



GEWEX Radiative Flux Assessment

By Greg Kopp, LASP, University of Colorado

Greg Kopp was invited to participate in the GEWEX (Global Energy and Water Cycle Experiment) Radiative Flux Assessment (RFA) held at NASA/GISS in New York on June 25-27. Greg represents the solar irradiance measurement community on this group, which was established to ascertain the current status and accuracy of the radiative balance of the Earth from both top-of-atmosphere and ground-based measurements of incoming and outgoing broadband radiation in the visible and infrared. The RFA team members include several NASA/LaRC researchers plus scientists from around the US, Europe, and Asia. The resulting radiative flux assessment publication from the group is underway and should be completed in 2008.

Greg presented a comprehensive overview of the space-borne total and spectral solar irradiance measurements. The primary interest of the group was on the absolute accuracy of the incoming solar irradiance, as this is most relevant for global radiative balance. Since the measured outgoing short- and long-wave radiative energy is much lower than the measured incoming solar radiation, there is keen interest in the SORCE/TIM TSI incoming value of 1361 W/m^2 , which is lower than other TSI instrument's values yet is increasingly supported by ongoing calibrations. This lower incoming value may account for 20-25% of the discrepancy between the incoming and outgoing global radiative balance; although uncertainties on the outgoing radiation currently greatly exceed those of the incident solar radiation, so there is a sizeable uncertainty associated with this discrepancy. Reducing these uncertainties and understanding radiative balance is a necessary component of understanding the global climate, and one to which SORCE is contributing directly via accurate solar irradiance measurements.

SORCE Meeting - Confirmed Speakers

Feb. 5-7, 2008
La Posada de Santa Fe
Resort & Spa
Santa Fe, New Mexico



The 2008 SORCE Science Meeting, *SORCE's Past, Present, and Future Role in Earth Science Research*, is shaping up to be another excellent event. Each of the four sessions, which are briefly described below, include the following confirmed speakers in alphabetical order.

1. Variability of the Solar Irradiance Over the Solar Cycle

We will review total and spectral solar irradiance variations over the 11-year solar cycle and discuss potential causes and indicators of this variability.

- Doug Biesecker, NOAA, Space Environment Center
- Gary Chapman, SFO, California State Univ.
- Greg Kopp, LASP, Univ. of Colorado
- Judith Lean, Naval Research Laboratory
- Gary Rottman, LASP, Univ. of Colorado
- Gérard Thuillier, Service d'Aéronomie du CNRS
- Tom Woods, LASP, Univ. of Colorado

2. Atmospheric Models, Processes, and Solar Irradiance

We will discuss the influence of solar cycle irradiance variability in atmospheric models and chemical and dynamical processes related to stratospheric ozone variations.

- Guy Brassuer, Natl. Center for Atmospheric Research
- Michael King, NASA, GSFC
- David Lary, NASA, GSFC
- Jay Mace, Univ. of Utah
- Paul Newman, NASA, GSFC
- Mark Schoeberl, NASA, GSFC

3. Models of Solar Processes Causing Variability Affecting Climate

We will discuss the solar physical processes that cause irradiance variations over time periods of years to centuries.

- Tom Ayres, CASA, Univ. of Colorado
- Juan Fontenla, LASP, Univ. of Colorado

325,680

Hits to the SORCE Website

(Since 4/21/03, As of 7/20/07)

- David Hathaway, NASA, Marshall Space Flight Center.
- Karel Schrijver, Lockheed Martin, ATC
- Sami Solanki (or Natalie Krivova), Max-Planck-Inst. fur Sonnensystemforschung
- Juri Toomre, JILA, Univ. of Colorado

4. Climate Models, Processes, and Solar Irradiance

We will talk about the influence of solar cycle irradiance variability on climate change and in climate models.

- Caspar Ammann, National Center for Atmospheric Research
- Bryant Cramer, NASA, GSFC
- David Rind, NASA, GISS

The agenda for this interactive meeting consists of invited and contributed oral and poster presentations concerning variations in the Sun's radiation and in the Earth environment. We will discuss the utilization of improved solar irradiance measurements and models, such as being developed by *SORCE*, to help advance climate and atmospheric models, in conjunction with ongoing Earth Science measurements. **A Call for Abstracts will be coming out in late August for contributed papers and posters.** We encourage your participation and hope that you will join us.

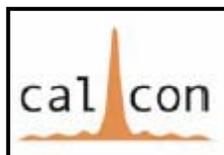
For a complete meeting description and key questions to be addressed, please visit our website at: <http://lasp.colorado.edu/sorce/2008scimeeting>. Registration information will be available in late August as well.

***Mark your calendar today!
Don't miss this *SORCE* Meeting!***



SORCE Scientists Involved in Upcoming CALCON Conference –

The 2007 CALCON Technical Conference in Logan, Utah, is set for September 10-13. This annual gathering is an opportunity for the calibration community to discuss calibration, characterization, and radiometric issues within the microwave, IR, visible, and UV spectrums.



The *SORCE* TIM and SOLSTICE instruments will be featured in several talks.

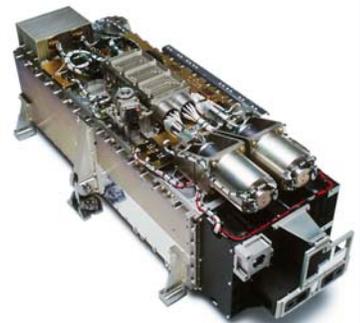
During the *Solar, Lunar, and Stellar Radiometric Measurements* session, David Harber is presenting “Optical Power Comparison Between Ground-Based *SORCE*/TIM and NIST Detector,” and Martin Snow is presenting “Absolute UV Irradiance of the Moon from the *SORCE* SOLSTICE”. Karl Heuerman is presenting “The TSI Radiometer Facility for Absolute Calibrations of Total Solar Irradiance Instruments” during the session on *Specialized Calibration Equipment*. Abstracts can be found on the meeting website: <http://www.sdl.usu.edu/conferences/calcon/>.

This CALCON meeting is also an opportunity for the *LASP* scientists to catch-up with the NIST scientists that they have worked with over the past year on *SORCE* calibration issues.

SIM Wavelength Shift –

*By Jerry Harder, LASP,
University of Colorado*

One of the outcomes from the 14-20 May on-board computer (OBC) anomaly was that the *SORCE* instruments became very cold. In the case of *SIM*, the instrument spent about 6 days at temperatures below its nominal operating value, and for 3½ days the instrument was at -17° C with the lowest daily excursions dropping down to around -24° C. Environmental testing for the instrument exceeded this range in both time and temperature, so there was never any fear of damaging the instrument, however, ensuring that the very precise on-orbit calibration did not change required some careful analysis.



After the instrument was returned to nominal operating temperatures, it was clear that the radiometric response of the instrument did not change, but a small wavelength shift was observed. The origin of the wavelength shift was identified by data comparisons before and after the OBC anomaly, and it appeared in both *SIM* A and B with slightly different values. Analysis showed that the problem can be readily corrected by changing only one parameter in the *SIM* wavelength/dispersion model. This parameter, *gamma-maz*, essentially establishes the relative orientation between the folding mirror on the wavelength drive system and the prism; a change in its value will affect where the refracted rays hit the focal plane, but not their dispersive properties. See our *Solar Physics* paper (Harder *et al.*, 2005, “The Spectral Irradiance Monitor: Measurement Equations and Calibration”, 230, 169-203) for more information on the wavelength dispersion model. Any small change in the mounting of either the prism or folding mirror induced by

the cold temperatures could produce the problem observed here. For SIM A, the change in orientation between the two optics corresponded to 10.6 arc seconds – a small but still significant difference. We have monitored this parameter over the last 2 month, and it appears to be a permanent, one-time event since the value of this parameter has not been drifting with time. The next version of SIM processing will include the needed changes in *gamma*z for SIM A and B and bring the irradiance time series up to date.



***Upcoming Meetings / Talks –
SORCE scientists plan to present papers or attend the
following 2007 meetings:***

2007 North American Radio Science Meeting,
July 22-26, Ottawa, ON, Canada

SPIE – Optical and Photonics, August 28-30,
San Diego, CA

CALCON, Conference on Characterization and
Radiometric Calibration for Remote Sensing,
Sept. 10-13, Logan, UT

AGU Fall Meeting, Dec. 10-14, San Francisco, CA

**To submit information to this newsletter, please contact:
vanessa.george@lasp.colorado.edu.**