

COMMISSION FOR BASIC SYSTEMS
OPEN PROGRAMME AREA GROUP ON INTEGRATED OBSERVING SYSTEMS

INTER-PROGRAMME EXPERT TEAM ON SATELLITE UTILIZATION AND
PRODUCTS

ITEM: 10.2

THIRD SESSION

Original: ENGLISH

GENEVA, SWITZERLAND, 2-5 MAY 2017

COSPAR TRAINING AND CAPACITY BUILDING PROGRAMME

(Submitted by Jean-Louis Fellous, COSPAR Executive Director)

Summary and Purpose of Document

A COSPAR Capacity Building Workshop on Space Weather was held in Kamchatka, Russia, in August 2016, organized by the Institute of Cosmo-physical Research and Radio waves Propagation (IKIR). The workshop was co-sponsored by WMO in the framework of the Memorandum of Understanding signed by COSPAR and WMO in 2012 and renewed in 2015. The COSPAR Capacity Building programme for 2017 and 2018 may include a new workshop on Space Weather, proposed by the Brazilian Institute for Space Research (INPE) in São Jose dos Campos. Co-sponsorship by WMO is recommended.

ACTION PROPOSED

The second session is invited to:

- (a) Take note of the information provided on current plans to hold a COSPAR capacity building workshop on Space Weather in Brazil in 2018;
- (b) Recommend WMO and other organizations to contribute to the organization of that workshop through dissemination of the information, a grant for students and support to lecturers; and,
- (c) Make any other appropriate recommendation concerning the objectives and content of the workshop.

Appendices: A. Proposal Form for a Cospar Capacity Building Workshop on Space Weather
B. Report of joint COSPAR/WMO Workshop "Impact of Space Weather on Earth",
15-26 August 2016, IKIR, Paratunka, Kamchatka, Russian Federation

DISCUSSION

Introduction

1. The Committee on Space Research (COSPAR) and the WMO Space Programme signed in January 2012 a Memorandum of Understanding for an initial period of three years, renewed in 2015, through which they agreed to pursue the following cooperative activities:
 - a. Exchange of information on capacity building activities;
 - b. Exchange of contact points;
 - c. Mutual acknowledgment and promotion;
 - d. Collaboration of VLab and COSPAR host institutions, and partner satellite agencies, in organizing capacity building events;
 - e. Provision of mutual sponsorship of capacity building events (in-kind);
 - f. Exploration of further areas of partnership.

Training and capacity building workshops

2. The COSPAR Panel on capacity building (PCB) and the WMO VLab used several opportunities in the past years to collaborate on the organization of training workshops held in various countries, notably in China, Thailand and Russia, on topics of mutual interest.
3. The COSPAR CB programme includes a companion Fellowship programme open to young scientists who have been participants at one of the COSPAR Capacity Building workshops to enable them to build on skills gained at the workshop. It provides for visits of 2-4 weeks duration for the purpose of carrying out joint research to laboratories that collaborate with COSPAR in providing the fellowship pro-gram. Details on the COSPAR Capacity Building and Fellowship programmes are available on the COSPAR Web site¹.

Training event on space weather

4. Earlier discussions held in 2013-2014 independently by the two organizations and jointly in the context of the WMO ET-SUP and at the COSPAR Scientific Assembly in Moscow identified Space Weather as a priority topic for collaboration in training and capacity building. Several projects were been envisioned, including expressions of interest in hosting and/or organizing a CB workshop by the Brazilian INPE (*Instituto Nacional de Pesquisas Espaciais*) and the Institute of Cosmo-physical Research and Radio waves Propagation (IKIR) of the Academy of Sciences of the Russian Federation.

Update

5. The Russian proposal was first submitted to COSPAR in March 2015. Following initial comments and questions from the PCB, the proposal was resubmitted in a more comprehensive manner and accepted after a site visit in 7-8 January 2016 by Dr Alexi Glover (ESA), then Chair of the COSPAR Panel on Space Weather and an active member of the PCB, assuming that additional sponsorship will help close the budget. WMO agreed to contribute to the workshop which was successfully held in August 2016. A full report of the "Joint COSPAR and WMO Capacity Building Workshop on Impact of Space Weather on Earth" was published in the December 2016 issue (n°197) of *Space Research Today*, freely distributed three times a year to the 10,000 COSPAR Associates.
6. The Brazilian project was first submitted to COSPAR in May 2015, but it showed a number of features that required significant clarification or adjustment. It has been resubmitted in early 2017 and is now pre-approved by the Panel on Capacity Building. The workshop is planned to be held at INPE in São Jose dos Campos (São Paulo), Brazil, on 17-28 September 2018.
7. It is anticipated that WMO will be willing to disseminate information about the Workshop, participate in the selection of students, and contribute a grant for students and support for lecturers.

Appendix: A. Proposal Form for a Cospar Capacity Building Workshop on Space Weather

¹ <https://cosparhq.cnes.fr/events/cb-workshops> and <https://cosparhq.cnes.fr/events/fellowship-program>

Appendix A: Proposal Form for a COSPAR Capacity Building Workshop

Title: SPACE WEATHER CAPACITY BUILDING WORKSHOP

Proposer

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Summary

The "Space Weather Capacity Building Workshop" focuses on topics in Space Weather Science and Applications with emphasis in Solar Physics, Interplanetary Medium, Geomagnetic Field and Earth Magnetism, and Ionized and Neutral Earth's Atmosphere.

The number of attendees shall be around 30 students. Ideally they should be 50% Brazilians (maximum) and at least 50% from Latin America and other continents. The target will be MSc, PhD students or Post-Docs that have interest in the Space Weather related topics.

All the traveling, housing and meals will be covered by the workshop to all attendees.

The workshop will take place in the facilities of the Brazilian Space Weather Study and Monitoring Program (EMBRACE - "Estudo e Monitoramento Brasileiro do Clima Espacial") at National Institute for Space Research (INPE - "Instituto Nacional de Pesquisas Espaciais") in Sao Jose dos Campos, Sao Paulo, Brazil from 17 to 28 September 2018.

Proposal

This Space Weather Capacity Building workshop should capacitate the students for using ground based and satellite data to understand what is happening in the Sun-Earth environment and to estimate which effects should be expected on Earth. It is also foreseeing that students will develop new collaborative contacts with scientists from the Space Weather community in this occasion.

Many regional conditions make South America singular in the studies of Space Weather effects on Earth. The South America Magnetic Anomaly (SAMA), the intensity of equatorial ionospheric perturbations like plasma bubbles, the Equatorial Ionospheric Anomaly (EIA), the highly distinct magnetic declination among other physical peculiarities make Space Weather studies and applications in South America even more unique. In this sense this workshop will be of great importance to disseminate the understanding of Space Weather studies and to emphasize the impact of its applications to society in general. The workshop format emphasize the "hands on" labs where the students will learn where to find and how to understand and analyze the data for practical use in their Space Weather scientific studies. Besides, this Workshop could get attention of more students for this promising and yet relatively new area.

Since INPE has decades of international Space Science studies and collaborations, it is expected that this institution could lead the efforts to attract more students to Space Weather topics regionally, raising the interest of young professionals in Space Weather science and/or applications and, also, strengthening the scientific international collaboration between the attendees.

Description of the planed activity (workshop format) The program for the first day (Monday, 17/09) include the registration and initial seminars about the topics to be discussed in the following days, including a presentation of the host institution (INPE) and the EMBRACE program to the students. Also, on the first day students will participate of a "Briefing" where, similar to what usually happens in large space weather centers,

researchers will present an analysis of the conditions of Space Weather using the data obtained in the last week, discussing the provisions for the Space Weather in the following days.

The following four days (18 to 21) will be divided into Solar (18, 19) and Interplanetary Medium (20, 21) topics. After the weekend break (when there will be a field trip), the first four days of the second workshop week (24 to 27) will be dedicated to Magnetosphere, Magnetic Field and GIC (24, 25) and Ionized and Neutral Atmosphere (26, 27).

On the last day (Friday, 28/09) there will take place presentations of the six groups formed during the workshop. The presentations will be about Space Weather study case events, following the perturbations from de Sun to the Earth, similarly to what was shown in the first workshop day to the students. Also, there will be a round table and the evaluation of the event.

The activities will start at 9:00 a.m. and will finish at 7:00 p.m. There will be two coffee breaks (10:30 to 11:00 a.m. and 3:30 to 4:00 p.m.) and lunch time (0:30 to 2:00 p.m.) each day.

During each one of the eight days dedicated to the four main topics of the workshop (18 to 21 and 24 to 27), the morning program will include two specialized seminars in the corresponding field given by the invited lecturer. After lunch there will be hands on activities related to the theme of the lectures. By late afternoon there will be time to students develop their group projects that will be presented in the last day (29 September). On the last day there will be a round table and the evaluation of the event.

Other relevant information

The host institution is going to dispose four available rooms during the event: two auditoriums and two computer's rooms. The open ceremony of the capacity building will be host in the large auditorium with 250 seats available, since all the LOC and institution's representatives can take part of the ceremony. After that, the lectures are planned to take place in a second auditorium, with 60 seats available. This auditorium has the advantage to be in the Space Weather building, next to the computer's room, and to have a more adequate size to the number of attendants of the workshop.

During the workshop, the participants will have access to 100 Mb wireless Internet. Participants will be asked to bring their own computer, but eventually the host institution can provide them for some students. We are considering using open access software (mostly) and also licensed software. In case of the former, participants will be asked to download it before the workshop and a guide with the installation steps will be provided, for the second case the software will be provided via institutional licenses or by using the local computers. The students will use data available on the EMBRACE servers and from other Space Weather web portals.

The main lectures for Solar Physics, Interplanetary Medium, Geomagnetic Field and Earth Magnetism, and Ionized and Neutral Earth's Atmosphere are going to be defined and invited by the International Scientific Support Group which is working together with the Local Organizing Committee on this matter.

During the event all the attendees will be accommodated in shared rooms in the same hotel and the transportation between the hotel and INPE will be provided. The accommodation of the lecturers will be in the same hotel in individual rooms. The hotel will provide breakfast and internet access to students and lecturers.

The lunch and the dinner will take place inside the INPE campus.

We are expecting to expend around 48,000 EUR with the lodging and food, the international and from other Brazilian states transportation for all participants (students and lecturers), local city transportation, and minor general expenses. We are requesting COSPAR to contribute with the most part of it (around 25,000 EUR) and we are submitting projects for partial funding to our local funding agencies: Sao Paulo State Funding Agency for Scientific Research (FAPESP), Coordination of Improvement of Higher Level Personnel (CAPES), National Council for Scientific and Technological Development (CNPq), and Brazilian Society of Space Geophysics and Aeronomy (SBGEA) which should contribute with the total amount of 15,000 EUR up to 23,000 EUR. We are also requesting the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) for partial support (2,000 EUR).