

COSPAR Capacity Building Regional Workshop for African Oceanographers
Ocean Remote Sensing: A Tool for Ocean Science and Operational Oceanography
Rabat, Morocco, 19 - 30 September 2005

The COSPAR series of Capacity Building Workshops is now in its fifth year. Three workshops on X-ray astronomy were held successively in Brazil (2001), India (2003), and South Africa (2004), and one on magnetospheric physics was organized in China (2004).

The 5th COSPAR Capacity Building Workshop, and the first one in geophysical sciences, had the objective to develop the scientific skills of a small and carefully selected group of young scientists from African countries. The Workshop was devoted to a well-targeted programme of practical instruction on ocean sciences and their applications with particular emphasis on the utilization of satellite data.

Nearly fifty years after the launch of the first artificial satellite, space research has contributed significantly to changing our vision of the Earth and universe, and progress in the means of observation from space has played a central role in furthering our knowledge of planet Earth. This progress has led to an improved understanding of the multi-scale processes in the atmosphere, ocean and biosphere. The increased power of computing systems initially allowed for the development of numerical weather prediction, and more recently of ocean general circulation models.

Like meteorologists before them, oceanographers are now on their way to establishing a network of operational forecasting centres at global, regional or local scales. This is one central challenge for the Global Ocean Observing System (GOOS), a joint program of the IOC, the WMO, and of their regional components.

The fifth workshop in the COSPAR Capacity Building series took place in Rabat, Morocco and aimed to encourage and develop use of ocean remote sensing and associated *in situ* data by scientists from Africa. The scientific themes were intended to foster use of altimetry, scatterometry, thermography and ocean colour data related to existing research and potential applications in the region. The workshop focussed on science for which ocean satellites are proving especially effective such as ocean currents, surface vector winds and waves, air-sea fluxes, marine biology, etc. The proper management of a series of threats mankind is or will be facing in the future depends on a better description of the ocean, and the consciousness of such challenges owes much to space research and in particular to the data gathered by weather and ocean observing satellites. For instance:

- Ocean circulation plays a regulating role on climate evolution at all scales. At basin scale, the El Niño Southern Oscillation in the Pacific Ocean has global impacts. Slower trends, such as the variation of mean sea level or the ocean uptake of carbon dioxide, will strongly influence climate evolution and impact the conditions of life of many species (including ours) on our planet,
- Maritime transport of oil and other harmful products is frequently causing accidental or deliberate marine pollution with severe ecological consequences,
- Marine leisure activities are developing rapidly with a significant economic weight,
- Fisheries face the challenge of a more rigorous stock management in order to protect endangered marine species,
- Offshore petroleum industry exploitation reaches ever deeper ocean fields, and,
- Alternative energy sources using ocean wind, waves, tides and deep cold water are being considered.

The scientific programme concentrated on key satellite systems and the basic analysis techniques for inferring physical information from the data. The time was, as on previous occasions, divided roughly

equally between lectures and practical exercises. Morning sessions were devoted to tutorial lectures, and afternoon sessions consisted of hands-on, computer-based practical exercises, using 26 modern workstations equipped with Matlab, Bilko and Seadas softwares. Participants learned how to apply the techniques and analysis software addressed during morning lectures and discovered the various resources available on the web (public archives, visualization tools, etc.).

The workshop was attended by 24 highly-motivated PhD and post-doctoral students (18 male and 6 female) coming from Algeria, Egypt, Ghana, Kenya, Mauritius, Morocco, Mozambique, South Africa, Tunisia, and Uganda, selected amongst 67 applicants. Although the students came with different backgrounds and various expectations, the multilevel approach of the lectures and the computer sessions provided a very efficient means of getting everyone involved, thus ensuring that when the students return home they are 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. Lecturers came from Belgium, France, Italy, Morocco, South Africa, Tunisia, the UK and USA. Most of them acted as tutors for the exercise of preliminary project formulation that took place in the last sessions, addressing scientific issues of regional interest in the Mediterranean Sea and the Atlantic and Indian oceans. Each student had been asked to prepare a poster in advance of the Workshop on his/her activities. Ms. Nathalie Burls, from the University of Cape Town, South Africa, was attributed the Best Poster Award.

The two main sponsors of the workshop were COSPAR and CRTS (Centre Royal de Télédétection Spatiale, Morocco). Other sponsors included ESA, IFREMER, IRD, ISPRS, Medias-France, Mercator Ocean, the European Commission MERSEA Project, the UK Met Office, UNESCO/IOC, CNES, and the University of Plymouth.

This workshop would not have been as successful without the outstanding support and contribution of CRTS, which provided an ideal venue with a highly efficient computer environment, and granted all participants with magnificent hospitality and a social program much appreciated by everyone.

More information and access to the workshop material is available at <http://cobrawo.mediasfrance.org>.

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