

## Will the sun cool us?

*The Deniers -- Part VII*

*Lawrence Solomon, Financial Post*

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The science is settled" on climate change, say most scientists in the field. They believe that man-made emissions of greenhouse gases are heating the globe to dangerous levels and that, in the coming decades, steadily increasing temperatures will melt the polar ice caps and flood the world's low-lying coastal areas.

Don't tell that to Nigel Weiss, Professor Emeritus at the Department of Applied Mathematics and Theoretical Physics at the University of Cambridge, past President of the Royal Astronomical Society, and a scientist as honoured as they come. The science is anything but settled, he observes, except for one virtual certainty: The world is about to enter a cooling period.

Dr. Weiss believes that man-made greenhouse gases have recently had a role in warming the earth, although the extent of that role, he says, cannot yet be known. What is known, however, is that throughout earth's history climate change has been driven by factors other than man: "Variable behaviour of the sun is an obvious explanation," says Dr. Weiss, "and there is increasing evidence that Earth's climate responds to changing patterns of solar magnetic activity."

The sun's most obvious magnetic features are sunspots, formed as magnetic fields rip through the sun's surface. A magnetically active sun boosts the number of sunspots, indicating that vast amounts of energy are being released from deep within.

Typically, sunspots flare up and settle down in cycles of about 11 years. In the last 50 years, we haven't been living in typical times: "If you look back into the sun's past, you find that we live in a period of abnormally high solar activity," Dr. Weiss states.

These hyperactive periods do not last long, "perhaps 50 to 100 years, then you get a crash," says Dr. Weiss. "It's a boom-bust system, and I would expect a crash soon."

In addition to the 11-year cycle, sunspots almost entirely "crash," or die out, every 200 years or so as solar activity diminishes. When the crash occurs, the Earth can cool dramatically. Dr. Weiss knows because these phenomenon, known as "Grand minima," have recurred over the past 10,000 years, if not longer.

"The deeper the crash, the longer it will last," Dr. Weiss explains. In the 17th century, sunspots almost completely disappeared for 70 years. That was the coldest interval of the Little Ice Age, when New York Harbour froze, allowing walkers to journey from Manhattan to Staten Island, and when Viking colonies abandoned Greenland, a once verdant land that became tundra. Also in the Little Ice Age, Finland lost one-third of its population, Iceland half.

The previous cooling period lasted 150 years while a minor crash at the beginning of the 19th century was accompanied by a cooling period that lasted only 30 years.

In contrast, when the sun is very active, such as the period we're now in, the Earth can warm

dramatically. This was the case during the Medieval Warm Period, when the Vikings first colonized Greenland and when Britain was wine-growing country.

No one knows precisely when a crash will occur but some expect it soon, because the sun's polar field is now at its weakest since measurements began in the early 1950s. Some predict the crash within five years, and many speculate about its effect on global warming. A mild crash could be beneficial, in giving us Earthlings the decades needed to reverse our greenhouse gas producing ways. Others speculate that the recent global warming may be a blessing in disguise, big-time, by moderating the negative consequences of what might otherwise be a deep chill following a deep crash. During the Little Ice Age, scientists estimate, global temperatures on average may have dropped by less than 1 degree Celsius, showing the potential consequences of even an apparently small decline.

Dr. Weiss prefers not to speculate. He sees the coming crash as an opportunity to obtain the knowledge necessary to make informed decisions on climate change, and the extent to which man-made emissions have been a factor.

"Having a crash would certainly allow us to pin down the sun's true level of influence on the Earth's climate," concludes Dr. Weiss. Then we will be able to act on fact, rather than from fear.

Lawrence Solomon is executive director of Urban Renaissance Institute and Consumer Policy Institute, divisions of Energy Probe Research Foundation.

#### CV OF A DENIER:

Nigel Weiss, professor emeritus of mathematical astrophysics in the University of Cambridge, discovered the process of "flux expulsion" by which a conducting fluid undergoing rotating motion acts to expel the magnetic flux from the region of motion, a process now known to occur in the photosphere of the sun and other stars. He is also distinguished for his work on the theory of convection, and for precise numerical experiments on the behaviour of complicated non-linear differential equations. Nigel Weiss is a recipient of a Royal Society Citation, he is a past President of the Royal Astronomical Society, and a past Chairman of Cambridge's School of Physical Sciences. He was educated at Clare College, University of Cambridge.

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