

Analysis of Data from Multisatellite Magnetospheric Missions

Beijing, May 4-13, 2004

COSPAR has recently initiated a series of Capacity-Building Workshops with the objective to develop the scientific skills of a small and carefully-selected group of young scientists from developing countries by a well-targeted programme of practical instruction in space data processing. The third workshop in this series took place in Beijing and was devoted to the analysis of data from multisatellite magnetospheric missions such as Cluster and Double Star.

This workshop was attended by 25 motivated PhD and post-doc students coming from China, India, Taiwan and Russia. The scientific programme concentrated on key satellite instruments and the basic analysis techniques for inferring physical information from the data. Morning sessions were devoted to tutorial lectures, and afternoon sessions consisted of hands-on computer exercises. During the latter, participants learned how to apply the techniques and the analysis software that had been addressed during the morning lectures, and discovered the various facilities that are available on the web (public archives, visualization tools, etc). Some of the topics were: magnetic field measurements, coordinated ground-space observations (with real time observations from Cluster, EISCAT and Cutlass), electric fields and their spectral analysis, MHD simulation support, storm and substorm phenomena, ...

After a first and very intensive week, the work culminated in the preparation of a scientific proposal by four teams that worked competitively. This activity strongly contributed to develop organizational and team-work skills among the students. On the last day, the teams defended their proposal to an international review panel, which was impressed by the students' accomplishments. During a final award ceremony led by COSPAR president Roger Bonnet, each student received a certificate of completion.

Although the students came from different backgrounds and had various expectations, the multilevel approach of the lectures and the computer sessions provided a very efficient means for getting everyone involved, thus ensuring that when the students return home they will be able to set up a working system with minimal support. The pedagogical skills of the lecturers and their strong involvement in the projects greatly contributed to this.

The lecture material of this workshop, together with the computer programmes and the data files have been put together in a single repository on data analysis techniques for space plasma physics, see the web page given below.

Lectures at this workshop were given by : Stuart Bale (University of Berkeley), Wolfgang Baumjohann (IWF, Graz), Stefan Buchert (IRF,Uppsala), Thierry Dudok de Wit (University of Orléans), You Qiu Hu (University of Science and Technology of China, Anhui), Robert McPherron (UCLA), Ondrej Santolík (Charles University, Prague), Joachim Vogt (International University Bremen), and Hua Zhao (CSSAR, Beijing). Most of the lecturers in addition acted as tutors for the project teams.

The sponsors of this school were : COSPAR (main sponsor), the Center for Space Science and Application Research (CSSAR), the Chinese National Space Administration (CNSA), the Chinese Science and Technology Association (CSTA), the Chinese Natural Sciences Foundation (CNSF), the Chinese Academy of Sciences (CAS), ESA, IAGA, ICSU, Mathworks Inc., NSF, UNESCO, and URSI.

This meeting would not have been so successful without the excellent support of the Center for Space Science and Applied Research (CSSAR), which provided an ideal venue, with a highly efficient computer environment. We would like to express our deepest gratitude to the members of the local organizing committee for their efforts spent in preparing this workshop, for their hospitality and for the social activities that were much appreciated by everyone.

For more information about the school, and for access to all the material, see
<http://www.faculty.iu-bremen.de/jvogt/cospar/cbw3/>

Wu Ji (CSSAR, Beijing)
Joachim Vogt (International University Bremen) Thierry
Dudok de Wit (University of Orléans)

May 19, 2004

**** text to be added in the expanded version of the COSPAR report ****

Lessons learned from this workshop

Teaching in such a short time a group of young students from various countries and with differing backgrounds is quite a challenge. Nevertheless, these COSPAR capacity building workshops have turned out to be remarkably efficient in fostering contacts between different communities and providing students with the basic tools for getting more involved in international space research projects.

Compared to similar meetings that were also dedicated to data analysis tools for space plasmas, we were surprised to discover how efficient the transfer of knowledge could be in such a ten-day workshop. There are several reasons for this.

- The lectures and the computer sessions were built on a multilevel basis, allowing students with various backgrounds to rapidly find the information they needed. It is important that the lecturers are not only experts in their field, but they must also be excellent tutors.
- Hands-on computer sessions proved to be essential for moving from theory to practice. In spite of their limited duration (4 hours per day) and the mixture of environments the students had to work in (IDL, Matlab and Fortran), the computer sessions were widely considered as one of the most efficient ways of learning how to use various resources that are available on the web. The cost of such computer sessions is high (rental of modern equipment, high speed access to internet, staff permanently on duty) but this is justified if they are effective - experience shows they are.
- Permanent contact between the students and with the lecturers is important, as it can eventually lead to long-term collaborations. Social activities and minor details such as having meals together should not be underestimated.
- Finally, getting all the students to work in small project teams and on a competitive basis was remarkably efficient in helping them develop team-work, and learn the basic rules of the proposal submission game they will have to play later.

The average cost per student for such workshops is quite high, since there is no registration fee, no accommodation costs and travel support is provided to those who ask for it. Such a strong level of support, however, has proven to be essential to attract young students who otherwise would have very little chance to ever attend such a workshop.