

Hard Disk Cafe Toastmasters, Calgary

CTM-??-2nd "Mega-Life, Mega-Death, and the invisible hand of the Sun"

Bill Howell, 17Jan07

Introduction

Throughout history, mankind has enjoyed periods of prosperity and abundance, noted for their great advances in architecture, arts and sciences. It also appears that these good times are often associated with explosions of human populations, and for that reason I call these "Periods of Mega-Life".

Throughout history, mankind has also faced periods of catastrophes: drought, floods, famine, pandemics, earthquakes, and wars. Sadly, these periods have often been associated with dramatic losses of population, and it also seems to me that they may be associated with "Dark Ages". For that reason I call these "Periods of Mega-Death".

More and more it appears as though the sun has influenced mankind's periods of prosperity and doom. It is as though the invisible hand of the sun has been a part of the best and worst of our times, and this influence isn't usually dominant but it can be seen. For example, at the very dawn of history - and I mean this in the strictest literal sense - the first civilizations arose following the end of the last great ice age, and we know that the ice ages have been a function of the variability of the sun's energy that reaches Earth. We don't know when the next ice age will come, even though we're headed in that direction even now (perhaps 100 to 10,000 years hence is too remote to worry about).

Mega-Life and Mega-Death - these are "tied at the hip".

- by this I mean that solar changes affect different regions in different ways, and probably with different time lags. For example, an increase in solar irradiance would have variable climate effects with somewhat different timing around the world, perhaps turning a productive agricultural area into desert in one region, while converting another cold or excessively humid area into a great food basket.

Mechanisms:

- Climate Change - one key "intermediate variable"
- Rate & extent of Mutations - cancers, possibly pandemics of virus, bacteria, microbes

Effects (for the most part, hypothesis link these effects to climate change, ergo some solar role)

- Pandemics - influenza since 1700 for sure; likely - malaria, bubonic plague, cholera;
- Regional or Global: outbreaks of Peace or War
- Births and Deaths of civilizations - recent conjecture about Mayan, Chinese Tang, Egyptian
- Revolutions in political systems, art, science
- Prosperity and poverty - and population changes (the measure of Mega-Life and Mega-Death)
- Earthquakes and volcanoes (this is stretch!, but...)

Conclusions

Will our advanced science and social organization save us from harm when the sun next changes its chaotic phase? I believe we will be safe. But we will also be tested, and we also will be affected in significant ways. Of course, I could be wrong, and maybe then we will be making sacrifices to the sun god, just as civilizations have done that throughout history.

Upcoming Event:

University of Calgary, Institute for Sustainable Energy, Environment and Economy (www.iseee.ca)
Distinguished Speaker Series 2007

Daniel Schrag, Harvard University *“Ancient Perspectives on Future Climate”*

Dr. Daniel Schrag, who studies climate change over the broadest range of Earth history, is Professor of Earth and Planetary Sciences at Harvard University and Director of the Harvard University Center for the Environment. He will discuss a variety of strategies for meeting the world's energy needs with the smallest possible impact on our atmosphere, and what strategies we might require if climate change is more dramatic than we expect.

Presented with TransAlta Corporation

Date: Thursday, January 25, 2007

Time: 7:30 p.m.

Location: University Theatre

TO RESERVE YOUR SEAT(S) BEFORE THE TALK, EMAIL iseeespk@ucalgary.ca OR CALL (403) 210.9786

Climate Change history - a function of astronomy, geology and biology

I like to say that climate is a function of astronomy, geology, and biology just to make sure that I don't focus myopically on only one factor (which tends to happen). Some components of each of these general classes are given below, but the list isn't complete and I don't explain below how the interactions go. This doesn't say anything about a host of intermediate variables and effects!

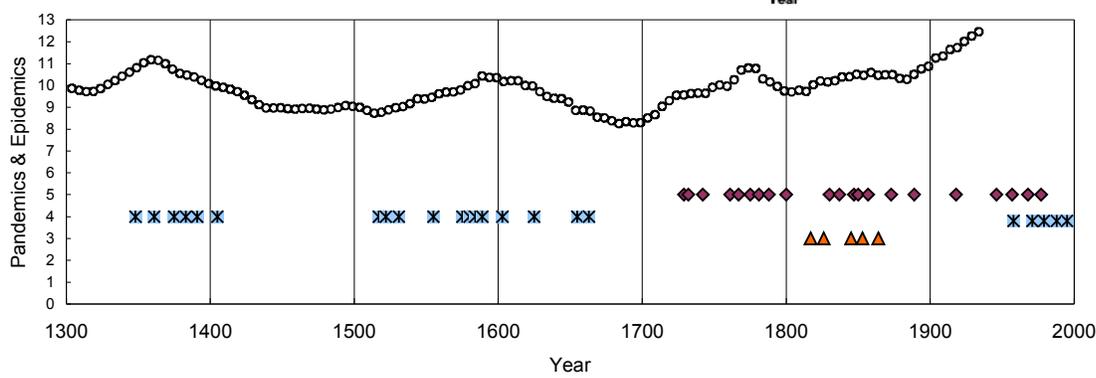
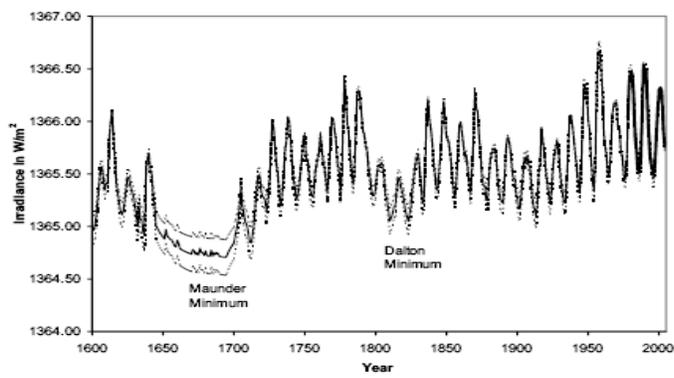
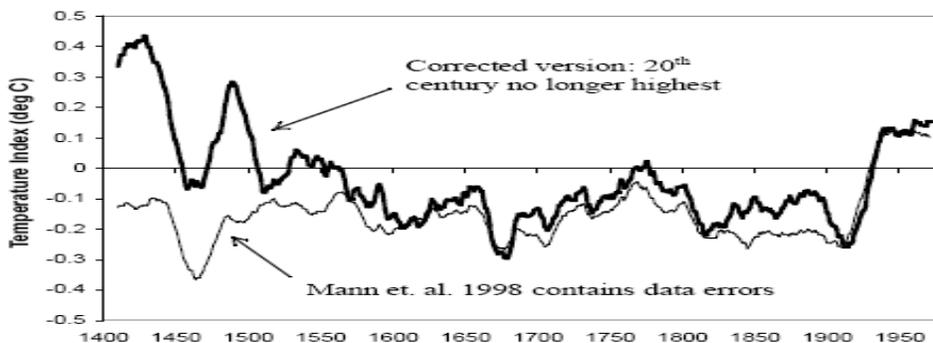
- astronomy: solar - irradiance (total, UV, visible ...), high energy particles, magnetosphere; Earth - orbital (eccentricity - affected by Jupiter Saturn etc), axis (precession, tilt); moon; galactic rays (extremely high energy particles - clouds and perhaps mutation rates & severity)
- geology - magnetosphere, geothermal (radioactive decay, flows), volcanic eruptions (CO₂, ash, methane), tectonics
- biology - [CO₂] versus temperature changes over evolutionary history, effect on regional humidity and erosion, concentrations in sea (eg CaCO₃ in shells, pH etc)

CO₂ - It is my guess that with time science will show that today's man-made CO₂ is having a negligible or very minor effect on our current climate. Almost every major data set used to bolster the man-made CO₂ theory is better interpreted that CO₂ is merely a function of temperature in geologic history (man-made influence perhaps within last 150 years, or last 8,000 years, time lags are critically important!), or that the GHG effect is likely due to water vapor, which is the dominant GHG by far. The General Circulation Models (GCMs) have a glorious record with weather forecasting, and an infamous record of reversals and twiggling when applied to climate modelling. I'll have more confidence in GCMs when the modelers show signs of understanding and mastering the "small-world universal function approximation" dilemma (somewhat like the curve-fitting issue), when they start including more of the major climate drivers in an unbiased and realistic way (cloud, water vapour, solar irradiance), and when the GCMs are able to model the last 150 years at least (without fudging, and instead of being prisoners of monotonic trends in temperatures over a short period of a few decades).

Its my gut feel that major advances in climate modelling will require the application better mathematical tools for non-linear, chaotic, and discontinuous systems, non-stationary with heavy heteroscedasticity, and high or infinite phases/states.

1300 to Present - Pandemics & Epidemics, temperature & solar

For some purposes it would be better to show regional temperatures and disease outbreaks. There are major gaps in the disease time series.



delta 14C = 10*(10-absissa)

Influenza
Bubonic Plague
Cholera

Solar irradiance F10.7 from Tapping et al:
K.F. Tapping, D. Bote l'er, A. Crouch, P. Charbonneau, A. Manson, H. Paquette ""Modelling solarmagnetic flux and irradiance during and since the Maunder minimum"" ?Journal vol/n/pp? Springer Science + Business Media. Printed in the USA 2006 27pp

delta 14C from IntCal04 data series <http://www.radiocarbon.org/IntCal04%20files/intcal04.14c>
Paula J Reimer et.al. "IntCal04: Calibration Issue" Radiocarbon, Volume 46, nr 3, 2004, Updated 30 June 2006
Time lag adjustment subtracted for delta 14C = 70 years

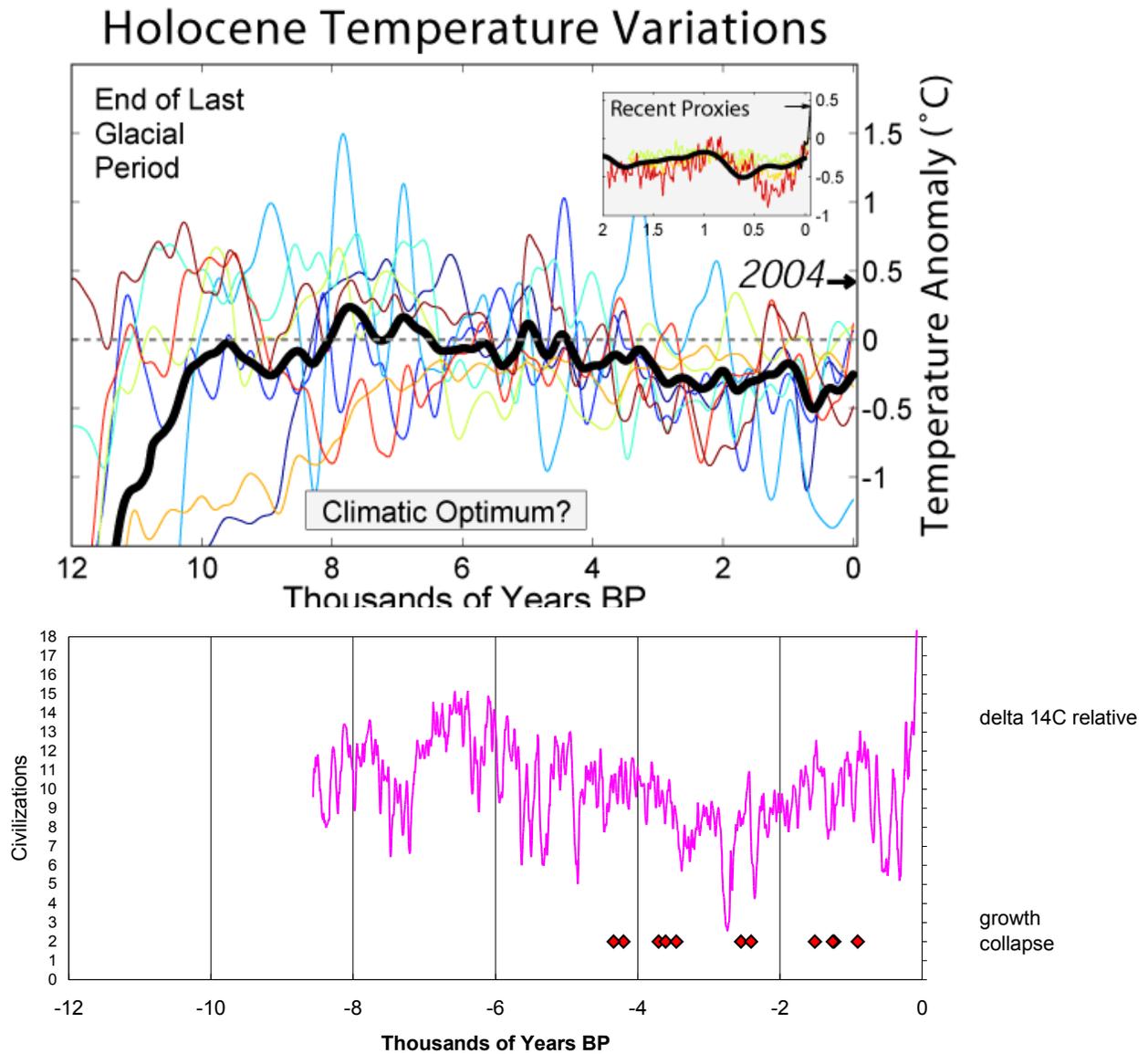
Temperature series from:
S. McIntyre, R. McKittrick "Corrections to the Mann et. al. (1998) proxy data base and Northern Hemispheric average temperature series" Energy & Environment · Vol. 14, No. 6, 2003, p751-771

The solar-influenza correlation since 1700 is statistically significant:

K.F. Tapping, R.G. Mathias, D.L. Surkan, "Pandemics and solar activity". Canadian J. Infectious Diseases, vol 12, no 1, pp 61-62, Jan-Feb 2001

Holocene period - 10,000 BC to present

http://www.globalwarmingart.com/wiki/Image:Holocene_Temperature_Variations_Rev_png



Notice how the use of proxy temperatures potentially "hides" regional trends which can differ (eg Northern vs Southern hemispheres).

"delta 14C relative" means delta 14C data detrended (geomagnetic sinusoidal APPROXIMATE) from:

Paula J Reimer et.al. "IntCal04: Calibration Issue" Radiocarbon, Volume 46, nr 3, 2004, Updated 30 June 2006

<http://www.radiocarbon.org/IntCal04%20files/intcal04.14c>

There will still be residual trend in the data as an optimal regression wasn't used for the detrending.