

Tattoo this: “It’s the Sun, stupid!”

New Berkeley BEST project temperature records confirm: changes in solar radiation influence climate

Willie Soon and William M. Briggs, September 2012

Scientists have been studying solar influences on the climate for over 5000 years.

Chinese imperial astronomers kept detailed sunspot records. They noticed that more sunspots meant warmer weather. In 1801, the celebrated astronomer William Herschel (discoverer of the planet Uranus) observed that, when there were fewer spots, the price of wheat soared. He surmised that less “light and heat” from the sun resulted in reduced harvests.

Earlier last month Professor Richard Muller of the University of California, Berkeley's BEST project announced that, based on their newly constructed global land temperature record, “no component that matches solar activity” was related to temperature. Instead, Professor Muller said, carbon dioxide controlled temperature.

Could it really be true that solar radiation, which supplies Earth with the energy that drives our weather and climate – and which, when it varied, caused the climate to shift over the ages – is no longer the principal influence on climate change?

Consider the charts that accompany this article. They show some rather surprising relationships between solar radiation and daytime high temperatures, taken directly from Berkeley’s BEST project. The remarkable thing about the graphs is that these tight relationships hold for areas as large as the USA, to areas as small as the Sunshine state, and even as minor as our nation's capital.

This new sun-climate relationship picture may be telling us that the way our Sun cools and warms the Earth is largely through the penetration of incoming solar radiation in regions with cloudless skies.

Recent work by NCAR senior scientists Drs. Harry van Loon and Gerald Meehl place strong emphasis of this physical point, and argue that the use of daytime high temperatures is the most appropriate test of the hypothesis connecting solar radiation with surface temperature. All previous sun-climate studies have included the complicated nighttime temperature records, while the Sun is on the other hemisphere.

Even small changes in solar radiation may have a strong effect on Earth’s temperature and climate. In 2005, our research demonstrated a surprisingly strong correlation between solar radiation and temperatures in the Arctic over the past 130 years. Since then, we have demonstrated similar correlations in all the regions surrounding the Arctic, including the US mainland and China.

This confirmation of a sun-temperature relation using only the daytime high temperature records from the USA certainly adds scientific weight to the soundness of this connection.

The close relationships between the abrupt ups and downs of solar activity and similar changes in temperature that we have identified occur locally in coastal Greenland; regionally in the Arctic Pacific and north Atlantic; and hemispherically for the whole circum-Arctic. This strongly suggests that changes in solar radiation drive temperature variations, at least in many regions.

Correlations like these cannot be drawn for temperature and CO₂ concentration. There is simply no similar close match between the steady rise in atmospheric CO₂ concentration and the often dramatic ups and downs of surface temperatures in and around the Arctic, China and the United States.

Even more recently, in collaboration with Professor David R. Legates of the University of Delaware, we were able to provide a self-consistent explanation for these apparent sun-climate correlations. It involves exchanges of heat and moisture between the equator and the Arctic region.

In addition, we recently discovered direct evidence that changes in solar activity have influenced what has been called the “conveyor-belt” circulation of the great Atlantic Ocean currents over the past 240 years. For instance, solar-driven changes in temperature, and in the volume of freshwater released from the Arctic, causes variations in sea surface temperature in the tropical Atlantic 5-20 years later.

These peer-reviewed results, appearing in prestigious journals, make it difficult to maintain that changes in solar activity play no (or only an insignificant) role in climate change.

The hallmark of good science is the testing of plausible hypotheses that are either supported or rejected by the evidence. The evidence in BEST's own data, and in other data we have analyzed, is consistent with the hypothesis that the Sun causes climate change, especially in the Arctic, China and the USA.

BEST's data also clearly invalidates the hypothesis that CO₂ is the most important cause of observed temperature changes across the USA.

Former US president Bill Clinton recently expressed his astonishment that “best tattoos” he had ever seen were on construction workers at a solar energy plant in California. He said, “You win the tattoo vote, we’ll have the damndest environmental policy you ever saw!”

President Clinton would probably be the first to admit that the viability of solar electricity power plants depends not only on the mysteries of cloudless skies, but also the brutal reality of economics.

Taking Mr. Clinton’s advice, perhaps we can propose a new science-based tattoo worthy of his fame: “It’s the Sun, stupid!”

Willie Soon has been researching the relationship of solar radiation and Earth’s climate for the past 21 years. William M. Briggs is a meteorology-trained statistician and former associate editor of the *Monthly Weather Review*.

A Coincidence Between Solar Radiation and Daytime High Temperature of USA, Florida, Washington DC?

