ECOHYDROLOGY & HYDROBIOLOGY

DOI: 10.2478/v10104-012-0030-2

Vol. 12
No. 4, 269-270
2012
Editorial

Erasmus Mundus Master Course in Ecohydrology

Erasmus Mundus Master Course in Ecohydrology – an opportunity for global water education challenges

Luís Chícharo

Coordinator of the EMMC in Ecohydrology; Centre for Marine and Environmental Research (CIMA-UALG), University of Algarve, Campus de Gambelas, 8005-139 Faro, Portugal; e-mail: lchichar@ualg.pt

Aquatic ecosystem health has become a focus for global attention. Human population growth and climate variability are affecting both the quantity and quality of the water at a global scale. Despite the fact that Earth is the blue planet, only 3% of Earth´s total water is freshwater, and only 0.03% is both accessible and suitable for human use. Estuarine and coastal ecosystems are the end points of continental discharges and pollutants, and are also being impacted by sea level rise. The recognition of the dimension of the threat led major world regions and economies to establish, often recently, protective regulations such as the Water Framework Directive in Europe (2000), the Water Law of the People's Republic of China (2002) or the Clean Water Act in the USA (1972).

However, the understanding that sustainability of water ecosystems is the key to maintain water related goods and services, such as biodiversity, required the formulation of a new paradigm for global water resources. Ecohydrology, a new concept for water ecosystem management and sustainability has been developed under the International Hydrologic Programme (IHP) of UNESCO. The ecohydrology approach is based on the understanding of ecological and hydrologic processes at the river basin scale and how the interplay between those processes is responsible for sustaining ecosystem health in the long term.

Ecohydrology requires solid scientific knowledge and education in this thematic area is crucial, needed and required globally. In fact, ecohydrology is one of major pillars of the IHP, recognized by the 193 member states of UNESCO. The approval, in 2009 by the European Commission's Education, Audiovisual and Culture Executive Agency (EACEA) of the proposal to establish an Erasmus Mundus Master Course (EMMC) in Ecohydrology is a major contribution to education in water, and for the global development of this thematic area. This Erasmus Mundus Master Course in Ecohydrology brings together high quality students from all regions of the world and also attracts expert scholars who contribute to create a broad and global perspective on aquatic resources degradation, challenges and solutions. This special volume brings together several papers developed by the students of the EMMC in Ecohydrology, resulting from their Master Theses, or course assignments.

The papers selected for this special volume cover different topics, including urban, freshwater and coastal ecohydrology, and bioengineering. The paper by Negussie *et al.* (this issue) shows how ecohydrologic processes can be improved with the creation of a sequential biofiltration system that intensifies sedimentation, increases biogeochemical processes and uses vegetation to remove biogenic compounds. This system was implemented in Poland and in Ethiopia and permits, among others, to purify urban stormwater and wastewater. In line with this idea, the paper by Congying Li analyses the potential for applying ecohydrology concepts to control urban storm water logging, in a harmonized way with good urban design concept, in Beijing (China). The other papers deal with estuarine and coastal systems, e.g. Katarzyna Sroczynska and colleagues (this issue) evaluate the role mangrove oyster have in controlling water quality in Espirito Santo estuary (Brazil);

reduction of mangrove area due to human activities and sea level rise may affect water quality in these systems. Jeff Abrogueña *et al.* (this issue) demonstrate the impact of human activities such as dams and aquaculture farms on fish species assemblages in Philippine mangroves and suggest the restoration of mangrove area for the improvement of ecohydrologic functions and sustainability of fish diversity, coastal fisheries and mangrove nursery functions. Renata Gonçalves *et al*. (this issue) analyse, in the laboratory, the nursery habitat selection by estuarine fish larvae and suggest Guadiana estuary (Portugal) hydrodynamics and biological factors to be mainly responsible for the habitat selection. Teja Muha *et al.* (this issue) highlight how the dual regulation between hydrologic and biological processes can be harmonized with dams to control zooplankton assemblages and invasive jellyfish blooms at the Guadiana estuary; and Hadayet Ullah *et al*. (this issue) demonstrate how climate variability and continental contributions from Portuguese rivers are affecting major species abundance and availability to coastal fisheries, highlighting the need to sustain the integrated ecohydrologic functioning of rivers and coastal ecosystems.

With this special volume I want to thank to all the colleagues involved in the Erasmus Mundus Master Course in Ecohydrology, from University of Algarve (Portugal), University of Lodz (Poland), UNESCO-IHE Institute for Water Education (The Netherlands), Christian Albrecht University of Kiel (Germany) and University of La Plata (Argentina), and also to all scholars who shared their knowledge with us, and who came from China, Australia, India, Brazil, Saudi Arabia, Ethiopia, Canada, Indonesia, Egypt and United Kingdom. Mainly I want to thank the EMMC students for the effort and dedication to their studies, and I hope that this volume constitutes an incentive for their promising careers as young scientists in the very challenging research area of ecohydrology.