

Solar radiation study offers clues on 20th century global warming wobbles

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The new paper shows that surface incident solar radiation (R_s) over land globally peaked in the 1930s, substantially decreased from the 1940s to the 1970s, and changed little after that. Credit: Jong Soo(Peter) Lee

The amount of solar radiation passing through Earth's atmosphere and reaching the ground globally peaked in the 1930s, substantially decreased from the 1940s to the 1970s, and changed little after that, a new study has found.

The study, published in the journal *Proceedings of the National Academy of Sciences*, found that "neither the rapid increase in temperature from the 1970s through the 1990s nor the slowdown of [warming](#) in the early 21st century appear to be significantly related to changes of R_s ([solar radiation](#) reaching the Earth's surface)".

The new finding may help explain variations in warming during the 20th century. The authors showed that, while aerosols and clouds did play some role in [temperature variations](#), they did not have a major effect on global mean land temperatures after 1985.

The authors, Kaicun Wang from Beijing Normal University and Robert E. Dickinson from the University of Texas at Austin, compiled a [global data](#) set of daily temperatures from the 1900s and through to 2010.

They analysed the relationship between the amount of solar radiation reaching the Earth and diurnal temperature range (the daily temperature variations that occur as day turns into night).

The authors of the study said that "the overall increase of global temperature over the last century has been largely attributable to the increase of [greenhouse gases](#). Less well understood are the reasons for the variability of this increase on a decadal time scale... However, [global temperatures](#) do not appear to be significantly affected by changing R_s (solar radiation reaching the Earth's surface)."

Wobbles in warming

Steve Sherwood, Director of the Climate Change Research Centre at the University of New South Wales, said the new paper was not really about whether the sun drives climate change.

"We already know from direct observations of the power coming from

the sun that it has contributed nothing to global warming since 1979, though it probably made a small contribution to warming early in the 20th century," said Professor Sherwood, who was not involved in the study.

"What this paper is really about is trying to explain the wobbles along the way in warming during the 20th century, and in particular the hiatus from about 1940 to 1970 in global warming, which was followed by strong warming thereafter. There has been a long debate as to whether such wobbles have been due to natural variations in ocean heat uptake, or to variations in aerosols (or clouds)," he said.

"This paper shows that aerosols and clouds did play some role but have never altered the global-mean land temperature by more than 0.1 to 0.2 degrees, while its overall warming has been over 1 degree."

John Cook, Climate Communication Research Fellow at the University of Queensland, said there was growing evidence that solar activity has made little to no contribution to [global warming](#) over recent decades.

"In fact, several recent studies have found the sun and climate have been moving in opposite directions, with the sun having a slight cooling effect," said Cook, who was not involved in the new study.

More information: "Contribution of solar radiation to decadal temperature variability over land,"

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