

Number 1

October 10, 2007

THE FUTURE IS NOW

Welcome to the great climate change adventure. This newsletter will help you to understand the latest scientific findings in the new rapidly changing climate of the anthropocene. Maybe now that our Arctic sea ice is almost gone, society will begin to notice the big climate changes in other parts of the world.

I have read the academic literature and I have talked to the scientists. I have been to the Arctic, seen for myself and talked to the locals. Our most senior climate scientists have been warning us for decades that never before seen climate responses are likely in our climate future. These responses, or feedbacks, will become most evident *first* in the arctic and then spread to other parts of the world. Then, they will get worse if we don't do something about it.

WHY TRANSPORTATION PLANNING?

Transportation – public, freight, trucking, airlines, shipping, trains, and private automobiles are the second largest contributor of greenhouse gases to the environment. Transportation contributes a third of the greenhouse gases that are generated every year and this proportion is rising due to the increased use of fossil fuel dependent transportation throughout our Earth's society.

THE ANTHROPOCENE ERA

Anthropocene comes from the Greek anthropos 'human' and kainos 'recent'. The anthropocene is a new geologic term meaning: the most recent period in history where the human race has had a global impact on the climate and environment of planet Earth. Nobel Prize winning scientist Paul Crutzen coined the term in the year 2000 to describe the new geologic era that the planet is experiencing. The term has gained widespread acceptance since it was first used. Crutzen was awarded the Nobel Prize for work in the understanding of ozone depletion processes.

Top News Item

The National Snow and Ice Data Center (NSIDC), supported by the National Oceanic and Atmospheric Administration (NOAA), the National Science Foundation (NSF), and the National Aeronautics and Space Administration (NASA), released the following statement:

"Arctic Sea Ice Shatters All Previous Record Lows

Arctic sea ice during the 2007 melt season plummeted to its lowest levels since satellite measurements began in 1979. The average sea ice coverage for the month of September was 4.28 million square kilometers (1.65 million square miles), the lowest September on record, shattering the previous record for the month, set in 2005, by 23 percent ..." The image below illustrates the extent of the melt:



The Arctic amplifies global warming responses. Because of man-caused global warming, Arctic sea ice coverage is now diminishing extremely rapidly. This massive melt is occurring 35 to 50 years earlier than the most confident predictions. Scientists are finding that the global circulation models (GCMs) that they use to predict climate change are quite conservative. The largest scientific body ever, the Intergovernmental Panel on Climate Change

(IPCC), uses 13 of the most robust global climate models to form its predictions. The dashed line and the blue shaded area in the previous image represent these models. It is now obvious that these 13 models grossly underestimated recent warming in the Arctic.



WHY IS THE ARCTIC MELTING SO FAST? Like a mirror, ice reflects up to 90% of the sun's energy back to space, with very little melt occurring. Water absorbs up to 90% of the sun's energy, changing it into heat that stays in the arctic environment and melts large amounts of ice. The more melting there is, the more heat stays in the environment. We are now experiencing what is called a positive feedback in the Arctic. This is a significant event that has not happened in at least 2 to 3 million years; it concerns almost 30% of the permanent ice cover on Earth, and it will change our world climate.

TRANSPORTATION ISSUES

- ⇒ Vehicles in the United States generate more CO2 than every CO2 source in all of India.
- \Rightarrow The world automobile count will increase by 50% by 2030.
- ⇒ Poorly inflated tires can waste as much as 300 pounds of carbon per 10,000 miles of driving.
- Automobiles and light duty trucks account for two thirds of the transportation sector carbon dioxide emissions.
- ⇒ Over the last 30 years greenhouse gases emitted by the transportation sector have increased at a pace faster than any other sector.
- \Rightarrow One quarter of all automobile trips are less than 2 miles.

The three major areas where transportation related greenhouse gas emissions could be reduced are in technological, non-motorized transportation and transportation management. Hybrid vehicles are an obvious choice for technology. Biking and walking those trips less than 2 miles must become a standard part of the western way of life. But, most importantly, we must manage our transportation systems so that they encourage us to minimize the number and length of trips. This means that strip development must be avoided at all costs. Nodal development allows for offices services and business to be located within easy access of residential areas. Land use practices must be optimized to allow for this "nodal" growth to take place. Land use practice policy is the responsibility of our leaders in government.

WHAT HAPPENS IF WE DON'T GET OUR CARBON EMISSIONS UNDER CONTROL? Scientists don't really understand the answer to this question yet. They do know that our planet has two stable climate states, glacial cold and interglacial warm. We have been in an interglacial warm phase for much longer than normal, probably due to global warming that started thousands of years ago with the introduction of agriculture and rice farming to Earth's society. Scientists also know that our climate does not change between these two states gradually, as was once believed about the glacial pace of climate changes in ice ages. Scientist know now that our climate changes very vigorously, much more so than ever encountered by written history, and it does so within periods measured in lifetimes, Tens of years and even single years, instead of centuries or millennia.

Changes in the coverage of Arctic Sea ice of slightly greater extent than today have happened before with CO2 concentrations much less than they are today however, the rate at which the changes are taking place today and the elevated CO2 concentrations today are greater than before – quite a bit greater. Polar bears may adapt to life on land, but what is certain is that their future is questionable. The extinction of two of Earth's magnificent species is just a small part of the problem. Nothing like this melt has ever occurred on our planet in its current continental configuration, greenhouse gas concentrations and increasing rate of melt, etc. The key is that these increases, and many others like them are outpacing the super computer models and leading to surprises that have been unexpected in the world of science.

