



### ***SORCE Data Products Update –***

The SORCE scientific data products have been available to the public for one year. Each month, not only has the quantity of data increased, but the SORCE data quality has improved greatly. Previous and current measurements are continuously refined through instrument calibration and data processing efforts. For each new version of the SORCE data products, the entire data set is typically re-processed.

SORCE data products are available for public download from the Goddard Earth Sciences DAAC. For more information about data availability from the DAAC, reading the SORCE HDF data files, and data quality, please visit the SORCE data product web page: [http://lasp.colorado.edu/sorce/data\\_access.html](http://lasp.colorado.edu/sorce/data_access.html). Following is a status overview of the data processing for each individual instrument.

### **Total Solar Irradiance Data**

The **TIM** instrument measures the Total Solar Irradiance (TSI), monitoring changes in incident sunlight to the Earth's atmosphere. There are two Level 3 TSI data products produced – one containing daily-mean irradiances and the other containing four 6-hourly mean irradiances. Updates to Level 3 TSI data occur monthly in order to reduce repeated delivery of data.



Some on-orbit instrument characterization continues and a few minor corrections are under development. Version 2 data have recently been released and are now available to the public. Due to a small nonlinearity effect in the applied instrument power, present TIM TSI data may exhibit an annual variation on the order of 0.2 W/m<sup>2</sup> (150 ppm) in phase with the Sun-Earth distance. Present data are suitable for detecting changes of TSI not requiring relative accuracy less than 0.2 W/m<sup>2</sup> (150 ppm) within any one year. However, long-term relative uncertainties are estimated to be less than 0.014 W/m<sup>2</sup>/yr (10 ppm/yr). Present absolute accuracy is approximately 0.4 W/m<sup>2</sup> (300 ppm), although there remains an unresolved difference between TIM and other radiometers.

### **Solar Spectral Irradiance Data**

The SORCE **SOLSTICE**, **SIM**, and **XPS** instruments together provide measurements of the Solar

Spectral Irradiance (SSI) from 1 nm to 2000 nm, excluding 34-115 nm. Measurements are combined into merged daily and 6-hourly spectra, with irradiances reported on a standard wavelength scale, with 1-33 nm varying spectral resolution. Level 3 spectral data products result in two data files per mission day. Data files are written in HDF5 format, and the size of each file remains constant at approximately 150KB. SORCE spectral solar irradiance data are available at the GES DAAC from February 25, 2003 through April 29, 2004. Data from each instrument possess a unique version number, and are collectively incorporated into the version 2 SORCE SSI products at the DAAC.

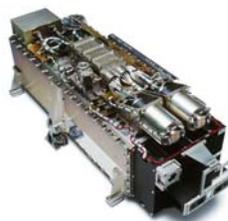
### **SOLSTICE**

A full-mission re-processing of SOLSTICE Level 2 and Level 3 data was completed and released (version 4) to the DAAC this month. Analysis of the Level 3 solar data suggests that on-orbit instrument degradation is less than 5% during the first 400 mission days. The Level 3 data recently released have been re-processed without a degradation correction, as degradation characterization is still in progress. Present data are suitable for detecting relative irradiance changes over short periods of time (~1-2 solar rotations {27-54 days}), but not for long-term studies.



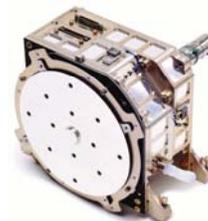
### **SIM**

A full-mission re-processing of SIM Level 3 data (version 3) was also recently released to the DAAC. On-orbit instrument characterization is still in progress. Present absolute accuracy is approximately 2%, and relative precision is ~0.2%. Software and instrument calibration improvements are underway that will significantly improve the quality of these data.



### **XPS**

Nominal data processing activities are routinely producing Level 3 (version 5) data. These data are of good quality and are appropriate for research and/or publication.





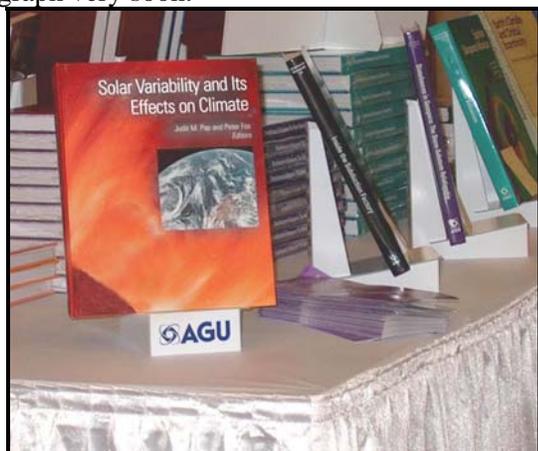
Montréal's Square Victoria with fountains in the background. Photo courtesy of Marty Snow, LASP.

## ***SORCE Team Participates at AGU Spring Meeting –***

The AGU Spring Meeting was held in Montreal, Canada, May 17-21. In addition to Gary Rottman being honored by becoming an AGU Fellow, the SORCE team was present to share the current SORCE measurements.

The 2004 Fellows were recognized at a special AGU Honors Program on Wednesday evening, May 19<sup>th</sup>, which was followed by a celebratory reception. Less than 0.1% of the AGU membership receive this honor in any given year, and AGU requires that Fellows have attained acknowledged eminence in the geophysical sciences.

The Meeting was also an opportunity for AGU to present its most recent Monograph Series publication, *Solar Variability and Its Effects on Earth's Atmosphere and Climate System*. With co-authors Linton Floyd (Interferometrics, Chantilly, VA) and Rodney Viereck (Space Environment Center, NOAA, Boulder, CO), Gary Rottman contributed a chapter called "Measurement of the Solar Ultraviolet Irradiance". SORCE Project Scientist, Tom Woods also has a chapter in this book – "Solar Extreme Ultraviolet and X-ray Irradiance Variations". AGU's weekly publication, *EOS*, will be publishing a Book Review on the Monograph very soon.



AGU introduces *Solar Variability and Its Effects on Climate* at their bookstore exhibit in Montréal.

Representing SORCE, Gary was an invited speaker in a session called "Violent Sun-Earth Connection Events of October-November 2003: Genesis", where he presented *Irradiance Observations of the October 28, 2003 X-17 Flare*. Marty Snow from LASP also had a SORCE poster presentation in the same session called, *Solar Flares in the UV from SORCE SOLSTICE*.

## ***SORCE Fun Facts***

On April 21<sup>st</sup>, the SORCE MU (microprocessor unit, the computer responsible for instrument command and data handling) achieved 365 consecutive days of uninterrupted nominal operations. "I think the MU hardware and software performance has met or exceeded all expectations," said David Gathright, LASP Flight Software Engineer. David has worked on the SORCE mission since May of 2000. In addition to his role as part of the instrument software development team, David served as LASP's on-site representative for spacecraft integration and test at Orbital Sciences Corporation and served in the same role during launch vehicle integration at Kennedy Space Center. Below David provides some interesting MU SORCE statistics as of April 21<sup>st</sup> :

- Total Powered Time: 10728 hours
- Commands Processed: 77387138
- Total Telemetry: 20037830215 bytes (19109 MB, or 18.66 GB)
- Software Patches: 2
- Total MU Resets: 2 (both due to Read 0's, solved by 1<sup>st</sup> post-launch patch)
- Last MU Reset: March 3, 2003 (for the SPaM patch)

Ken Griest, LASP Planning and Scheduling software engineer, has additional fun facts to share, current as of May 6. The difference between 'maneuvers' and 'activities' mentioned below is that maneuvers include the spacecraft commands only (pointing, attitude change, etc.), whereas activities include any set of commands directing either the spacecraft and/or the instruments.

- Number of maneuvers planned since launch: 51,527
- Number of maneuvers that resulted in contingency: 4 (or 0.008%)
- Percentage of successful maneuvers since launch: 99.992%
- Number of activities planned since launch: 372,148
- Average number of activities planned per day: ~800

Overall, the SORCE spacecraft is in great shape and is performing very well. Data are collected twice daily on the spacecraft housekeeping, instrument module housekeeping, and the SORCE science measurements.

On a weekly basis the instrument scientists, data processing, mission and science operations, and planning personnel meet to discuss the current status. The weekly status reports are available on the *SORCE* website at -- [http://lasp.colorado.edu/sorce/weekly\\_status.html](http://lasp.colorado.edu/sorce/weekly_status.html).

## ***SORCE Scientists to Attend AAS / Solar Physics Division Meeting –***

The 204<sup>th</sup> meeting of the American Astronomical Society will be held in Denver, Colorado, May 30-June 3, 2004. TIM scientist, Greg Kopp, will be presenting a poster titled ***Total Solar Irradiance Observations of the Oct./Nov. 2003 Solar Flares*** in the session “When the Sun Went Wild”. Greg is also co-authoring another poster in the same session, called ***Remarkable Low Temperature Emission of the 4 November 2003 Limb Flare***. Jerry Harder, SIM scientist, will be discussing the SIM instrument measurements in his poster, ***Solar Irradiance Variations in the Visible and Infrared: Comparison of the SORCE SIM instrument to the RISE model***.

## ***2004 SORCE Science Meeting – Registration Materials Coming Soon***

The 2004 *SORCE* Science Meeting – ***Decadal Variability in the Sun and Climate*** – is set for October 27-29 in Meredith, New Hampshire. Meredith is a small town on the west side of Lake Winnepesaukee, which is in the heart of New Hampshire’s lakes region.

This *SORCE* Science Meeting seeks new understanding of the evidence for and mechanisms involved in decadal variability in the Sun and climate. We hope to relate current understanding of the solar variability with climate effects and potential climate response mechanisms. The agenda will consist of both invited and contributed oral presentations and posters. Sessions include:

- Decadal variability in the atmosphere and coupling to climate
- Decadal variability in the oceans as climate drivers
- Tropical climate variability modes (ENSO)
- High latitude climate variability modes (NAO/AO, PDO)
- Non-linear/stochastic climate response processes
- Mechanisms and modes of decadal solar variability

A science dinner is planned for Thursday, October 28. Besides an excellent guest speaker, as a special bonus the dinner happens to occur on the same evening of a total lunar eclipse, which peaks in the early evening! Depend-

ing on the weather, viewing from the deck of the *Gunstock Ski Lodge* could be spectacular!

The science program organizing committee members are Mark Baldwin from NorthWest Research Associates, Inc., Bellevue, Washington; Greg Kopp from LASP, University of Colorado; and Judith Lean from Naval Research Laboratory, Washington, DC.

Speaker information, abstract and registration forms, and logistical details will be available by the end of June. An e-mail notification will go out to our *SORCE* mailing list with a summary and the updated web address. Please put the *SORCE* meeting dates on your calendar now – October 27-29. For meeting updates, please visit our website: <http://lasp.colorado.edu/sorce/2004ScienceMeeting.html>.



Church Landing is a new facility at The Inns at Mill Falls, where the next *SORCE* Science Meeting will be held. The Inn’s website is <http://www.millfalls.com/>.

**54,764**  
**Hits to the SORCE Website**  
*(Since 4/21/03, As of 5/24/04)*

***Upcoming Meetings / Talks –***  
*SORCE* scientists plan to present papers or attend the following 2004 meetings:

- AAS / Solar Physics Division, May 30-June 3, Denver, Colorado
- COSPAR Meeting, July 18-25, Paris, France
- SORCE* Science Meeting, October 27-29, Meredith, New Hampshire
- AGU Fall Meeting, Dec. 13-17, San Francisco, California

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