



Successful SORCE Campaign Overlaps with TCTE –

By Tom Woods, LASP, Univ. of Colorado

The SORCE instruments have not taken any solar measurements since July 30th due to an aging battery. For almost two months the LASP mission operations team worked 24/7 to bring SORCE out of emergency mode and now they are ready to take SORCE one step towards life again with more solar observations. A high priority has been obtaining overlapping total solar irradiance measurements between SORCE and the Total Solar Irradiance Calibration Transfer Experiment (TCTE). The hugely successful SORCE/TCTE cross-calibration campaign started on Sunday, Dec. 22, during a short eclipse period, and ran until Saturday Dec. 28. All SORCE instruments made good solar observations, and TIM was given a higher priority to overlap with TCTE. The SORCE battery performed so well that SORCE TIM was left on for several orbit eclipses on Dec. 25, the minimum eclipse day. During this “holiday” campaign, the SORCE scientists and mission ops team met daily to review the status of the instruments, spacecraft and instrument health, and experiment execution. Necessary adjustments were made as needed each day.



We are very grateful to everyone who supported this successful and important six-day SORCE campaign! It’s a happy new year with SORCE planning to return to daily solar observations in 2014 with a new “hybrid” operating mode. This hybrid mode will be possible after loading revised flight software for the spacecraft On-Board Computer (OBC) in January.

SORCE’s Birthday!

SORCE is celebrating its 11th birthday on **Jan. 25!** Not bad for a 5-year mission! Go SORCE!



Happy Birthday SORCE!



EGU Meeting – Abstracts due Jan. 16

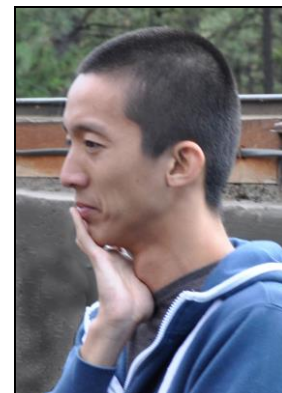
By Marty Snow, LASP, Univ. of Colorado



Please consider submitting an abstract to the upcoming European Geosciences Union (EGU) General Assembly to be held in Vienna, Austria, April 27 – May 2, 2014. Of special interest to solar physicists is **ST1.4 – Solar Irradiance Variability: Measurements, Models, Proxies, and Causes**, which is convened by Matthieu Kretschmar, Margit Haberleiter, and Marty Snow. For more information, please visit their website: <http://www.egu2014.eu/home.html>.

Session ST1.4 Description:

We solicit contributions involving spectral and total solar irradiance observations, as well as irradiance proxies such as sunspots, the Mg II index, radio flux, magnetic field measurements, etc. Solar irradiance model progress and comparisons are also invited, as well as studies on the mechanisms underlying solar irradiance variability (e.g., solar surface brightness distribution and evolution of solar features such as plages). Proxies are essential for filling gaps in irradiance measurements, inter-instrument comparisons, and as inputs to irradiance models. Recent updates to solar irradiance composites resulting from better instrument calibrations, refinements to inter-instrument comparisons, or new assessments of the long-term stabilities of irradiance records or proxies are invited. Studies of solar variability on both rotational, solar cycle timescales and beyond are welcome.



Invited speakers: Maria Dasi Espuig (left) and Kok Leng Yeo (right). Both are PhD candidates from Max Planck Institute in Germany.

2014 *SORCE* Science Meeting

Jan. 28-31  Cocoa Beach, FL

The 2014 *SORCE* Science Meeting is an 11-year celebration in honor of *SORCE*'s observations over the full 11-year solar cycle. We will focus on **Variability in the Sun and Climate over the *SORCE* Mission**, as we look back at what we have learned over the last 11 years during the *SORCE* mission. We are looking for new understanding of the evidence for and mechanisms involved in decadal variability in the Sun and climate. For more information on the science key questions we hope to address, please visit the *SORCE* Meeting website.

Science Program

We have a great 3.5-day science agenda lined to explore variations in the Sun's radiation and in the Earth environment. Below are the six sessions and the speakers within each session. Individual abstracts can be found on the *SORCE* Science Meeting website.



Tuesday, Jan. 28, morning:

1. Role of the Sun in Climate Change during the *SORCE* Mission

Robert Cahalan, NASA GSFC, Greenbelt, MD
*After 11 Years with *SORCE* – What's New? What's Next?*

Josefino Comiso, NASA GSFC, Greenbelt, MD
Sea Ice Changes in Recent Decades

Cassandra Bolduc, Université de Montréal, Canada
Modelling Stratospheric Ozone Variability with the MOnTeCARlo SSI Model (MOCASSIM)

Martin Mlynczak, NASA Langley, Hampton, VA
Influence of Solar Variability on the Structure, Composition, and Energy Balance of the Atmosphere from 2002 to 2014

William Ball, Imperial College London, UK
SSI and Stratospheric Ozone: A new assessment of the relationship using Bayesian Inference

Aimee Merkel, LASP, University of Colorado-Boulder
Further Evidence of Solar Cycle Variability in Middle Atmospheric Ozone and the Importance of Incorporating SSI in Atmospheric Modeling

Anna Shapiro (presented by Werner Schmutz), PMOD/WRC, Switzerland
The Stratospheric Response to a Discrepancy of the SSI Data

Lunchtime Discussion:

Current and Future Plans for Sun-Climate Research

Panel Members: Madhulika Guhathakurta, Cheryl Yuhas, Tom Sparn, and Werner Schmutz

Tuesday, Jan. 28, afternoon:

2. SSI Measurements

Tom Woods, LASP, University of Colorado-Boulder
Reference Solar Spectra for Earth Science Research

Jeff Morrill, NRL, Washington, DC
A Combined SUSIM / SBUV UV SSI Dataset from 1991-2012

Gérard Thuillier, LATMOS/CNRS, France
SOLSPEC: Recent results and status

Christian Muller, Belgium Inst. for Space Aeronomy, Brussels
Full Solar Rotations Observed by the SOLAR Payload on the ISS in December 2013 and June 2014

Werner Schmutz, PMOD/WRC, Switzerland
Variations of Near-UV and Visual Solar Spectral Irradiance as Measured by VIRGO/SoHO and PREMOS/Picard

Gaël Cessateur, PMOD/WRC, Switzerland
THE PREMOS/PICARD Radiometer: An overview after 3 years of observations

Jerry Harder, LASP, University of Colorado-Boulder
*Observations of Solar Variability in the 240-2400 nm Range using *SORCE* SIM*

Matthew DeLand, SSAI, Lanham, MD
Solar Cycle 24 Variability Observed by Aura OMI

David Bolsée, Belgium Inst. for Space Aeronomy, Brussels
Accurate Determination of the TOA Solar Spectral NIR Irradiance Using a Primary Standard Source and Bouguer-Langley Technique



Wednesday, Jan. 30, morning:

3. Decadal and Longer Sun-Climate Variations

Gerald North, Texas A&M University
Paleoclimatic Analysis of Solar Cycle Imprint on Greenland Surface Temperatures

Jürg Beer, Eawag, Dubendorf, Switzerland
Solar Variations and Climate Change: The view from ice cores

Dong Wu, NASA GSFC, Greenbelt, MD
The $s=0$ Atmospheric Oscillations in 35-Year MERRA Zonal Wind and Temperature

Roger-Maurice Bonnet, ISSI, Bern, Switzerland
Review and Discussion of Past and Future Climates, of their Astronomical, Solar, and Anthropogenic Forcing. Strategies for Future Space and Modeling Research

Alexander Ruzmaiken, JPL, California Inst. of Technology
Sun-Climate Variations on Centennial Time Scales

Guoyong Wen, NASA GSFC and Morgan State University, Baltimore, MD
Climate Responses to Spectral Solar Forcing in GISS GCMAM

Wednesday, Jan. 29, afternoon:

4. TSI Measurements and Composites

Greg Kopp, LASP, University of Colorado-Boulder
“Variability” in the TSI Over the SORCE Mission – and Beyond

Wolfgang Finsterle, PMOD/WRC, Switzerland
Of Straying Photons, Shiny Apertures, and an Inconstant Solar Constant – Advances in TSI Radiometry

Richard Willson, ACRIM PI, Coronado, California
ACRIM3 Characterization by the LASP/TRF and the Total Solar Irradiance Database

Shashi K. Gupta, SSAI, Lanham, MD
Projection of SORCE Total Solar Irradiance Measurements 5-10 Days Forward for Near Real-Time Applications

Jae N. Lee, NASA GSFC and JCET, Univ. of Maryland, Baltimore County
Rotational Variations in Total Solar Irradiance Observations: From SORCE/TIM, ACRIM/ACRIM III, and SoHO/VIRGO

Claus Fröhlich, PMOD/WRC, Switzerland
New and Improved Version of the VIRGO TSI and PMOD Composite

Jean-François Cossette, Université de Montreal, Canada
Cyclic Thermal Signature in a Global MHD Simulation of Solar Convection

Evening Science Dinner: Tribute to Robert Cahalan

Thursday, Jan. 30, morning:

5. SSI Composites, Proxies, Models

Martin Snow, LASP, University of Colorado-Boulder
The Magnesium II Index: 35 Years and Counting

Ken Tapping, Natl. Research Council, D.R.A.O., BC, Canada
The Continuing Deviation between the Sunspot Number and F10.7 Activity Indices

Rich Stolarski, Johns Hopkins University, Baltimore, MD
The Impact of Solar Spectral Irradiance Variations on Stratospheric Composition: Theory and observations

Tamas Varnai, NASA GSFC, Univ. of MD, Baltimore County
Advances in Understanding 3D Interactions between Sunlight and the Atmosphere during the SORCE Mission

Margit Haberreiter, PMOD/WRC, Switzerland
SOLID – a European Project towards a Comprehensive Solar Irradiance Data Exploitation

Matthieu Kretschmar, LPC2E, CNRS Univ. of Orléans
Assessment of Solar Irradiance Datasets for the SOLID Project

Micha Schöll, LPC2E, CNRS University of Orléans, France
First Steps Towards a Homogeneous SSI Data Set: Selection, merging and quality assessment

Thursday, Jan. 30, afternoon:

5. SSI Composites, Proxies, Models (continued)

Natalie Krivova, Max Planck Institute, Germany
Modelling Solar Irradiance with SATIRE

Sami Solanki, Max Planck Institute, Germany
Towards the Next Generation of Solar Irradiance Reconstruction Models

Anatoliy Vuiets, LPC2E, CNRS University of Orléans, France
What Can We Learn from SORCE about the Contribution of Different Magnetic Structures to the SSI?

Serena Criscuolo, NSO, Sacramento Peak, Sunspot, NM
Interpretation of SIM Measurements from Analysis of 3D MHD Simulations

Thierry Dudok de Wit, LPC2E/CNRS and Univ. of Orléans
Multi-Wavelength Solar Radio Observations and their use as Solar Proxies for Upper Atmospheric Modeling

Alexander Shapiro, (presented by someone else) PMOD/WRC
How to Constrain the Spectral Profile of the Solar Irradiance Variability?

Juan Fontenla, NorthWest Research Associates, Boulder, CO
The UV SSI of the Sun Compared to Cooler Stars, Similarities and Differences

Thursday, Jan. 30, late afternoon:

Poster Session / Reception

Posters presentations are listed after Session 6 below.

SORCE 11-Year Anniversary Celebration

<http://lasp.colorado.edu/home/sorce/news-events/meetings/>



Beautiful Cocoa Beach, Florida.

Friday, Jan. 31, morning:

6. Legacy of SORCE & Future Directions after SORCE

Gary Rottman, LASP, University of Colorado-Boulder
The Historical Development of SORCE

Graeme Stephens, JPL and California Inst. of Technology
Maintaining the Continuation of Long-Term Satellite TSI Observation – thoughts from an NRC review

Peter Pilewskie, ATOC and LASP, Univ. of Colorado-Boulder
Status of the Total Solar Irradiance Sensor (TSIS) Mission

Mark Rast, APS and LASP, University of Colorado-Boulder
The Case for a Radiometric Imager, and How to Build One

Yukihiko Takahashi, Hokkaido University, Sapporo, Japan
Micro-Satellite as an Alternative Vehicle

Brian Soden, RSMAS, University of Miami, Florida
Climate Feedbacks

Pål Brekke, Norwegian Space Centre, Oslo, Norway
NORSAT-1: Total Solar Irradiance, Space Weather, and Ship Detection

Steve Platnick, NASA GSFC, Greenbelt, MD
Future Plans for NASA's Earth Observing System (EOS)...

Poster Session Presentations, Thursday, Jan. 30

In alphabetical order:

Stéphane Beland, LASP, University of Colorado-Boulder
SORCE SIM Data Version 19

Gary Chapman, San Fernando Observatory, CSU, Northridge
The Declining Strength of Recent Sunspot Cycles

Angela Cookson, San Fernando Observatory, CSU, Northridge
Using Ground-Based Ca II K Images as a Proxy for Shorter UV

Thierry Dudok de Wit, LPC2E, CNRS Univ. of Orléans
How to Make Composites out of Multiple Observations

Thierry Dudok de Wit, LPC2E, CNRS Univ. of Orléans
The Impulse Response of the Solar Spectral Irradiance: What does it tell us about the solar spectral variability?

Wolfgang Finsterle, PMOD/WRC, Switzerland
CLARA – A Compact and Light-Weight Absolute Radiometer

Claus Fröhlich, PMOD/WRC, Switzerland
Understanding Long-term Changes of the VIRGO Radiometer and Sunphotometer in Space

Claus Fröhlich, PMOD/WRC, Switzerland
New and Improved Version of the VIRGO SPM Data

Linda A. Hunt, SSAI, Hampton, VA
Solar Cycle Dependence of Odd-Oxygen, Odd-Hydrogen, and Ozone in the Mesopause Region Observed by SABER

Doug Lindholm, LASP, University of Colorado-Boulder
SORCE Solar Irradiance Data Products and the LASP Interactive Solar Irradiance Data Center (LISIRD)

Courtney Peck, Dept. of Physics and LASP, University of Colorado-Boulder
The Role of the Solar Center-to-Limb Variation in Deduced Photometric Trends

Erik Richard, LASP, University of Colorado-Boulder
A Compact Solar Spectral Irradiance Monitor for Future Small Satellite and CubeSat Science Opportunities

Nicola Scafetta, ACRIM team
Empirical Evidences for a Planetary Gravitational/Electromagnetic Modulation of Total Solar Irradiance Satellite Measurements

Nicola Scafetta, ACRIM team

Discussion on Climate Oscillations: CMIP5 general circulation models versus vs. a semi-empirical harmonic model based on astronomical cycles

Martin Snow, LASP, University of Colorado-Boulder
SORCE Undergraduate Research Program

Tom Sparn, LASP, University of Colorado-Boulder
The Early History of SORCE

Katherine Suess, LASP, University of Colorado-Boulder
Developing a Proxy Model for Solar EUV Irradiance using SORCE and GOES

Registration is still open!
Please join us!

Science Dinner – Tribute to Robert Cahalan

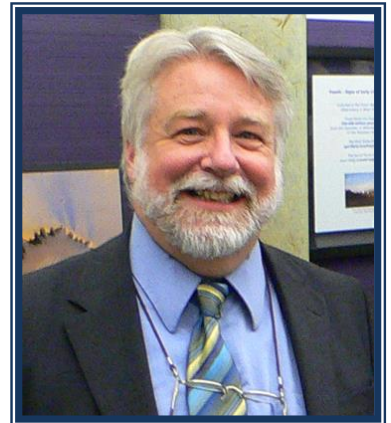
Wednesday, Jan. 29

5:45 p.m. Reception, 6 pm Sunset, 6:30 pm Dinner
Eau Gallie Yacht Club, Indian Harbour Beach

Robert (Bob) Cahalan is the Chief of NASA GSFC's Climate and Radiation Laboratory for Atmospheres in the Earth Sciences Division. Bob has served as Project Scientist for SORCE from the initial mission concept to launch, and through a decade of successful measurements.

The role of Project Scientist has been complex, requiring an individual who is both knowledgeable and interested in the science objectives, but also an individual who effectively advocates the science and aggressively engages in the political battles to keep the mission on track.

In addition to SORCE Project Scientist, Bob is also the Project Scientist for the joint NASA-NOAA Total and Spectral Solar Irradiance Sensor (TSIS). He is Emeritus President of the International Radiation Commission (IRC), a group of 40 commissioners representing 20 countries. Dr. Cahalan has been recognized with prestigious national and international awards, including Outstanding Leadership and Service of the U.S. Climate Change Science Program, and the NASA Exceptional Service Medal. He is a Fellow of the American Meteorological Society.



SORCE has been very fortunate to have Bob onboard, advancing our understanding modeling, instrumentation, and solar radiation. He is recognized for his pioneering theoretical and experimental advances in understanding the role of cloud structure in climate; and his leadership in three-dimensional atmospheric radiative transfer. He has researched global warming and climate change at NASA Goddard since 1979.

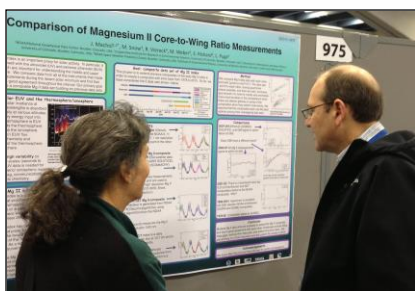
Don't miss this special evening!
SORCE Dinner RSVP on the Registration Form.
Entrée selection requested.

Busy AGU Meeting for SORCE –

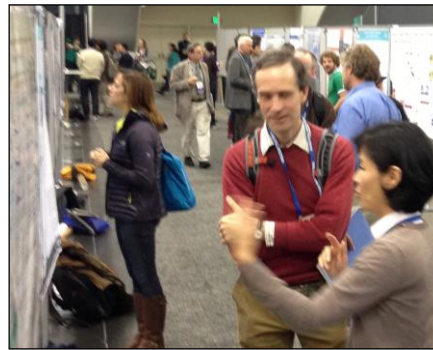
SORCE scientists from LASP were very busy during the Fall AGU Meeting in San Francisco, California, December 9-13. Presentations included:

- Tom Woods – *Solar Extreme Ultraviolet and X-ray Irradiance Measurements for Thermosphere and Ionosphere Studies (Invited)*
- Tom Woods – *Variations of the Solar Extreme Ultraviolet and Far Ultraviolet Irradiance During Solar Cycles 23 and 24 (Invited)*
- Greg Kopp – Session Chair for “*Solar Irradiance: Observations, Proxies, and Models*”
- Greg Kopp – *TCTE Instrument Performance and Status*
- Doug Lindholm – *LISIRD: LASP Interactive Solar Irradiance Data Center*
- Marty Snow – Session Chair for “*Solar Irradiance: Observations, Proxies, and Models*”
- Marty Snow – *SOLSTICE II -- Magnesium II Index*
- Erik Richard – *A Compact Solar Spectral Irradiance Monitor for Future Small Satellite and CubeSat Science Opportunities*
- Anne Wilson – *Establishing Long Term Data Management Research Priorities via a Data Decadal Survey*

Photos from the AGU Meeting were taken by Marty Snow, LASP, University of Colorado

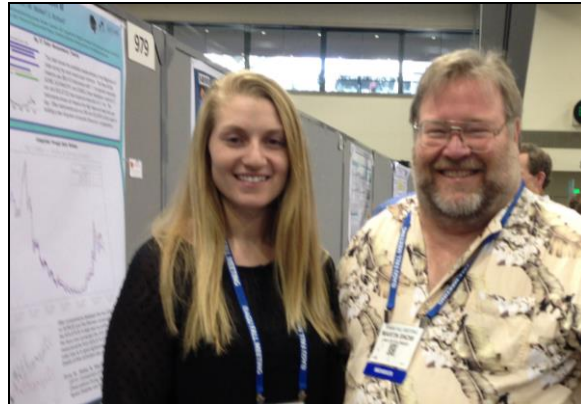


Janet Machol from NOAA chats with SORCE PI Tom Woods about her presentation, “Comparison of Mg II Core-to-Wing Ratio Measurements During Solar Minimum 23/24.”

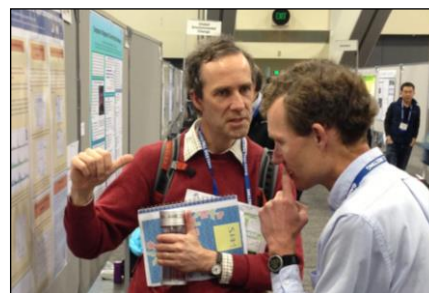
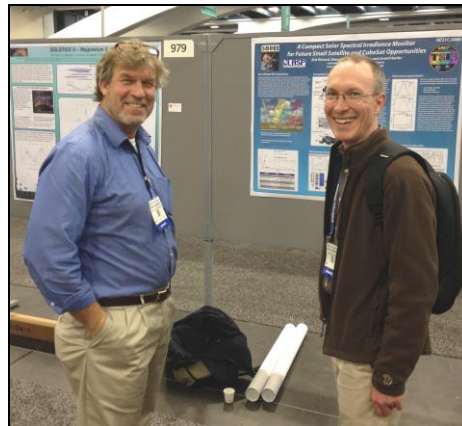


Jae Lee from NASA GSFC discusses her poster entitled “Rotational variations in space-based TSI observations” with Thierry Dudok de Wit.

Below Marty Snow, REU Program Coordinator, meets up with 2010 SORCE REU student Erica Dolinar who was presenting a poster. She now attends graduate school at the University of North Dakota.



Erik Richard catches up with Bill Swartz from JHU. Erik presented a poster on a compact SSI monitor for small satellites and cubesats.



Thierry Dudok de Wit explains his poster, “Synoptic radio observations as proxies for upper atmospheric modelling,” to Greg Kopp, SORCE TIM scientist.

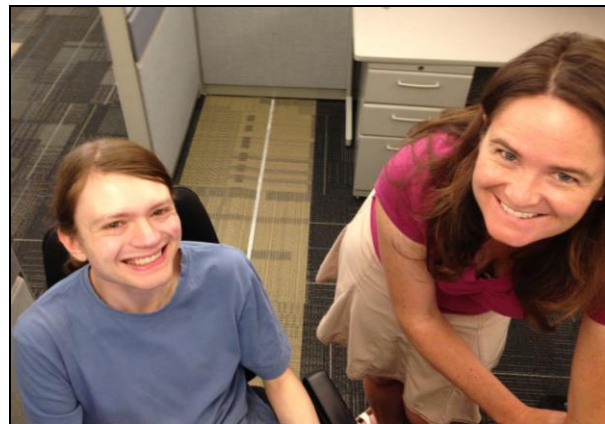
SORCE Wants Summer Undergrad Research Students –

By Marty Snow, LASP, Univ. of Colorado

Each summer, the SORCE mission funds student research projects in concert with the University of Colorado's Research Experience for Undergraduates (REU) program. For eight weeks, the students come to Boulder, Colorado to work with SORCE scientists on a research project involving measurements from SORCE. The program pays for the students' travel costs and housing, plus a \$500/week stipend.

They begin their time at LASP with a lecture series on Solar and Space Physics from experts in the field, and end with a student symposium where the students present their findings. Last year, three students worked on a diverse set of projects using SORCE data. This included studying the response of the Earth's atmosphere to solar variability, developing a proxy model for solar EUV irradiance, and studying climate change on Mercury.

This year's projects will be just as interesting! Applications for the 2014 program are now being accepted, and we invite students from around the country to apply for a position to work on SORCE and other missions. We depend on professional scientists interested in SORCE science to recommend well qualified students to our program. Full program details are available at <http://lasp.colorado.edu/reu>, including all deadlines (application deadline is Feb. 3). For further information, feel free to contact the REU Program Organizer, Marty Snow (snow@lasp.colorado.edu or 303-735-2143).



SORCE scientist Aimee Merkel worked with Alex Lanzano from the University of Chicago during the summer of 2013.

Upcoming Meetings / Talks –

SORCE scientists plan to present papers or attend the following 2014 meetings/workshops:

SORCE Science Meeting, Jan. 28-31, Cocoa Beach, FL
EGU General Assembly, April 27-May 2, Vienna, Austria

HAPPY NEW YEAR

All the best to you in 2014!