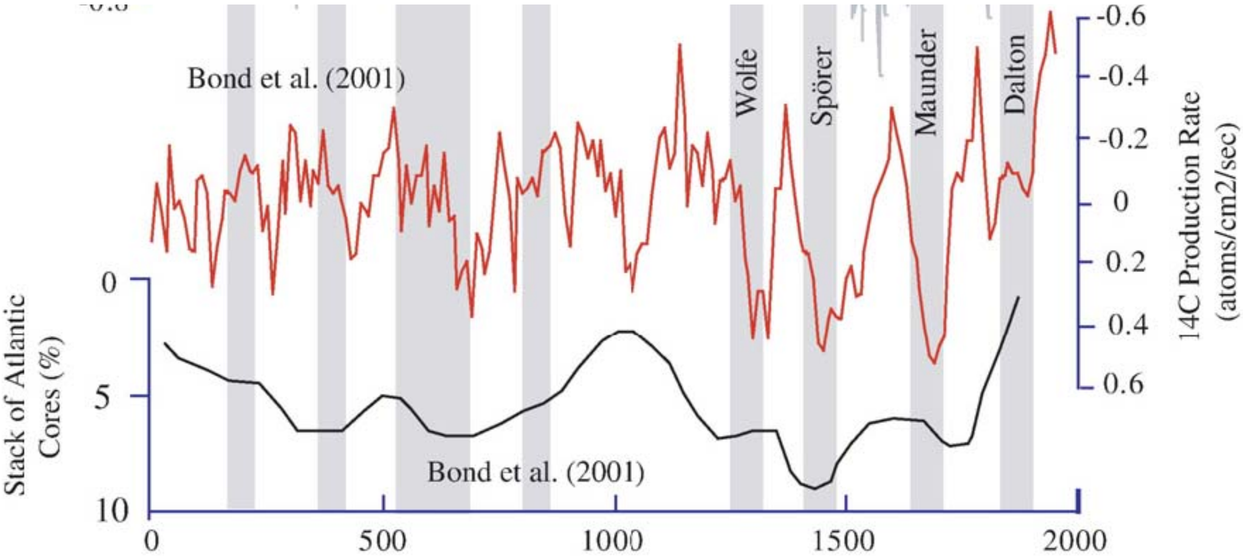
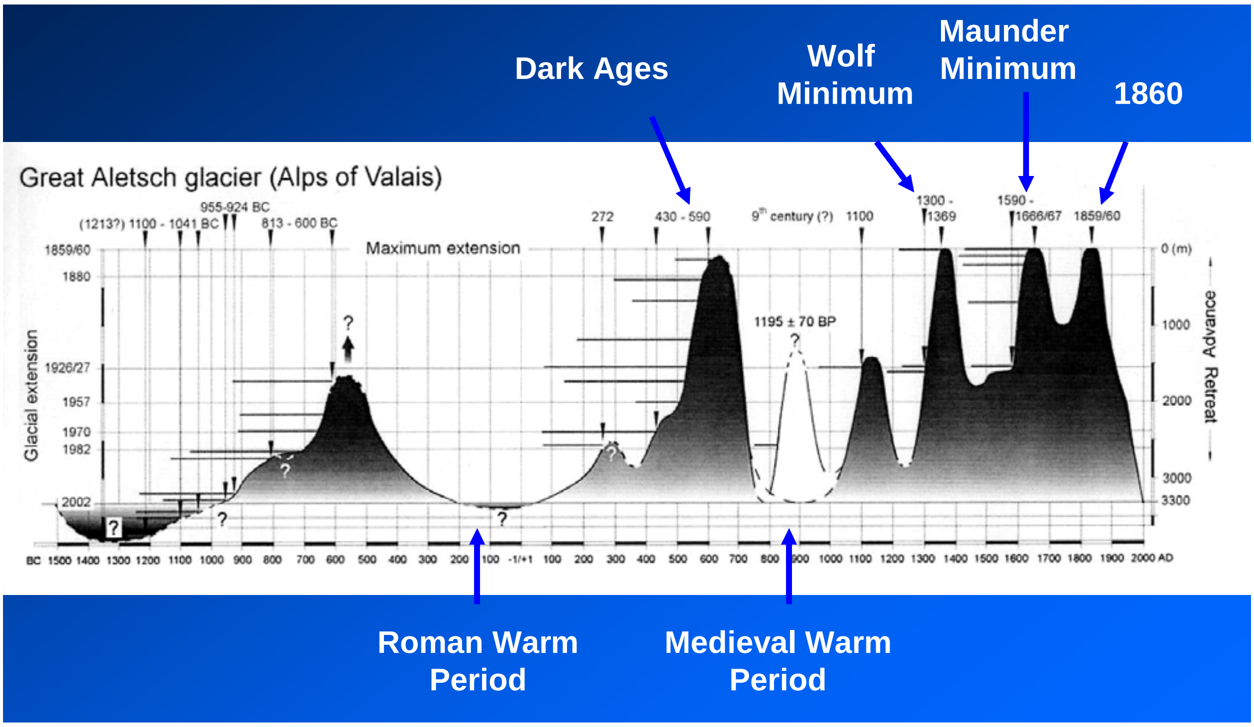
The Warning in the Stars

If climate is not a random walk, then we can predict climate if we understand what drives it. The energy that stops the Earth from looking like Pluto comes from the Sun, and the level and type of that energy does change. So the Sun is a good place to start if we want to be able to predict climate. To put that into context, let's look at what the Sun has done recently. This is a figure from "Century to millenial-scale temperature variations for the last two thousand years indicated from glacial geologic records of Southern Alaska" G.C.Wiles, D.J.Barclay, P.E.Calkin and T.V.Lowell 2007:

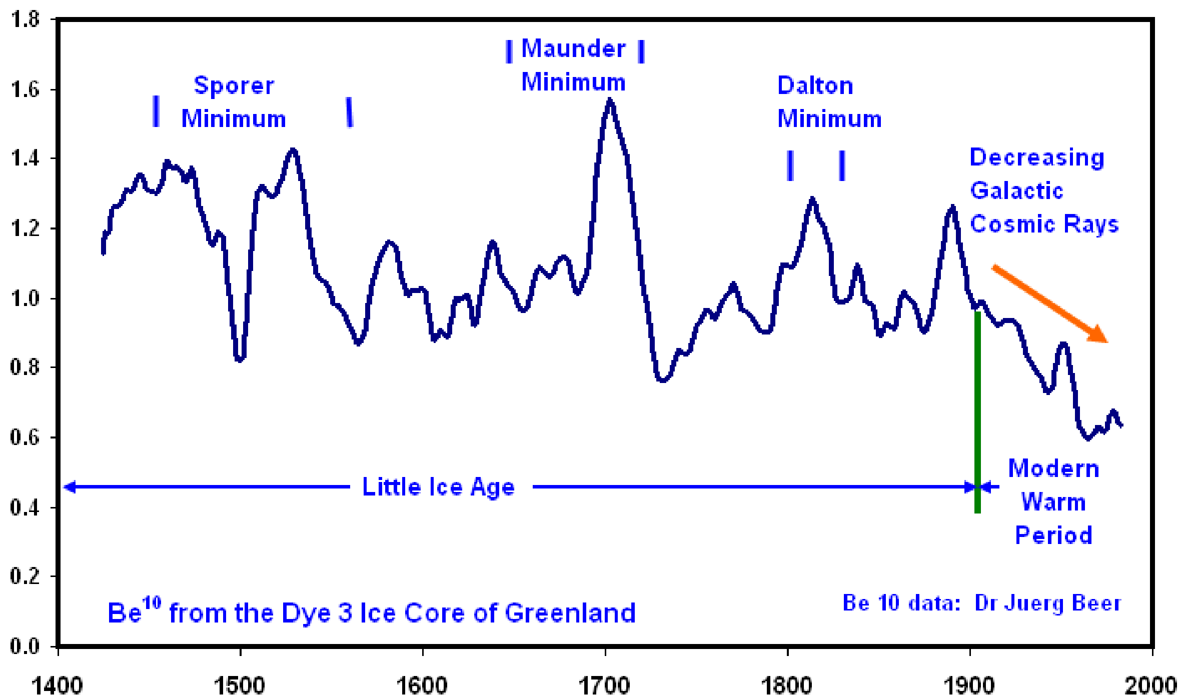


The red line is the C14 production rate, inverted. C14 production is inversely related to solar activity, so we see more C14 production during solar minima. The black line is the percentage of ice-rafted debris in seabed cores of the North Atlantic, also plotted inversely. The higher the black line, the warmer the North Atlantic was. The grey vertical stripes are solar minima. As the authors say," Previous analyses of the glacial record showed a 200- year rhythm to glacial activity in Alaska and its possible link to the de Vries 208-year solar (Wiles et al., 2004). Similarly, high-resolution analyses of lake sediments in southwestern Alaska suggests that century-scale shifts in Holocene climate were modulated by solar activity (Hu et al., 2003). It seems that the only period in the last two thousand years that missed a de Vries cycle cooling was the Medieval Warm Period.

The same periodicity over the last 1,000 years is also evident in this graphic of the advance/retreat of the Great Aletsch Glacier in Switzerland:



The solar control over climate is also shown in this graphic of Be10 in the Dye 3 ice core from central Greenland:



The modern retreat of the world's glaciers, which started in 1860, correlates with a decrease in Be10, indicating a more active Sun that is pushing galactic cosmic rays out from the inner planets of the solar system.

The above graphs show a correlation between solar activity and climate in the broad, but we can achieve much finer detail, as shown in this graphic from a 1996 paper by Butler and Johnson:

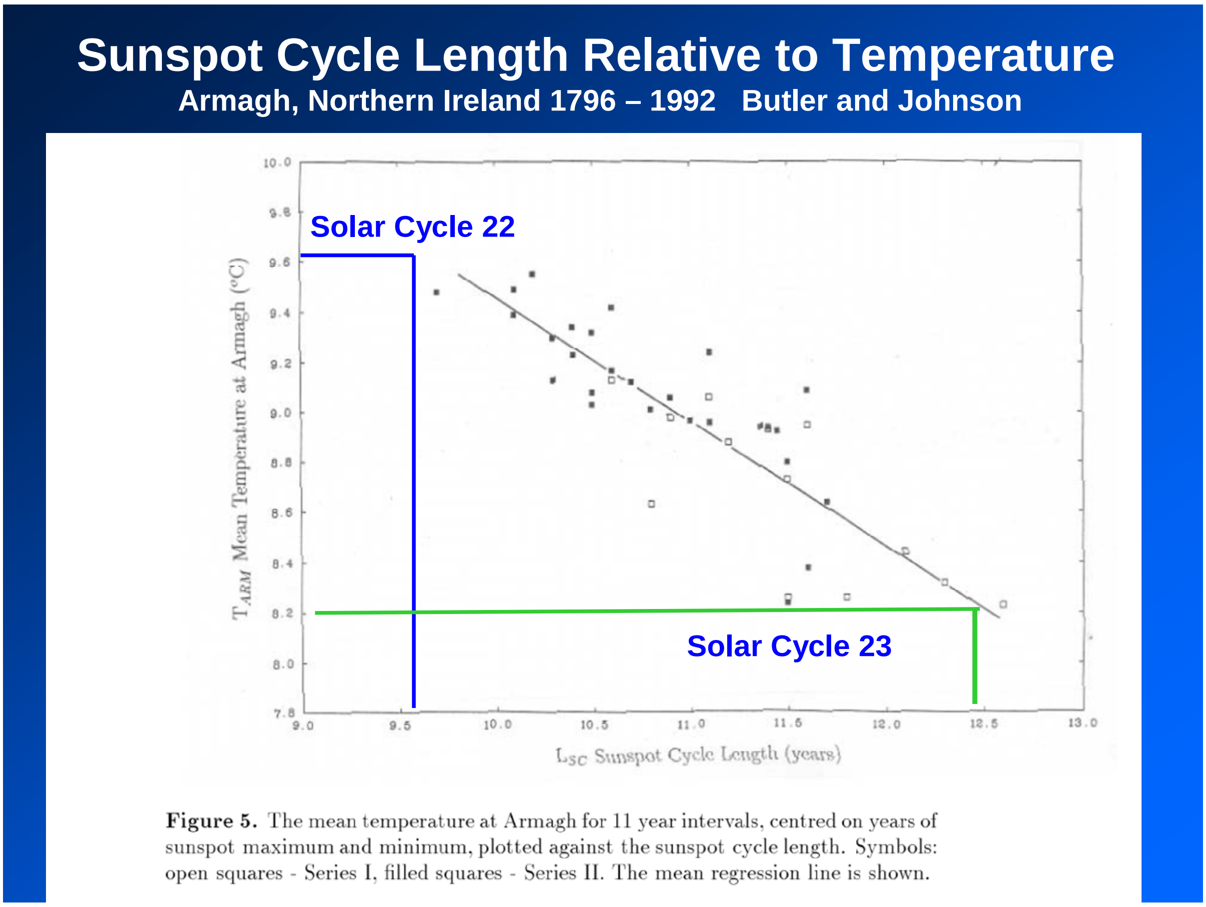


Figure 5. The mean temperature at Armagh for 11 year intervals, centred on years of sunspot maximum and minimum, plotted against the sunspot cycle length. Symbols: open squares - Series I, filled squares - Series II. The mean regression line is shown.

Butler and Johnson applied Friis-Christensen and Lassen theory to one temperature record – the three hundred years of data from Armagh in Northern Ireland. There isn't much scatter around their line of best fit, so it can be used as a fairly accurate predictive tool. The Solar Cycle 22/23 transition happened in the year of that paper's publication, so I have added the lengths of Solar Cycles 22 and 23 to the figure to update it. The result is a prediction that the average annual temperature at Armagh over Solar Cycle 24 will be 1.4° C cooler than over Solar Cycle 23. This is twice the assumed temperature rise of the 20th Century of 0.7° C, but in the opposite direction.

To sum up, let's paraphrase Dante: The darkest recesses of Hell are reserved for those who deny the solar control of climate.

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