



SORCE at AGU Fall Meeting –

The AGU Fall Meeting Program Committee has approved two sessions of interest to SORCE scientists. Conveners invite you to submit an abstract by the deadline.

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

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, HAO, Boulder, CO
mScott@ucar.edu

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, 303-4735-0934
- David Young, NASA Langley Research Center
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- John Dykema, Harvard University
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REU Students Work on SORCE –



REU summer interns, left to right: Brian Kirby, James McGrail, and Julie Feldt.

The NSF 2008 Research Experience for Undergraduates (REU) Program came to a close on Friday, August 1. The purpose of the program is to provide students with a summer opportunity to work with scientists on projects spanning the field of solar and space physics, from instrument hardware to data analysis to modeling of the Sun-Earth system. Three student interns worked at LASP for 9 weeks on SORCE-related projects.

Julie Feldt from the University of Kansas worked with Marty Snow and Greg Holsclaw on *Lunar Reflectance at Lyman- α* . Using SOLSTICE, Julie used far-ultraviolet data of the atmosphere, Moon, and Sun to determine the reflectance of the moon at the wavelength of Lyman- α (121.6nm).

Marty Snow, along with Erik Richard, also mentored James McGrail from the University of Michigan. James'

project, *Mg II Index Comparisons and Correlations*, focused on comparing Mg II index data sets from as far back as 1978. Because of the various measurement techniques used in the past, he found that it is possible to make a new composite Mg II index that is better at predicting solar irradiance than the standard NOAA Mg II index.

Brian Kirby, a junior at the University of Michigan this fall, worked with SIM data to study the change in radiant sensitivity, the ration of current generated by a photodiode per watt of energy received, due to temperature fluctuations experienced by the photodiodes taking the solar irradiance measurements. Brian worked with Jerry Harder and Erik Richard on developing an experiment to determine the temperature coefficient of radiant sensitivity for the photodiodes used on the SIM instrument. The title of his project was *Temperature Coefficient of Radiant Sensitivity of Silicon Photodiodes for SIM*.

Solar Irradiance Reference Spectra Workshop at LASP –

By Jerry Harder, LASP, University of Colorado

LASP scientists participated in the Whole Heliosphere Interval (WHI) Data and Modeling Assessment Workshop held on Aug. 26-29 at NCAR in Boulder, Colorado. The WHI is an international coordinated observing and modeling effort to characterize the 3-dimensional interconnected solar-heliospheric-planetary system. The broader 3-day workshop focused on gathering data and model information, performing preliminary assessment and analysis, and connecting and linking the various data and models. Daily WHI Workshop themes included:

- Characterizing the global, interconnected, (non-transient) heliosphere
- Analyzing energy transport/transient origins and impact
- Studying physics at boundaries throughout the heliosphere

More information on this program can be found at: <http://ihy2007.org/WHI/whidmaw.shtml>.

As part of this study LASP solar scientists organized a Solar Irradiance Reference Spectra (SIRS) Workshop to define a solar spectrum representative of solar minimum conditions. This solar spectrum was constructed from the suite of LASP

instruments and missions that measure solar spectral irradiance and its variability. The spectrum spans more than three orders of magnitude of wavelength coverage and is nominally concurrent for all of the contributing instruments. This spectrum is a composite of TIMED SEE XPS for the x-ray portion of the spectrum, rocket prototype EVE and TIMED SEE for the EUV, SORCE SOLSTICE for the UV, and SORCE SIM for the visible and infrared. The reference spectrum consists of two time periods; one from 10-16 April 2008 that includes the 14 April 2008 EVE Calibration Rocket flight from White Sands Missile Range, and the other is a 11-day period centered on 29 March 2008. The latter spectrum includes the effect of 3 small active regions; whereas, the April 10-16 period was a very quiet period. Additional support for this study comes from the decomposition of PSPT images using SRPM modeling (Figure 1). These images help to determine the composition of solar surface features during the time period of the campaign.

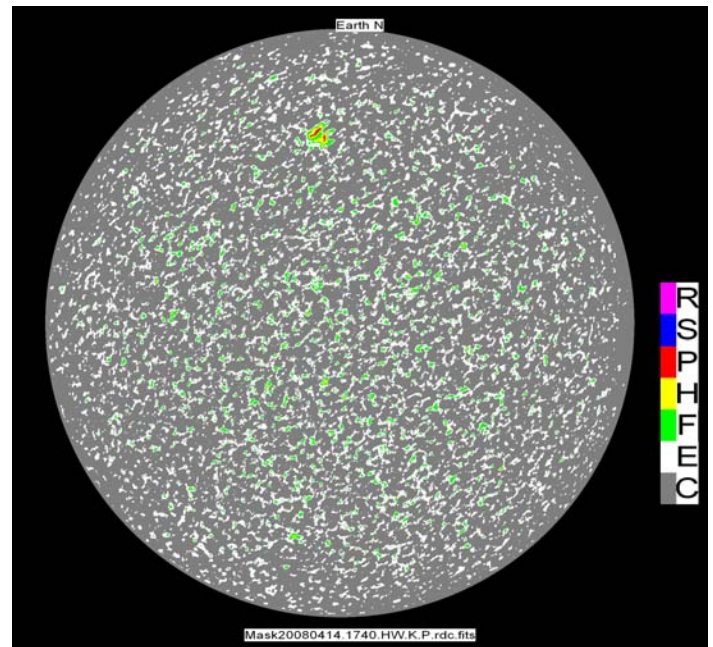


Figure 1. PSPT/SRPM mask image of the sun on 14 April 2008 (on the EVE Rocket flight day). The solar image is decomposed into 7 components: No sunspot components were present on that day (models R and S), but a small active region was present in the northern hemisphere (models P and H). The majority of the image shows mostly the quiet sun components F, E, and C.

Some of the discussion at the LASP workshop centered around whether the spectrum is representative of solar minimum conditions. The standard definition of “solar cycle minimum” is the minimum in sunspot numbers smoothed over 1-year. The sunspot number minimum level is approximately 0-5. While Figure 2 indicates that the average sunspot number is dropping conditions during the campaign are a very good approximation.



variability, and continued analysis of degradation corrections. These WHI reference spectra (data and plots) can be obtained from:

<http://ihy2007.org/WHI/DATA/SolarIrradiance/> and also from <http://lasp.colorado.edu/lisird>.

636,448

Hits to the *SORCE* Website

(Since 4/21/03, As of 8/22/08)

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

- International Radiation Symposium (IRS2008), Aug. 3-8, Iguacu Falls, Brazil
- CALCON Technical Conference, Aug. 25-28, Logan, UT
- WHI (Whole Heliosphere Interval) Data and Modeling Assessment Workshop, Aug. 25-29, Boulder, CO
- ISSI Meeting, Sept. 23-26, Bern, Switzerland
- 5th Canadian Solar Workshop, Nov 5-7, Toronto, Canada
- AGU Fall Meeting, Dec. 15-19, San Francisco, CA

To submit information to this newsletter, please contact: vanessa.george@lasp.colorado.edu.

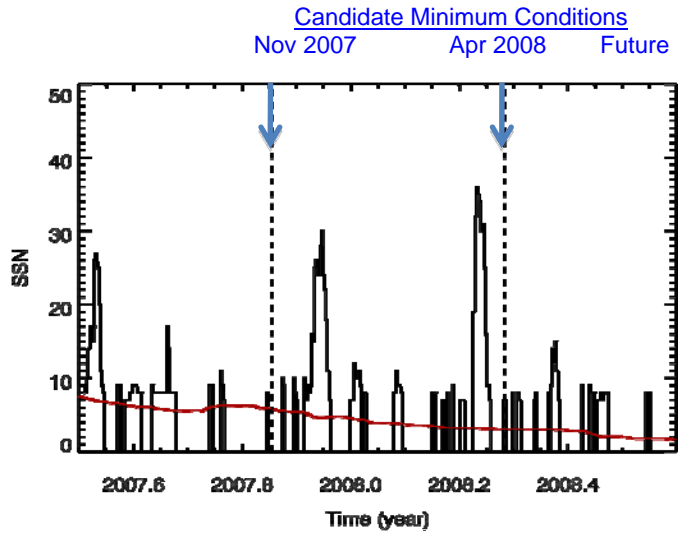


Figure 2. Sunspot index during the time frame of the measurement campaign. The plot shows two candidate days for solar minimum, but there is an indication that it continue to drop; the actual date of solar minimum will require another year of observations to confirm.

The late March active region passage (see Figure 2 for sunspot number) is interesting since it provides an opportunity to test the sensitivity of the spectrum to an observable solar irradiance change. Figure 3 is an example in the ultraviolet portion of the spectrum as measured by SOLSTICE. This graph shows the influence of the active region most notably in the FUV region (110-200 nm) producing a relative change of a few percent, it s influence in the MUV, visible, and infrared drops another factor of 10.

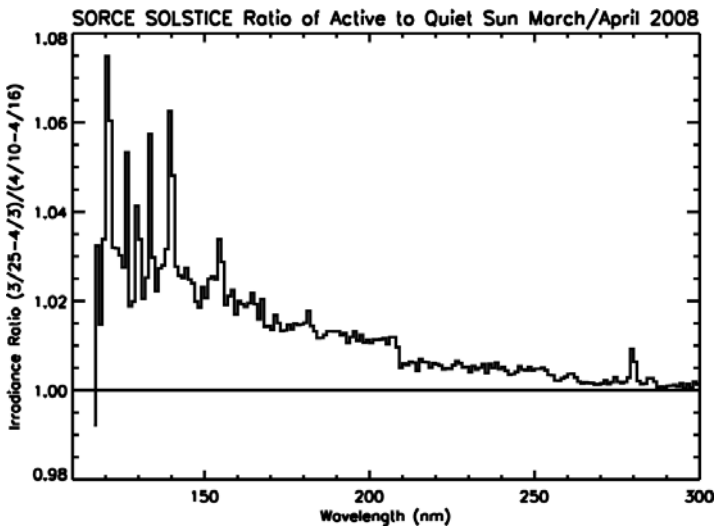


Figure 3. SORCE SOLSTICE: Ratio of March 25 through April 4 (active Sun) to April 10-16 (quiet Sun).

The effort to produce this reference spectrum represents the starting point for the LASP team’s contribution to the WHI session at the 2008 Fall AGU meeting. In the intervening months, we plan on refining this spectrum through intercomparison activities, further investigations in solar