



Mission Update –

Science is the word of the day. Operating in normal mode, SORCE instruments are making excellent daily solar observations, with nightly stellar observations for calibration. As the quality and quantity of solar data continues to expand, the scientists and engineers concentrate on verifying the instrument calibrations and data processing software. New experiment commands are up-loaded daily to the spacecraft. Data are being distributed to the science community through the Goddard Space Flight Center DAAC. For additional information on obtaining SORCE data from the DAAC and reading the SORCE HDF data files, see [data_access.html](#).



SORCE Science Meeting December 4-6, Sonoma, California –

The next SORCE Science Meeting – Physical Processes Linking Solar Radiation and Solar Variability with Global Climate Change – is set for December 4-6, 2003 in Sonoma, California. This meeting will be the first science meeting since the January 25th launch. The SORCE meeting dates have been selected to accommodate people wanting to attend the AGU meeting, which is the following week in San Francisco. We encourage your attendance and hope that you will share this announcement with colleagues.

The scientific organizing committee members are Judith Lean from NRL, Peter Pilewskie from NASA Ames Research Center, and Doug Rabin from NASA Goddard Space Flight Center. The meeting will be devoted to our understanding of the physical processes that connect the Sun's radiation and its variability to our terrestrial environment, including the processes involved with climate and ozone response to solar radiative forcing and the



mechanisms that cause solar activity and radiation variations. The agenda will consist of both invited and contributed oral presentations and posters. The featured speaker at the Science Meeting Dinner on Thursday evening, Dec. 4, will be Dr. John Eddy, who will speak about "Tales of the Sun and Climate".

The following topics will be covered during the meeting in the Scientific Sessions planned:

- Solar Radiation – Status of Current Measurements
- Climate Change Processes Involving Solar Radiation in the Troposphere
- Global Change Processes Involving Solar Radiation in the Stratosphere
- Processes and Evidence for Long-Term Irradiance Variations
- Future Directions in Sun-Climate Research

Please refer to the meeting website for the complete meeting announcement, with additional information on the agenda, Call for Papers, registration forms, and travel and lodging information – [Dec03ScienceMeeting.html](#). The website will be updated regularly with the latest science program additions.



A Closer Look: The TIM Instrument –

The Total Irradiance Monitor (TIM) measures the solar radiant power density incident at the top of the Earth's atmosphere, continuing a 25-year record of such measurements from several spaceborne instruments. The total solar irradiance (TSI) measurements show solar variability due to activity on the Sun (Figure 1) and provide important information about the primary external driver of the Earth's climate. The TIM reports four TSI measurements per day, with data currently available through NASA Goddard's DAAC website at [daac.gsfc.nasa.gov/upperatm/sorce/](#) and through the SORCE website at [tsi_data.html](#).

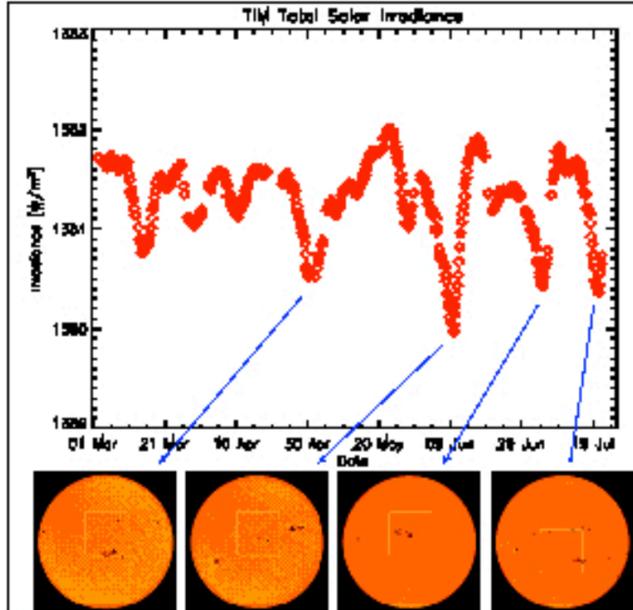


Figure 1: The Sun's output varies with solar activity, as this plot of TIM data correlated with images of the solar disk shows. Dark sunspots decrease the Sun's irradiance, while associated magnetic activity increases it. (Solar disk images are courtesy of SOHO/MDI consortium.)

The SORCE was launched on January 25, 2003, and the TIM was powered on a few days thereafter. The TIM began acquiring solar data in early March, after a one-month period of spacecraft and instrument commissioning. The instrument is fully functional, with all detectors and mechanisms working properly. Regular solar observations with the TIM's primary electrical substitution radiometer (ESR) provide nearly continuous TSI measurements during the sunlit side of each SORCE orbit. Duty cycling the other three ESRs gives an intermittent relative comparison against the primary ESR for tracking degradation; so far, we see no change attributable to degradation, although these analyses continue. Ground

processing of the TIM data uses phase-sensitive detection, a first for a spaceborne TSI instrument, to convert the measured ESR power into solar irradiance while reducing sensitivity to noise and spurious thermal signals.



TIM is a radiometer that measures TSI with 0.01% absolute accuracy and a relative stability of 0.001% per year. Greg Kopp is the TIM instrument scientist at LASP responsible for data analyses and instrument calibration.

Initial intercomparisons between the four TIM ESRs were less consistent than expected. It was soon found through testing of an identical TIM instrument here in the lab that a small non-linearity correction needs to be applied. This was verified for the SORCE instrument on orbit, and now after making the correction based on the lab unit, the agreement between TIM channels is greatly improved with deviations of about 0.03%. Initial analyses of the TIM data yield TSI measurements about 0.3% lower than the other currently-operating instruments. This discrepancy indicates either higher uncertainties in the characterizations/calibrations of previous TSI measurements or a possible TIM calibration error; this discrepancy is the subject of much current TIM analysis.



Special Session at AGU Meeting –

A special session relevant to SORCE has been accepted for the AGU Fall Meeting in San Francisco, December 8-12. Falling under the Solar and Heliospheric