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## Background Solar Irradiance and the Climate of the Earth in the End of the 20th Century

PDF (Size: 291KB) PP. 191-195 DOI: 10.4236/acs.2012.22019

### Author(s)

Maxim Ogurtsov, Markus Lindholm, Risto Jalkanen

### ABSTRACT

The possible response of global climate to the changes of background radiation derived from satellite measurement during 1983-2001 is analyzed. Estimation is made by means of one-dimensional energy-balance climatic model. It is shown that the increase of the global surface radiation by  $3 \text{ W} \times \text{m}^{-2}$  through 1983-2001 should result in a corresponding rise of temperature, which exceeds the actual observed values by  $0.6^\circ\text{C} - 2.0^\circ\text{C}$ . Possible causes of such disagreement are discussed.

### KEYWORDS

Climate; Solar Irradiance

### Cite this paper

M. Ogurtsov, M. Lindholm and R. Jalkanen, "Background Solar Irradiance and the Climate of the Earth in the End of the 20th Century," *Atmospheric and Climate Sciences*, Vol. 2 No. 2, 2012, pp. 191-195. doi: 10.4236/acs.2012.22019.

### References

- [1] J. T. Houghton, Y. Ding, D. J. Griggs, et al., "Climate Change 2001: The Scientific Basis," Intergovernmental Panel on Climate Change (IPCC), Cambridge University Press, Cambridge, 881 p.
- [2] S. Solomon, Q. Dahe, M. Manning, et al., Eds., "Climate Change 2007: The Physical Science Basis," Intergovernmental Panel on Climate Change (IPCC), Cambridge University Press, Cambridge, 996 p.
- [3] E. Palle, P. R. Goode, P. Montanes-Rodriguez and S. E. Koonin, "Can Earth's Albedo and Surface Temperatures Increase Together?" *EOS*, Vol. 70, No. 4, 2006, pp. 37-43. doi: 10.1029/2006EO040002
- [4] R. T. Pinker, B. Zhang and E. G. Dutton, "Do Satellites Detect Trends in Surface Solar Radiation?" *Science*, Vol. 308, No. 5723, 2005, pp. 850-854. doi: 10.1126/science.1103159
- [5] E. Palle, P. R. Goode, P. Montanes-Rodriguez and S. E. Koonin, "Changes in the Earth's Reflectance over the past two Decades," *Science*, Vol. 304, No. 5675, 2004, pp. 1299-1301. doi: 10.1126/science.1094070
- [6] M. Wild, H. Gilgen, A. Roesch, A. Ohmura, C. Long, and E.G. Dutton, "From Dimming to Brightening: Trends in Solar Radiation Inferred from Surface Observations," *Science*, Vol. 308, No. 5723, 2005, pp. 847-850. doi: 10.1126/science.1103215
- [7] M. I. Budyko, "The Effect of Solar Radiation Variations on the Climate of the Earth," *Tellus*, Vol. 21, No. 5, 1969, pp. 611-619. doi: 10.1111/j.2153-3490.1969.tb00466.x
- [8] W. D. Sellers, "A Global Climatic Model Based on the Energy Balance of the Earth-Atmosphere System," *Journal of Applied Meteorology*, Vol. 8, No. 3, 1969, pp. 392-400. doi: 10.1175/1520-0450(1969)008<0392:AGCMBO>2.0.CO;2
- [9] S. Schwartz, "Heat Capacity, Time Constant, and Sensitivity of Earth's Climate System," *Journal of Geophysical Research*, Vol. 112, 2007, 12 p. doi: 10.1029/2007JD008746

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- [10] J. Hansen, M. Sato, P. Kharecha and K. von Schuckmann, "Earth's Energy Imbalance and Implications," *Atmospheric Chemistry and Physics Discussion*, Vol. 11, 2011, pp. 27031-27105. doi:10.5194/acpd-11-27031-2011
- [11] M. Sato, J. E. Hansen, M. P. McCormick and J. B. Pollack, "Stratospheric Aerosol Optical Depths, 1850-1990," *Journal of Geophysical Research*, Vol. 98, 1993, pp. 22987-22994. doi:10.1029/93JD02553
- [12] J. Lean, J. Beer and R. Bradley, "Reconstruction of Solar Irradiance since 1610: Implications for Climate Change," *Geophysical Research Letters*, Vol. 22, No. 23, 1995, pp. 3195-3198. doi:10.1029/95GL03093
- [13] D. V. Hoyt and K. H. Schatten, "A Discussion on Plausible Solar Irradiance Variations, 1700-1992," *Journal of Geophysical Research*, Vol. 98. No. A11, 1993, pp. 18895-18900. doi:10.1029/93JA01944
- [14] A. V. Mordvinov, N. G. Makarenko, M. G. Ogurtsov and H. Jungner, "Reconstruction of Magnetic Activity of the Sun and Changes in Its Irradiance on a Millennium Timescale Using Neurocomputing," *Solar Physics*, Vol. 224, No. 1-2, 2004, pp. 247-253. doi:10.1007/s11207-005-4282-5
- [15] G. C. Reid, "Solar Total Irradiance Variations and the Global Sea Surface Temperature Record," *Journal of Geophysical Research*, Vol. 96, No. D2, 1991, pp. 2835-2844. doi:10.1029/90JD02274
- [16] M. Wild, H. Gilgen, A. Roesch, A. Ohmura, C. Long, E. Dutton, B. Fogman, A. Kalis, V. Russak and A. Tsvetkov, "From Dimming to Brightening: Decadal Changes in Surface Solar Radiation," *Science*, Vol. 308, No. 5723, 2005, pp. 847-850. doi:10.1126/science.1103215
- [17] M. Wild, A. Ohmura and K. Makowski, "Impact of global Dimming and Brightening on Global Warming," *Geophysical Research Letters*, Vol. 34, 2007, 4 p. doi:10.1029/2006GL028031
- [18] M. Wild, "Global Dimming and Brightening: A review," *Journal of Geophysical Research*, Vol. 114, 2009, 31 p. doi:10.1029/2008JD011470
- [19] P. Alpert, P. Kishcha, Y. J. Kaufman and R. Schwarzbard, "Global Dimming or Local Dimming?: Effect of urbanization on sunlight availability," *Geophysical Research Letters*, Vol. 32, 2005, 4 p. doi:10.1029/2005GL023320