Geophysical Research Abstracts
Vol. 16, EGU2014-2012-1, 2014
EGU General Assembly 2014

SORCE 11 years after launch: What's new? What's next?

Robert Cahalan (1), Greg Kopp (2), Peter Pilewskie (2), Erik Richard (2), and Tom Woods (2)

(1) NASA/Goddard Space Flight Center, Climate & Radiation Laboratory, Greenbelt, MD 20771, United States (robert.f.cahalan@nasa.gov, +1 301 614-6307), (2) LASP / University of Colorado, 3665 Discovery Drive, Boulder, CO 80303, United States

We discuss recent changes in estimates of the Total Solar Irradiance (TSI) and the energy budget. We highlight the historic closing of the calibration gap between the suite of TSI instruments, due largely to comparisons made with a cryogenic Transfer Radiometer Facility (TRF) located at the University of Colorado, built by UCO/LASP with support from NASA and NIST. The resulting continuous record of TSI promises to be a milestone in improving understanding of the Sun's impact on Earth's climate. Climate models are sensitive not only to TSI, but also to variations in the Spectral Solar Irradiance (SSI), and the vertical profiles of temperature and ozone are especially sensitive to SSI variations. Variations in SSI need further study before they may be considered as firmly established as TSI variations, which themselves remain controversial, despite a strengthening consensus over the SORCE epoch. The TSIS SIM has recently undergone comprehensive end-to-end calibration in the LASP SSI Radiometry Facility (SRF) utilizing the NIST SIRCUS laser system covering 210 – 2400 nm for SSI, a facility not yet available when SORCE launched in 2003. With SORCE follow-on missions such as the Total and Spectral Solar Irradiance Sensor (TSIS), we anticipate narrowing uncertainties in SSI variability that will be important to improving our understanding of the climate responses to solar forcing. The long-term goal of improving the ability to monitor Earth's energy balance, and the energy imbalance that drives global warming, will need continued improvements in the measurement of both shortwave solar and longwave earth-emitted radiation.