

SNS • SORCE News Source



Solar Radiation and Climate Experiment Monthly Newsletter

July 2008

COSPAR Participation –



Representing SORCE solar spectrum irradiance results, Tom Woods and Marty Snow attended the 37th COSPAR Scientific Assembly, July 13-20, in Montreal, Canada. Over 2000 people from over 60 countries attended the conference. Tom and Marty both gave oral presentations in the 7th Thermospheric-Ionospheric-

Geospheric (TIGER) session.

Marty Snow presented *Solar Spectral Irradiance Variability in the UV from SORCE and UARS SOLSTICE*. Following is his abstract – The SOLAR-STellar Irradiance Comparison Experiment (SOLSTICE) on the Solar Radiation and Climate Experiment (SORCE) has been measuring the solar spectral irradiance on a daily basis since early 2003. This time period includes near-solar maximum conditions, the Halloween storms of 2003, and solar minimum conditions. These results can be compared to observations from the SOLSTICE I experiment that flew on the Upper Atmosphere Research Satellite (UARS) during the decline of the previous solar cycle as well as with currently operating missions. We will discuss similarities and differences between the two solar cycles in the long-term ultraviolet irradiance record.

Tom Woods gave a talk entitled *Improved Solar Soft X-Ray Irradiance Algorithm for Broad Band Photometers using CHIANTI Spectral Models*. His abstract follows – The solar soft X-ray (XUV) radiation is highly variable on all time scales and strongly affects Earth's ionosphere and upper atmosphere; consequently, the solar XUV irradiance is important for atmospheric studies and for space weather applications. While there have been several recent measurements of the solar XUV irradiance, detailed understanding of the solar XUV irradiance, especially its variability during flares, has been hampered by the broad bands measured in the XUV range. In particular, the simple conversion of the XUV photometer signal into irradiance, which assumes a static solar spectrum, over estimates the flare variations by more than a factor of two as compared to the atmospheric response to the flares. To address this deficiency in the simple conversion, an improved algorithm using CHIANTI spectral models has been developed to process the XUV Photometer System (XPS) measurements with its broad band photometers. Model spectra representative of quiet Sun, active region,

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**SORCE and time
are flying by!**

2000 days in orbit!

and flares are combined to match the signals from the XPS and produce spectra from 0.1 to 40 nm in 0.1 nm intervals for the XPS Level 4 data product. The two XPS instruments are aboard NASA's Solar Radiation and Climate Experiment (SORCE) and Thermosphere, Ionosphere, Mesosphere, Energetics, and Dynamics (TIMED) satellites. In addition, the XPS responsivities have been updated for the latest XPS data processing version. The new XPS results are consistent with daily variations from the previous simple conversion technique used for XPS and are also consistent with spectral measurements made at wavelengths longer than 27 nm. Most importantly, the XPS flare variations are reduced by factors of 2 to 4 at wavelengths shorter than 14 nm and are more consistent, for the first time, with atmospheric response to solar flares. Along with the details of the new XPS algorithm, some comparisons to dayglow and photoelectron measurements and model results are also presented to help verify the accuracy of the new XUV irradiance spectra.

Peter Pilewskie Attends 2008 IRS –

Peter Pilewskie will be speaking at the 2008 International Radiation Symposium (IRS) in Foz do Iguacu, Brazil, Aug. 3-8. This conference



occurs every 4 years, and this will be the first time for them to meet in South America. Foz do Iguacu city is located at the triple-national border between Brazil, Argentina and Paraguay. Organized by the International Radia-

tion Commission (IRC), which is part of the International Association of Meteorology and Atmospheric Sciences (IAMAS), this symposium will focus on current results related to the problems in atmospheric radiation. Bob Cahalan, *SORCE's* NASA Program Scientist, is one of the organizers for this meeting. The attendees will have an opportunity to exchange ideas within the international community on the existing problems in atmospheric radiation, from theory and modeling to measurements and applications on weather and climate.

Peter is an invited speaker in a special "Radiation budget and forcing" session, which is exploring alterations of radiation budget and its components by anthropogenic and natural processes, resulting in climate changes. His talk is entitled "*Input to the Climate System: A New Understanding of Solar Irradiance from the Solar Radiation and Climate Experiment*".

SORCE PI to Co-Convene AGU Fall Meeting Session –

The AGU Fall Meeting Program Committee has approved a session proposed by *SORCE PI* Tom Woods.

SH06: The Quiet Sun – Results from the Current Solar Cycle Minimum

The 11-year solar cycle is currently in or near its minimum level. While this period has few of the exciting solar storms, it is an interesting period to study the base level to which solar activity and variability is compared. For climate change, it provides a time frame to compare how this solar cycle minimum is different or the same as the previous minimum in 1996; that is, long term trends in solar variations and Earth's climate and atmosphere can be derived. For space weather, the solar cycle minimum provides a relatively quiet state when individual solar events, such as flares and coronal mass ejections, can be traced through the heliosphere without the complications of the consequences of multiple events. Presentations of the solar quiet conditions and state of the heliosphere during the Whole Heliosphere Interval (WHI) in April 2008 are the focus for this session.

Please contact the session conveners with questions:

- Tom Woods, LASP, Univ. of Colorado, Boulder, tom.woods@lasp.colorado.edu, 303-492-4224
- Scott McIntosh, NCAR, High Altitude Observatory (HAO), Boulder, CO mjscott@ucar.edu, 303-497-1544

***Fall AGU Abstract Deadline:
10 September 2008***

Greg Kopp, *SORCE TIM* instrument scientist, is also co-convening a session at AGU, focusing on needed climate measurements of high accuracy.

GC19: SI-traceable climate measurements from space: requirements, methods, and accuracies.

The NRC Decadal Survey calls for long-term climate records, which are "of high accuracy, tested for systematic errors on-orbit, and tied to irrefutable standards such as those maintained in the U.S. by NIST." The data sets that result will be considered "climate benchmarks" because their measurements can be traced to international standards and thus compared to independent future measurements. This session includes discussions of estimated radiometric sensitivities to climate change based on current climate models, measurement requirements for establishing climate benchmarks, and instrument and metrology concepts for obtaining radiometric climate measurements of the high absolute accuracies needed for future climate missions such as CLARREO. Presentations on climate data records or climate model sensitivities utilizing incoming solar irradiances, outgoing short- and long-wave radiation, or Global Navigation Satellite System radio occultation refractivity are solicited.

Please contact the session conveners with questions:

- Greg Kopp, LASP, Univ. of Colorado, Boulder, greg.kopp@lasp.colorado.edu, 303-735-0934
- David Young, NASA Langley Research Center, Hampton, Virginia, david.f.young@nasa.gov, 757-864-5740



2009 SORCE Science Meeting –

It's not too early to start thinking about the 2009 *SORCE Science Meeting*, which 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:

- the response to variations in total and spectral electromagnetic radiation
- the response of the atmosphere to energetic particles precipitating from the space
- the identification of mechanisms and interactions leading to indirect solar effects



- the impact of solar activity on tropospheric meteorological processes and climate

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.

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, visit:

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

Abstracts are due Jan 23, 2009.

Upcoming Meetings / Talks –

SORCE scientists plan to present papers or attend the following 2008 meetings:

37th COSPAR Scientific Assembly, July 13-20,
Montreal, Canada

International Radiation Symposium (IRS2008),
Aug. 3-8, Iguacu Falls, Brazil

WHI (Whole Heliosphere Interval) Data and Modeling
Assessment Workshop, Aug. 25-29, Boulder, CO

CALCON Technical Conference, Aug. 25-28, Logan, UT

ISSI Meeting, Sept. 23-26, Bern, Switzerland

AGU Fall Meeting, Dec. 15-19, San Francisco, CA

To submit information to this newsletter, please contact:

vanessa.george@lasp.colorado.edu.



598,800

Hits to the SORCE Website

(Since 4/21/03, As of 7/18/08)