

Variations on Sun's role in climate change

In their Opinion piece "Is Climate Sensitive to Solar Variability?" (PHYSICS TODAY, March 2008, page 50), Nicola Scafetta and Bruce West draw attention to a "phenomenological solar signature" they find in preindustrial records of global temperature. Correlations between temperature proxies and solar activity have been reported since the 18th century; see, for example, reference 1. However, their significance cannot be judged without considering volcanism, which may account for much of the apparent correlation with solar activity over the past millennium.² Scafetta and West assume that the only secular influence on preindustrial climate is the Sun.

Scafetta and West also state that anthropogenic influence on global warming is overestimated if climate is as sensitive to solar activity as their studies suggest. But in their referenced work, they admit that such a high sensitivity requires more powerful couplings between solar activity and climate than have been identified so far. That is hardly news; for more than a decade, the big question has been whether such powerful Sun-climate coupling mechanisms exist. For reasons we reviewed recently,³ variation in total solar irradiance (TSI) seems to lack the required power, and the solar UV flux variation—another candidate mentioned by the authors—seems to account for less than 10% of the variance in the 20th-century global temperature. Solar modulation of cosmic rays and their possible effect on cloud cover is the most complex candidate and remains hardest to test.

Letters and opinions are encouraged and should be sent by e-mail to ptletters@aip.org (using your surname as "Subject"), or by standard mail to Letters, PHYSICS TODAY, American Center for Physics, One Physics Ellipse, College Park, MD 20740-3842. Please include your name, affiliation, mailing address, e-mail address, and daytime phone number on your attachment or letter. You can also contact us online at <http://www.physicstoday.org/pt/contactus.jsp>. We reserve the right to edit submissions.

Additionally, Scafetta and West use solar flare statistics as a proxy for TSI variations to derive a similarity in the power law indices of solar fluctuations and Earth temperature variations. Their claim is puzzling since solar flares make a negligible contribution to TSI variation. Why not just analyze the widely available TSI record itself?

In summary, a solar effect on global temperature may well exist, and incisive correlation studies can play a role in its investigation. However, it is increasingly clear that deployment of improved radiometric and photometric instruments will be required to discriminate between suggested Sun-climate coupling mechanisms.

References

1. J. Eddy, *Science* **192**, 1189 (1976).
2. G. Hegerl et al., *J. Climate* **20**, 650 (2007).
3. P. Foukal et al., *Nature* **443**, 161 (2006).

Peter Foukal

(pfoukal@comcast.net)

Heliophysics Inc

Nahant, Massachusetts

I was rather disturbed to read the opinion article by Nicola Scafetta and Bruce West, which discussed the global surface temperature anomaly in relation to solar variability. Some important issues regarding their work should prompt readers to question their motivation and whether their conclusions come from an unbiased perspective. I offer those key concerns.

The authors use global temperature data that extend back only to 1890 and cover a short period of time, rather than data from other techniques, such as ice-core sampling, that cover a longer time span.

The authors claim that the increase in temperature, and the consequent change in climates, since 1900 is largely due to solar variability. Climates are often defined as average temperatures over 30 years—also a short time scale. However, if we are observing large temperature changes on time scales shorter than 30 years, it is certainly believable that those changes are due to human activity.

More fundamental, though, from a physical viewpoint is that if solar vari-

ability were to influence temperatures as much as Scafetta and West claim, that variability should exist over Earth's entire life span. It should be present in all possible temperature data from pre-recorded times. If the Sun were truly having more variability in its output now than it ever has in its past, climate change is not our greatest worry.

More disturbing on a personal, moral level is that the authors are putting forth an argument that attempts to distance us from our responsibility for climate change. Ultimately, that gives readers—including politicians and the general public—justification to continue down the path we started with industrialization around 1900. Many people find that perspective very comforting because it means we don't have to change our ways of doing things.

The political perspective of Scafetta and West's opinion is disturbing because the current administration has repeatedly promoted policies that deny human-induced climate change. And the primary funding for the research in this Opinion piece came from the US Army Research Office. Furthermore, the majority of the references Scafetta and West cite are written by one or the other or both of them and have all been published during the current administration.

The authors are entitled to their opinion. Many other scientists, though, and the Intergovernmental Panel on Climate Change hold another opinion: that solar variability has had a negligible effect on climate. Surely, if solar variability were causing such drastic temperature changes, the IPCC would have incorporated it into its models and findings. Instead of trying to blame climate change on solar variability or other galactic events, we should rethink how we live our lives and whether our lifestyles are fundamentally compatible with the needs of other species on Earth. This is the only home we have; we can't use it up and throw it away in the same manner that we leave our trash at the curbside.

Diedrich Schmidt

(diedrich.schmidt@rub.de)

Ruhr-Universität Bochum

Bochum, Germany