

## Observing Climate with Satellites – Are We on Thinner Ice?

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The Earth's climate is determined by irradiance from the Sun and properties of the atmosphere, oceans, and land that determine the reflection, absorption, and emission of energy within our atmosphere and at the Earth's surface. Since the 1970s, Earth-viewing satellites have complimented non-satellite geophysical observations with consistent, quantitative, and spatially-continuous measurements that have led to an unprecedented understanding of the Earth's climate system. I will describe the Earth's climate system as elaborated by satellite and *in situ* observations, review arguments against global warming, and show the convergence of evidence for human-caused warming of our planet.



Photograph by James Balog

A late-summer melt stream on top of the Greenland ice sheet. Photo by James Balog of the Extreme Ice Survey.

Compton Tucker is a senior research scientist in the Laboratory for Hydrospheric and Biospheric Sciences at NASA's Goddard Space Flight Center in Greenbelt, Maryland USA and an adjunct professor at the University of Maryland. He holds a B.S. degree in biology and a masters and PhD degree in Earth Science, all from Colorado State University. After his BS degree, he worked in two banks before realizing banking was not his calling, and entered graduate school. Since his masters degree, he has studied vegetation using reflected light, including: global land photosynthesis, tropical and temperate deforestation, arid and semi-arid lands, and ecologically-coupled diseases. He has also used satellite data to study glacier variations in Turkey and in tropical Central and South America. He is the author of more than 160 scientific papers that have been cited more than 15,000 times. He has been awarded NASA's Exceptional Scientific Achievement Medal, the National Air and Space Museum Trophy, The Mongolian Medal of Friendship, The Henry Shaw Medal from the Missouri Botanical Garden, and the Galathea Medal from the Royal Danish Geographical Society.