

High solar cycle spectral variations inconsistent with stratospheric ozone observations

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Changes in energy from the Sun over the solar cycle are thought to have an impact on surface weather, particularly over the North Atlantic, Europe, and the United States. Heating of the equatorial stratosphere from solar ultraviolet radiation initiates the pathway to the surface, and is governed by the magnitude of ultraviolet solar cycle changes. Our understanding of the solar impact on climate is critically dependent on quantifying this variability. Launched in 2003, observations from the *SORCE* satellite have shown broadband, ultraviolet solar cycle changes two to three times larger than previous observations, and solar models. Employing the larger changes in climate models leads to a larger regional surface climate response.

We present results from work recently published in *Nature Geoscience*. We combine information from a state-of-the-art climate model with composites of ozone observations and find strong evidence that the changes in ozone do not support the large changes observed by *SORCE*. Further, our results support the lower forcing given by the solar models and, thus, the magnitude of solar cycle changes observed by the *UARS/SUSIM* instrument, which operated from 1991-2005. The use of a more realistic solar forcing in climate models will allow for a better understanding of the mechanism by which the Sun can influence surface climate.