

suggest that both bottom-up and top-down ecological processes control the Guadiana Estuary ecosystem health. The estuarine ecosystem health requires transient river floods and is compromised by flow regulation by the Alqueva dam. Remedial ecohydrological measures are thus necessary. To make modelling techniques available to policy-makers and managers to test "what if" scenarios, several Graphical User Interfaces were developed to answer simple decision requirement in case of Harmful Algal Bloom - HAB risks in the river. Bottom-up and top-down processes regulating HABs events are tested and presented as elements for simple Decision Support System for managers.

### Location and date

The seminar will be held at the University of Algarve, Campus de Gambelas, Amphitheater Teresa Gamito on 11 December 2009.

### Organisation

*International Centre for Coastal Ecohydrology (ICCE)  
Universidade do Algarve  
Associação Portuguesa dos Recursos Hídricos  
International Association of Hydrogeologists  
Portuguese Chapter*

### Registration and Contacts

This event is free of charge but registration is mandatory. Due to high interest in this event reservation requests are subject to availability. Please send an e-mail with name of participant, institution to:

Prof. **José Paulo Monteiro**

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### Program

**14:00-14:30** Opening of the seminar with the presence of the Rector of the Universidade do Algarve, Prof. **João Guerreiro**, the President of the Administração de Região Hidrográfica of the Algarve, Eng<sup>a</sup> **Valentina Calixto** and Prof. **Jorge de Saldanha Matos**, President of the Associação Portuguesa dos Recursos Hídricos.

**14:30-15:15** Prof. **David Lerner**

*University of Sheffield/ Catchment Science Centre*

A history of catchment management: the River Don in England.

**15:15-16:00** Dr. **John Aldrick**

*Environment Agency - England and Wales*

Water Framework Directive - River Basin Plans, the journey so far.

**16:00 -16:30** Coffee break

**16:30-17:15** Dr. **Tibor Stigter**

*CVRM Geosystem Centre/ UALG/ IST*

Water Resource Management in the Algarve: influence on qualitative and quantitative status of coastal aquifers and adjacent wetlands.

**17:15-18:00** Dr. **Radhouan Ben-Hamadou**

*Centre of Marine Sciences (CCMAR) / International Centre for Coastal Ecohydrology (ICCE)*

Ecohydrology models to achieve river basin management

### Acknowledgements

In recognition of the longstanding ties between Britain and Portugal a joint research programme for specific projects between Portugal and Britain was initiated in 1986. As 1986 marked the 600th anniversary of the Treaty of Windsor, which is the oldest such agreement between any two member countries of the European Community, this scheme is called the Treaty of Windsor Programme. The organisation of this seminar acknowledge the Fundação para a Ciência e a Tecnologia and the British Council for their contribution for this event.



## Seminar on Conceptual to Practical Models of Water Management at the Scale of Regional Drainage Basins

11 December 2009

**UNIVERSIDADE DO ALGARVE**  
**Amphitheater Teresa Gamito**  
**Campus de Gambelas**  
**FARO**  
**Portugal**

**FCT** Fundação para a Ciência e a Tecnologia  
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR



The International Centre for Coastal Ecohydrology (ICCE), in collaboration with the University of Algarve (UALG), the Associação Portuguesa dos Recursos Hídricos (APRH) and the Portuguese Chapter of the International Association of Hydrogeologists (AIH-GP) has the pleasure to invite you for the seminar "***From Conceptual to Practical Models of Water Management at the Scale of Regional Drainage Basins***".

### General Framework

This event is the second of a series of thematic seminars dedicated to fill the gap between: (a) scientific research into understanding the hydrological and hydrogeological processes that operate in river basins and (b) the technical and engineering methods currently used to model and manage water and river basins. The discussion is therefore centred in the relation between technical and scientific issues and of course will be embedded in the ongoing development of River Basin Management Plans, which are required to implement the Water Framework Directive in all the countries of the European Community.

### Objectives

In this seminar we have the opportunity to share the experiences of **David Lerner**, Professor of Environmental Engineering at the University of Sheffield, and co-Director of the Catchment Science Centre. He will present a history of catchment management: the River Don in England as an example of how the Water Framework Directive is both new and also just old ideas. The Don and Rother catchment covers an area of approximately 1800 km<sup>2</sup> and is part of the Humber River Basin District.

The principal river in the catchment is the Don, the upper reaches and its tributaries have been

extensively impounded to create an extensive reservoir system used for public water supply. There is also a transfer of water into the network that supplies Sheffield from large dams. Further downstream between Sheffield and Doncaster the reaches are wide and deep reflecting their use for navigation. There is also a network of canals in this area.

Excluding public water supply abstraction there are currently about 370 abstractions from the Don and Rother catchment. The majority of these are for domestic use, with a smaller number for industry and agriculture. The major dischargers are wastewater treatment works that service the conurbations. These discharges make up a large proportion of the river flow by the time it reaches Doncaster. Water quality in the area has improved significantly since 1995. In response to these improvements, fish populations have also improved.

Currently 13% of surface water bodies in this catchment are achieving either good or potentially good status. The river basin management plans are proposing that by 2015, 26% compliance will be achieved, and this will have improved to 64% by 2027. To date 71% of water bodies have not yet been assessed.

Dr. **John Aldrick** (Water Resources Pressure Manager/ Environment Agency, UK) works in the Environment Agency - England and Wales, which is the body responsible for developing the River Basin Plans. He has been involved in the development of the River Basin Plans at all stages, from the initial characterisation, the Significant Water Management Issues, the draft plans, and now the final plans. According to its experience in this process Dr. John Aldrick will provide us with a general overview of UK experience of developing River Basin Plans.

Dr. **Tibor Stigter** (CVRM Geosystem Centre/ Technical University of Lisbon (IST) / University

of Algarve - UALG). This presentation aims to provide an overview of the influences of water resource management in the Algarve on the qualitative and quantitative status of coastal aquifers, as well as adjacent wetlands, which have been subject to more recent research. It is currently considered that the highly valuable coastal ecosystem of the Ria Formosa lagoon is affected by the discharge of nutrient-loaded groundwater from agricultural areas, some of which have been designated vulnerable zones in compliance with the Nitrates Directive. Other ecosystems are groundwater dependent and consequently may be threatened by a future increase in water consumption and scarcity, further enhanced by climate change. Several examples will be provided of how coastal aquifers have witnessed the evolution of surface and groundwater resource management in the Algarve.

Dr. **Radhouan Ben-Hamadou**. (Centre of Marine Sciences (CCMAR)/ International Centre for Coastal Ecohydrology (ICCE). Modelling at the sub-catchment or river basin level can combine the hydrological, ecological, environmental, economic and social aspects of water issues into an integrated framework. Whilst hydrological models simulating water balance elements are well developed, ecological and other water aspects models require significant improvement. An ecohydrological model is proposed here integrating physical, chemical and biological processes in the Guadiana Estuary during low flow conditions and that predicts the ecosystem health as determined by the following variables: river discharge, nutrients, suspended particulate matter, phytoplankton, zooplankton, bivalves, zooplanktivorous fish and carnivorous/omnivorous fish. Low flow conditions prevail now that the Alqueva dam has been constructed. The model is successful in capturing the observations of along-river changes in these variables. It