

NEWSLETTER

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1. Editorial - The President at the United Nations - COPUOS

At its 644th meeting, the UN COPUOS (United Nations Committee on the Peaceful Uses of Outer Space) invited, at their request, the observers for the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP), President Dr. Natchimuthuk Gopalswamy and Scientific Secretary, Prof. Marianna Shepherd, to attend its 55th session and to address it, as appropriate, on the understanding that it would be without prejudice to further requests of that nature and that it would not involve any decision of the Committee concerning status. The 55th session of UN COPUOS was held in Vienna, Austria from June 6th to June 15th, 2012. This invitation followed SCOSTEP's application to UN Office for Outer Space Affairs (OOSA) in October 2011 for becoming an Observer to UN COPUOS and its Subcommittees.

In his address to the Committee on June 7, 2012 Dr. N. Gopalswamy pointed out that SCOSTEP provides guidance to the Solar-Terrestrial Physics (STP) discipline centers of ICSU's World Data System and seeks opportunities for interaction with national and international programs involving STP elements. It attempts to develop and sustain student interest in Sun-Earth connections, to promote efficient exchange of data and information between solar and terrestrial scientists in all countries, and to seek projects and programs that cross over traditional boundaries of physical regions and focused scientific disciplines. Thus SCOSTEP objectives are in accord with the United Nations Committee on the Peaceful Uses of Outer Space mission and we would like to develop a stronger relationship, participate in United Nations

activities and implement UN OOSA principles and goals into SCOSTEP's mission. This is particularly relevant in view of the fact that at the 49th session of the Scientific and Technical Subcommittee of COPUOS, the Working Group on the Long-term Sustainability of Outer Space Activities established an expert group on Space Weather. SCOSTEP is striving to clarify the science behind the Space Weather phenomenon and hence it is highly beneficial to have a closer relationship between COPUOS and SCOSTEP. Granting SCOSTEP a permanent observer status with COPUOS will provide an opportunity for a close collaboration in Space Weather issues.



Figure 1: *The Vienna International Center – UN COPUOS Headquarters*

The SCOSTEP President's address to the Committee was followed by a technical presentation on SCOSTEP's activities, given by the Scientific Secretary, Prof. Marianna Shepherd, on June 12, 2012.

Both these presentations at the 55th session of UN COPUOS can be found at

http://www.yorku.ca/scostep/?page_id=46.

COPUOS decided to recommend the granting of SCOSTEP's observer status. The General Assembly (GA), in its resolution on international cooperation in the peaceful uses of outer space, is to endorse the decision of the Committee to grant permanent observer status to SCOSTEP. The final deliberation on

the matter will be at the GA plenary session in December 2012.

2. CAWSES News

2.1 Appointment of New CAWSES TG Leaders

The SCOSTEP/CAWSES II (Climate and Weather of the Sun-Earth System) program which began in 2009 as a continuation of the original CAWSES (2004 – 2008) is about a year away from its completion. It has been dedicated to addressing fundamental questions of how the coupled sun-Earth system operates on timescales of minutes to millennia while encompassing a coordinated inter-disciplinary international effort organized into four theme groups, namely:

- 1) **TG1:** What are the solar influences on the Earth's climate? (TG Leaders: *Katja Matthes, Annika Seppälä*), (2009-2011: *Joanna Haigh, Ilya Usoskin*);
- 2) **TG2:** How will geospace respond to an altered climate? (TG Leaders: *Dan Marsh, Jan Lastovička*)
- 3) **TG3:** How does short-term solar variability affect the geospace environment? (TG Leaders: *Kazunary Shibata, Joe Borovsky*)
- 4) **TG4:** What is the geospace response to variable inputs from the lower atmosphere? (TG Leaders: *Jens Oberheide, Kazuo Shiokawa*)

In order to strengthen the activity of these four theme groups the CAWSES Co-chairs, Dr. Joseph Davila and Prof. Toshitaka Tsuda have appointed the following additional TG leaders:

- 1) **TG1:** Prof. Cora Randall, University of Colorado, Department of Atmospheric and Oceanic Sciences, Boulder, Colorado. (US)
- 2) **TG2:** Prof. Gufran Beig, *Indian Institute of Tropical Meteorology, Pune* (India)
- 3) **TG3:** Prof. Yihua Yan, Key Laboratory of Solar Activity, National Astronomical Observatories, Chinese Academy of Sciences, (China)
- 4) **TG4:** Prof. S. Gurubaran, Equatorial Geophysical Research Laboratory, Indian Institute of Geomagnetism, Tirunelveli (India)

2.2 CAWSES TG₃ – ISEST Program

The International Study for Earth-Affecting Solar Transients (ISEST) program is newly created within the frame of CAWSES Task Group 3. It has a focused objective of improving the scientific understanding of the origin and propagation of solar transients, and developing the prediction capacity of these transients' arrival and potential impact on the Earth. The program will be an international effort including observations from space and ground, data analysis and modeling, and transition from science to prediction operation. The success of the program will help alleviate the adverse space weather effects on technological systems and the society.

The ISEST program will address the following scientific tasks. (1) Create a comprehensive database of a significant number of Earth-affecting solar and heliospheric transient events, encompassing the rising phase and maximum phase of solar cycle 24. (2) Characterize and quantify the kinematic and morphological properties of solar and heliospheric transients. (3) Develop advanced theoretical models of the propagation and evolution of heliospheric transients. These models will be able to explain specific events observed. (4) Develop advanced 3-D numerical models of prediction of ICME arrival and the expected strength of space weather impact. Numerical models should be well constrained by observations, effectively tested and validated. (5) Prediction tool development. The ultimate goal is to develop a reliable and accurate prediction model of solar and heliospheric transients, which can be used for operational purpose. (6) Public outreach and education.

ISEST SOC members: Jie Zhang (Chair, USA), Bojan Vršnak (Co-Chair, Croatia), Ayumi Asai (Japan), Peter Gallagher (Ireland), Alejandro Lara (Mexico), Noé Lugaz (USA), Christian Mostl (Austria), Alexis Rouillard (France), Nandita Srivastava (India), Yuri Yermolaev (Russia), Yu-Ming Wang (China), David Webb (USA)

3. Reports on Meetings

3.1 *Second CAWSES II, Task 2 Workshop: Modeling Polar Mesospheric Cloud Trends Laboratory for Atmospheric and Space Physics, University of Colorado, May 3-4, 2012.*

This was the 7th workshop sponsored by IAGA/ICMA/CAWSES and focused on global change in the upper mesosphere, specifically decadal-scale trends in Polar Mesospheric Clouds, PMC (or Noctilucent Clouds, NLC, as they are traditionally called when observed from the ground at twilight).

The issue of long-term changes in PMC was addressed in the first workshop in Boulder, Colorado, 10-11 December, 2009.

Thirty-five scientists and students from six countries attended the workshop at LASP, which occupied two full days of talks and discussions. The total number of papers was twenty six. There was a final wrap-up with a panel discussion, consisting of six scientists, both modelers and observers. The agenda is given as an appendix.



Figure 2: Group Photo of the participants in the Second CAWSES II, Task 2 Workshop.

We are arranging to place all presentations on a secure web page, which is being handled free of charge by LASP. Access to this webpage can be made through our WIKI, with a password provided by the committee, upon request. Both the slides themselves (PDF files) and the audio presentations (mp3 files) are made available. The user can download pairs of files of their choice, and follow along the audio portion while perusing the slides. This will facilitate understanding

of the slides, which by themselves are of little use even to those in the field. Both, the presentations and the questions, answers and discussion are included in the audio files. We have also recorded the panel discussion, which provides an overall view of the scientific results, and opinions of the panel on the outstanding questions. The availability of these files will be advertised to the community in the near future.

Attending, but not giving presentations were Drs Kim Nielsen (Computational Physics, Inc.), Jeremy Winick (retired, AFCRL), David Rusch (NASA HQ, USA), Joe McInerny and Anne Smith (both from NCAR), and Ruth Liebermann (GATS, Inc.).

In an appendix, we attach the scientific highlights of the workshop, which will be provided to Dr. Lastovička for his COSPAR report.

We plan to submit a meeting report for publication in EOS, the trade journal of the American Geophysical Union. We thank SCOSTEP and CAWSES for their financial support.

http://www.cawses.org/wiki/index.php/Project_3_PMC/NLC_altitude_frequency_and_brightness_changes_related_to_changes_in_dynamics_and_chemical_composition

(Reported by Gary Thomas and Uwe Berger)

3.2 *Whole Atmosphere Wave Coupling and Interaction Processes (C22), 39th COSPAR, Mysore, India*

This well attended symposium brought together over 80 researchers from 13 countries to focus on new measurements, modeling and theoretical studies of dynamical, electrodynamic and chemical coupling processes throughout the neutral and ionized atmosphere, emphasizing planetary waves, gravity waves and tides. It was also an open forum supporting CAWSES-II/TG4 and other coordinated project activities. The meeting comprised six half-day oral and one poster session and took place over four days with 16 solicited presentations, 39 contributed talks and 21 poster papers. Presentations, including solicited talks, were about equally divided between junior (PhD students, postdocs), middle and senior level scientists, proving that atmospheric wave phenomena and their coupling is a lively field. Solicited speakers were given 30 minutes with 15 minutes for contributed papers. Unfortunately, three colleagues were prevented from attending the

symposium due to visa issues. Three more talks were withdrawn on short notice. However, all presentations were replaced by volunteers from the organizing committee or by upgrading poster presentations.

The five main topics covered in C22 were: (i) Global structure, variability and sources of GW, PW and tides; (ii) Secondary wave generation, propagation and their effects on the neutral and ionized atmosphere; (iii) Neutral-ionosphere coupling processes; (iv) Ionosphere-Thermosphere-Mesosphere response to lower and middle atmosphere variability; (v) Polar dynamics and coupling to lower latitudes. Half-day sessions were organized according to the physical problem, to allow for different views from the neutral and ionized atmosphere communities and to bring lower, middle, and upper atmosphere scientists closer together.



Figure 3: The venue of the 39th COSPAR Scientific Assembly, Infosys Campus, Mysore, India

The first half-day was devoted to a comprehensive overview of coordinated projects, including CAWSES, new measurement capabilities and science challenges. During the second half-day, the focus was on “Global structure and variability of GWs” which provided the global observational perspective from ground-based optical, radar, and balloon and satellite measurements at various altitudes from the troposphere to the MLT region, and the corresponding modeling perspective.

During the third half-day, the emphasis was on “Gravity wave coupling to the ionosphere and thermosphere” that highlighted the profound effects of these waves on the IT system. The fourth half-day then focused on larger scale waves: PWs and tides including their structure and variability.

Similar to GWs, PWs and tides also significantly influence the IT system, and this was the main point of the fifth half-day, including wave-wave interaction effects and processes. The sixth half-day was then devoted to stratospheric warmings and their effect on the IT, including presentations addressing the potential importance of lunar tides for the coupling between stratospheric polar dynamics and the low-latitude ionosphere-thermosphere.

As a final word, we were pleased with the high quality of the presentations as indicated by the extensive discussions after almost every talk. There was significant progress in a number of fields, e.g., in polar region neutral dynamics and planetary-scale wave coupling into the ionosphere, to name just a few. We would also like to acknowledge the financial support from SCOSTEP that allowed us (through COSPAR) to provide travel support for five participants including three students.

(Report by J. Oberheide and T. Nakamura)

4. SCOSTEP News

4.1 New IAU representative to the SCOSTEP Bureau

In August 2012 China hosted the XXVIII General Assembly of the International Astronomical Union (IAU) in Beijing. At this session Prof. Mei Zhang, was appointed as the new IAU representative to the SCOSTEP Bureau, replacing Dr. Nat Gopalswamy. She is a professor at the National Astronomical Observatory of China, Chinese Academy of Sciences, in Beijing, and chief scientist at the Huairou Solar Observing Station located in the outskirts of Beijing. Mei Zhang studies solar magnetic fields with a particular interest in the million-degree hot, ionized solar corona and has made several fundamental contributions to the understanding of the formation of long-lived coronal structures and their two forms of eruption, solar flares and coronal mass ejections (CMEs). The SCOSTEP Bureau welcomes Prof. Mei Zhang to SCOSTEP.

4.2 CAWSES TG4 Business meeting during the 39th COSPAR General Assembly, Mysore, India, July 20, 2012

Task Group 4 of CAWSES-II held a Business Meeting at the 39th COSPAR Scientific Assembly in Mysore, India, on 20 July. The purpose of the Business

Meeting, open to all participants, was to give an update of recent CAWSES-II activities in general and TG₄ in particular, including status reports of campaign activities and future plans. An open discussion about the plans until the end of CAWSES-II in 2013 took place. The Business Meeting was chaired by the two TG₄ co-leaders, Jens Oberheide of Clemson University and Kazuo Shiokawa of Nagoya University.

4.4 Request for input to the planning of the next SCOSTEP Scientific Programs for the period 2014-2018

From Nat Gopalswamy, President, SCOSTEP

The Scientific Committee on Solar Terrestrial Physics (SCOSTEP) is an interdisciplinary body of the International Council for Science (ICSU), charged with the long-term responsibility to promote international, interdisciplinary scientific programs in solar-terrestrial physics. SCOSTEP has run many successful scientific programs such as International Magnetospheric Study (IMS: 1976-79), Solar Maximum Year (SMY: 1979-81), Middle Atmosphere Program (MAP: 1982-85), Solar-Terrestrial Energy Program (STEP: 1990-97), Planetary Scale Mesopause Observing System (PSMOS 1998), and Equatorial Processes Including Coupling (EPIC 1999), STEP-Results, Applications, and Modeling Phase (SRAMP 1998 - 2002), and International Solar Cycle Study (ISCS 2003). The current scientific program is the Climate and Weather of the Sun-Earth System (CAWSES) started in 2005 and will complete 2 consecutive 4-year terms in 2013. SCOSTEP has begun discussing potential scientific programs that are timely for the 2014-2018 period. SCOSTEP is soliciting input from scientific bodies engaged in solar terrestrial physics issues and from the scientific community in general. We request the input in the form of white papers that crisply defines the scientific program including the scientific question to be addressed, an objective that can be achieved over a period of four years, data sets to be used, modeling collaborations, and a team of scientists (international steering committee) to coordinate the project. The programs need to be interdisciplinary and international. A small amount of funds will be made available for the selected programs. Inputs received by the end of 2012 will be most useful.

Please e-mail your input to the SCOSTEP Scientific Secretary, Marianna Shepherd (mshepher@yorku.ca) by December 31, 2012.

4.5 STP₁₃ – Mark your Calendar

Recently the President met with Dr. Chi Wang, the chief organizer of the STP 13 in Xi'An, China in 2014. The meeting was attended by three others from the LOC and Dr. ST Wu, past VP of SCOSTEP. Taking into account the fact that 40th COSPAR Scientific Assembly will be held in Moscow in mid-August 2014, it was felt that another meeting in China in the summer of 2014 will be too close. The same problem had to be considered for the STP 12 in 2010, but because both meetings were in Germany, so it was easy to do both back to back. The STP₁₃ LOC suggested that mid-September to mid-October will be better including the weather. Based on the input from the SCOSTEP Bureau, it has been decided that STP 13 will be held during October 13-17, 2014. *Please mark your calendar!*

5. SCOSTEP Capacity Building Activities

5.1 Comic Books in Tamil

During the Space Festival 2012 in Coimbatore, India (July 9 – 14, 2012) organized by the Bharathiar University, SCOSTEP Comic Books translated into Tamil, a classical language from Southern India, were released by the former President of India, Dr. APJ Abdul Kalam. Ten thousand copies were printed and distributed to the students. The Space Festival had several outreach activities organized by NASA scientists including Nat Gopalswamy (SCOSTEP President), Joseph Davila (CAWSES co-chair), S. Gurubaran (CAWSES TG₄ co-chair), and P. K. Manoharan (CAWSES – India). The Festival was attended by more than 100,000 students (elementary school to high school) and general public. The activities included solar scale modeling, radio and optical telescopes to view the Sun, balloon launches, sounding rocket exhibit, planetarium show by the Periyar Science Center, Chennai, and launching of many types of model rockets.



Figure 4: The release of the COMIC Books in Tamil at the Space Festival 2012 in Coimbatore, India (July 9-14, 2012). The former president of India, Dr. APJ Abdul Kalam (inset).

Comic books in Tamil were received by several dignitaries during the inauguration of Space Festival 2012 from the former President of India, Dr. APJ Abdul Kalam, who encouraged children to take to science and become achievers (inset).

5.2 SCOSTEP Capacity Building and Teacher Workshop in Bandung Indonesia

SCOSTEP has become a major partner in running the Space Science Schools organized by the International Space Weather Initiative, thanks to a grant from SCOSTEP's parent body, the International Council for Science (ICSU). The most recent school was hosted by the National Space Agency of Indonesia (LAPAN) in Ciloto, near Bandung during September 17-26, 2012. The school was cosponsored by the MAGDAS group from Kyushu University, Kyoto University, IPS Australia, KASI (Korea), and Alcala University, Spain. The school was directed by Nat Gopalswamy (SCOSTEP & ISWI), Clara Yatini (LAPAN), and Kiyohumi Yumoto (Kyushu University, MAGDAS PI). The school lectures covered all aspects of solar terrestrial physics, starting from solar interior and magnetism, interplanetary disturbances, geospace disturbances, and ionospheric precursors of earthquakes. The school was accompanied by two additional capacity building activities: (1) a one-day teacher workshop run by Deborah Scherrer and David Rodrigues from Stanford Solar Center, Stanford University with SCOSTEP support, and (2) an ISWI instrument workshop, featuring low-cost instruments such as MAGDAS (Kyushu University), CALLISTO

(ETH Zentrum, Switzerland), and GPS receivers (Ecole Polytechnique, Paris, France). Sixty eight students from 10 countries attended the School. Twenty four lecturers from 12 countries gave 44 lectures in all in the school. Several lecturers included hands-on activities as part of their lectures. There was also a one-day field trip to the historical Bosscha Observatory in Bandung (started 90 years ago).



Figure 5: Photo of the participants in the Science Teacher Workshop on September 24, 2012, Bandung, Indonesia

6. Upcoming Events

September 11 - 14: 7th Workshop on long-term changes and trends in the atmosphere (Trends 2012), Buenos Aires, Argentina,
<http://www.herrera.unt.edu.ar/faceyt/trends2012/>

September 17 - 26, 2012: SCOSTEP Space Science School, Bandung, Indonesia

October 9 - 12: 4th International HEPPA (High Energy Particle Precipitation in the Atmosphere) meeting, Boulder, CO, USA,
<http://www2.acd.ucar.edu/heppasolaris>

November 6 - 9: International Symposium on Solar-Terrestrial Physics, Indian Institute of Science Education and Research, Pune, India,
<http://www.iiap.res.in/meet/ISTP/index.php>

November 12 - 16: International AGU Chapman Conference on: "Hemispheric and Longitude Dependence of Space Weather", Addis Ababa, Ethiopia, www.agu.org/meetings/Chapman/

November 12 – 17: International School on
Atmosphere-Ionosphere Radar ISAR – NCU – 2012,
Graduate Institute of Space Science, National Central
University, Chung-Li, Taiwan,
<http://isarncu.tw/isar/announcement.htm>

7. General Information about SCOSTEP

7.1 SCOSTEP Web Site

Information on SCOSTEP can be found at:
<http://www.yorku.ca/scostep/>

7.2 SCOSTEP Contact

The Scientific Secretary is the main point of contact
for all matters concerning SCOSTEP.

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