



Q & A with Willie Soon:

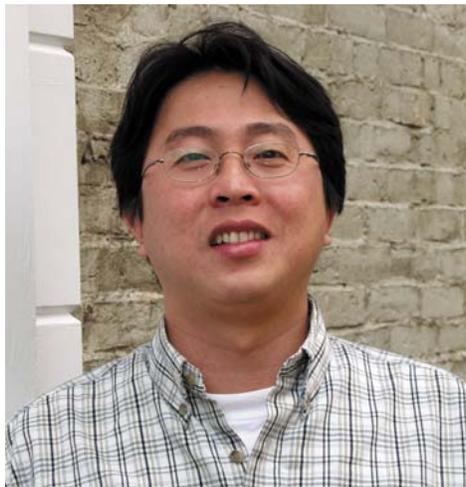
A Leading Physicist on What His Research Tells Us About Long-Term Climate Change, and the Environmental Establishment's Reaction to His Findings

Dr. Willie Soon, a physicist at the Solar and Stellar Physics Division of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts, and an astronomer at the Mount Wilson Observatory in California's San Gabriel Mountains, recently discussed with CEI his research on climate change and the environmental establishment's reaction to his article, "Reconstructing Climatic and Environmental Changes of the Past 1000 Years: A Reappraisal," (co-authored with Sallie Baliunas) which shows that the 20th Century was not the warmest of the last 1000 years. Dr. Soon writes and lectures frequently on important issues related to the sun, other stars, and the Earth, as well as general science topics in astronomy and physics.

"Every way of seeing is a way of not seeing" – Kenneth Burke, American rhetorician

CEI: What first got you interested in researching the impact of anthropogenic changes on the Earth's climate? What, if any, impact has mankind had on the Earth's environment?

Soon: I started seriously researching the possibility of carbon dioxide (CO₂) warming of the globe when I was trying to learn how the sun's variable light and charged-particle outputs can impact Earth's climate on both year-to-year and century-to-century timescales. That was about one sunspot cycle, or 11 years, ago. We have plenty of direct evidence for man changing the Earth's environment on local and regional scales, but what is often not appreciated is that not all man-made modifications and influences are so horribly destructive. The evidence about man-made CO₂ causing global warming is nowhere close to that neat, but incorrect, conceptual picture of warming as in a greenhouse. If we are serious about knowing the answers, we need to avoid simplistic analogies, stop



worrying about public perceptions, and conduct the hard scientific research that is ahead of us.

CEI: Prior to 1950, there were various theories for the cause of climate change—e.g. changes in elements of the Earth's orbit, lunar-solar tidal influences, sunspots. How many of these ideas have been discredited? Which, in your estimation, merit further research?

Soon: There are a number of proposed factors for causal climate change. The hardest aspect of scientific research is indeed to rule out—or discredit—any of those possibilities. To date, we know that changes in the Earth's solar orbit occurring over tens of thousand of years account for the huge swings in the Earth's past climatic condition, from fully glaciated states to the very warm epochs in which there is hardly any ice around the continents. It is still extremely difficult to quantitatively define the role of climate factors like volcanic eruptions, the sun's variable outputs, atmospheric gases like water vapor, carbon dioxide, or methane on climatic changes, especially those occurring within the past 100 years or so. All these factors need to be quantitatively compared in a realistic fashion. Many attempts based on computer climate models are inadequate because climate models are still far from

representing reality. So there is indeed a danger in rushing to discredit certain climatic factors while most rejections, especially of the sun's radiant energy, are simply not warranted yet.

CEI: Were you surprised at the reception that your report, "Reconstructing Climatic and Environmental Changes of the Past 1000 Years: A Reappraisal," (published in the journal *Energy & Environment*) has received in the press and in some scientific journals?

Soon: Since the appearance of the paper, I have been writing many letters to newspapers and magazines to better educate reporters and writers. I am indeed surprised at the very negative reactions from a group of scientists who appeared to think that my paper was an attack on their work. This perception is unfounded. My paper simply adds more cautions, novel viewpoints and approaches, and a broader range of evidence for climate variability and non-variability to the developing scientific literature. All my efforts have centered on testing whether various hypotheses should be accepted or rejected. In a letter to the *Chronicle of Higher Education*, my Harvard-Smithsonian Center for Astrophysics colleague and co-author Sallie Baliunas and I point out that, "[W]hen Earth's climate is perturbed by some forces, more than just temperature changes." Therefore, "to understand the climate change phenomena, it is prudent to inclusively examine the broader scope of changes from a more comprehensive perspective than that of temperature." We also note: "Ultimately, willingness and carefully attending to examine all possibilities about the nature of climate variability will reveal more about what is going on than what we now know. Of that we have no doubt." (This and other letters can be found on my web page: <http://cfa-www.harvard.edu/~wsoon/ChronicleHigherEducation03-d>).

CEI: A 2001 National Science



Foundation survey of 1,500 people found that 77 percent believed that, “increased carbon dioxide and other gases released into the atmosphere will, if unchecked, lead to global warming.” People of all education levels seem to buy this notion. Is there a way to counter climate alarmism among the public?

Soon: In my opinion, the only way to reduce alarmism is to yield to facts and evidence that may belie any extreme assertions. On the topic of carbon dioxide and global warming, there have been too many opinions but little internally consistent facts. For example, the United Nations’ Intergovernmental Panel on Climate Change (IPCC) *Third Assessment Report*, which is hailed as the most authoritative source on climate change, is really a political document promoting a particular brand of belief: that the climatic impact of man-made greenhouse gases will be profoundly negative and that remedial action is urgent. The science itself is secondary. As one of the report’s own co-authors, MIT meteorologist Richard Lindzen, points out, IPCC presented the report as representing a scientific consensus, even though individual authors were not consulted on whether they agreed with parts of the report beyond those they worked on. Further, IPCC used the “Summary for Policymakers” to misrepresent what is in the actual report. And the report’s peer-review process was pointless, since authors did not respond to reviewers’ comments—including Lindzen’s. We may be dangerously moving away from science-by-evidence to science-by-public appeals; and that is bad not only for science, but also for the public, who will be left swimming in a pool of ignorance.

CEI: In the 1970s, there was considerable hysteria about global cooling very similar to today’s hysteria about global warming. What accounts for this dramatic about-face?

Soon: There is a historical tendency of alarmism surrounding anything related to climate change. What is little known today is that, during the 1970s, many international conferences and panels—

especially those convened by the World Meteorological Organization—were leading to a consensus that greenhouse gases may cause catastrophic cooling, ending with a new Ice Age for the Earth. Since the 1990s, we’ve been told that greenhouse gases are causing global warming. It would be best left to the social scientists to tackle the question about the dramatic switch in popular views—endorsed by certain scientists and experts, though not all—since there are no real advances in scientific

scale temperatures. This holds especially true when dealing with climate history of the last 1000 years or so, where one can hardly have enough local and regional information to construct any global temperature confidently. (Ross McKittrick is interviewed in the November issue of *Monthly Planet*.)

CEI: What are the Dalton Minimum and the Maunder Minimum and how could their study help us better understand the Earth’s long-term climate?

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knowledge between the 70s and 90s that would explain those contrasting extremes in conviction.

CEI: At a July 29 Senate Environment and Public Works Committee hearing, you testified that local and regional temperature changes are more important than global changes. What is the reason for this and why is this proposition controversial?

Soon: Yes, I emphasized that the reality of climate change is local and regional in scope. I do think that this is universally agreed since there is really not much on which to argue against that. Neither we nor the environment function under any actual constraints of a “global” temperature. The fact is that “global” temperature is a quantity that looks good on paper but is quite difficult to measure confidently. Going a step further, my friends Chris Essex (University of Western Ontario) and Ross McKittrick (University of Guelph, Ontario), in their book *Taken by Storm*, compare the senselessness of defining a global temperature with determining the average temperature of all the patients in a hospital. I have simply cautioned that “global” temperature has very limited use unless we can accurately define it based on sufficient confidence about its local and regional

Soon: The Dalton Minimum and the Maunder Minimum are two specific intervals, around 1795-1820 and 1645-1715, respectively, in the sunspot record that points to signs of a less active sun, which in turn can plausibly be linked to a dimmer sun, at least in some wavelength regions. A sun with less radiant energy is certainly a good possible explanation for some of the cooler episodes in climate history. But I think the most important reason to research these solar activity minima is to provide a better contrasting benchmark on what will happen when the sun’s activity is stronger and forces more radiant energy onto the Earth’s climate system. Coincidentally, a new scientific paper (“A Millennium Scale Sunspot Number Reconstruction: Evidence for an Unusually Active Sun since the 1940s,” to appear in *Physical Review Letters*) authored by a team led by solar physicist Ilya Usoskin, of the University of Oulu in Finland, suggests that the sun’s magnetic activity has been unusually active in the 20th Century compared to its activity record of the past 1000 years or so. I am happy to announce that in my upcoming book, *The Maunder Minimum: The Variable Sun-Earth Connection*, I attempt to shed light on these two solar activity minima (<http://www.wspc.com/books/physics/5199.html>).