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OPEN PROGRAMME AREA GROUP ON INTEGRATED OBSERVING SYSTEMS

INTER-PROGRAMME EXPERT TEAM ON SATELLITE UTILIZATION AND  
PRODUCTS

ITEM: 12.2

FOURTH SESSION

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**Report on COSPAR-WMO  
Training and Education collaborative activities**

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

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**Summary and Purpose of Document**

A COSPAR Capacity Building will feature a workshop on Space Weather, proposed by the Brazilian Institute for Space Research (INPE) to be in São Jose dos Campos in September 2018, co-sponsored by WMO. The renewal of the Memorandum of Understanding signed by COSPAR and WMO in 2012 and renewed in 2015, and its possible extension, is recommended.

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**ACTION PROPOSED**

The fourth session is invited to:

- (a) Take note of the information provided on the upcoming COSPAR capacity building workshop on Space Weather in Brazil in September 2018;
- (b) Confirm its recommendation to 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;
- (c) Recommend the renewal of the COSPAR-WMO Memorandum of Understanding about training and capacity building for another period of three years starting in 2019; and,
- (d) Make any other appropriate recommendation concerning a possible extension of the cooperation between COSPAR and WMO.

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**Appendices:** A. Space Weather Workshop: Report of the site visit

## 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 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 site<sup>1</sup>.

### Training events 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 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.

5. The Russian workshop was successfully held in August 2016 with a significant support from WMO. 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, then resubmitted in early 2017 and formally approved in late November 2017 by the Panel on Capacity Building, following a site visit by the former chair of the COSPAR Panel on Space Weather, Dr Alexi Glover from ESA (Appendix A). The workshop is firmly planned to be held at INPE in São Jose dos Campos (São Paulo), Brazil, on 17-28 September 2018.

7. The Brazilian project was presented to, and well received by, IPET-SUP-3 in May 2017. As a result, WMO is expected to disseminate information about the Workshop. WMO is further invited to participate in the selection of students and to contribute a grant for students and support for lecturers.

### Renewal of the COSPAR-WMO agreement

8. The COSPAR Panel on Capacity Building wishes to express its high appreciation of the contributions and support provided over the years by WMO in what represents a good number of training events of mutual interest, encompassing such disciplines as now atmospheric and ocean

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

sciences, land remote sensing, and space weather, in several countries of the world, including China, Thailand Russia and soon Brazil.

9. It is understood that the WMO contributions and support respond to the benefits for the meteorological community at large of being exposed to new data, techniques and tools at the forefront of space research, made available by the scientists who organize COSPAR Capacity Building workshops. The COSPAR-WMO agreement has also contributed to the WMO educational effort to address highly relevant space weather issues that are, and will more and more be, faced by meteorological satellite operators and users. From the COSPAR perspective, this 6-years old agreement has proven very useful and mutually beneficial.

10. Moreover, the WMO contribution and support has been useful to many students, and it is a great satisfaction that through their agreement, WMO and COSPAR have jointly helped a large number of enthusiastic young scientists from developing countries.

11. One additional aspect of COSPAR-WMO collaboration could be further explored. With its worldwide constituency and global network of National Weather Services and their associated research departments and laboratories, WMO could help establish contacts with entities which may be willing to host COSPAR fellows (see §3 above). This would not require any financial commitment on behalf of WMO, which could simply help identify people at NMHS, universities or research institutes willing to welcome selected students who attended joint capacity building workshops and possibly provide some small support for those fellows.

## **Conclusion**

12. COSPAR is eagerly looking forward to continuing its productive and rewarding collaboration with WMO in the years to come.

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Appendix A: Space Weather Workshop: Report of the site visit

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### ***Space Weather Science Towards Improved Forecasting, Brazil Capacity Building Workshop***

#### **Site visit: 16-17<sup>th</sup> November 2017.**

Present: Fabio Becker Guedes, Clezio De Nardin, Inez Batista, Joaquim Costa, Jose Cecatto, Rafael Mendonça, Carlos Braga, Claudia Candido, Fatima Usifatti, Livia Alves, Lígia da Silva, Marcel Banik, Cristiano Wrasse, Alexi Glover.

Absent: Odin Mendes Junior.

#### **1. Team introductions**

Team introductions were held. The workshop will be hosted by INPE, specifically the EMBRACE space weather programme.

Fabio Becker-Guedes will lead the workshop local organising committee with support of ~14 colleagues.

The Scientific organising committee will be nominated as soon as the workshop receives final confirmation from COSPAR following the site visit. A list of members has been drafted consisting of INPE staff, regional and international experts in space weather science and applications.

A brief separate meeting was arranged with the INPE director Ricardo Galvao who expressed his support for the meeting.

#### **2. Main aims and scope of the workshop including planned dates**

Aims and scope are as described in the proposal document.

The dates were agreed as being 17-28<sup>th</sup> September 2018

#### **3. Scientific Programme and coursework planning**

The overall scope and structure of the scientific programme was agreed. The SOC will be responsible for identifying suitable international lecturers.

Lectures will take place in the morning, hands-on training sessions and project work in the afternoon. Students will be grouped into international teams and will have an associated project tutor. The final day will include student presentations.

All lectures and student presentations will be given in English.

Projects will be defined prior to the workshop and are expected to consist of end-to-end analysis of a given period of space weather activity. The students will be tasked to present the event(s), their analysis and interpretation using both ground and space based observations and give a mock-up space weather briefing. A tutors meeting is scheduled for the 2<sup>nd</sup> day in order to finalise student teams and assign tutors per group prior to assigning projects.

All data to be used is freely available via the internet and analysis is expected to be carried out using free software such as Octave and SunPy (<http://sunpy.org/>).

#### **4. Application Process**

This will start in mid-January. A first draft of the website was presented. This will be finalised and made available by 10<sup>th</sup> January.

Students will be asked to provide CV, letter of recommendation from their institute, list of publications and a short letter of motivation explaining how the course will benefit their research.

The application process will be the same for all participants, and the application should be made in English.

Selection of successful candidates shall be made by the SOC. Candidates will primarily be selected based on scientific merit. The aim is for 50% Brazilian and 50% international participants.

## **5. INPE on-site facilities**

The local facilities for the meeting were reviewed. The Welcome sessions and Monday lectures will be held in a large (~200 seat auditorium). The lecture theatre used for the following lectures can accommodate 60 people with fixed seating, plus there is space for additional seating if needed. The room includes overhead projection facilities. Both are pictured in the INPE proposal.

Project work will be mainly carried out in the EMBRACE facilities. The institute has ~15 terminals which can be used by the students. If more are required, laptops can be provided. However, students will be asked to bring their own laptops where possible.

Two meeting rooms are equipped with desks, computers and seating for students to carry out project work during the afternoon sessions. A separate meeting room will be available for lecturers and tutors.

A short daily space weather briefing will be given by the local team utilising the EMBRACE CODE facility (pictured below). This will help illustrate to the students how current conditions are evolving with respect to expectations.

Internet connection at INPE is relatively fast. A dedicated network will be set up for the workshop allowing the students access to journals for which INPE has a subscription.

## **6. Proceedings/course material publication**

Publishing the lecture material after the event was discussed as a possibility to be investigated further.

Live-streaming the morning lectures was also discussed as a possible option, allowing those not able to participate in person to follow some aspects of the workshop. This would be subject to confirmation that the necessary facilities are available and agreement of the lecturers.

## **7. Travel, Visas and Accommodation**

The LOC will provide invitation letters where necessary.

INPE will arrange transfer of all participants from the airport in Sao Paolo. All lecturers are encouraged to stay for the full 2-week period. However, it's understood that some may need to arrive/leave during this time.

The Faro hotel has been pre-booked for the duration of the meeting for ~30-40 people.

Alexi stayed at the Faro during the visit. Accommodation standard and catering standard at the hotel is acceptable. The internet connection is fine for normal usage but likely not suitable for downloading large amounts of data so this will need to be done during the day at INPE as required.

Lunch will be held at a canteen premises within INPE. This is organised in buffet style and a separate area will be reserved for the workshop participants.

Dinner will be held at the hotel. A separate room has also been reserved for the students to work there during the evening.

## **8. Social/Cultural Programme**

A full social programme will be compiled including excursions over the weekend. Several ideas were discussed including:

- Historial tour of Sao Jose dos Campos

- Beach trip
- Traditional music

INPE also has on-site sports facilities which will be used for e.g. football tournament.

## 9. Budget

In addition to the COSPAR support, INPE have identified three sources of additional funding from different agencies. Due to the regular planning of these agencies, final confirmation of their support will be received late in the CBW planning (Apr-June). However, the LOC stress that this is usual practice and they are confident that support requests will be successful. Further support may be possible from the city and/or commercial sponsors and will be investigated. A detailed budget plan has been compiled and a small group assigned to work on mitigation planning in case of unforeseen issues including budget.

In addition, the following is noted:

- WMO: Fabio to contact T. Kurino to confirm that 1-2 lecturers will be supported by WMO.
- ESA: Alexi will ask whether the ESA science directorate would be willing to provide support for a lecturer
- NASA: E Talaat (Heliophysics, NASA HQ) will be approached about potential support for a lecturer.

## 10. COSPAR fellowship programme

The INPE team confirmed their strong interest to participate and will nominate someone from the LOC to follow up with the fellowship programme.

## 11. Advertising

The first version of the website including draft programme will be made available by the 10<sup>th</sup> January, and a first advertisement letter will be circulated to various institutes and mailing lists.

## 12. Schedule including key dates until workshop

10<sup>th</sup> Jan: first version of website and application period open: 31st March: Close applications and start review (online programme finalised in the meantime)

30<sup>th</sup> April: Finalise review and inform successful participants

17<sup>th</sup> Sept: Workshop takes place.



Figure 1: The Embrace Programme's CODE facility at INPE.