

Climate change is not part of a natural cycle: Barber

The world indeed needs to pay more attention to the dramatic changes currently unfolding in the Arctic. Unfortunately the *Dauphin Herald* article of my keynote address at the Hudson Bay Route Association Annual General Meeting (AGM) on April 3, 2013 got many of the details of my research work incorrect. To be honest, I am not that surprised by these errors (or omissions) as climate science is a complex topic requiring significant thought, research and reflection. It is not something very conducive to putting into five second sound bites on television or indeed in newspapers. I do, however, believe that it is important to communicate science as effectively as possible to the public and thus I have drafted a letter to correct the major shortcoming of the original article done by Jessica Rawluk.

I want mostly to be clear that the climate change we have been experiencing in the Arctic is like nothing we have seen on our planet for many thousands of years. Yes there are natural cycles of the climate system, but we are currently superimposing another scale of change otop of this natural cycle of change. The cause of this "human induced" change is directly due to our reliance on fossil fuels. We take carbon out of the ground and burn it to drive our cars and indus-

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tries, heat our homes, harvest our crops, power our airlines and generally drive our economic engine. The greenhouse gases from the burning of these fossil fuels go into the atmosphere where they can reside for many hundreds of years. They enhance the greenhouse effect that makes the planet warmer than it would be without these additional greenhouse gases being present.

When I began working in the Arctic (in 1981) the climate models of the day predicted that we should see the first and strongest signs of a warming global climate in the Arctic due to something called the Arctic Amplification. The basis of this is that as sea ice melts you replace a white surface (sea ice reflects sunlight) with a dark ocean surface (which absorbs sunlight). This basically causes the Arctic to warm up more than the rest of the planet. Over the past 20 years we have seen global temperatures increase by about 0.7°C and the Arctic at least 3 times that (2.5 to 3.5°C).

Now on first thought this change in temperature might not look like much, but consider that during the last glacial maximum (when glaciers covered most of the interior of North America and most of northern Europe and Asia, our global

temperatures were only 4°C colder than they are now. If 4°C colder means Dauphin sits under a 3-km thick glacier, as it did 18,000 years ago, then what does 4°C warmer mean – well right now it means that we are losing a lot of sea ice in the Arctic ocean.

Sea ice grows out in the winter and shrinks back in the summer. When I started working in the Arctic about 85 per cent of the ice in the Arctic basin survived the summer and started to regrow the next winter. We call this multi-year sea ice (as it is multiple years old). This stuff gets very thick (>5-m) and very hard each year that it survives and regrows. Today only about 18 per cent of the Arctic is covered with ice by the end of summer and the rest of the Arctic ocean regrows first-year sea ice only. The first year ice is much thinner (<2-m) and much weaker. With such a small amount of sea ice left at the end of each melt season, shipping is episodically now possible through the NE passage (along the Russian coast) through the NW passage (in northern Canada) and indeed even across the north pole in the summer. Indeed it is this transition that has various oil and gas, mining, shipping and tourist industries so interested in the Arctic. First-year sea ice is relatively simple to engineer for whereas multi-year sea ice is a major barrier to

transportation and development. Our models predict a global average increase of 4°C will occur before the end of this century and at that time the Arctic will warm by around 12°C. Sea ice, glaciers and permafrost have begun melting at an alarming rate throughout the arctic and this melt will accelerate in the decades ahead.

The natural cycles of climate change go on over the millennial time scales (i.e., thousands to hundreds-of-thousands of years). Human induced climate change goes on over the decadal time scale (i.e. tens to hundreds of years). The scientific research my group, and many hundreds of other scientists around the world does, clearly show that the changes currently underway in the Arctic are indeed the first and strongest signs of a

global warming of our planet and are a direct result of human reliance on fossil fuels. We are creating a human induced change in our climate system and the ramification of this has already begun to affect the Arctic and will affect us here in southern Canada and indeed throughout the globe in the near future.

Climate change is one of the greatest threats our civilization has ever faced. It will bring both opportunities and challenges. Indeed one of the opportunities is that the Port of Churchill will have an extended shipping season, due to the fact that the open water season in Hudson Bay has already begun to expand. The challenges involve how we adapt to this changing climate, how we develop alternate energy sources to minimize how much the temperatures increase, and how

variable temperature and precipitation patterns become. The first step in this process is for the public to become informed about the complexities of climate change and to begin the process of adapting our societies to become more resilient to this change. The planet will not be destroyed by climate change – the natural cycles of climate have induced much larger changes over the millions of years of change on our planet. The thing most at risk is us; our economies, our political stability and our ability to have a meaningful and sustainable future on this planet we call home.

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