

TSIS / SORCE News

Total & Spectral Solar Irradiance Sensor / Solar Radiation & Climate Experiment



Nov.-Dec. 2019

2020 Sun-Climate Symposium –

*What is the Quiet Sun and
What are the Subsequent Climate Implications?*

**Marriott University Park
Tucson, Arizona
Jan. 27-31, 2020**

Science Overview

Observations of the Sun and Earth from space have revolutionized our view and understanding of how solar variability and other natural and anthropogenic forcings impact Earth's atmosphere and climate. For more than four decades the total and spectral solar irradiance and global terrestrial atmosphere and surface have been observed continuously, providing unprecedented high-quality data for Sun-climate studies. This 3.5 day Symposium will be an opportunity to discuss solar and climate observations and models over both spacecraft-era and historical timescales.



The sunset in beautiful Saguaro Natl. Park, just west of Tucson.

**Hotel Reservations ☼ Due Dec. 27
Registration ☼ Due Jan. 3**

**[http://lasp.colorado.edu/home/sorce/
news-events/meetings/2020-scs/](http://lasp.colorado.edu/home/sorce/news-events/meetings/2020-scs/)**

Sessions and Presenters

Below are the seven sessions and the speakers within each session. A detailed description of each session is on the meeting website. Poster presentations are listed at the end of the speaker listing. You can also find the individual abstracts on the website (under Science Program > Speakers/Posters).

Tuesday, Jan. 28

Symposium Kick-Off/Welcome

Peter Pilewski and Tom Woods, LASP, Univ. of Colorado – Boulder

TSIS / SORCE Status Overview

1. The Sunset of SORCE

Gary Rottman, LASP, Univ. of Colorado – Boulder
SORCE – Important Factors of Concept and Development

Robert Cahalan, NASA GSFC, Greenbelt, MD (Emeritus)
Celebrating SORCE

Greg Kopp, LASP, Univ. of Colorado – Boulder
Highlights from SORCE / TIM

Jerry Harder, LASP, Univ. of Colorado – Boulder
SORCE SIM Instrument Highlights for Middle Ultraviolet, Visible, and Near Infrared

Bill McClintock, LASP, Univ. of Colorado – Boulder
Highlights from 17 Years of SORCE / SOLSTICE Observations

Tom Woods, LASP, Univ. of Colorado – Boulder
SORCE X-ray Ultraviolet Photometer System (XPS) Highlights

Sean Ryan, LASP, Univ. of Colorado – Boulder
SORCE's Flexible Satellite Architecture Allows Science to Continue Despite Hardware Challenges

Tom Sparn, LASP, Univ. of Colorado – Boulder
SORCE Management in a Civilized Time

2. Recent/Space-Era Solar Cycles Timescales

Bo Andersen, Norwegian Space Agency, Oslo
*Homage to Claus Fröhlich
What is the TSI Value at Solar Minima in the Space Age?*

Serena Criscuoli, Natl. Solar Observatory, Boulder, CO
Modern and Historical Reconstructions of Solar UV Irradiance Variability

Erik Richard, LASP, Univ. of Colorado – Boulder
Solar Spectral Irradiance Measurements from the TSIS-1 SIM: Data continuity and comparisons to other records

Stéphane Béland, LASP, Univ. of Colorado – Boulder
SORCE / TSIS Overlap Analysis

Margit Haberreiter, Physikalisch-Meteorologisches Observatorium (PMOD/WRC), Davos Dorf, Switzerland
TSI Measurements from NORISAT-1 / CLARA

James Limbacher, NASA GSFC & SSAI, Greenbelt, MD
Estimating the Precision of TSI Measured from VIRGO, SORCE, TCTE, and TSIS-1 Using the Triple Differencing Technique

Shashi Gupta, NASA Langley Research Center & SSAI, Hampton, VA
A Comparative Examination of SORCE and TSIS-1 TSI Data during the Overlap Period

Hanna Strecker, Leibniz (KIS), Germany
On the Decay of Sunspots

Pradeep Kayshap, Czech Republic
Variability of Mg II Line in Quiet Sun and Coronal Hole

Debi P. Choudhary, San Fernando Observatory, California State Univ. – Northridge
Solar Irradiance Variations in Chromospheric Spectral Lines

Sergey Marchenko, NASA GSFC & SSAI, Greenbelt, MD
Solar Activity and Responses Observed in Balmer Lines

Thierry Dudok de Wit, LPC2E, CNRS and University of Orléans, France
Response of Solar Irradiance to Solar Proxies: Is it instantaneous?

Wednesday, Jan. 29

3. Solar Variability and Climate Trends on Secular Times Scales

Alexander Shapiro, Max Planck Inst., Göttingen, Germany
Solar Activity over the Last Four Billion Years

Frédéric Clette, Royal Observatory of Belgium, Brussels
Re-evaluation of the 400-Year Sunspot Record (Note: Greg Kopp to present)

Lisa Upton (Invited), Space System Research Corp. (SSRC), Boulder, CO
Reconstructing Historical Solar Activity with the Advective Flux Transport Model

Leif Svalgaard, Stanford University, Stanford, CA
Validation of the Group Sunspot Series

Matthias Rempel, High Altitude Observatory / Natl. Center for Atmospheric Res. (HAO/NCAR), Boulder, CO
On the Contribution of Quiet Sun Magnetism to Solar Irradiance Variations

Valerie Trouet, Tree-Ring Research Lab., University of Arizona, Tucson
Reduced Caribbean Hurricane Activity during the Maunder Solar Minimum

Alexander Ruzmaikin, Jet Propulsion Laboratory, California Inst. of Technology, Pasadena
The Earth Climate at Deep Minima of the Solar Activity

Jennifer van Saders, Univ. of Hawaii, Honolulu
The Sun in Stellar Context: Stellar Windows into Solar Magnetic Evolution

Tom Ayres, CASA, University of Colorado – Boulder
Seeking the Quiet Sun Among the Stars



Thursday, Jan. 30

4. Solar Influence on the Atmosphere and Climate

Judith Lean, LASP, University of Colorado – Boulder and Naval Research Laboratory (NRL Emeritus)
Navigating the Causes of Modern Climate Change

Vikram Mehta, The Center for Research on the Changing Earth System (CRCES), Catonsville, MD
Solar Influences and the Earth's Decadal Climate Variability

Karen Rosenlof, NOAA Earth System Research Laboratory (ESRL), Boulder, CO
Ozone Change and Its Influence on Climate

Lon Hood, University of Arizona, Tucson
Top-down Solar Influences on the Madden-Julian Short-Term Climate Oscillation

Robert Meier, George Mason University, Fairfax, VA
Solar EUV Irradiance and Thermospheric Composition Trends Retrieved from FUV Dayglow Observations

Scott McIntosh, HAO / NCAR, Boulder, CO
A New Clock for the Sun: Sun-Climate Implications & What May Be Looming

Han-Li Liu, HAO / NCAR, Boulder, CO
Atmosphere and Ocean Responses to Extreme Low Solar Activity and Their Hemispheric Differences

Cornelius Csar Jude H. Salinas, Natl. Central University, Taoyuan City, Taiwan
Possible Solar Cycle Responses of Eddy Diffusion in the Mesosphere and Lower Thermosphere as Inferred from SABER CO₂

Jae Lee, University of Maryland, Baltimore County and NASA GSFC, Greenbelt, MD
Solar Cycle Modulation of MLS Nighttime Ozone near the Secondary Ozone Maximum Layer

Christopher Castro, University of Arizona, Tucson
The North American Monsoon in a Changing Climate

5. A New Reference Spectrum for Remote Sensing

David Doelling, NASA Langley Research Center, Hampton, VA
GSICS Applications and the Need of a Solar Irradiance Reference Spectrum

Dave Crisp, Jet Propulsion Laboratory, California Inst. of Technology, Pasadena
The Impact of the TSIS-SIM Data on the OCO-2/OCO-3 Data Analysis

Brent Holben, NASA GSFC, Greenbelt, MD
AERONET – the Ground-based Aerosol Satellite

Tom Stone, U.S. Geological Survey, Flagstaff, AZ
Requirements for a Reference Solar Spectrum for Lunar Calibration Applications

Odele Coddington, LASP, Univ. of Colorado – Boulder
Progress towards a New, High-Resolution, High-Accuracy Solar Reference Spectrum based on TSIS-1 SIM

Marty Snow, LASP, University of Colorado – Boulder
Solar Spectral Irradiance during WHPI and Comparison to WHI and WSM

Nuno Pereira, Royal Belgium Institute for Space Aeronomy, Brussels
Near Infrared Ground-based Spectrum

Luc Damé, Laboratoire Atmosphères, Milieux, Observations Spatiales (LATMOS), France
New Absolute Reference Spectrum SOLAR-ISS2 at 2008 Solar Minimum and its Extension at Very High Resolution (0.01 nm) from 500 nm up to 4200 nm for Atmospheric Modeling and Remote Sensing



Friday, Jan. 31

6. Observational Predictions

W. Dean Pesnell, NASA GSFC, Greenbelt, MD
How Well Can We Predict Solar Cycle 35?

Philip Judge, HAO / NCAR, Boulder, CO
The Next Five Decades Under the Sun

Andrés Muñoz-Jaramillo, Southwest Research Institute (SwRI), Boulder, CO
How Hemispheric Polar Field Reversal Sets the Timing and Shape of the Solar Cycle

7. Looking Ahead – Future Observations of the Sun and Earth

Yolanda Shea, NASA Langley Research Center, Hampton, VA
CLARREO Pathfinder: Mission Overview

Julien Amand, Royal Meteorological Institute of Belgium, Brussels
SIMBA, Measuring the Earth's Radiation (im)Balance

Wolfgang Finsterle, PMOD/WRC, Davos Dorf, Switzerland
Calibrating Space Radiometers to Ground-based TSI Standards

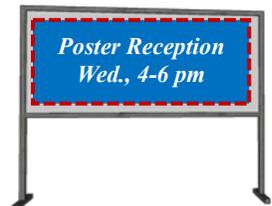
Susan Breon, NASA GSFC, Greenbelt, MD
TSIS-2: Continuing the Solar Irradiance Data Record

Brian Boyle, LASP, University of Colorado – Boulder
TSIS-2 and Beyond

Dave Harber, LASP, University of Colorado – Boulder
The Compact SIM (CSIM), Compact TIM (CTIM) and Future Compact Earth Radiation Budget Instruments

Charles Kankelborg, Montana State University, Bozeman
The FURST Mission

POSTER Presentations (listed alphabetically)



Dhruba Banerjee, Kolkata, India
A comprehensive study of characteristics and vulnerability power of Tropical Cyclone in the Bay of Bengal and the Arabian Sea in 2018 and the possible solar linkage with them

Catharine Bunn, Montana State University, Bozeman
Detection of Explosive Events in SORCE-Calibrated IRIS Full-disk Mosaics

Ana Cristina Cadavid, San Fernando Observatory, California State University, Northridge
Total Solar Irradiance and Photometric Indices during the Activity Minimum between Solar Cycles 23 & 24



Odele Coddington, LASP, Univ. of Colorado – Boulder
Short-term Solar Irradiance Variability as Observed by TSIS SIM

Odele Coddington, LASP, Univ. of Colorado – Boulder
Progress toward the Next Generation Solar Irradiance Variability Models (SIST Program)

Angela Cookson and Gary Chapman, San Fernando Observatory, California State University, Northridge
Analysis of Photometric Images of the Quiet Sun during Solar Minimum (SIST Program)

Luc Damé, LATMOS, IPSL/CNRS/UVSQ, Guyancourt, France
The SoSWEET-SOUP (Solar, Space Weather Extreme Events and Stratospheric Ozone Ultimate Profiles) Constellation Mission

Matt DeLand, SSAI and NASA GSFC, Greenbelt, MD
Evaluation of “Quiet Sun” Trends in SSI Observations (SIST Program)

Giuliana de Toma, HAO / NCAR, Boulder, CO
Understanding the Sources of Variability in the Mg II Index (SIST Program)

Leonid Didkovsky, Space Sciences Laboratory, Univ. of Southern California, Los Angeles
A Dissipation of Solar Transition Region Network Cells as a Proxy of Activity Decrease

Gulsun Dumbadze, Ilia State University, Tbilisi, Georgia
Eigenspectra of Active Region Long-period Oscillations Obtained using the Image Processing Moment Method

Josh Elliott, LASP, University of Colorado – Boulder
The Latest SORCE SOLSTICE Calibrations and Data Products

Josh Elliott, LASP, University of Colorado – Boulder
The Latest SORCE XPS Calibrations and Data Products

Wolfgang Finsterle, PMOD/WRC, Davos Dorf, Switzerland
Results from the Pre-Launch Calibration of DARA for JTSIM

Mackenzie James, University of Arizona, Tucson
Identifying Events with Time Lag between Change in Total Solar Irradiance and Sunspot Area

Greg Kopp, LASP, University of Colorado – Boulder
New Historical TSI Reconstructions Based on the Revised 400-Year Sunspot Record (SIST Program)

Hunter Leise, LASP, University of Colorado – Boulder
LISIRD: An Online Resource for Making Solar Data More Accessible

Emma Lieb, LASP, University of Colorado – Boulder
SALSA: Solar Applied pLanetary dataSet cAlibration

Janet Machol, CIRES, Univ. of Colorado; NOAA Natl. Centers for Environmental Info. (NCEI), Boulder, CO
The GOES-R Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS)

Aimee Merkel, LASP, University of Colorado – Boulder
Response of Polar Mesospheric Clouds to the 11-Year Solar Cycle

Jamie Mothersbaugh, LASP, University of Colorado – Boulder
Quantification and Effects of Diode Detector Degradation in the SORCE SIM Instrument

Stijn Nevens, Royal Meteorological Institute of Belgium, Brussels
Scattering and Diffraction on the View Limiting Apertures of Absolute Radiometers

Olugbenga Ogunmodimu, Manchester Metropolitan University, UK
Superposed Epoch Analysis of Cosmic Noise Absorption for Co-Rotating Interactive Regions

Aghogho Ogwala, Lagos State University, Nigeria
Variation in Observed Total Electron Content and Comparison with IRI-2016 Model at Equatorial and Low-Latitude

Suman Panda, Montana State University, Bozeman
VUV Line Profiles of Sun as a Star from SUMER

Steven Penton, LASP, University of Colorado – Boulder
SORCE Solar Spectral Irradiance Monitor Data Release V26, and a Look Forward to V27

Alberto Remesal Oliva, PMOD/WRC, Davos Dorf, Switzerland
Degradation Process Due to UV Radiation and Future Radiometers

Alberto Remesal Oliva, PMOD/WRC, Davos Dorf, Switzerland
Lab Experiments: Characterization of new flat detector and its dome and degradation process in TSI radiometer

Gary Rottman, LASP, University of Colorado – Boulder
Maybe a Second Best Way to Measure TSI

Laura Sandoval, LASP, Univ. of Colorado – Boulder
SORCE Phase-F

Leif Svalgaard, Stanford University, CA
Three Centuries of Monthly Sunspot Group Numbers

Joel Tibbetts, Grinnell College, Iowa
From Aleph to TAV: SORCE/SIM Recalibration using TSIS

Betsy Weatherhead, Jupiter Intelligence, Boulder, CO
Satellite Overlap Requirements for Building Long-term Continuous Records

Bob Weber, Lower Peninsula, MI
CO₂ Naturally Follows Solar-driven Climate Extremes

Bob Weber, Lower Peninsula, MI
TSI Sun-Climate Prediction Theory

Dong Wu, NASA GSFC, Greenbelt, MD
Increases of Reflected Solar Radiation as Observed by MISR from Volcanic Eruptions in 2000-2018

Location / Venue

Tucson, AZ is most famous for its dramatic beauty! The Sonoran Desert covers this region with spectacular cacti – including the giant saguaro, a symbol of the American Southwest. They have captivated visitors for decades. To complement the legendary year-round sunshine and saguaro- and sunset-landscape, there are scenic mountain ranges surrounding the city. On the flip-side to its Old West heritage, Tucson offers a thriving visual and performing arts scene, not to mention the amazing restaurants (UNESCO designated City of Gastronomy). Once you immerse yourself in the laid-back atmosphere of Tucson, you may never want to leave!



We will be meeting at the **Tucson Marriott University Park Hotel**, a state-of-the-art full service conference facility near the University of Arizona campus.

Logistics and Registration

Please visit the 2020 Sun-Climate Symposium website for logistical information, including maps and transportation options. **Important dates:**

- **Hotel Reservations – due Fri., Dec. 27**
- **Early Registration – due Fri., Jan. 3**

<http://lasp.colorado.edu/home/sorce/news-events/meetings/2020-scs/>

Upcoming Meetings / Talks –

TSIS/SORCE scientists are presenting papers or attending the following 2019-2020 meetings/workshops:

2019

AGU Fall Meeting, Dec. 9-13, San Francisco, CA

2020

American Meteorological Society (AMS) Annual Meeting, Jan. 12-16, Boston, MA

Sun-Climate Symposium, Jan. 27-31, Tucson, AZ

Space Weather Workshop, April 20-24, Boulder, CO

European Geosciences Union (EGU), General Assembly, May 3-8, Vienna, Austria

New Developments and Applications in Optical Radiometry (NEWRAD). June 23-26, Boulder, CO

International Radiation Symposium (IRS), July 6-10, Thessaloniki, Greece

Solar Irradiance Science Team Meeting, July 22-23, Boulder, CO

COSPAR Scientific Assembly, Aug. 15-23, Sydney, Australia

JSWSC Topical Issue

The *Journal of Space Weather and Space Climate* is planning a Topical Issue on “**Space Climate: The past and future of solar activity**” to appear in 2020.

This is an open call for papers discussing any aspect of Space Climate, i.e., the long-term change in the Sun and its effects in the heliosphere and the near-Earth space environment, including solar effects on the atmosphere and climate.

The deadline for online submissions is Jan. 31, 2020, <https://www.editorialmanager.com/jswsc/default.aspx>. For more details, please contact the Topical Editor-in-Chief, Kalevi Mursula, University of Oulu, Finland; kalevi.mursula@oulu.fi, or visit the JSWSC website: <https://www.swsc-journal.org/news/297-topical-issue-space-climate-the-past-and-future-of-solar-activity-deadline-31-january-2020>.



Happy Holidays!