



## 2009 *SORCE Science Meeting* –

### ***“The Impact of Solar Variability on Earth”***

***July 19-29, 2009  
Montreal, Canada***

The 2009 SORCE Science Meeting will be held in conjunction with the IAMAS 2009 Meeting in Montreal, Canada, July 19-29. There will be a special SORCE-related session (M03) called ***“The Impact of Solar Variability on Earth”***.

The session will address all aspects of the impact of solar variations on the Earth’s atmosphere and oceans. These include:



- Variability of the solar irradiance (TSI and SSI measurements and modelling)
- Variability of energetic particle precipitation
- Solar signal in the thermosphere, mesosphere, and stratosphere (observations, modelling, mechanisms)
- Solar signal in the troposphere (observations and modelling, processes, climate relevance)
- Solar signal in the oceans and the role of atmosphere-ocean coupling
- Solar impact on centennial to millennial timescales

***Abstract Deadline:  
Jan. 23, 2009***

The symposium invites contributions on identifying the solar signal from ground-based and satellite observational datasets ranging from the upper atmosphere (thermosphere, mesosphere) to the troposphere, the Earth’s surface and the oceans. Papers on the solar irradiance and particle flux on Earth are welcome as well as contributions on physical and chemical processes and mechanisms leading to the observed solar signal. Simulations with mechanistic, general circulation and chemistry climate models are especially encouraged. Studies may include solar variations on different time scales ranging from the 27-day rotation period over the 11-year solar cycle to centennial and millennial variations including the Maunder Minimum.



Currently, the invited speakers who have accepted are (alphabetically):

- Ulrich Cubasch, Freie Universität Berlin, Germany, *Modeling*
- Wolfgang Finsterle, PMOD/World Radiation Center, Davos, Switzerland, *TSI data SOVIM*
- Bernd Funke, Instituto de Astrofísica de Andalucía, Granada, Spain, *MPIPAS data*
- Lesley Gray, Reading University, UK, *T, v in stratosphere and mesosphere; ability of CCMs to reproduce observations*
- Kunihiko Kodera, Meteorological Research Inst., Tsukuba, Japan, *Solar influence on climate variability modes*
- Greg Kopp, LASP, Univ. of Colorado, Boulder, *SORCE TSI measurements and NASA Glory TIM*
- Katja Matthes, Freie Universität Berlin, Germany, *Solar signal and QBO*
- David Rind, NASA GISS, New York, NY, *Impact of SSTs on atmospheric solar signal in NASA GISS model*
- Hauke Schmidt, Max Planck Inst. for Meteorology, Hamburg, Germany, *Solar signal in the thermosphere*

- Kirill Semeniuk, York Univ., Toronto, Canada, *CMAM modeling of particle variations*
- Gerard Thuillier, Service d'Aéronomie du CNRS, France, *SSI measurements*
- Yvonne Unruh, Imperial College, London, UK, *SSI modeling*
- Warren White, Univ. of California at San Diego, Scripps Inst. of Oceanography, La Jolla, *Solar signal in SST data*

Session conveners are Ulrike Langematz (Freie Universität Berlin, Germany), Victor Fomichev (York University, Toronto, Ontario, Canada), Joanna Haigh (Imperial College, London, UK), Lon Hood (Univ. of Arizona, Tucson), Alexei Krivolustsky, Werner Schmutz (PMOD/World Radiation Center, Davos, Switzerland), and Tom Woods (LASP, Univ. of Colorado, Boulder).

For general IAMAS 2009 Meeting information and science program, visit:

<http://iamas-iapso-iacs-2009-montreal.ca/index.asp>.

The SORCE-related session is IAMAS session M03.

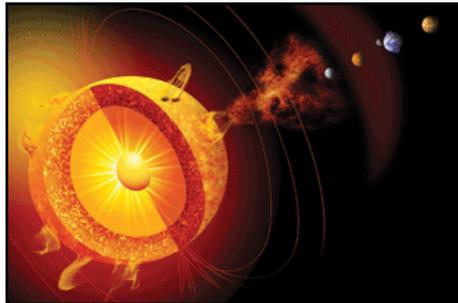
*We hope that you will join us!*

## *Heliophysics Summer School –*

The third of a 3-year NASA-sponsored Heliophysics Summer School will be hosted by the UCAR Visiting Scientist Programs in Boulder, CO, 22-29 July 2009. For details please visit their website at:

<http://www.vsp.ucar.edu/HeliophysicsSummerSchool/2009/announcement.html>.

The summer school program has two principal aims: 1) to deepen the appreciation of the basic science of heliophysics for a select group of students as teachers take them through highly interactive seminars and hands-on working groups, and 2) to produce a series of textbooks from which heliophysics may be taught at universities worldwide.

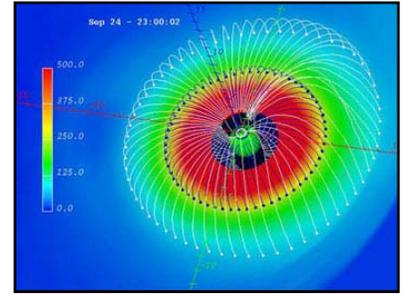


This summer's final program will focus on long-term processes, from the Sun's modulated activity to its influences on the climate systems of the heliosphere, Earth's atmosphere, and planetary environments. The complete 3-year summer school program encompasses the entire scientific discipline that is now called heliophysics, which was borne out of the need for interdisciplinary research in the context of NASA's Living with a Star (LWS) Program.

Approximately 30 students (chosen from graduate students through first or second year postdoctoral fellows) are selected each year through a competitive process. Each

participant will receive air travel, lodging and per diem. Attendants will be selected for the 2009 summer school independent of their participation in earlier schools.

Drs. Karel Schrijver (Lockheed Martin ATC) and George Siscoe (Boston University) are the Deans of the summer school. The lectures will be given by teachers from the U.S., Canada, and Europe – see the schedule at the UCAR website:



<http://www.vsp.ucar.edu/HeliophysicsSummerSchool>.

The summer school is sponsored by the Living With a Star program of the Heliophysics Division in NASA's Science Mission Directorate. The UCAR Visiting Scientist Programs office administers the summer school.

The deadline for application submission by students is **1 April 2009**. Application information and forms can be found on their website.

## *AGU Fall Meeting Participation –*

Once again, the SORCE science team will be participating in the annual Fall AGU Meeting, to be held Dec. 15-19, in San Francisco, California. Alphabetical by author, the following presentations are scheduled:

- Margit Haberleiter – *Understanding and forecasting solar EUV and UV irradiance variations AU*
- Jerry Harder – *Solar Spectral Variability as Measured by the SORCE SIM Instrument*
- Greg Kopp – *Total Solar Irradiance Benchmark Measurement Requirements*
- Greg Kopp – *SI-Traceable Climate Measurements From Space: Requirements, Methods, and Accuracies*
- Doug Lindholm – *SORCE Solar Irradiance Data Products*
- Anne Wilson – *LISIRD: Where to go for Solar Irradiance Data*
- Peter Pilewskie – *Establishing a Climate Benchmark Data Record from the Earth-Reflected Solar Spectral Radiance*
- Erik Richard – *SI-Traceable Solar Spectral Irradiance Measurements: The NPOESS TSIS Spectral Irradiance Monitor*
- Marty Snow – *Changes in the Solar Minimum Irradiance in the Middle and Far Ultraviolet on Solar Cycle Timescales*
- Tom Woods – *Session Chair for “The Quiet Sun: Results from the Current Solar Cycle Minimum*
- Tom Woods – *Solar Irradiance Reference Spectra (SIRS) for IHY2007 Whole Heliosphere Interval (WHI)*

## SSI and Solar Global Changes Workshop –

By Juan Fontenla, LASP, University of Colorado

A workshop was convened at LASP on Nov 4 and 5 to discuss available evidence concerning possible global changes on the solar structure and implications for the solar spectral irradiance (SSI). The participants in the workshop were: Drs. Guiliana deToma, Juan Fontenla, Irene González Hernández, Margit Haberleiter, Charles Lindsey, Eric Quémerais, Mark Rast, Marty Snow, and Tom Woods.

Discussions focused on the SSI work from various authors who indicate that modeling which includes only the active region-related features observed on the solar surface are insufficient for explaining the available SSI observations at UV, visible, and IR wavelengths. In addition, measurements of changes in the quiet-Sun FUV radiance were discussed, as well as evidence of changes in the quiet-Sun network. All of these indicate solar-cycle changes that go beyond those of active regions. Furthermore, solar cycle related changes in the helioseismic signal of far-side signal delays were shown and discussed in the context of changes in the global oscillation frequencies of the p- and f-modes.

Evidence was shown of substantial changes to the polar solar wind density, but not its velocity, over the solar cycle that may relate to changes in the global polar magnetic field.

It was concluded that more work is needed in this area to identify physical processes and relationships, and that another workshop will be organized in 2009 to promote collaborations for additional in-depth research on this critical multi-disciplinary topic.



Juan Fontenla, LASP, and Eric Quémerais, Service d'Aéronomie du CNRS (France).



## SORCE RW3 Anomaly Disposition –

By Robert Cahalan, SORCE and TSIS Project Scientist, NASA GSFC; and Tom Woods, SORCE PI, LASP, University of Colorado

### Status:

Starting on Sept. 18, 2008, the SORCE flight team at LASP observed from the housekeeping telemetry anomalous performance in reaction wheel #3 (RW3) on the spacecraft. After weeks of analysis and exploring all of the options, the SORCE spacecraft is now under 3-wheel control, and the pointing performance has returned to normal. Reaction wheel #3 has been turned off, and is being preserved for back-up operations. In addition, engineers are studying 2-wheel control as an additional backup plan. Data processing algorithms are being updated to correct for field-of-view and wavelength shift effects related to offset pointing.



The RW3 anomaly had the most significant impact on the SIM data products of the solar spectral irradiance (SSI). Future revision to SIM data processing is planned to correct for the pointing offsets, which will improve the SIM data during the six-week reaction wheel anomaly period.

### Summary of Science Impact:

The assessment of long-term solar cycle variations from the SORCE mission is not expected to be impacted by the recent SORCE reaction wheel 3 (RW3) anomaly, now that the SORCE spacecraft pointing has returned to nominal performance. However, there is a six-week period when the spacecraft pointing was degraded, and the SSI results at the visible and near infrared wavelengths were affected.

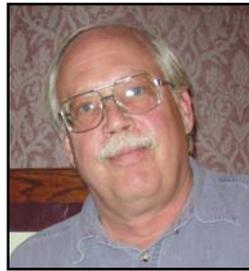
The RW3 failure, and resulting degraded pointing, had no significant impact on science from XPS, TIM, or SOLSTICE because their processing algorithms already include a pointing correction. However, the SIM data are impacted, so SIM will need to have a new pointing correction based on analysis of the angular dependence at several selected wavelengths. This correction for SIM data will be included in a re-processing cycle for the SIM data. This effort is estimated to take less than a year, and the revised SIM data product may be available before the next SORCE Science Meeting in July 2009. The hope is to have a new SORCE-SIM analysis of field-of-view dependency done in time to take advantage of any improvements that could be included in formulation for TSIS-SIM. Extensive raytracing of SIM by Erik Richard, SIM scientist at LASP, has already been performed. The main results from this analysis effort is that SIM's current design (as well as the TSIS-SIM design) is robust against wavelength shifts re-

lated to pointing offsets, but that responsivity changes related to pointing offsets are expected because the illumination onto the prism face changes with pointing offsets. These responsivity changes, without wavelength shifts, are expected for SIM and are a much easier correction than one that also includes wavelength shifts. SORCE has obtained weekly cruciform scans (X-Y scans at fixed wavelength) throughout the mission, and field-of-view maps (5 x 5 map with 5 arc-minute steps) at all wavelengths have also been obtained a few times per year. These pointing offset calibration experiments will be used to derive the new pointing correction algorithm for SIM data.

### ***Sad News This Month –***

Two people who played a major role in SORCE's development passed away recently.

Kip Denhalter joined LASP in 1984 and contributed his electrical engineering expertise to almost every project that passed through LASP's doors during that time. With his patience and a meticulous manner, he excelled in all projects, including testing, GSE development, and exquisite documentation.



James Brault was a LASP consultant who worked on the initial concept designs for what became the SORCE SIM instrument. Jim's contributions to advancing our knowledge and understanding of the solar spectrum through his seminal work on high resolution Fourier transform spectroscopy has benefited many programs including our own. He was also a generous man who was always willing to give his time, energy and knowledge to helping others succeed. The attached photo was taken during a solar measurement campaign for the solar eclipse of May 30th, 1967 at the Bellingshausen site in the South Pacific.



We deeply appreciate all that Kip and Jim contributed for the SORCE instruments, and they will be greatly missed.

**751,829**  
**Hits to the SORCE Website**  
*(Since 4/21/03, As of 11/21/08)*

### ***Upcoming Meetings / Talks –*** *SORCE scientists plan to present papers or attend the following 2008-2009 meetings:*

- SSI and Solar Global Changes Workshop, Nov. 4-6, LASP, Univ. of Colorado, Boulder
- 5<sup>th</sup> Annual Canadian Solar Workshop, Nov 5-7, Montreal, Canada
- International Space Science Institute (ISSI) Working Group Meeting – Tools for UV Calibration, Nov. 24-26, Bern, Switzerland
- AGU Fall Meeting, Dec. 15-19, San Francisco, CA

**To submit information to this newsletter, please contact:**  
[vanessa.george@lasp.colorado.edu](mailto:vanessa.george@lasp.colorado.edu)