

Variability in the Sun and Climate over the *SORCE* Mission
A look back at what we've learned over the last 11 years

SORCE Science Meeting
Jan. 28-31, 2014 * Cocoa Beach, Florida

Monday, Jan. 27

Welcoming Reception

5:30-6:30 p.m. **Courtyard Marriott**

Tuesday, Jan. 28

Welcome and Introduction

8:00 – 8:20 a.m. **Welcome / Introduction / *SORCE* Status**
Tom Woods, LASP, University of Colorado, Boulder

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

Chair: Jae Lee, NASA GSFC, Greenbelt, Maryland

8:20 – 9:00 a.m. **Keynote: Robert Cahalan, NASA GSFC, Greenbelt, Maryland**
*After 11 Years with *SORCE* – What's New? What's Next?*

9:00 – 9:30 a.m. **Josefino Comiso, NASA GSFC, Greenbelt, Maryland**
Sea Ice Changes in Recent Decades

9:30 – 9:50 a.m. **Cassandra Bolduc, Université de Montréal, Canada**
*Modelling Stratospheric Ozone Variability with the *MONteCARlo* SSI Model (*MOCASSIM*)*

9:50 – 10:20 a.m. **Break**

10:20 – 10:40 a.m. **Martin Mlynczak, NASA Langley Research Center, Hampton, Virginia**
Influence of Solar Variability on the Structure, Composition, and Energy Balance of the Atmosphere from 2002 to 2014

10:40 – 11:00 a.m. **William Ball, Imperial College London, UK**
SSI and Stratospheric Ozone: A new assessment of the relationship using Bayesian Inference

11:00 – 11:20 a.m. **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

11:20 – 11:40 a.m. **Anna Shapiro (presented by Werner Schmutz), PMOD/WRC, Switzerland**
The Stratospheric Response to a Discrepancy of the SSI Data

Panel Discussion / Q&A (Buffet Lunch provided)

11:40 – 12:50 p.m. ***Current and Future Plans for Sun-Climate Research***
Panel: Madhulika Guhathakurta, Cheryl Yuhas, Tom Sparn, and Werner Schmutz

Session 2.

Solar Spectral Irradiance (SSI) Measurements

Chair: Erik Richard, LASP, University of Colorado

- 12:50 – 1:20 p.m.** **Keynote: Tom Woods**, LASP, University of Colorado, Boulder
Reference Solar Spectra for Earth Science Research
- 1:20 – 1:50 p.m.** **Jeff Morrill**, Naval Research Laboratory (NRL), Washington, DC
A Combined SUSIM / SBUV UV Solar Spectral Irradiance Dataset from 1991 to 2012
- 1:50 – 2:20 p.m.** **G rard Thuillier**, LATMOS / CNRS, France
SOLSPEC: Recent results and status
- 2:20 – 2:40 p.m.** **Christian Muller**, Belgium Institute for Space Aeronomy, Brussels
Full Solar Rotations Observed by the SOLAR Payload on the ISS in December 2013 and June 2014
- 2:40 – 3:10 p.m.** **Werner Schmutz**, PMOD/WRC, Switzerland
Variations of Near-UV and Visual Solar Spectral Irradiance as Measured by VIRGO/SoHO and PREMOS/Picard
- 3:10 – 3:40 p.m.** **Break**
- 3:40 – 4:00 p.m.** **Ga l Cessateur**, PMOD/WRC, Switzerland
THE PREMOS/PICARD Radiometer: An overview after 3 years of observations
- 4:00 – 4:20 p.m.** **Jerry Harder**, LASP, University of Colorado, Boulder
Observations of Solar Variability in the 240-2400 nm Range using SORCE SIM
- 4:20 – 4:40 p.m.** **Matthew DeLand**, Science Systems and Applications, Inc. (SSAI), Lanham, Maryland
Solar Cycle 24 Variability Observed by Aura OMI
- 4:40 – 5:00 p.m.** **David Bols e**, Belgium Institute for Space Aeronomy, Brussels
Accurate Determination of the TOA Solar Spectral NIR Irradiance Using a Primary Standard Source and Bouguer-Langley Technique

Wednesday, Jan. 29

Session 3.

Decadal and Longer Sun-Climate Variations

Chair: Gary Rottman, LASP, University of Colorado

- 8:30 – 9:20 a.m.** **Keynote: 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
- 9:20 – 9:50 a.m.** **J rg Beer**, Eawag: Swiss Federal Institute, D bendorf, Switzerland
Solar Variations and Climate Change: The view from ice cores
- 9:50 – 10:10 a.m.** **Dong Wu**, NASA GSFC, Greenbelt, Maryland
The $s=0$ Atmospheric Oscillations in 35-Year MERRA Zonal Wind and Temperature
- 10:10 – 10:40 a.m.** **Break**
- 10:40 – 11:10 a.m.** **Alexander Ruzmaiken**, NASA JPL, California Institute of Technology, Pasadena
Sun-Climate Variations on Centennial Time Scales
- 11:10 – 11:30 a.m.** **Guoyong Wen**, NASA GSFC; GESTAR, Morgan State University, Baltimore, Maryland
Climate Responses to Spectral Solar Forcing in GISS GCMAM
- 11:30 – 1:30 p.m.** **Box Lunch provided**

Session 4. Total Solar Irradiance (TSI) Measurements and Composites

Chair: Marty Snow, LASP, University of Colorado

- 1:30 – 2:10 p.m.** **Keynote: Greg Kopp**, LASP, University of Colorado, Boulder
“Variability” in the TSI Over the SORCE Mission – and Beyond
- 2:10 – 2:40 p.m.** **Wolfgang Finsterle**, PMOD/WRC, Switzerland
Of Straying Photons, Shiny Apertures, and an Inconstant Solar Constant – Advances in TSI Radiometry
- 2:40 – 3:10 p.m.** **Richard Willson**, ACRIM Principal Investigator, Coronado, California
ACRIM3 Characterization by the LASP/TRF and the Total Solar Irradiance Database
- 3:10 – 3:40 p.m.** **Break**
- 3:40 – 4:00 p.m.** **Shashi K. Gupta**, Science Systems and Applications Inc. (SSAI), Lanham, Maryland
Projection of SORCE Total Solar Irradiance Measurements 5-10 Days Forward for Near Real-Time Applications
- 4:00 – 4:20 p.m.** **Jae N. Lee**, JCET, Univ. of Maryland, Baltimore County; NASA GSFC, Greenbelt, MD
Rotational Variations in Total Solar Irradiance Observations: From SORCE/TIM, ACRIM/ACRIM III, and SoHO/VIRGO
- 4:20 – 4:40 p.m.** **Jean-François Cossette**, Université de Montreal, Canada
Cyclic Thermal Signature in a Global MHD Simulation of Solar Convection

Science Dinner – Tribute to Robert Cahalan, Eau Gallie Yacht Club

5:25 Bus Departs Hotel, 5:45 pm Reception, 6 pm Sunset, 6:30 pm Dinner

Thursday, Jan. 30

Session 5. SSI Composites, Proxies, Models

Chairs: AM – Jerry Harder, LASP, University of Colorado

PM – Greg Kopp, LASP, University of Colorado

- 8:00 – 8:30 a.m.** **Keynote: Martin Snow**, LASP, University of Colorado, Boulder
The Magnesium II Index: 35 Years and Counting
- 8:30 – 9:00 a.m.** **Ken Tapping**, National Research Council, D.R.A.O., Penticton, BC, Canada
The Continuing Deviation between the Sunspot Number and F10.7 Activity Indices
- 9:00 – 9:30 a.m.** **Rich Stolarski**, Johns Hopkins University, Baltimore, Maryland
The Impact of Solar Spectral Irradiance Variations on Stratospheric Composition: Theory and observations
- 9:30 – 9:50 a.m.** **Tamás Várnai**, NASA GSFC, Greenbelt, Maryland; and University of Maryland, Baltimore County
Advances in Understanding 3D Interactions between Sunlight and the Atmosphere during the SORCE Mission
- 9:50 – 10:20 p.m.** **Break**

- 10:20 – 10:50 a.m.** **Margit Haberreiter**, PMOD/WRC, Switzerland
SOLID – a European Project towards a Comprehensive Solar Irradiance Data Exploitation
- 10:50 – 11:20 a.m.** **Matthieu Kretzschmar**, LPC2E, CNRS University of Orléans, France
Assessment of Solar Irradiance Datasets for the SOLID Project
- 11:20 – 11:40 a.m.** **Micha Schöll**, LPC2E, CNRS University of Orléans, France
First Steps Towards a Homogeneous Solar Spectral Irradiance Data Set: Selection, merging and quality assessment
- 11:40 – 1:00 p.m.** **Buffet Lunch Provided**
- 1:00 – 1:30 p.m.** **Natalie Krivova**, Max-Planck-Institut für Sonnensystemforschung, Germany
Modelling Solar Irradiance with SATIRE
- 1:30 – 2:00 p.m.** **Sami Solanki**, Max-Planck-Institut für Sonnensystemforschung, Germany
Towards the Next Generation of Solar Irradiance Reconstruction Models
- 2:00 – 2:20 p.m.** **Anatoliy Vuiets**, LPC2E, CNRS University of Orléans, France
*What Can We Learn from *SORCE* about the Contribution of Different Magnetic Structures to the Solar Spectral Irradiance?*
- 2:20 – 2:40 p.m.** **Serena Criscuoli**, National Solar Observatory (NSO), Sacramento Peak, Sunspot, NM
Interpretation of SIM Measurements from Analysis of 3D MHD Simulations
- 2:40 – 3:10 p.m.** **Break**
- 3:10 – 3:40 p.m.** **Thierry Dudok de Wit**, LPC2E / Centre National de la Recherche Scientifique (CNRS) & University of Orléans, France
Multi-Wavelength Solar Radio Observations and their use as Solar Proxies for Upper Atmospheric Modeling
- 3:40 – 4:00 p.m.** **Juan Fontenla**, NorthWest Research Associates, Boulder, Colorado
The UV SSI of the Sun Compared to Cooler Stars, Similarities and Differences
- 4:00 – 6:00 p.m.** **Poster Session – Brief Introduction and Reception**
Chair: Marty Snow, LASP, University of Colorado

Friday, Jan. 31

Session 6. Legacy of SORCE and Future Directions after SORCE

Chair: Tom Woods, LASP, Univ. of Colorado

- 8:00 – 8:40 a.m.** **Keynote: Gary Rottman**, LASP, University of Colorado, Boulder
The Historical Development of SORCE
- 8:40 – 9:10 a.m.** **Graeme Stephens**, NASA JPL and California Institute of Technology, Pasadena
Maintaining the Continuation of Long-term Satellite Total Solar Irradiance Observation – thoughts from an NRC review
- 9:10 – 9:30 a.m.** **Peter Pilewskie**, Dept. of Atmospheric and Oceanic Sciences and LASP, University of Colorado, Boulder
Status of the Total Solar Irradiance Sensor (TSIS) Mission
- 9:30 – 9:50 a.m.** **Mark Rast**, Dept. of Astrophysical and Planetary Sciences and LASP, University of Colorado, Boulder
The Case for a Radiometric Imager, and How to Build One
- 9:50 – 10:10 p.m.** **Break**
- 10:10 – 10:40 a.m.** **Yukihiro Takahashi**, Hokkaido University, Sapporo, Japan
Micro-Satellite as an Alternative Vehicle
- 10:40 – 11:10 a.m.** **Brian Soden**, Rosenstiel School for Marine and Atmospheric Science (RSMAS), University of Miami, Florida
Diagnosing Radiative Forcings in CMIP5 Models
- 11:10 – 11:30 a.m.** **Pål Brekke**, Norwegian Space Centre, Oslo, Norway
NORSAT-1: Total Solar Irradiance, Space Weather, and Ship Detection
- 11:30 – 12:00 p.m.** **Steve Platnick**, NASA GSFC, Greenbelt, Maryland
Challenges in Using Current Generation Imager Solar Reflectance Observations for Climate Change Detection and Future Directions

2014 SORCE Science Meeting Poster Session

Thursday, Jan. 30, 4-6 pm

Summary of Poster Presentations (in alphabetical order):

Stéphane Beland, LASP, University of Colorado, Boulder

SORCE SIM Data Version 19

Odele Coddington, LASP, University of Colorado, Boulder

Applying Information-Theoretic Approaches for Objective Model Selection and Quantification of a Model Selection Uncertainty

Angela Cookson, San Fernando Observatory, California State University, Northridge

Using Ground-Based Ca II K Images as a Proxy for Shorter UV

Thierry Dudok de Wit, LPC2E, CNRS University of Orléans, France

How to Make Composites out of Multiple Observations

Thierry Dudok de Wit, LPC2E, CNRS University of Orléans, France

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, Science Systems and Applications Inc. (SSAI), Hampton, Virginia

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

Research to Operations, Possibilities for Total and Spectral Solar Irradiance in the Next 25 Years

Katherine Suess, LASP, University of Colorado, Boulder

Developing a Proxy Model for Solar EUV Irradiance using SORCE and GOES