

COSPAR Capacity Building Workshop on Remote Sensing of the Global Water Circulation to Climate Change

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As the COSPAR Capacity Building Workshop series thrived its way to the year 2012, the 12th year anniversary of this event, the enchanting and fascinating city of Beijing witnessed the 16th COSPAR Capacity Building Workshop with the theme *Remote Sensing of the Global Water Circulation to Climate Change*.

The Workshop was jointly organized by COSPAR and the *National Space Science Center (NSSC)*, Beijing, and supported by *European Space Agency (ESA)*, *Asia-Pacific Space Cooperation Organization (APSCO)*, *World Meteorological Organization (WMO)*, *Chinese Academy of Sciences (CAS)*, *National Remote Sensing Center of China (NRSCC)*, *National Satellite Meteorological Center, China (NSMC)*, *National Satellite Ocean Application Service, China (NSOAS)*, *Fudan University (FDU)*, and *State Key Laboratory of Remote Sensing Science of the Institute of Remote Sensing and Digital Earth, CAS (RADI)*. The activities of this educational project were framed within the COSPAR Scientific Commission A on *Space Studies of the Earth's Surface, Meteorology, and Climate*.

37 students, selected out of 100 applicants, had the opportunity to receive the COSPAR Diploma at the *Closing Ceremony* directly from Professor Giovanni F. Bignami, President of COSPAR, and there were a dozen participants who attended the workshop on *ad hoc* basis. The students from 14 countries (Bangladesh, China, India, Indonesia, Iran, Malaysia, Mongolia, Pakistan, Peru, Poland, Sri Lanka, Thailand, Turkey and Vietnam) had been recommended by their home institutes and selected with competition by the organizers.

The Workshop lasted for 12 days from 3 to 14 September, 2012, during which period 15 lecturers from Europe, United States of America, Australia, Brazil and China, combined the theoretical aspects and practical sessions together to nurture the capacity of next generation scientists in the field of Remote Sensing and Water Circulation.

Academically, the Workshop specially stressed building the capability to handle real satellite data for various applications over land and ocean, mainly in relation to the water cycle. The programme included scientific and technological lectures related to the remote sensing principles, sensors, data processing, Calibration/Validation and retrieval algorithms, assimilation of remote sensing data and products in numerical prediction models, tutorials and specific aspects of the ESA SMOS (*Soil Moisture and Ocean Salinity*) and other missions, NASA SMAP (*Soil Moisture Active and Passive*) and AQUARIUS missions. The emphasis was on the practical hands-on dedication to the characteristics of these missions. Especially for SMOS, *ESA's Water Mission*, the Workshop extraordinarily benefitted from the presence of the core scientists of this mission, covering in detail all aspects of the different SMOS Levels data and products, full training on the appropriate ESA toolboxes and the specific SMOS data assimilation techniques in the ECMWF (*European Centre for Medium-Range Weather Forecasts*) model.

The Workshop was also a good opportunity to introduce the prestigious WMO VLab to the students. This was masterly done by Professor Oleg Pokrovsky as an Invited Lecture. *Virtual Laboratory for Training and Education in Satellite Meteorology* (VLab) is a global network of specialized training centers and meteorological satellite operators working together to improve the utilization of data and products from meteorological and environmental satellites. It was firstly developed by WMO in 1997 and subsequently endorsed by the *Coordination Group for Meteorological Satellites* (CGMS) in 2000. The key objective of the VLab is to improve the worldwide utilization of satellite data and products throughout WMO Members.

Apart from the lectures, there were three scientific/technical visits arranged, namely (i) NSSC (*National Space Science Center*), specifically, the *Key Laboratory of Microwave Remote Sensing* (NSSC/MIRS) and the *Operation Center and Data Center of the Meridian Project*, (ii) NSOAS (*National Ocean Satellite Application Center*) and (iii) RAD (Institute of Remote Sensing and Digital Earth, CAS (RADI)). Another significant institutional visit was to APSCO (*Asia-Pacific Space Cooperation Organization*) Headquarters. APSCO was one of the main sponsors of the Workshop since 31 of the students proceeded from APSCO Member States, namely Bangladesh, China, Indonesia, Iran, Mongolia, Pakistan, Peru, Thailand and Turkey. During this visit a brief introduction on APSCO activities was given and the participants were invited to an orientation tour to APSCO "*Exhibition Hall*" and other facilities. The graduates expressed their keen interest on the present and future activities of APSCO.

The Workshop was really rich in resources to its very end when we could enjoy the participation of Professor Giovanni Bignami, President of COSPAR, who presided over the *Closing Ceremony* giving the very last lecture on *COSPAR, a Platform for International Cooperation in Space*. More than 110 people among lecturers, students from the Workshop and officials from Sponsoring Institutions, as well as young scientists and students from NSSC attended the ceremony. In the end, 37 students from 14 countries around the world received the Diplomas delivered by Professor Bignami, who gave a high prize to both the Workshop content and organization and qualifying it as "*remarkable and successful*", manifesting his support to forthcoming editions in other countries. Previously to the *Closing Ceremony*, the Course could also enjoy a conference by Dr Mario Hernandez, Senior Programme Specialist for Remote Sensing activities at *Space for Heritage*, UNESCO. He was in Beijing involved at another remote sensing department from the *Chinese Academy of Science* and gladly accepted to give a talk on *Space Technologies for Natural and Cultural Heritage* which certainly caught the attention of all the attendants who got to know about a singular and remarkable application of space technologies to assist with monitoring UNESCO natural and cultural *World Heritage* sites.

Besides the complete and dense scientific and technical program arranged by the Scientific Committee of the Workshop, there were some extracurricular activities held by the *Local Organising Committee* that also made the stay unforgettable, such as for example, culture exchange and sports activities, culture visiting activities in the millenary, historical, beautiful and wonderful city of Beijing, ... and many other social activities. The purpose of holding this kind of activities, like in the previous COSPAR Capacity Building Workshops, was to build close relations

between the participants and solidify the community identity. The *Local Organising Committee* did an extraordinary and professional job in this matter as well.

We would first like to thank Professor WU Ji (NSSC), Chair of the Course; besides providing a perfect organization, his action was crucial to get the necessary resources to make the course successful. We also thank all the Sponsors of this activity -starting with COSPAR- for the support, guidance, assistance and help provided in all the phases of the Course, and ESA, for the continuous collaboration in its organization. Especially, we would like to thank Dr. Volker Liebig, Director of ESA's *Earth Observation Programmes*, ESA/ESRIN, Frascati, Italy, for the financial support and help provided with the ESA Toolboxes which upgraded and raised the standard of the Course. The significant support provided by *APSCO (Asia-Pacific Space Cooperation Organization)* through Dr. Zhang Wei, its Secretary-General and Mr. Nyamkhuu Tsoodol, Director General and Mr. Abdus Salam, Deputy Director General, *Department of Education Training and Database Management*, is greatly acknowledged here. They have provided the necessary financial support to most of the students of the region, 31 in total: Admirable! *The World Meteorological Organization (WMO)* has contributed through Dr Stephan Bojinski and Professor Oleg Pokrovsky who introduced VLab to the students. We also acknowledge the sponsorship of all Chinese Institutions and Agencies such as the *National Remote Sensing Center of China (NRSCC)*, the *National Satellite Meteorological Center, China (NSMC)*, the *National Satellite Ocean Application Service, China (NSOAS)*, *Fudan University (FDU)* and the *State Key Laboratory of Remote Sensing Science* of the *Institute of Remote Sensing and Digital Earth, CAS (RADI)*.

Once again, it is clearly manifest that an activity like this cannot be successful without the local organizers. And the success of this Workshop is noteworthy. The *Chinese Academy of Science (CAS)* has facilitated the generous action of the *National Space Science Center (NSSC)*, from its Director General, Professor WU Ji, to all the students who volunteered for the smooth development of all the activities. The *Local Organising Committee* was professionally coordinated by the *International Cooperation Department* of NSSC through Ms. LAN Li, Mr. XU YongJian and Ms. GAO Yanni, who poured themselves out and generously dedicated their efforts and attention to the lecturers and students of the Workshop.

All the Workshop participants abroad from China recognize and agree that we have been able to experiment and enjoy the hospitality of the Chinese people. Proudly this COSPAR Capacity Building Workshop on *Remote Sensing of the Global Water Circulation to Climate Change* incorporates to the history of the COSPAR Workshops (<http://cosparhq.cnes.fr/Meetings/Workshops.htm>).



Group photograph after the *Closing Ceremony*