

experimental teams have rejected the PMOD alterations as arbitrary.^{2,3}

Recent work³ that uses measurements of solar magnetic fluxes at Earth's surface establishes that a significant degradation of the TSI record from ERBS occurred during the gap in the ACRIM records (1989–92), as the ACRIM team has always claimed. That degradation invalidates the trust placed in the PMOD composite and its downward alterations of the NIMBUS7 record. Thus one is forced to select the ACRIM composite, which shows a TSI increase between 1980 and 2002, as we discussed in our Opinion piece.

Duffy and coauthors' choice of preferring an arbitrary TSI composite that shows no upward trend from 1980 to 2000 clearly undercuts their first major claim, that the Sun could not contribute to the warming observed since 1980, and consequently everything they deduced from it.

The second claim by Duffy and coauthors is that climate sensitivity to solar variability is low. To support that conclusion, they cite a 2004 study⁴ by Gerald North and coworkers that summarizes findings obtained from simple energy-balance models. However, Duffy and coauthors omitted that study's major finding: that the empirical solar signature exceeds the energy-balance model predictions by a factor of two on average, implying that the climate is much more sensitive to solar changes than what climate models predict. Also, they do not realize that using a 10-year running average in their figure 2 suppresses the solar cycle's 11-year signature on climate.

The authors also ignore three other important points. First, our findings are consistent with secular paleoclimate temperature reconstructions that were recently made and confirmed.⁵ Second, the glacial epochs were induced by small changes in the redistribution of sunlight due to the Milankovitch astronomical cycles—variations in the eccentricity, obliquity, and precession of Earth's orbit; that fact suggests significant climate sensitivity to changes in TSI inputs. And third, the oscillations of greenhouse gases observed between the glacial epochs were not induced by human activity but were a complex climate-dynamics response to the small redistribution of sunlight produced by Milankovitch cycles; that fact contradicts the assumption implicit in all climate models adopted in the Intergovernmental Panel on Climate Change 2007 report, that only humans can modify greenhouse gas concentrations.

Finally, the assumption underlying the piece by Duffy and coworkers is that the anthropogenic global warming theory is settled, those who claim otherwise are in error, and their studies should be dismissed. Yet an international team of scientists has published a comprehensive research review⁶ disproving that claim by summarizing and organizing the findings of thousands of scientific papers; their review contradicts several conclusions of the IPCC 2007 report, which ignored many of the papers reviewed in *Climate Change Reconsidered*.⁶ The review also lists more than 30,000 US scientists who have signed a petition stating that there is no convincing evidence to support the anthropogenic global warming theory. We remind readers about the dangers of dogma replacing science.

References

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The rather passionate rebuttal of the Scafetta and West solar variability hypothesis by Philip Duffy, Benjamin Santer, and Tom Wigley seems to clearly show some weaknesses in the Scafetta and West model. Nevertheless, Duffy and coauthors ignore a data trend that weakens the argument for climate change based almost solely on greenhouse gas emissions. Their own figure 2 clearly illustrates that although GHG emissions have continued to increase at an enormous rate, global temperatures have not increased over the past decade and have actually slightly decreased overall since the record-setting warmth of the 1998 El Niño maximum. Also, last year's apparently

anomalous low temperatures occurred during a year of extremely low solar activity (and a possibly weak La Niña), despite the aforementioned increase in GHG emissions and without a significant volcanic eruption.

Although the various current climate models are getting better at re-creating the past, they still fail in accurately predicting the future, especially with their emphasis on GHG emissions. So it certainly doesn't hurt to examine other models such as Scafetta and West's. If there exists a single climate model from a decade ago that based climate change predominantly on GHGs and that predicted the past 10 years of cooling, I would love to see a reference to it.

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Duffy, Santer, and Wigley reply:

Solar irradiance measurements have been made by a number of satellites covering different time periods. Several investigators have stitched together the multiple records into composites, correcting for small instrumental differences (for a comparison, see the online version of this letter). Nicola Scafetta and Bruce West make much of the fact that our figure showed the PMOD composite rather than their favorite, ACRIM. The differences between the two, however, are insignificant in terms of implications for climate; neither produces anything close to the observed late-20th-century warming, even if one assumes a climate sensitivity much greater than the most commonly accepted value. Furthermore, the superiority of the ACRIM composite is not established.¹

Scafetta and West's characterization of the 2004 paper by Gerald North and coworkers (reference 4 in Scafetta and West's letter) contradicts that paper's abstract. Far from finding that "the climate is much more sensitive to solar changes than what climate models predict," North and coworkers find "a faint response to the solar cycle" with amplitude "roughly what we would expect (a few hundredths of a degree) based on simple energy-balance model estimates." That finding contradicts Scafetta and West's argument that the climate is mysteriously hypersensitive to solar variations.

We used a 10-year running mean in our figure 2 precisely because it masks the 11-year solar cycle; our point was that there is no significant multidecadal trend due to solar variability.