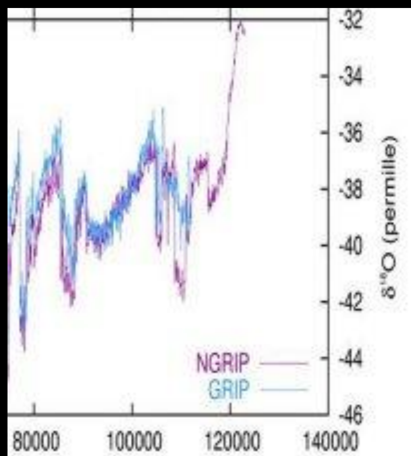
Ice Age Canada

Is Canada a nation without a future?



The oxygen-18 proof in the pudding

The oxygen-18 profile shapes the answer

By Rolf A. F. Witzsche – 2013 – Published by Cygni Communications Ltd. Canada

In love with our humanity: This is the critical issue.

Are you amazed at what we have within our reach to know and do, as human beings?

You should be amazed, because your having a future may depend on it, even a future existence.

The above image provides a unique picture of the climatic conditions on Earth at the beginning of the last Ice Age, 120,000 years ago, which gives us an indication of what lies immediately before us as the next Ice Age could potentially begin in 30 years. All of this is knowable. We have the tools to discover what the world was like in distant times that few people have survived, and to understand why great challenges arose, and how to avoid them in our time.

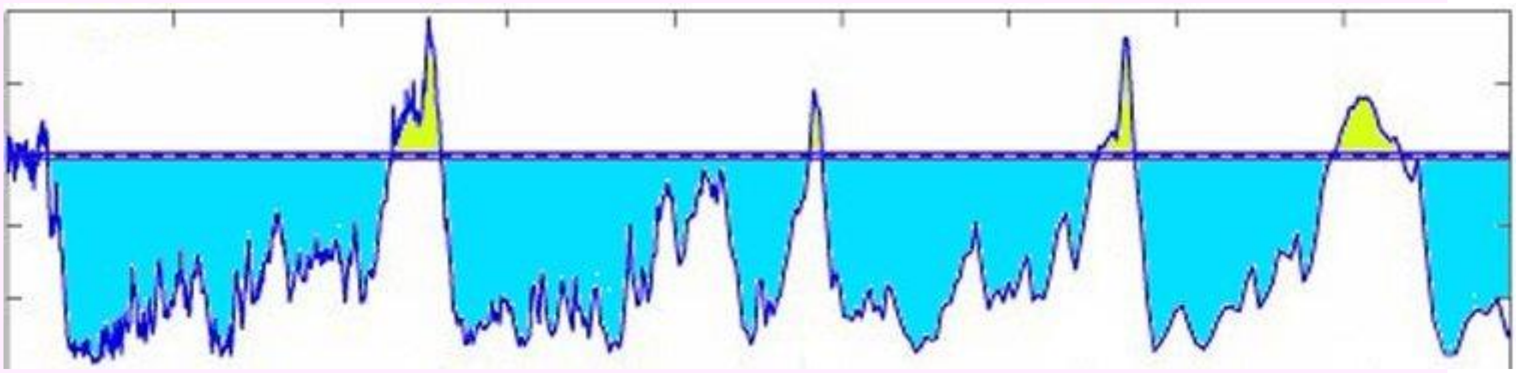
The above graph that illustrates the beginning of the last Ice Age, illustrates a variable that no one can actually see, physically, which is defined only in the form of numbers that represents the changing climate conditions by a measurable ratio between gases that have been preserved in ice for 120,000 years. By observing the changing ratios, concrete conclusions can be drawn.

The illustration above provides us a visual image of the changing ratio between two forms of oxygen, the normal form (oxygen-16) and the heavier form (oxygen-18) that is an isotope that carries two extra neutrons in its atomic nucleus. The natural ratio of the two gases is 99.8% to 0.2%. It has been discovered that this ratio can change minutely with changing climate conditions. The deviation from the normal ratio is plotted above, measured in units of a tenth of a percent of the normal ratio. The plot presents the changing values of the deviation over time, measured within ice samples drilled at two separate locations on the Greenland ice sheet. These 'landmark' drilling projects were multi-year efforts divided into short field seasons of 12 to 15 weeks from mid-May to mid-August (1989-1992 for drilling at the Greenland Ice Core Project - GRIP, and 2000-2004 for drilling at North Greenland Ice Core Project - NGRIP).

Historic temperature determinations are made possible by the fact that the 0.2% of the oxygen on earth that exists as an isotope that has two extra neutrons attached (oxygen-18) is 12% heavier. A normal oxygen atom is made up of 8 protons and 8 neutrons, which give it a weight of 16 (oxygen-16). The heavy isotope contains 10 neutrons, which give it a weight of 18 (oxygen-18), a 12% increase.
In geochemistry, paleoclimatology and paleoceanography, the ratio of the heavy isotope in comparison with normal oxygen is commonly used to 'measure' of the prevailing temperature, such as the precipitation in a given area.

Because water that is made up of normal oxygen requires less energy to vaporize, and is more likely to diffuse to the liquid surface to be vaporized, vaporizes more readily than 'heavy' water, the changed ratio represents the vaporizing efficiency, which is affected by climates. When the resulting vapor then forms clouds and condenses back into liquid, the portion of the vapor containing the 'heavy' water enters the liquid state more readily and is thus the first to rain out. While the clouds are carried by the air streams from a warm region to a cold region, the 'heavy' water is increasingly removed by precipitation, leaving progressively more of the 'light' water vapor to rain out deep in the cold regions. This 'distillation' produces a measurable lower 18O/16O ratio for precipitation in the lower-temperature regions. The measured ratio is expressed as δ18O (or delta-O-18) defined in "per mil" ratios (‰, parts per thousand, one tenth of a percent). In the chart above, the scale numbers represent the factional negative difference of the isotope ratios found in the ice core samples in Greenland. The greater the difference is, the colder the precipitation had been that produced the ice. Since these ratios remain stable, we can accurately 'measure' prevailing conditions far back in historic times.

In the southern hemisphere the heavy hydrogen isotope, hydrogen-2 (deuterium) is used as a temperature marker. In Antarctica two separate, 'landmark' drilling projects were likewise conducted, one at Russia's Vostok station, and a second one at a site 560Km 'nearby' named Dome-C, the site of the European Project for Ice Coring in Antarctica (EPICA).



The EPICA site has the oldest ice on Earth. With drilling completed in 2004, the project presents us a climate record going back in time 740,000 years. The above graph has been produced from the EPICA ice cores. It shows only the latest 450,000 years, beginning at the present on the left. The historically earlier Vostok drilling project had produced a similar pattern. (See the comparison details)

Vostok, the coldest place on Earth: −89.2 °C (−128.6 °F) on 21 July 1983

Click for a larger view

At Russia's Vostok station, drilling began in the 1970s with ice recovered from less than 1000 meters deep. The deepest ice was taken in 2012 from a depth of 3770 meters when the surface of Lake Vostok was reached.

In Greenland, the Greenland Ice Sheet Project (GISP) was started in 1971, which became a decade-long project that reached bedrock in 1981 at a depth of 2037 meters. Its follow-up project, the U.S. (GISP2) project, drilled at a glaciologically better location on the summit of the Greenland ice sheet. It reached bedrock on July 1, 1993 after five years of drilling, and produced an ice core 3053.44 meters in length, reaching the deepest ice in the world at the time. Below is a photograph of a section of the GISP2 core from a depth of 1837 meters, which has the annual layers clearly visible.

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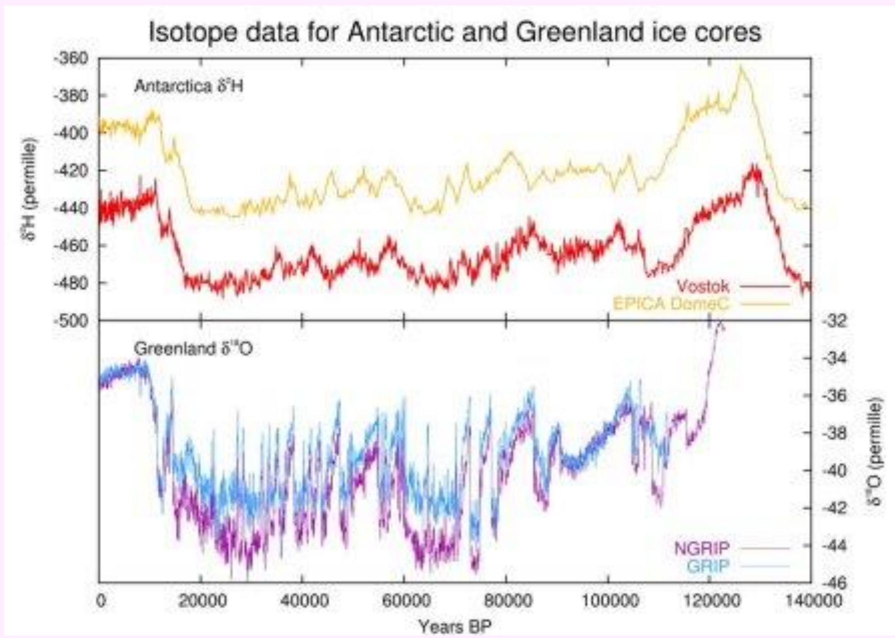
While the Antarctic ice sheet is only marginally thicker (3233 m at Dome-C) compared with the Greenland ice (3065 m at NGRIP), the Antarctic Ice covers a vastly longer time frame (740,000 years at Dome-C, vs 120,000 years at NGRIP), because of the desert conditions in Antarctica that produce a mere 20 millimeters of precipitation per year. The Greenland ice sheet, because of its shorter time span for the same depth of ice, is highly advantageous in that its ice record is less compressed. It gives us a higher-resolution view into the past, with fine details that are not available in the Antarctic records, or at best are extremely muted there. Thus, together, the 6 major landmark drilling projects (GRIP, NGRIP, GISP, GISP2, Vostok, and EPICA) provide us a deep view into the climate history of our planet with an amazing resolution of details.



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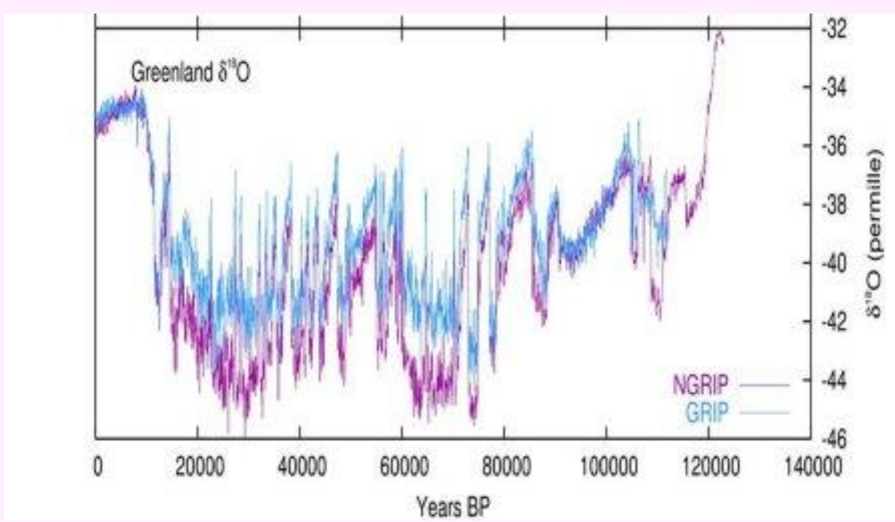
The Greenland ice core records present us detailed evidence of large historic climate oscillations occurring throughout the last Ice Age, though more pronounced in the later half.



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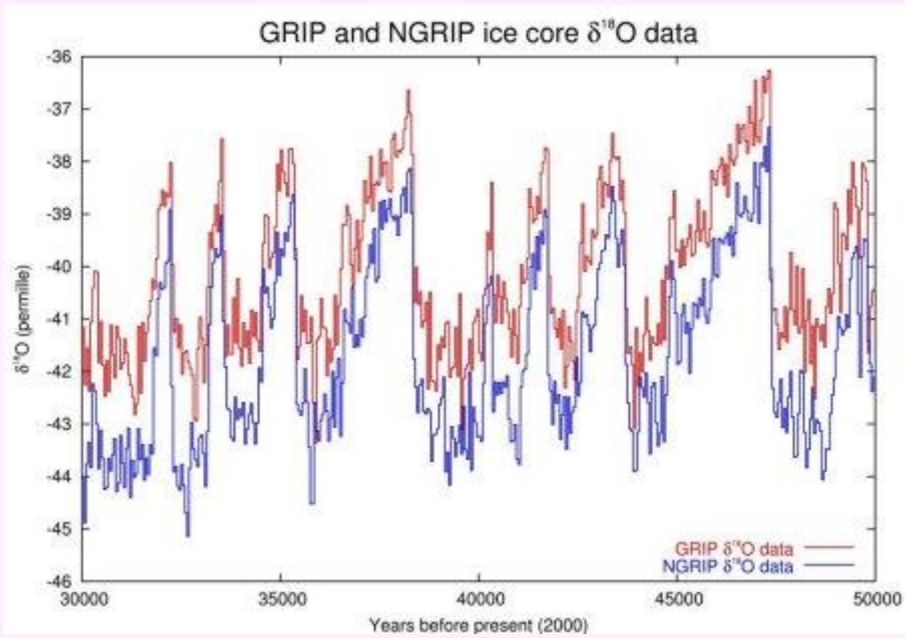
As you can see, these large oscillations that have been detected, known as the Dansgaard-Oeschger events, tell us that rapid temperature changes have occurred, from the deepest glaciation climate to near the current interglacial climate, always followed by a more-gradual reversal (such as at 7000 years ago). In all, a total of 25 of these rapid climate fluctuations have been identified in the ice core records for the last glacial period. These events appear to have occurred quasi-periodically with an average beat time of 1,470 years.



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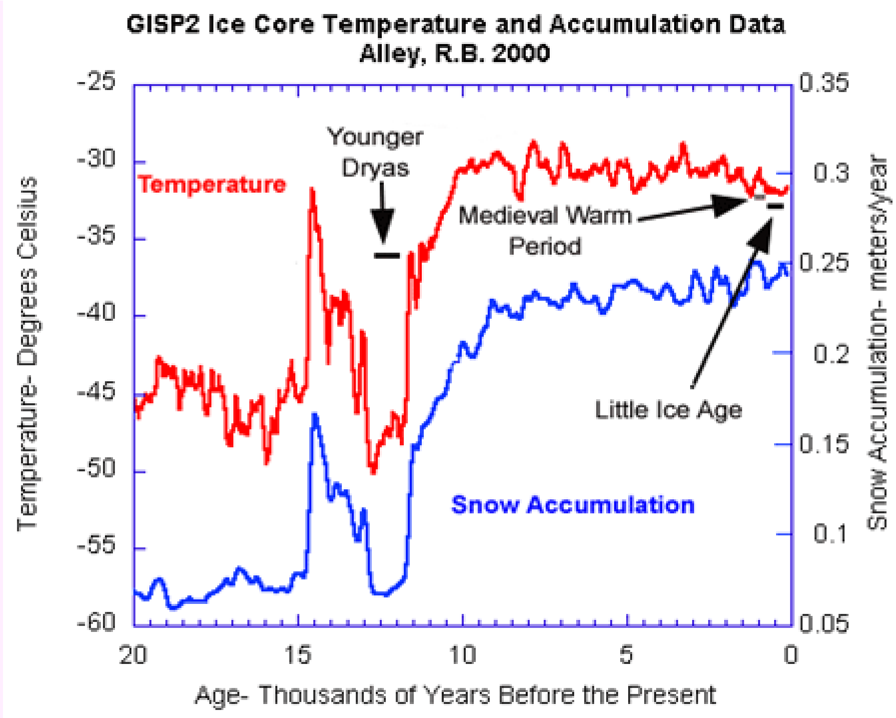
The Dansgaard-Oeschger events produce rapid warming episodes, typically over 30 to 40 years, followed by gradual cooling over a longer period in the range of hundreds of years.

The consistently regular periodicity of the large D-O events remains an enigma in the context of mechanistic ice age dynamics as the events cannot be tied to known terrestrial causes, or orbital variations. Attempts have been made to link them to ocean current fluctuations, but that's pulling on straws in a world that was more than 50 times colder than the little Ice Age in the 1600s has been. The deepest part of the glaciation period (reported by NGRIP) was almost a third colder than the low point of the Younger Dryas event.



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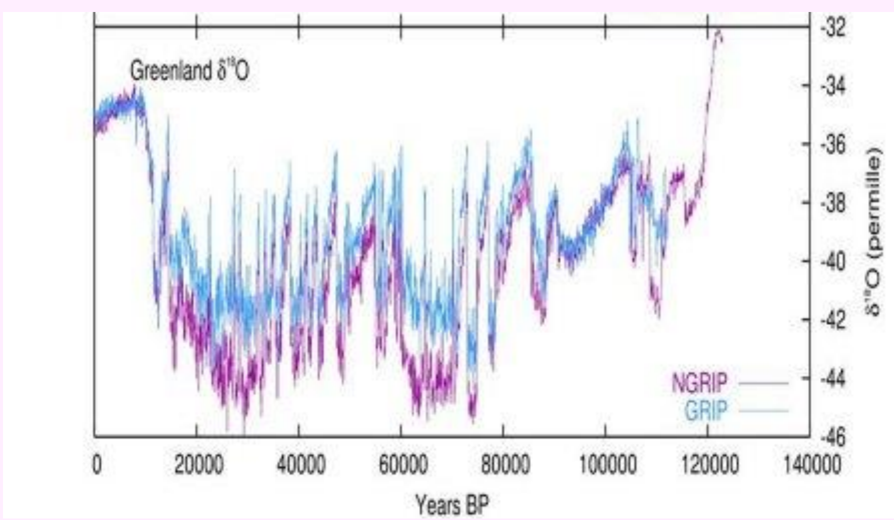
However, if one considers the electrodynamics nature of the Ice Age itself, which begins when the Sun goes inactive - when the plasma density in its flow through the solar system drops below the threshold required to maintain the Primer Fields - then the sharp drop-off that is seen at the start of the last Ice Age 120,000 years ago, makes perfect sense.



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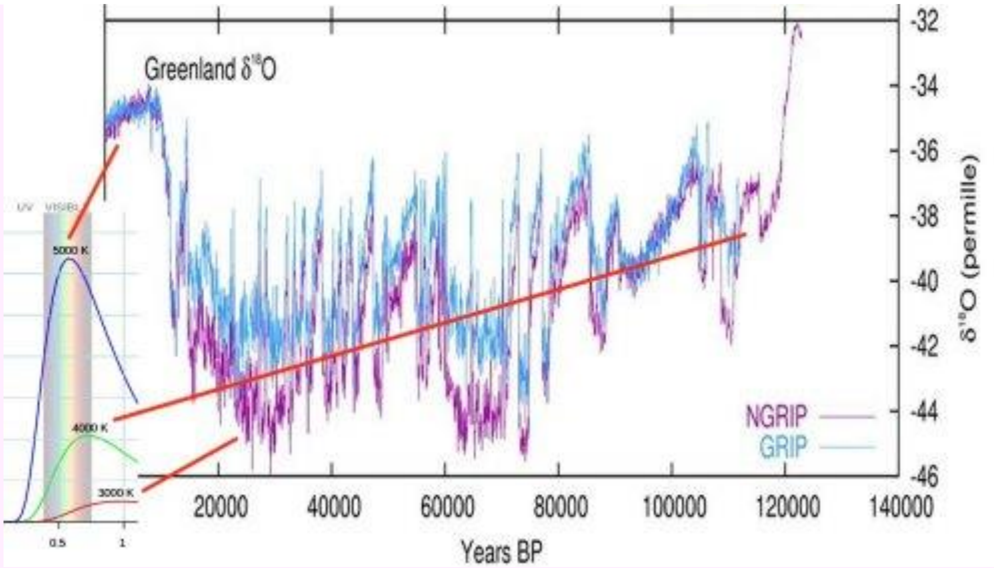
In this case, the rapid cooling would have been caused by the Sun going inactive. The sharply reduced temperature would in this case logically reflect the Sun's residual energy, or energy produced by its residual energy resources, which of course would gradually diminish.

Since moving plasma in space keeps moving, its density that after a cut-off is no longer consumed, would likely be bunching up near the solar system to the point that sufficient density accumulates for the Primer Fields to form anew, whereby the Sun would become active again for a period. The Sun would remain active then until the plasma-density would be consumed once more, whereby the Primer Fields would collapse, and the Sun become inactive again. In the process the Sun residual energy would diminish further, until it becomes 'pumped up' again when the reactivation of the Sun repeats itself, and so on.

In this context the Dansgaard-Oeschger events can be recognized as solar reactivation events. In fact, these events are in principle exactly what one would expect to see for an electric Ice Age event in which the Sun becomes inactive and is reactivated periodically. If the reactivation didn't happen, the entire planet would freeze up as some suggest it did roughly 700 million years ago. The electric Ice Age, small as in the present epoch, or large as in earlier times, is ultimately the only cause large enough to force the gigantic climate events that Ice Ages are that pile up snow across the continents so deep that the ocean levels become lowered by 400 feet. No mechanistic process with the Sun remaining a constant factor can cause these gigantic effects. Only electric principles can have these effects. Thus, it would be surprising if one did not see at least some corresponding evidence in the ice core records. The fact that one sees the evidence so clearly as they appear in the NGRIP ice core data in the form of the Dansgaard-Oeschger events suggests that the ice age climates are much harsher than is generally believed.

The duration and the intensity of the solar reactivation events that we see reflected in the Greenland ice, would of course likely be modulated by whatever background changes may have been occurring in the density of the plasma flowing through the solar system. The timing and duration of the individual reactivation events, would then be affected by the modulation prevalent at the time. The resulting climate pattern that we see between the various D-O pulses would then reflect the state of the residual energy remaining in the Sun at the time, which over time would diminish to extremely low levels, as illustrated below in what has been actually observed, referenced to the standard black-body radiation curves for the corresponding solar temperatures.



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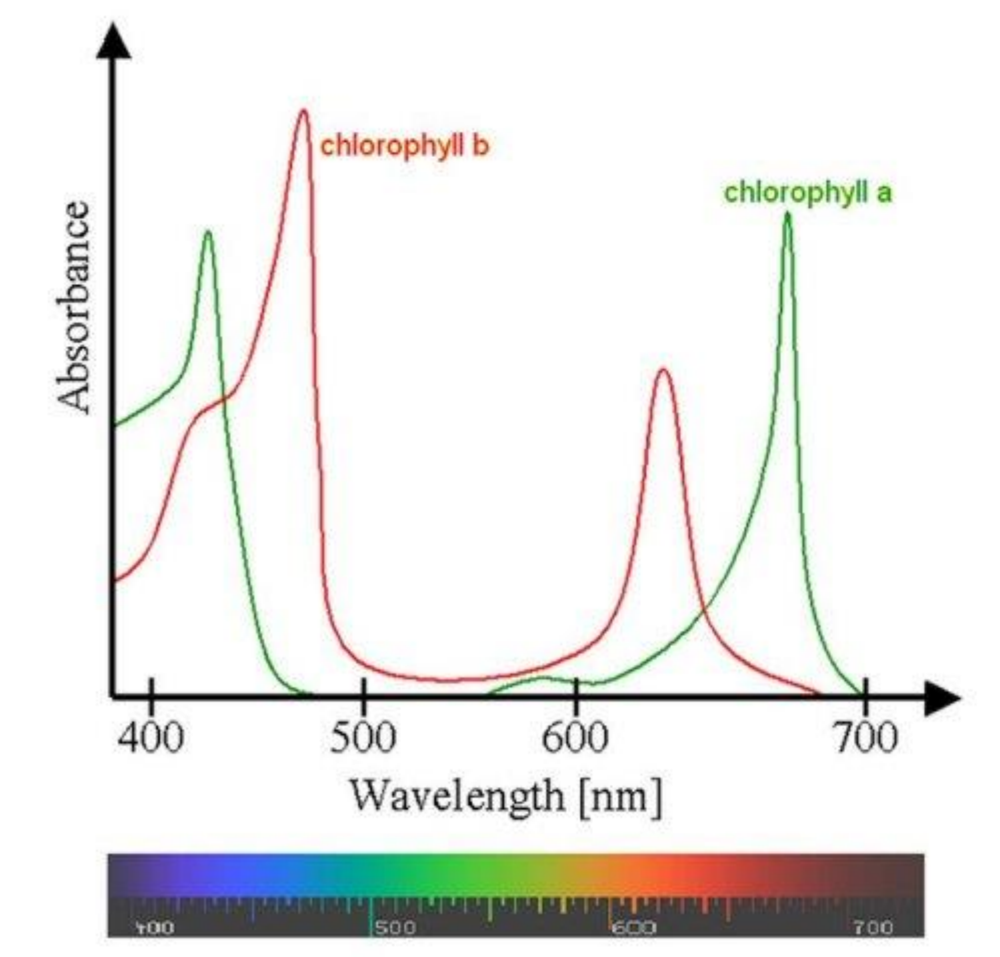
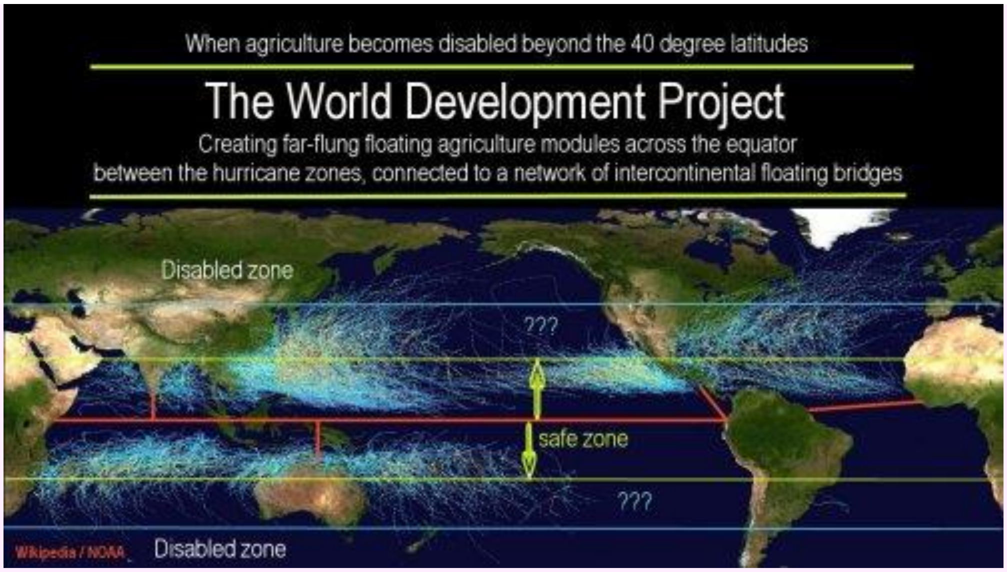
[black-body radiation curves]

For the coming Ice Age in potentially 30 years from the present, the residual energy of the Sun would be relatively high at the very beginning of that Ice Age. It would likely be in the range of about 30% of the present level. Outdoor agriculture would still be possible in the tropics at this stage, and most certainly so with artificial sunlight assisting plant growth.

At later stages, half way through the Ice Age, the residual solar radiation would have diminished to 10% or less. At this point full indoor agriculture with artificial climates would most likely be required. This does not mean that full indoor agriculture, even largely automated agriculture, would not be implemented much earlier. This would likely happen, because full indoor agriculture promises the highest efficiency in production for agriculture, and would be 100% independent of climate conditions. The energy requirement for large-scale full indoor agriculture would theoretically be relatively minimal. At present, only a few percent of the sunlight that gets to the plants is actually utilized by the plants.



The chlorophyll absorption bands, in which plants utilize sunlight, are fairly narrow. With LED light-sources tuned to the bands required for plant growth, the energy input can be kept low. With everything else optimized for the most ideal and efficient plant growth, such as with artificially increased CO2 concentration, temperature, and also moisture, up to 10-fold greater efficiencies may be achieved. What seems impossible today may soon be common place, because we simply have no other option than to adopt our living to the changing environment. This would likely mean for the majority of the people of Canada that they create themselves a satellite arena for living in the tropics where little suitable free land exists.



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This means creating new lands afloat on the seas, attached to intercontinental floating bridges, complete with floating cities, industries, infrastructures, and so on. This can be done. It is totally possible. It will likely be done, because it is necessary, because no other options really exist. When the Sun goes inactive unprecedented conditions will unfold. While it will take a long time for the continental ice sheets to accumulate that file up 12,000 feet deep, the conditions for them will begin almost immediately. We will likely see minus-80, or colder, winter conditions, similar to the Antarctic winter today, being experienced across most of the disabled zone, with clouds of ice fog carrying the precipitation. This means that the oxygen-18 ratios that are found in the Greenland ice cores likely represent evermore the conditions at the evaporation point with few losses during the transport stage as ice-fog crystals. On this basis it may well be that the generally assumed Ice Age severity is strongly underestimated.

Large-scale human living may simply not be possible in the disabled zones under such circumstances. The same, of course, also applies to all of Russia, Europe, and parts of China. When the Ice Age begins, nearly the whole of humanity will become directly dependent on large-scale world development projects for the creation of new resources for living that presently do not exist. Fortunately almost 3/4 of the surface of the Earth is located in the tropics and sub-tropics, and the materials do exist in abundance for humanity to build itself a new home there.

Of course, if society fails on this front, to develop itself, nothing that it presently being pursued will have any significance. More than 99% of humanity will then starve to death for the lack of agriculture, or die in wars over food. Creative, reactive responses are not possible once the Ice Age has started, for the simple reason that it takes several decades to create the industries and infrastructures that enable large-scale human living in an Ice Age World. We should not ignore that only a mere 1 to 10 million people had made it through the last Ice Age alive. This was the total world-population after more than 2 million years of human development, possibly living of fish during the meagre times, which would likely be sufficient to support a small population.

The creative responses that are needed today, to enable 7 to 10 billion people to live in the new Ice Age environment, will have to begin now when such responses are still possible. It will likely be too late in a decade, considering that the next Ice Age could begin potentially in 30 years. Then, when the Ice Age begins without the new infrastructures having been built, the existence of much of humanity will simply end.

But why should this happen? We have the capacity in hand today that humanity did not have before, to snub the Ice Age Challenge and meet it with such power that it becomes a non-event.

Home Page

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