

**THE SCIENTIFIC COMMITTEE ON SOLAR-TERRESTRIAL PHYSICS (SCOSTEP)**  
**Annual Report (01/01/2006 – 12/31/2006)**  
**by Gang Lu**

PROGRAM OVERVIEW

The Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) was originally established in January 1966 by the 11th General Assembly of the International Council of Scientific Unions ([ICSU](#)) as the Inter-Union Commission on Solar-Terrestrial Physics (IUCSTP.) At its 16th General Assembly in September 1972, ICSU reorganized IUCSTP as a special committee with responsibility for interdisciplinary solar-terrestrial physics programs of finite duration. The designation SCOSTEP took effect in September 1973 after the ratification of a new Constitution by the ICSU Executive Board and General Committee. In September 1978, with the ratification of the Constitution by the 17th ICSU General Assembly, SCOSTEP became a Scientific Committee of ICSU charged with the long-term responsibility to promote international interdisciplinary programs in solar-terrestrial physics.

SCOSTEP facilitates cross-project cooperation, cross-disciplinary conferences, and multi-national research collaboration with the scientific goal of advancing quantitative understanding of coupling mechanisms responsible for the transfer of mass and energy throughout the solar-terrestrial system. The practical goal is to improve predictability of the effects of the variable components of solar energy and disturbance on the terrestrial environment. These disturbances range from interference with satellite and aircraft communications systems, to blackouts of electric power grids. SCOSTEP has a clear record of making contributions of significant intellectual merit. SCOSTEP has played a critical role in advancing discovery in the field of solar-terrestrial physics for nearly 3 decades, especially in its unique position regarding international collaboration, and it makes important efforts to integrate research and education in the field.

SCOSTEP organizes and conducts international solar-terrestrial physics (STP) programs of finite duration in cooperation with other ICSU bodies. The committee shares results of these programs by joining in conducting meetings, conferences, and workshops and by publishing newsletters, handbooks and special journal issues about solar-terrestrial physics programs. Past SCOSTEP programs included: International Magnetospheric Study (IMS: 1976-79); Solar Maximum Year (SMY: 1979-81); Middle Atmosphere Program (MAP: 1982-85); and Solar-Terrestrial Energy Program (STEP: 1990-97). Four Post-STEP programs were conducted during the period of 1998-2002. These programs were: STEP-Results, Applications, and Modeling Phase (SRAMP); International Solar Cycle Study (ISCS); Planetary Scale Mesopause Observing System (PSMOS); Equatorial Processes Including Coupling (EPIC). SCOSTEP currently sponsors the Climate And Weather of the Sun-Earth System ([CAWSES](#)) program. CAWSES is an international program established with an aim of significantly enhancing our understanding of the space environment and its impacts on life and society. The main functions of CAWSES are to help coordinate international activities in observations, modeling, and applications crucial to achieving this understanding, to involve scientists in both developed and developing countries, and to provide educational opportunities for students of all levels.

The governing body of SCOSTEP is the SCOSTEP Bureau. The Bureau comprises of SCOSTEP's President, the Vice President, the Scientific Secretary (ex. Officio), and the representatives of the ICSU [Participating Bodies such as Committee on Space Research \(Dr. Ryoichi Fujii\)](#), International Association of Geomagnetism and Aeronomy (Dr. Wolfgang Baumjohann), International Association of Meteorology and Atmospheric Sciences (Dr. Toshitaka Tsuda), International Astronomical Union (Dr. Natchimuthukonar Gopalswamy), International Union of Pure and Applied Physics (Dr. Sandra Chapman), Scientific Committee on Antarctic Research (Dr. Maurizio Candidi), and International Union of Radio Science (Dr. Christian Hanuise). The Bureau directs scientific, administrative, and financial activities. The Scientific Secretary administers the Secretariat, organizes meetings, and conducts the financial business of SCOSTEP under the direction of the Executive Officers and Bureau. The Bureau usually meets annually.

The SCOSTEP General Council provides oversight for SCOSTEP operations. The General Council presently consists of representatives from 30 subscribing Adherents, and is chaired by SCOSTEP's President. The Council meets every two years to review the scientific, financial and administrative activities of SCOSTEP and, if necessary, refer matters to the Bureau for further consideration. Thirty-seven scientists from 20 countries currently serve as Scientific Discipline Representatives to provide advice to SCOSTEP about scientific programs and act as critical links between national and regional activities in their fields and SCOSTEP international scientific programs. They lead within SCOSTEP and through other ICSU bodies to propose new programs and participate in the Steering Committees and projects of ongoing programs. There are also representatives of three World Data Centers for STP and two Affiliates from International Ursigram and World Days Service (IUWDS) and World Meteorological Organization (WMO). Eleven correspondent countries are recognized by SCOSTEP, and they participate in Council discussions but are not voting members. Further, SCOSTEP reports its accomplishments annually to the ICSU Executive and participates by request in activities at ICSU Headquarters and at meetings of other ICSU bodies.

Funding for SCOSTEP activities comes mainly from the annual National Adherent subscriptions, and is supplemented by special grants and services provided by host organizations. SCOSTEP seeks opportunities for interaction with national and international programs involving STP elements. It provides guidance to the STP discipline centers of ICSU's World Data Center system. It attempts to develop and sustain student interest in Sun-Earth Connections, to promote efficient exchange of data and information between STP scientists in all countries, and to seek projects and programs that cross over traditional boundaries of physical regions and focused scientific disciplines.

Some 400 scientists are directly involved in SCOSTEP programs, and about 4,000 are on the mailing list to receive SCOSTEP publications such as newsletters and technical reports. The updated core membership directory is available at <http://www.scostep.ucar.edu>. This web page also provides links to the SCOSTEP sponsored programs (e. g., CAWSES and some previous programs) and related groups.

## 2006 ACTIVITIES

### Scientific Meetings and Workshops:

- STP-11:

SCOSTEP held its 11<sup>th</sup> Quadrennial Solar Terrestrial Physics Symposium (STP-11) in Rio de Janeiro on MARCH 6-10, 2006. The conference was attended by 135 participants from 26 countries in South and North America, East and West Europe, Asia, Australia, and Africa. The sessions of STP-11 were organized in accordance to the CAWSES science Themes. There were five hour-long keynote presentations that addressed the main research topics central to the CAWSES program, and these presentations are available online at the SCOSTEP [website](#). Other invited and contributed presentations given at the conference covered a wide range of research areas in the Sun-Earth system, from solar variability, magnetospheric and ionospheric disturbances, to the coupling processes in the middle and upper atmosphere. More than 170 scientific papers were presented at the conference in either oral or poster format, showing great advances in understanding the complex Sun-Earth system. Additional information on the STP-11 conference is available through CAWSES News (Volume 3, Number 1, March 2006) and online at <http://www.bu.edu/cawses>.

- Advanced School on Space Weather

The Space Weather School was held on May 2-19, 2006, Trieste, Italy, and was co-directed by Profs. Jeff Forbes and Mauro Messerotti. A total of 29 lecturers gave tutorials on basics physics concerning the Sun-Earth system. The school was attended by 54 international students, including 5 from Africa, 13 from Asia, 11 from South America, and 11 from East Europe.

- Ice Layer Workshop

The Ice Layer Workshop was held from May 14-17, 2006 in Kuhlungsborn, Germany. A total of 60 scientists attended the workshop convened by Prof. Franz Josef Luebken. Recent development in ice layer related observations from both ground and space were presented, and results from modern models and interpretations regarding ice particle properties and their long-term variations associated with solar cycle were also discussed. In addition, a number of dedicated working groups were formed to discuss specific topics concerning ice particles. See CAWSES News (Volume 3, Number 2, September 2006) for more information.

- Tidal Campaign Workshop

The first Tidal Campaign Workshop was held in Beijing on July 21, 2006, and it was organized by Prof. William Ward. The workshop provided an overview of the complexity of atmospheric tides and waves based on various ground and space based observations. Participants also discussed opportunities for future campaigns. See CAWSES News (Volume 3, Number 2, September 2006) for more information.

- Workshop on Long Term Changes and Trends in the Atmosphere

This workshop was organized by Prof. Jan Lastovicka and was held in Sodankyla, Finland on September 4-7, 2006. The workshop was attended by 40 scientists from four continents. There were three topical discussions concerning the key unresolved

problems related to long-term changes and trends in atmosphere: (1) trends in dynamics, (2) trends in water-related phenomena, and (3) trends in the ionospheric  $F_2$  region.

- International School on Atmospheric Radar

International School on Atmospheric Radar (ISAR-NCU) was held at the National Central University in Taiwan on October 9-27, 2006. The school selected 23 students from a pool of 80 applicants, and the selected were from India, Indonesia, Brazil, US, and Taiwan. The school offered lectures on ionospheric and atmospheric physics as well as technical and scientific aspects of atmospheric radar, and those lectures were specifically designed to help young student and researchers to get acquainted to these fields. The participating students received financial support for travel and accommodation provided by the National Central University as well as by the SCOSTEP

- CAWSES International Workshop on Space Weather Modeling

Held on November 14-17, 2006, in Japan, this CAWSES workshop was co-chaired by Drs. Kazunari Shibata and Kanya Kusano, and was participated by more than 100 researchers and students. The workshop brought together modelers and observers to discuss recent progress and scientific challenges in space weather modeling on the four focused research topics: (1) the Sun and solar corona, (2) the heliosphere and solar wind, (3) the magnetosphere and ionosphere, and (4) novel numerical modeling techniques.

- 11<sup>th</sup> International Workshop on Technical and Scientific Aspect of MS Radar (MST-11)

The International workshop on MS radar was held in Gadanki, India, on December 11-15, 2006. The workshop provided a forum for both experts and students from all over the world to discuss research and development of radar techniques to study the mesosphere, stratosphere, troposphere, and the coupling to the ionosphere.

- Sun-Earth Connection Virtual Conference

The first Sun-Earth Connection Virtual Conference was cosponsored by SCOSTEP/CAWSES, which took place on November 13-17, 2006, with a central website located at <http://workshops.jhuapl.edu/s1/index.html>. This was the first ever virtual conference concerning the STP sciences, and was hugely successful by all counts. The conference had 268 registered participants worldwide, 87 abstracts and 35 information resources were loaded in the data commons area, and the website received a total of 118,000 hits. A summary report of the virtual conference is available at the above website. The main organizer of the virtual conference was Dr. Janet Kozyra.

#### Bureau and General Council Meetings:

The SCOSTEP Bureau members met on March 5, 2006 in Rio de Janeiro, prior to the 11<sup>th</sup> SCOSTEP Quadrennial Symposium. The Bureau approved the changes in CAWSES leadership, and also confirmed the appointment of Dr. Gang Lu as the new SCOSTEP Scientific Secretary to

replace Joe H. Allen, who retired from that position after a long and distinguished service to SCOSTEP. The Bureau also approved the relocation of the SCOSTEP Secretariat Office to the new location at the National Center for Atmospheric Research (NCAR). The relocation was kindly offered by NCAR's Director, Dr. Tim Killeen. The SCOSTEP General Council meeting was held on March 11 to discuss the Bureau actions as well as concerns expressed by National Adherent Representatives. The Bureau held an additional one-half day closing meeting on March 12 to consider actions arising from the Council meeting on the previous day. Following are several action items resulted from the bureau meetings:

1. Changes in CAWSES leadership

Dr. Sunanda Basu expressed her desire to step down as the chair of the CAWSES Science Steering Group (SSG). Dr. Susan Avery accepted the Bureau's nomination to be the new program leader. Dr. Avery assumed this leadership role on August 1, 2006. As recommended by the Bureau, the SSG members are dismissed while a new CAWSES Phase-II Planning Committee which consists of Marvin Geller, Brigitte Schmieder, Lev Zelenyi, Chi Wang, and Susan Avery is being formed.

The Bureau expressed its deepest appreciation to Dr. Basu for her extraordinary leadership and broad scientific vision in establishing the CAWSES program. In order to honor Dr. Basu's invaluable contribution to the CAWSES program, SCOSTEP presented her with an official certificate signed by the SCOSTEP President and Vice President under the recommendation by the Bureau.

2. SCOSTEP Sponsorship on Workshops/Symposia, and Other International Programs

2a. SCOSTEP continues its role in promoting international solar-terrestrial research activities, and it has issued official sponsorship on the following workshops and symposia:

- The Ice Layer Workshop held on March 15-17, 2006, in Kuhlungsborn, Germany
- The CAWSES Tidal Workshop held in Beijing in July 2006
- the workshop on Long Term Changes and Trends in the Atmosphere held in Sodankyla, Finland on September 4-7, 2006
- The 11<sup>th</sup> International Workshop on MS Radar (MST-11) held on December 11-15, 2006 in Gadanki, India
- The International School on Atmospheric Radar to be held at the National Central University in Taiwan, in January 2007
- The Coupling Processes in the Equatorial Atmosphere (CPEA) Symposium to be held in Kyoto, Japan, in March 2007
- The International CAWSES Symposium to be held in Kyoto, Japan, in October 2007

2b. SCOSTEP also expressed its strong support of several international programs:

- Letters were sent to William Liu of Canadian Space Agency to indicate that SCOSTEP is willing and interested in collaborating with the International Living With a Star (ILWS) program on matters related to ground-based data management and services. To facilitate such a collaboration, SCOSTEP has appointed an ad-hoc committee, which consists of Christian Hanuise, Maurizio Candidi, and Janet Kozyra, to provide ILWS with scientific advice regarding data management issues.

David Sibeck (representing ILWS) and Gang Lu (representing SCOSTEP) are the designated contact points.

- Letters of Support were sent to the Electronic Geophysical Year (eGY) and the International Heliophysical Year (IHY) to show its strong endorsement to both programs
- A letter was sent to the Russian Academy of Science in support of the proposals to extend the Super Dual Auroral Radar Network (SuperDARN) by building and deploying High Frequency (HF) radars in Siberia.

Minutes of the SCOSTEP Bureau and General Council meetings are available online at <http://www.scostep.ucar.edu>. The next SCOSTEP Bureau and General Council meetings will take place in July 2007 in conjunction with the XXIV IUGG General Assembly in Perugia, Italy.

#### Education/training activities:

In 2006 SCOSTEP provided funds to support student participation in several SCOSTEP sponsored meetings, workshops, and special schools. In particular, some 27 students (mostly from Brazil) attended STP-11 with all expenses paid by funds obtained by the local organization committee. SCOSTEP financially supported International School on Space Weather and the International Workshop on MST radar. Courses offered at these schools were specifically tailored to train students and young scientists, and easily accessible for those from developing nations.

Another important education and public outreach activity that SCOSTEP has carried out during the past 2 years is the publication and distribution of four comic books. The four comic books are entitled: "What is the Solar Wind?", "What is the Ozone Hole?", "What are the Cosmic Rays?", and "What is Global Warming?" These subjects are representative of the SCOSTEP scientific topics, and the books are designed specifically for K-12 education. The publication of comic books results from the collaboration between Japan (more specifically, Prof. Yohsuke Kamide at Nagoya University) and the SCOSTEP Office, and is mostly paid by funds provided by Japan. However, so far SCOSTEP contributed \$4,200 in 2005 and \$2,500 in 2006 toward the print and delivery costs for these books. These books are being distributed at major national and international conferences during past 2 years. We plan to continue the distribution of the comic books, and will make additional prints if needed. Below is a recent email message we received from one of the comic book receipts:

Date: Sat, 2 Dec 2006 16:21:39 -0500 (EST)  
From: Eileen Hofmann <hofmann@palmer.ccpo.odu.edu>  
Reply-To: Eileen Hofmann <hofmann@palmer.ccpo.odu.edu>  
Subject: thanks for the children's comic books  
To: louise@ucar.edu  
Cc: hofmann@palmer.ccpo.odu.edu  
X-Mailer: dtmail 1.3.0 @(#)CDE Version 1.6 SunOS 5.10 sun4u sparcc  
X-Virus-Scanned: amavisd-new at ucar.edu

Dear Louise,

Many thanks for the copies of the children's comic books on global warming, the solar wind, etc that you provided last week when I was attending the GLOBEC meeting at Center Green. My son's teacher was very pleased to get them and she is going to use them as part of her 4th grade science instruction.

I do appreciate you making the comic books available.

Eileen Hofmann  
Center for Coastal Physical Oceanography  
Crittenton Hall  
Old Dominion University  
Norfolk, VA 23529  
phone: 757-683-5334  
fax: 757-683-5550  
internet: hofmann@ccpo.odu.edu

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Note: Loiuise Beierle is an administrative staff at NCAR who helped distribute the comic books to the GLOBE workshop participants. GLOBE is an international education and outreach program that reaches to over a million primary and secondary students in more than 14,000 schools worldwide.

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### Publications:

Loss of support in 2002 for printing newsletters forced SCOSTEP to rely more on electronic dissemination to its participants. SCOSTEP now distributes its programs and current STP events through electronic newsletters and on Internet. Minutes from official meetings, national reports, and other related information are made available on SCOSTEP [website](#).

SCOSTEP publishes educational materials such as those comic books mentioned above. Other SCOSTEP publication includes "Auroral Phenomena and Solar-Terrestrial Relations", a CAWSES handbook of conference proceedings published in 2004.

### FUTURE PLANS

SCOSTEP is charged with the long-term responsibility to promote international interdisciplinary programs in solar-terrestrial physics. SCOSTEP will continue to work within the ICSU framework to encourage cross-disciplinary conferences and to facilitate cross-project cooperation and multi-national research collaboration. SCOSTEP will continue conducting programs with the scientific goal of advancing quantitative understanding of coupling mechanisms responsible for the transfer of mass and energy throughout the solar-terrestrial system. The practical goal is to improve predictability of the effects of the variable components of solar energy and disturbance on the terrestrial environment. These disturbances range from interference with satellite and aircraft communications systems, to blackouts of electric power grids.

The CAWSES program is now in the penultimate year of its original 5-year plan (2004-2008). During the past 3 years, CAWSES has truly become an international program. It has established regional offices in Brazil, France, Germany, India, Japan, and Taiwan, and involved scientists from 19 countries. It holds its own regular scientific workshops as well as special sessions in conjunction with other national and international conferences. At the last Bureau meeting in March 2006, the Bureau strongly endorsed the extension of the CAWSES program for the period of 2008-2012. A CAWSES Phase-II Planning Committee has been formed to draft a new roadmap for CAWSES during its extended mission on international scientific cooperation.