead zones have large impacts on the balance of greenhouse gases, not to mention fishing and the health of the planet in general. Further, consider that the population of the planet has increased approximately 800% since 1800. This roughly corresponds to the period of industrial development and pursuit of expansive economic growth. Think of the possible effect on climate, not to mention the environment in general, of this huge expansion in population, with its demands for food, energy, housing, infrastructure and so on. I think the species is facing a very serious and escalating crisis about which most of the population is clue less. If a demographic implosion didn’t already appear to be in the making, probably beginning at the end of this century, one would have to be created. Clearly, an initiative needs to be undertaken to plan how to keep population and the demands on the environment at a sustainable level once there is a significant decline in world population (Note, this is discussed in greater detail in “Is Economic Growth a Viable Long-Term Goal?” found on this page: http://davidcenter.com/Musings.php). Finally, I think belief that we can control the climate is hubris. We should never forget that once such a project is begun, unintended consequences are possible and they aren't always good. I do think that reducing our impact on climate and the environment may be possible.

There is a table on the next page.

Anthropogenic Contribution to the "Greenhouse effect," expressed as % of Total

Based on concentrations (ppb) adjusted for heat retention characteristics	% of Greenhouse Effect	% Natural	% Man-made
Water vapor	95.000%	94.999%	**0.001%**
Carbon Dioxide (CO2)	3.618%	3.502%	**0.117%**
Methane (CH4)	0.360%	0.294%	**0.066%**
Nitrous Oxide (N2O)	0.950%	0.903%	**0.047%**
Misc. gases (CFC's, etc.)	0.072%	0.025%	**0.047%**
Total	100.00%	**99.72**	**0.28%**