The Scientific Committee on Solar-Terrestrial Physics (SCOSTEP)

ANNUAL REPORT (1 JANUARY – 31 DECEMBER, 2017)

Prepared by Marianna G. Shepherd, SCOSTEP Scientific Secretary

The report that follows covers the period from 1 January to 31 December 2017. It reflects the activities carried out by the organization and its current scientific program, "Variability of the Sun and Its Terrestrial Impact" (VarSITI). SCOSTEP through its Capacity Building and VarSITI programs supported *12 scientific conferences* and workshops and the development of 5 databases. The collaboration with the ISWI (International Space Weather Initiative) continued through the support of ISWI meetings and the International Space Science Schools. SCOSTEP participated in the 54th Scientific and Technical Subcommittee (STSC) of the UN COPUOS (Committee on the Peaceful Use of Outer Space) as a permanent observer. These events were communicated to the SCOSTEP scientific community via the SCOSTEP and VarSITI Newsletters and the results achieved are summarized in this report.

1. SCOSTEP SPONSORED SCIENTIFIC MEETINGS AND WORKSHOPS (IN CHRONOLOGICAL ORDER)

- Data Analysis Workshop on Coronal Mass Ejection (CME) and Radio Bursts: Mekelle, Ethiopia, February 19 – 25, 2017

This Capacity-building workshop was organized by Mekelle University in collaboration with COSPAR, SCOSTEP, ISWI and Adigrat University to introduce a system that can help the understanding of space and ground-based data analysis with application to the study of coronal mass ejections. Six experts from USA, India, Europe and 33 participants from 6 African countries took part in the workshop. As part of the workshop, a CALLISTO instrument was installed and currently provides data on line. The workshop consisted of scientific talks and training focused on the elaboration of the diverse phenomena of CME, solar flare, solar radio bursts with special focus on type II bursts and the correlative data analysis on CMEs and associated shocks. The workshop began a collaborative process that could potentially help staff of Mekelle University and the young researchers participating in the workshop to make progress in Space science, and Sun-Earth connection, Astro-physics and related fields. The workshop also helped participants by fostering collaborative research at national and international levels.

Photo 1: The team taking part in the workshop and the CALLISTO antenna.

- 40th Annual Seminar "Physics of the auroral phenomena", Apatity, Russia, March 13 – 17, 2017

The 40th Annual Seminar "Physics of the auroral phenomena" was held during 13-17 March 2016 in Apatity (Murmansk region, Russia). The meeting was organized by the Polar Geophysical Institute (PGI) of the Russian Academy of Science. The main scientific goal of this Seminar was to discuss newest results on the space physics processes in the polar cap, auroral and subauroral regions. The program covers different aspects of the solar-terrestrial relations, from the physics of the Sun and solar wind to the influence of the solar activity on the biosphere. About 90 representatives from 24 universities and research institutes distributed across Russia (Moscow, Nizhniy Novgorod, Saint-Petersburg, Yakutsk, Irkutsk, Kaliningrad, Murmansk, Apatity) and several scientists from abroad (China, Peru, Finland, Germany, Bulgaria) took part in the Seminar. The Seminar was sponsored by the SCOSTEP/VarSITI program facilitating the participation of a number of graduate students, young scientists, and invited speakers. The program is available at http://pgia.ru:81/seminar/Programm.pdf, while all abstracts can be found at http://pgia.ru:81/seminar/abstracts_book.pdf. The Seminar will follow by publication of the proceedings, which will be available both online at http://pgia.ru/seminar/archive/ and in print.

Photo 2: Participants in the 40th Annual Seminar, March 13 – 17, 2017

- The '10 Years Neutron Monitoring Data Base' workshop, March 20 – 23, 2017

The '10 Years Neutron Monitor Data Base' Workshop took place in Athens in March 20 – 23, 2017, an event celebrating 10 years of continuous and reliable operation of the NMDB community. During this meeting more than 70 participants from 26 Institutes from 16 countries representing 45 Neutron Monitor Stations, had the opportunity to communicate their work and research, on a wide range of topics (cosmic rays, solar proton events, GLEs, space weather forecasting, etc.), within the scientific community. The scientific program included 30 oral and 18 poster presentations by graduate students, young scientists, researchers and experts on neutron monitor technology. The presence of the European Space Agency (ESA) was greatly welcomed. This meeting served as a chance for all the groups of the neutron monitor collaboration and its visitors to reflect on their progress so far, to evaluate their current activities and applications and to lay the foundations for future plans. All presentations are available online at http://cosray.phys.uoa.gr/index.php/workshops2/10-years-nmdb/88-workshops/97-program.

Photo 3: Group photo of the participants in the workshop.

- International Capacity Building School "Advanced Concepts in Solar-Terrestrial Coupling in the Context of Space Weather', July 9 – 14, 2017

This school targeting graduate students and early-career scientists was held in Irkutsk, Russia during 9-14 July 2017 on the sidelines of the VarSITI 2017 General Symposium. The school – broadly based on the Space Weather Research, Education and Development Initiative –introduced the 35 participants to interconnected themes in space weather sciences through tutorial lectures and trained them in accessing and analyzing web-based space weather data products. The school was organized in collabo-ration with personnel from the Community Coordinated Modeling Center (CCMC/NASA), the Institute of Solar-Terrestrial Physics (Irkutsk, Russia), the Center of Excellence in Space Sciences India (CESSI, IISER Kolkata), Institute for Space-Earth Environmental Research (ISEE, Nagoya University) and the SCOSTEP-VarSITI program. School Webpage: http://en.iszf.irk.ru/Space_weather_summer_school_2017

Photo 4: Group photo of the participants in the School – students, young scientists and lecturers.

- The Second VarSITI General Symposium, July 10 – 15, 2017, Irkutsk, Russia

The 2nd VarSITI General Symposium was held at Irkutsk, Russia during July 10-15, 2017. Local support was provided by the Institute of Solar-Terrestrial Physics of the Russian Academy of Science. This symposium was attended by 162 scientists and students from 26 countries summarizing the progress of various activities in the four VarSITI projects at the fourth year of the program. The symposium consisted of 7 sessions, 1) Solar and heliospheric drivers of earth-affecting events, 2) Long-term variation of the sun, geomagnetic activity, and climate, 3) Coupling between the earth's atmosphere and space and its relation to quiet and active sun, 4) Understanding the earth's space environment and its connection to space weather, 5) Sun to mud campaign event study, 6) Atmospheric response to solar variability and modulation of its impact on timescales from

minutes to decades, and 7) Data archiving and analysis tools. Papers based on the presentation given will be published in a special issue of JASTP. The symposium was sponsored by SCOSTEP, ROSTEC/FASO/RFBR/ISTP of Russia, JSPS core-to-core program/PWING Project/PSTEP Project/IEEE, Nagoya University of Japan, COSPAR, and NSF of USA (http://varsiti2017.iszf.irk.ru/index.php/conferences/varsiti).

Photo 5: Group photo of the participants in the 2nd VarSITI general symposium.

- IAU Symposium 335, July 17 – 21, 2017, University of Exeter, UK

The IAU Symposium 335 on "Space Weather of the Heliosphere: Processes and Forecasts" held at the University of Exeter, UK in July 17-21 2017, linked various aspects of research in solar, heliospheric and planetary physics, emphasizing cross-disciplinary developments. The Symposium was attended by 185 participants (36.8% women) from 30 countries and 21 accompanying persons, exhibitors or public lecturer. Thanks to IAU and cosponsors such as SCOSTEP/VarSITI, 47 scientists from around the world were granted travel support to attend the meeting. The poster competition engaged 28 young scientists and 34 judges, who selected five best presentations. A 3-day parallel education/public outreach program was carried out engaging 14 young scientists and members of the LOC to share their enthusiasm for space weather with schools, teachers and general public (~300 people).

Photo 6: Symposium's group photograph

- UN/USA Workshop on ISWI (Flagship Meeting for UNISPACE+50) – Boston College, July 31 – August 4, 2017

The United Nations/United States of America Workshop on the International Space Weather Initiative: The Decade after the International Heliophysical Year (IHY) 2007 was held at Boston College, Chestnut Hill, MA, from

July 31 to August 4, 2017. The workshop was organized jointly by the United Nations Office for Outer Space Affairs, NASA and the Boston College. It was co-organized and co-sponsored by the International Committee on Global Navigation Satellite Systems (ICG) and the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP). SCOSTEP supported the Workshop because there is a close cooperation with ISWI in capacity building activities and it is heavily involved in the science behind Space Weather and the UNISPCE+50.

The present Workshop marked the 10th anniversary of IHY, and addressed future international cooperation in space weather activities linked to the preparations for the 50th anniversary of the United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE+50) under its thematic priority 4. "International framework for space weather services".

The focus of this workshop was on recent advances made in scientific research by utilizing ISWI instrument data in conjunction with space mission data in adding significant new knowledge on space weather phenomena near Earth and interplanetary space. It highlighted achievements made over the past ten years and demonstrated the worldwide development of science, capacity building, and outreach.

This workshop led to the:

i. Creation of an international coordination mechanisms of operational space weather services, including monitoring, forecasting, awareness raising, with the overall goal to protect life, property and critical infrastructure;
ii. Recommendations for improved collection, exchange and delivery of space weather data, as well as improved operational analysis, modelling and forecasting methods through the promotion of best practices, suggestions of means to improve accuracy, reliability and interoperability.

- LPMR Workshop, Kühlungsborn, Germany, September 18 – 22, 2017

The well-established biannual workshop on 'Layered Phenomena in the Mesopause Region (LPMR)' took place during September 18-22, 2017 at the Leibniz Institute of Atmospheric Physics (IAP) in Kühlungsborn, Germany. A total of ~ 70 scientists and students from 11 countries participated in this workshop. A total of 48 oral talks and 12 posters were presented highlighting the actual status and recent progress in our understanding of layered phenomena in the mesopause region. Presentations covered atmospheric observations, laboratory measurements, numerical modeling and theoretical studies. There was common census to publish the results from this workshop in a special issue of an international peer reviewed journal, most likely Atmospheric Chemistry and Physic (ACP). The workshop was co-sponsored by the ROSMIC program of VarSITI (SCOSTEP), and the Leibniz Institute of Atmospheric Physics (IAP).

Photo 7: Group photo of participants in the LPMR workshop in front of the main building of IAP.

- Second International School on Equatorial and Low-Latitude Ionosphere (ISELLI-2) – September 11 – 15, 2017, Ota, Nigeria

The 2nd International School on Equatorial and Low-Latitude Ionosphere (ISELLI-2) was held at the Covenant University, Ota, Nigeria on 11-15 September 2017. The 38 students and young scientists participating in the School were from Nigeria, Uganda, Kenya, Egypt, Cote D'Ivore, Cameroon, and India. Fourteen lecturers from Japan, US, Cote D'Ivore, and Nigeria introduced ionospheric dynamics, measurement techniques, Spread-F/plasma bubbles, and space weather. A training of SPEDAS GUI system under IUGONET was also held. This school was supported by Centre for Atmospheric Research (CAR) of NASRDA, Covenant University, Institute for Space-Earth Environmental Research (ISEE) of Nagoya University, JSPS core-to-core program B. Asia-Africa Science Platforms, Japan, International Center for Space Weather Science and Education (ICSWSE) of Kyushu University, PSTEP and PWING Projects, and SCOSTEP/VarSITI.

Photo 8: Group photo of the participants in the ISELLI-2 workshop.

- ISEST Workshop, September 18 – 22, 2017, Jeju, Korea

The annual ISEST (International Study of Earth-Affecting Solar Transients) International Workshop was held in Jeju, Korea, during September 18 - 22, 2017. The ISEST, one of the four SCOSTEP/VarSITI projects, aims at bringing together scientists from different countries to interact and establish collaboration links that can effectively address the physical mechanisms of the origin, propagation, and Earth impact of solar transient events, including coronal mass ejections (CMEs), solar energetic particle events (SEPs) and co-rotating interacton regions (CIRs). Thirty-seven experts and students from eleven countries participated in this workshop. Leaders from the ISEST seven Working Groups presented progress reports at the beginning and summary reports at the end of the workshop. Rigorous and fruitful discussions were a trademark of the five-day-long workshop. All presentations and working group reports, along with data products, are archived and publicly available at http://solar.gmu.edu/heliophysics/index.php/Main_Page & http://kswrc.kasi.re.kr/Workshop/isest2017

Photo 9: Group Picture of 2017 ISEST Workshop Participants.

- 3rd IMAO Space Weather School, Abidjan/Côte d'Ivoire, 16 - 28 October 2017

The 3rd edition of the IMAO (ISWI-MAGHREB-WEST AFRICA) Space Weather School took place in Abidjan from October 16 to 28, 2017. This school brought together 30 participants: master and doctoral students and research professors from 10 countries (Algeria, Burkina Faso, Cameroon, Côte d'Ivoire, Guinea Conakry, Morocco, RC, DRC, Senegal and Tunisia). The lecturers were from Algeria, Côte d'Ivoire, France and Morocco. The school was organized by Vafi Doumbia, Olivier Obrou and the Laboratory of Atmosphere Physics, UFR-SSMT, University Félix Houphoüet Boigny, in collaboration with CRASTE-LF. The IMAO School was supported by the International Space Weather Initiative (ISWI) and SCOSTEP under the patronage of the Minister of Higher Education and Scientific Research.

Photo 10: Group Photo of IMAO 2017 Workshop Participants.

- IRI 2017 Workshop, National Central University, Taoyuan City, Taiwan, November 13 – 17, 2017

The IRI-2017 Workshop brought together 85 researchers from 23 countries to discuss the status and improvement of the International Reference Ionosphere (IRI) model with special emphasis on the low latitude region and on the development of the Real-Time IRI. The 68 presentations were distributed into sessions covering 'GNSS and Radio Occultation', 'Scintillation', 'F-peak and above', 'Irregularities and Anomalies', 'Storm Modelling', 'Ion Composition, Temperatures, and Ion Drift', 'New Inputs for IRI', 'Student Presentations', 'Final Discussions', and a Poster Session. The presentations and discussions at the workshop provided significant new information that will be incorporated in the next version of IRI. The best student presentations were rewarded with Gold, Silver and Bronze Awards. Jann-Yeng (Tiger) Liu was elected to become a new member of the IRI Working Group. The next IRI workshop is planned to be held at the Frederick University in Cyprus in September 2019. Papers from the workshop will form the core of a special issue of Advances in Space Research on "Improved RealTime Ionospheric Predictions with IRI and Formosat -3/COSMIC and other GNSS Data". The workshop was supported by VarSITI, by the Taiwanese Ministry of Science and Technology, by NCU through its Center for Space and Remote Sensing Research (CSRSR) and its Graduate Institute of Space Science (GISS), and by COSPAR.

Photo 11: Participants in the IRI-2017 Workshop

2. SUPPORT FOR DATABASES

- Catalog of large-scale solar wind phenomena during 1976–2016

(*Y. I. Yermolaev and N. S. Nikolaeva, Space Research Institute, Russian Academy of Sciences*)

Information on the large-scale solar wind phenomena is very important for study of the Sun, heliosphere and the solar-terrestrial links. During the period of 2002 - 2007 on the basis of OMNI database of 1-h solar wind (SW) plasma and IMF parameters the `Catalog of large-scale solar wind phenomena during 1976–2000` was created (see website ftp://ftp.iki.rssi.ru/pub/omni/ and http://www.iki.rssi.ru/people/y_etalcr2009.pdf]). The Catalog identifies reliably 3 types of quasi-stationary streams of the solar wind (1) heliospheric current sheet (HCS), 2) high speed streams from the coronal holes (HSS), and 3) slow streams from the coronal streamers), and 5 disturbed types (compression regions before fast streams HSS (CIR), and interplanetary manifestations of coronal mass ejections (ICME) that can include magnetic clouds (MC) and Ejecta with the compression region Sheath (SHEMC and SHEEj) preceding them) as well as the interplanetary shock. With VarSITI support the Catalog was extended to include the period of 2001-2016. The obtained data of particular interest to the ISEST/MiniMax24 project such as studies of mechanisms of propagation of solar transients through space, transfer of disturbances from the Sun to the Earth and prediction of geomagnetic disturbances.

- Database on the Forbush-effects and interplanetary disturbances to study Earth-affecting solar transients

(A.Belov, A. Abunin, E. Eroshenko, M. Abunina, V. Yanke, V. Oleneva , Institute of Terrestrial Magnetism, Ionosphere and Radiowave Propagation by N.V. Pushkov, RAS (IZMIRAN), Troitsk, Moscow, Russia).

The construction of the database for Forbush effects and interplanetary disturbances began in IZMIRAN in the 1990-ties and since that time it has been continuously improved and expanded. Currently it comprises data on the solar, interplanetary, geomagnetic disturbances, on the disturbances observed in cosmic rays (CR), and covers more than semi centennial period (from 1957 to 2016) of observation. Uniqueness of this local database is that in addition to different parameters characterizing disturbances from different sides (solar, interplanetary and geomagnetic data) it also contains the data on density and anisotropy of CR of 10 GV rigidity received by method of global survey (GSM) by the data of a world network of neutron monitors. A GSM version was also developed at IZMIRAN. It considers all world neutron monitor network as one multidirectional device and allows receiving characteristics of the CR (density, anisotropy and its components, various rigidity spectra) outside the atmosphere and a magnetosphere of Earth. Hourly average count rates of neutron monitors (NM) for computation of the CR parameters are undertaken as directly from some stations, so from NMDB database

(htt://www.nmdb.eu), founded under the European Union's FP7 program for providing data. The results of GSM are included then in the current database. However, since this database is local, so far it serves only internal use. In response to many requests concerning information stored in this base led to the need to update this information resource and to develop an Internet version of this database for the data to be accessed on line. Wth the support provided by a VarSITI grant the database was updated into an Internet version, and at present, the data-base on the Forbush effects and interplanetary disturbances (FEID) exists in open access at http://spaceweather.izmiran.ru/eng/dbs.html. It contains all the events over the period 1957 to 2016 (>7000 events) with complete set of the parameters which exist in the offline database (> 100 parameters in total for each event).

- A new database of radiation doses at commercial flight altitudes due to solar particle storms is linked to GLE database

(*I. Usoskin, A. Mishev, S. Tuohino, and A. Ibragimov , Space Climate Research Unit, Faculty of Science, University of Oulu, Finland*)

Solar flares and coronal mass ejections are powerful sporadic events taking place on the Sun, but the physics behind is still not fully understood. Such events can cause, in particular, solar particle storms characterized by very strong fluxes of highly energetic particles (mostly protons) in the vicinity of Earth. These particles form an important driver of space weather and pose significant hazards for the modern society, especially for space-borne technologies, e.g. navigation, communication, etc.

A database which provides basic information, mostly verified count rates of the neutron monitors around the globe, about GLE was developed by the research community (Louis Gentile, Margaret (Peggy) Shea and Don Smart, Marc Duldig were hosting it over the years) and is presently hosted by the University of Oulu at the URL: http://gle.oulu.fi . Recently, thanks to the focused support from VarSITI/SCOSTEP it has been greatly improved by providing, for each GLE event, where possible, information on the energy/rigidity spectra of solar energetic particles and the corresponding computed radiation doses at the polar flight altitude of 35 kft or ~11 km. The new database can be accessed as http://gle.oulu.fi/#/dose . The computations of the radiation dose were performed using a new numerical model for computation of effective and/or ambient dose equivalent at aviation altitudes, developed by the team.

- Database of Directivity Functions of Neutron Monitors

(G. Karapetyan, T. Karapetyan, and Z. Asaturyan, Cosmic Ray Division, Yerevan Physics Institute (Alikhanian National Lab), Yerevan, Armenia)

The database of Directivity Functions (DF) for Neutron Monitors (NM) has been created to provide the graphs of directional sensitivities of all acting NMs. Until recently, there was no comprehensive information of directional sensitivity of the NMs. In rare cases, approximate estimates were made for several NMs. The database contains DFs of 39 NMs, presented as color coding graphs. The color-coding gives the flux of primary galactic protons from blue (no contribution) to red (maximum contribution). The database is accompanied by the manual, which presents the concept of directivity function and explains the graphs. The database is free to use, the users can distribute, modify and use the graphs for any purposes except of commercial use. The web page of the database is: http://crd.yerphi.am/Directivity_Functions_Neutron_Monitors.

- Creation of a Database for Atmospheric and Whistler Events Detected in the Russian Far East

(V.A. Mochalov, G.I. Drugin, R.R. Karimov, et al., Institute of Cosmophysical Research and Radio Wave Propagation FEB RAS)

The new software-hardware complex of IKIR FEB RAS «Sensor signal analysis network» (SSAN) for distributed, time synchronized monitoring of Very Low Frequency (VLF) radiation can facilitate the solution of a number of problems associated with investigation of: 1) lightning activity; 2) monitoring of whistler and search for their lightning sources; 3) monitoring of volcano explosive eruptions in Kamchatka, and 4) cyclone structures in the atmosphere over oceans. IN addition to the scientific goals, the investigation of these tasks has a clear application component. Whistlers, as natural markers of plasmosphere state, are of great interest for space weather forecast. Radio pulses of lightning discharges during propagation along the Earth surface via the Earth-ionosphere wave-guide carry information on synoptic weather system structure.

SCOSTEP/VarSITI provided financial support for the construction of a database for atmospheric and whistler events detected in the Russian Far East, (http://www.ikir.ru/en/Departments/Paratunka/lre/Events/varsiti-2017.html). The database is divided into folders according to the location of the monitoring station and the used algorithm for atmospheric and whistler detection. The database stores files both in text format and in Java-serialized. In November 2017, synchronous registration of atmospherics and whistlers by SSAN complexes in the radio physical observation stations in Paratunka and in Yakutsk began in the operational mode. An important feature of these stations is that the power supply of the recording equipment, which is far from the industrial noises, is autonomous. In the test mode, registration is carry out in the city Vladivostok.

3. CAPACITY BUILDING ACTIVITIES

SCOSTEP is actively involved in the advancement of Capacity Building and scientific excellence through its scientific programs and partnership with the ISWI, ICSU and URSI. Through its initiatives, e.g. Space Science Schools, SCOSTEP Visiting Fellowships (SVS), SCOSTEP facilitates the training, interaction and collaboration of young and early career scientists with the best of the STP scientific community.

- *Solar-Terrestrial Physics Symposia (STP*): Every 4 years - assess progress made by the scientific program. The 14th Quadrennial Solar-Terrestrial Physics Symposium (STP14) – July 9 – 13, 2018, York University, Toronto, Canada
- *SCOSTEP Visiting Scholar (SVS) Program*: Initiated in 2014, to support training visits by graduate students or young scientists from developing countries to an advanced laboratory (up to 3 months) – 10 recipients of the SVS
- *International Space Science Schools*: Every year to provide advanced training to PhD students and Post-Doctoral Fellows in collaboration with the International Space Weather Initiative (ISWI), International Council for Science (ICSU), and International Union of Radio Science (URSI).

SCOSTEP has collaborated with the ISWI in capacity building and science education (CBASE) activities in Asia, Africa, and South America in collaboration with the URSI and ICSU regional offices for Asia and the Pacific (ICSU/ROAP), Africa (ICSU/ROA), and Latin America and the Caribbean (ICSU/ROLAC).

The CABSE activities consist of three elements:

a) conducting advanced schools in Space Weather/Space Science for young people (scientists and graduate students)

b) organizing teacher workshops for the benefit of school teachers in the host country

c) conducting space instrumentation workshops to disseminate information on low-cost instruments that can be deployed in developing countries to gather valuable data on space weather from ground.

SCOSTEP and ISWI activities promote space Sun-Earth connection studies via complementary approaches in international scientific collaborations, capacity building, and public outreach.

3.1. SCOSTEP VISITING SCHOLARSHIP PROGRAM - 2017

The SCOSTEP Visiting Scholarship (SVS) program was established in the fall of 2014 with the objective of providing training to young scientists and graduate students from developing countries in well-established solar-terrestrial physics laboratories and institutions, for periods of between one and three months. The training will help the young scientists to advance their career in solar terrestrial physics using the technique/ skill they learned during the training. SCOSTEP provides the airfare, while the host institute provides the living expenses (accommodation, sustenance, ground transportation, visa fees and other incidentals). The aim is to fund at least four scholars each year, one related to each of the four SCOSTEP/ VarSITI themes (http://www.varsiti.org/).

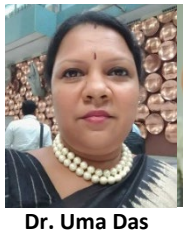
The Announcement of Opportunity for the SCOSTEP Visiting Scholarship 2017 (SVS-2017) competition was released on December 1, 2016. Twelve graduate students and young scientists applied for the SVS- 2017 scholarship. On February 25, 2017 all applications submitted to the SCOSTEP Secretariat in response to the 2017 SVS Announcement of Opportunity were sent for evaluation by the SVS Selection Committee, led by Prof. Nicole Vilmer (France) and members: Paul Baki (Kenya), Katya Georgieva (Bulgaria), Jean-Pierre Raulin (Brazil), Mike Taylor (USA), and Akimasa Yoshikawa (Japan). Twelve applications were received: India (7), Malaysia (2), Ethiopia (1), Kenya (1), and Uganda (1). On April 10, 2017 the recipients of the SVS grants were announced. They are: Dr. Anil Raghav (India); Ms Sanchita Pal (India); Dr. Uma Das (India); Mr Dupinder Singh (India); Ms Ashna V. Malayil (India); Dr. Tsegaye Kassa (Ethiopia).

Dr. Anil N.Raghav

STEP, Univ. of Sci. & Tech. of China (USTC)

Ms Sanchita Pal

NASA/GSFC, USA



Dr. Uma Das

ISEE, Nagoya Univ., Japan

Mr Dupinder Singh

Leibnitz IAF, Germany

Ms Ashna V. Malayil

NASA/GSFC, USA

Dr. Tsegaye Kassa Gogie

SANSA, Hermanus, South Africa

3.2. SCOSTEP STP14 SYMPOSIUM, YORK UNIVERSITY, TORONTO JULY 9 – 13, 2018

Preparations are underway for the upcoming SCOSTEP 14th Quadrennial Solar-Terrestrial Physics Symposium, July 9 – 13, 2018, which will be held at York University, Toronto, Canada. The STP14 will be of great importance for the entire STP community, as it will feature the achievements of SCOSTEP's Variability of the Sun and Its Terrestrial Impact (VarSITI) program, which is to end in 2018.Information about the STP14 Symposium can be found on the conference website: http://www.scostepevents.ca/.

4. SCOSTEP AT STSC UN COPUOS, VIENNA

The President of SCOSTEP, Dr. Nat Gopalswamy and Prof. Nikolai Østgaard (National Adherent Representative of Norway) attended the 54rd Session of the STSC (Scientific and Technical Subcommittee) UN COPUOS and on January 31, 2017 made two technical presentations on SCOSTEP activities. The presentations titled "An update of SCOSTEP Activities" (by N. Gopalswamy) and "Norwegian contributions to SCOSTEP/VarSITI" (by N. Østgaard). The Presentations can be found on the SCOSTEP website.

5. SCOSTEP'S NEXT SCIENTIFIC PROGRAM – 2019 – 2022

SCOSTEP has initiated an effort to develop community consensus in defining its next scientific program in Solar Terrestrial Physics. The following topics need be addressed: (i) Current status; (ii) Knowledge gaps, (iii) Future directions in observations and modeling to fill the gaps. Community leaders have been identified to lead the effort.

Discussions have already began via telecons and formal meeting will be held at the International Space Science Institute (ISSI) in Beijing and Bern in 2018. The committee is given the latitude of consulting the community, holding meetings and workshops in the process of drafting the SCOSTEP 'Road map'. The new program is intended to start in 2019, as a successor to the current VarSITI.

The Committee for Next Scientific Program includes: Ioannis Daglis (Greece) Chair; Daniel Marsh (USA); Loren Chang (Taiwan); Sergio Dasso (Argentina); Sarah Gibson (USA); Katja Matthes (Germany); Dibyendu Nandy (India) ; Vladimir Obridko (Russia); Annika Seppälä(New Zealand) ; Rémi Thiéblemont(France) ; Qiu-Gong Zong (China), and Emilia Kilpua (Finland).

6. SCOSTEP AWARDS – DISTINGUISHED SERVICE AWARD

Recognizing the societal importance of studies in the field of solar-terrestrial physics and in order to give credit to scientists who contribute significantly to these studies and to SCOSTEP activities, the SCOSTEP Bureau has recently instituted three awards: SCOSTEP Distinguished Science Award, SCOSTEP Distinguished Young Scientist Award, and SCOSTEP Distinguished Service Award. The SCOSTEP Distinguished Service Award recognizes a unique contribution to SCOSTEP activities, to realization of its programs and events.

Photo 12: The recipient of the SCOSTEP Distinguished Service Medal, Prof. Marvin A. Geller with SCOSTEP's President Dr. Nat Gopalswamy - April 28, 2017.

After a number of nominations from the solar-terrestrial community at large, the Awards Selection Committee unanimously selected and recommended to the SCOSTEP Bureau that **Professor Marvin Alan Geller** be the recipient of the *SCOSTEP Distinguished Service Award for 2017*. **Professor Dr. Marvin Alan Geller**, Professor

Emeritus of Atmospheric Sciences at the School of Marine and Atmospheric Sciences, Stony Brook University, USA. The Award is given to Prof. Marvin Geller for his substantial and unique contributions to various SCOSTEP programs through his leadership roles in them and his immense service to the Solar-Terrestrial Physics community as a leader of institutions and a mentor of many students. The SCOSTEP award was presented at the Award ceremony during the SCOSTEP General Council meeting, held on *April 28, 2017* at the Austrian Academy of Sciences, in Vienna, Austria.

7. SCOSTEP BUREAU MEETINGS

SCOSTEP organizes and conducts international solar-terrestrial physics (STP) programs of finite duration in cooperation with other International Council for Science (ICSU) bodies. Results from these programs are shared with the community of SCOSTEP scientists by joining in conducting meetings, conferences, and workshops and by publishing newsletters, handbooks and special journal issues.

The Bureau members are representative of the relevant ICSU bodies (IAU, IAGA, IAMAS, IUPAP, COSPAR, URSI, and SCAR) in SCOSTEP.

7.1 GENERAL COUNCIL MEETING – APRIL 28, 2017, VIENNA

SCOSTEP General Council meeting was held on April 28, 2017 in Vienna, at the Austrian Academy of Science.

At a ceremony during SCOSTEP's General Council Meeting, the SCOSTEP Distinguished Service Award for 2017 was given to Prof. Marvin A. Geller, Professor Emeritus of Atmospheric Sciences at the School of Marine and Atmospheric Sciences, Stony Brook University, USA. In his acceptance speech, Prof. Geller thanked SCOSTEP for the high recognition and briefly outlined the achievements of SCOSTEP in leading the international solar-terrestrial physics community during the time of his tenure.

The SCOSTEP President and the Scientific Secretary presented a report on SCOSTEP's activities and achievements since the last GC meeting in June 2015, in Prague, Czech Republic. In 2016, SCOSTEP through its Capacity Building and VarSITI programs organized and/or supported financially 19 international meetings and 2 capacity-building workshops. The most significant of these were the First VarSITI General Symposium, held in Albena, Bulgaria in June 2016, a SCOSTEP/ISWI International School on Space Science in Sangli, India, in November 2016 and a capacity- building workshop at Mekelle University in Ethiopia in February 2017. SCOSTEP participated in the 53th & 54th Scientific and Technical Subcommittee (STSC) of the UN COPUOS (Committee on the Peaceful Use of Outer Space) as a permanent observer. These events were communicated to the SCOSTEP scientific community via the SCOSTEP and VarSITI Newsletters and the website. The Minutes of the General Council meetings in Prague and Vienna are available at http://scostep.apps01.yorku.ca/about-2/archives/reports-and-documents/meeting-minutes/

7.2 SCOSTEP BUREAU MEETING – APRIL 29, 2017, VIENNA

The SCOSTEP Bureau held its annual meeting on April 29, 2017 at the Austrian Academy of Science, in Vienna, Austria.

Photo 13: Some of the SCOSTEP Bureau members, who attended the Bureau meeting on April 29, 2017. From left to right: T. Nakamura, M. Shepherd, V. Kuznetsov, N. Gopalswamy, A. Seppälä, F-J. Lübken, K. Georgieva

Introductory remarks, summarizing the main SCOSTEP activities since the last Bureau meeting, held on April 25, 2016: SCOSTEP Visiting Scholarship (SVS), Distinguished Science and Distinguished Young Scientist Awards – 2016, 1st VarSITI General symposium, ISWI/SCOSTEP Space Science School, Sangli, India, SCOSTEP Town Hall event during the AGU Fall meeting in San Francisco and STSC UNCOPUOS. The minutes from the meeting could be found on the SCOSTEP Website: http://scostep.apps01.yorku.ca/about-2/archives/reports-and-documents/meeting-minutes/

8. SCOSTEP SECRETARIAT ACTIVITIES

In March 2016 the 5-year Grant-in–aid provided by the Canadian Space Agency in support of the SCOSTEP Secretariat expired. In April 2016 SCOSTEP granted a 3-year 'Grant-in-aid' to York University for the continued support of the SCOSTEP Secretariat, at the level of 20% of the Scientific Secretary's time. The SCOSTEP Grant is gratefully acknowledged.

The SCOSTEP Secretariat continued its work in coordinating and managing all SCOSTEP related activities, as well as providing logistic and technical support for the VarSITI program. The Scientific Secretary Prof. M. Shepherd organized the annual SCOSTEP Bureau meeting on April 29, 2017 and the biennial General Council meeting on April 28, 2017 both held at the Austrian Academy of Science, Vienna. In June 2017, M. Shepherd was tasked with the organization of the STP14 Symposium to be held at York University in July 2018 and appointed Chair of the Local Organizing Committee. The organization of the Symposium is well on track. All relevant information can be found at the STP14 website: http://www.scostepevents.ca/ designed and managed by Dr. Shepherd.

The Scientific Secretary also managed the SCOSTEP Visiting Scholar program, oversaw the announcements and all SVS applications, as well as the logistics associated with the administration of the SVS grants. The Scientific Secretary organized the nominations and selection of the recipients of the SCOSTEP Distinguished Service Awards, all logistics related to the preparation and presentation of the awards, issued SCOSTEP Newsletters, administered the SCOSTEP Website, administered the SCOSTEP finances, administered VarSITI grants, and looked after general day-to-day SCOSTEP business. Further information on the activities outlined in this report could be provided on requested by the SCOSTEP Secretariat (mshepher@yorku.ca), or can be found at the SCOSTEP Website, http://www.yorku.ca/scostep/.

8.1 NEW ADHERENT MEMBER - GEORGIA

The Republic of Georgia is the newest SCOSTEP Adherent. On January 28, 2017 by an electronic vote, the SCOSTEP Council unanimously approved the Republic of Georgia's application for a membership in SCOSTEP. Prof. Goderdzi Didebulidze (Ilia State University) has been appointed as a National Adherent Representative for the Republic of

Georgia. There are also two new appointments of National Adherent Representatives: Dr. Rositsa Miteva – Bulgaria replacing Dr. Dora Pancheva, and Dr. Jean-Pierre Raulin – Brazil, replacing Prof. Pierre Kaufmann.

8.2 NEW BUREAU MEMBERS

In 2017 two new Bureau members were appointed: Prof. Dr. Jorge Chau (Leibniz Institute of Atmospheric Physics, Germany), replacing Prof. Craig Rodger as the representative of URSI, and Prof. Prasad Subramanian (India), replacing Prof. Mark Lester as the representationve of IUPAP.

8.3 NEW COMIC BOOKS TRANSLATION IN URDU

A new translation of the Comic Books is now available in Urdu, courtesy of Mr. Anees H. Siddiqui. These and translations in other languages could be found at: http://scostep.apps01.yorku.ca/comic-books/

9. AGU FELLOWS 2017

The American Geophysical Union has chosen 61 new AGU Fellows whose visionary leadership and scientific excellence have fundamentally advanced research in their respective fields. Only 0.1% of AGU members receive this recognition in any given year. Among the new AGU Fellows for 2017 are our distinguished colleagues (in alphabetic order) (https://eos.org/agu-news/2017-class-of-agu-fellows-announced):

M. Joan Alexander - Northwest Research Associates (Area of Expertise: Atmospheric Sciences. Atmospheric dynamics, waves, convection, global circulation modeling, mesoscale modeling, satellite, aircraft, balloon-borne observations, and middle atmosphere studies)

John C. Foster – MIT Haystack Observatory (Area of Expertise: Physics of the magnetosphere, ionosphere and thermosphere; Magnetosphere/ionosphere/ atmosphere coupling; Plasma waves and instabilities; incoherent scatter radar; radiation belt physics; plasmasphere and plasmasphere boundary layer)

John M.C. Plane – Faculty of Mathematics and Physical Sciences, University of Leeds (Area of Expertise: Atmospheric chemistry, planetary atmospheres, kinetics and photochemistry, mesosphere)

John Raymond - Smithsonian Astrophysical Observatory, Harvard University (Area of Expertise: Spectroscopy and physics of the solar corona, solar flares and Coronal Mass Ejections. Physics and spectroscopy of collisionless shock waves in supernova remnants. Physics of winds from accretion disks on X-ray emitting binaries).

The 2017 class of Fellows was recognized during the Honors Tribute on Wednesday, 13 December, 2017 held during the 2017 AGU Fall Meeting in New Orleans.