



## Organization

The International Symposium on Groundwater Sustainability is part of the Interacademy Panel's (IAP) Water Program for the triennium 2004-2006. The IAP has delegated in the Real Academia Española de Ciencias (Spanish Royal Academy of Sciences or RAC) the organization of the symposium.

The Spanish Ministry of Education and Science supports the celebration of the Symposium in Spain and has subscribed an agreement with the RAC through the Instituto Geológico y Minero de España (IGME or Spanish Geological Survey). The IGME is responsible for coordinating the organization and logistics of the symposium.

## Scientific Committee

- ▶ **Ramón Llamas**, Real Academia Española de Ciencias, Chairperson
- ▶ **Alice Aureli**, UNESCO
- ▶ **Ricardo Hirata**, Academia Brasileira de Ciencias
- ▶ **Juan Antonio López Geta**, Instituto Geológico y Minero de España
- ▶ **Luis Marín**, Academia Mexicana de Ciencias
- ▶ **Jennifer McKay**, University of South Australia
- ▶ **Stephen Ragone**, US National Ground Water Association
- ▶ **Abdin Salih**, UNESCO
- ▶ **Tushaar Shah**, International Water Management Institute, Sri Lanka
- ▶ **Henry Vaux**, US National Academy of Sciences
- ▶ **Nuria Hernández-Mora**, Coordinator
- ▶ **África de la Hera**, Coordinator

## Local Committee

- ▶ **Manuel Alcalde Sánchez**, Comisario, Confederación Hidrográfica del Júcar
- ▶ **Manuel Aldeguer Sánchez**, Comisario, Confederación Hidrográfica del Segura
- ▶ **José Miguel Andreu**, Universidad de Alicante
- ▶ **Ramón Aragón**, IGME – Murcia

- ▶ **Bruno Ballesteros**, IGME – Valencia
- ▶ **Concha Bru**, Universidad de Alicante
- ▶ **Antonio Estévez**, Universidad de Alicante
- ▶ **José Antonio Pina**, Universidad de Alicante

## Organizing Committee

- ▶ **Ramón Coy**, Ministerio de Educación y Ciencia, Spain
- ▶ **Ramón Llamas**, Real Academia Española de Ciencias
- ▶ **Juan Antonio López Geta**, Instituto Geológico y Minero de España
- ▶ **Jesús Yagüe**, Ministerio de Medio Ambiente, Spain
- ▶ **Stephen Ragone**, US National Ground Water Association

## Registration information

Symposium dates: January 24-27, 2006

Early Bird registration deadline: December 1st, 2005

The following registration fees are applicable:

Standard rate:	150€
Early bird registration:	125€
IAP members:	100€
Students (proof of status required):	35€

Registration entitles attendees to a CD Rom including speaker presentations and to attend scheduled social events. IAP members and invited speakers are also entitled to attend the scheduled field trip.

## Symposium Publications

Proceedings from the Symposium, including reports from the round table discussions, will be collected in a final symposium publication. Details on this publication will be available at a later date.

A CD-ROM with the preliminary texts by the invited speakers and panelists will be delivered to attendees at the beginning of the Symposium.

## Symposium Venue

The congress will be held at the University of Alicante, a mid-sized city on the Mediterranean coast in southeastern Spain. The weather is usually mild and warm, even in late January.

Alicante has an excellent public transportation system and world class accommodation and leisure facilities. The city has an international airport and can be accessed by train or interstate from Madrid or Barcelona. Information on various types and prices of accommodations will soon be available in the symposium's website.

## Languages

Spanish and English. Simultaneous translation services will be provided.

## Symposium Secretariat

Nuria Hernández-Mora  
África de la Hera  
ISGWAS. International Symposium on Groundwater Sustainability

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## With the collaboration of

- ▶ US National Ground Water Association
- ▶ UNESCO
- ▶ US National Academy of Sciences
- ▶ Academia Mexicana de Ciencias
- ▶ Academia Brasileira de Ciencias  
(Other institutions to be confirmed)



The Spanish Royal Academy of Sciences

on behalf of

The Interacademy Panel on International Issues

Alicante, Spain,  
January 24-27, 2006



# International Symposium on Groundwater Sustainability (ISGWAS)

Organized by:



First Announcement

Those interested in participating in the International Symposium on Groundwater Sustainability should fill out this registration form and send it by post or e-mail to:

CONGRESS SECRETARIAT  
ISGWAS. International Symposium on Groundwater Sustainability  
Instituto Geológico y Minero de España  
Ríos Rosas, 23  
28003 Madrid (Spain)  
E-mail: [isgwas.nhm@igme.es](mailto:isgwas.nhm@igme.es)

Payment must be made through bank transfer to:

Instituto Geológico y Minero de España  
Banco Santander Central Hispano  
C/ Ríos Rosas 40  
28003 Madrid (Spain)  
Account N°: 0049 3026 80 2114353997

The following registration fees are applicable:

Standard rate:	150€
Early bird registration:	125€
IAP members:	100€
Students (proof of status required):	35€

Early Bird registration deadline: December 1st, 2005

Registration fee includes welcome cocktail and farewell buffet dinner

# Introduction

Groundwater is an integral part of most water supply systems worldwide. It is a key resource for human use, irrigation and industry, and also provides a wide variety of other ecological and social services. The importance of groundwater is particularly significant in arid and semi-arid countries that increasingly depend on groundwater to supply their water needs, mainly for irrigation.

The development of groundwater resources has largely been the result of the initiative of millions of individual farmers and small municipalities throughout the world that have sought the resource often with little or no public intervention or oversight. This *silent revolution* has brought about innumerable social and economic benefits. But lack of effective supervision and control of these developments has often resulted in unintended negative ecological, economic and social consequences that may render them unsustainable over the long term.

It is in this context that the Interacademy Panel's (IAP) *International Symposium on Groundwater Sustainability* (ISGWAS) is particularly relevant at this time. Achieving the long-term sustainable use of groundwater resources will depend as much on understanding socioeconomic forces as well as on effectively monitoring and modeling climatic and hydrogeologic conditions. We need to develop adequate monitoring and information networks. But it is also imperative to understand what institutional arrangements, economic incentives, legal structures and educational initiatives can be developed to insure the long-term sustainability of groundwater development and use throughout the world.

The *International Symposium on Groundwater Sustainability* (ISGWAS) will bring together experts from different disciplines and regions of the world in Alicante, southeastern Spain, to discuss challenges and propose solutions to contribute to the long-term sustainability of groundwater resources.

# Program

## Tuesday, January 24

9:30 **Registration**  
 11:30 **Opening ceremony**  
 12:30 **Inaugural lecture**  
 "The Essential Role of Groundwater in Overall Water Resources Policy"  
**Dr. Ramón Llamas, Spanish Royal Academy of Sciences**  
 13:00 Lunch  
**Theme I: The Science of Hydrogeology: Current Innovations and Trends**  
 14:00-16:00 **Keynote speakers**  
 "The Post-Modern Water Balance and its Role in Groundwater Management"  
**Dr. Stephen Ragone, National Ground Water Association, USA**  
 "Current Trends in the Modelling of Heterogeneous Systems, with Examples Taken from Different Aquifer Types"  
**Dr. Ghislain de Marsily, École des Mines de Paris, France**  
 "Economics and Groundwater's Roles in Systemwide Management"  
**Dr. Jay Lund, University of California-Davis, USA**  
 16:00 h. Coffee break  
 16:30-18:30 **Round table**  
 "Urban Hydrogeology in Developing Countries: Chronicle of a Foreseen Crisis"  
**Dr. Ricardo Hirata, University of Sao Paulo, Brasil**  
 "Groundwater Management in Arid Zones: Emphasis on Qanat Systems"  
**Dr. Abdin Salih, UNESCO, Irán**  
**Dr. Jay Lund**  
**Dr. Ghislain de Marsily**  
**Dr. Stephen Ragone**  
 19:00 Welcome cocktail

## Wednesday, January 25

**Theme II: Groundwater Economics: Experiences Throughout the World**  
 9:00-11:00 **Keynote speakers**  
 "The Economics of Ground Water Management and the American Experience"  
**Dr. Henry Vaux, US National Academy of Sciences**  
 "Groundwater Irrigation in south Asia and North China: The Challenge of Managing a Collosal Anarchy"

**Dr. Tushaar Shah, International Water Management Institute, Sri Lanka**  
 "Groundwater's Role in Managing Water Scarcity in the Mediterranean Region"  
**Dr. Alberto Garrido, Universidad Politécnica de Madrid, Spain**  
 Coffee break  
 11:00 **Round table**  
 11:30-13:30 "From Groundwater to Wealth for One-Acre Farmers in Developing Countries"  
**Dr. Paul Polak, International Development Enterprises, USA**  
 "The Mexican Experience on Groundwater User Groups"  
**Dr. Oscar Escolero, Universidad Autónoma de México**  
**Dr. Henry Vaux**  
**Dr. Tushaar Shah**  
**Dr. Alberto Garrido**  
 13:30 Lunch  
**Theme III: The Ecological Implications of Groundwater Use**  
 14:30-16:30 **Keynote speakers**  
 "Groundwater Protection and Pollution"  
**Dr. Emilio Custodio, IAH Past President, Spain**  
 "Groundwater and Ecosystem Services"  
**Dr. Ger Bergkamp, IUCN Switzerland**  
 "Water Security and Ground Water in North China"  
**Dr. Jun Xia, Institute of Geographic Sciences & Natural Resources Research, Chinese Academy of Sciences**  
 16:30 Coffee break  
 17:00-19:00 **Round table**  
 "Coastal Aquifers: The Problem of Saltwater Intrusion, its Protection and Remediation"  
**Dr. Juan Antonio López Geta, IGME, Spain**  
 "Impact Assessment of Groundwater-Fed Wetlands"  
**Dr. Mike Acreman, Centre for Ecology and Hydrology, Wallingford, UK**  
**Dr. Emilio Custodio**  
**Dr. Ger Bergkamp**  
**Dr. Jun Xia**

## Thursday, January 26

**Theme IV: Information, Education and Conflict Prevention**  
 9:00-11:00 **Keynote speakers**  
 "The Role of the Academies of Science for Improved Groundwater Governance"

**Dr. Luis Marín, Universidad Nacional Autónoma de México**  
 "The Role of Groundwater in the Water Conflict and Resolution between Israelis and Palestinians"  
**Dr. Jad Isaac, Applied Research Institute-Jerusalem, Palestine**  
 "Groundwater Education in Spain: IGME Initiatives"  
**Dr. Gerardo Ramos, IGME, Spain**  
 Coffee Break  
 11:00 **Youth Groundwater Symposium**  
 11:30-13:30 Lunch  
**Theme V: Institutions for Groundwater Management**  
 14:30-16:30 **Keynote speakers**  
 "Groundwater Market and Agrarian Change in West Bengal, India"  
**Aditi Mukherji, Cambridge University, UK**  
 "Groundwater as the Cinderella of Water Institutions in Australia"  
**Dr. Jennifer McKay, University of South Australia**  
 "Politics and Institutions for Groundwater Management in a Systemwide Context"  
**Dr. Eran Feitelson, Hebrew Uniiversity of Jerusalem, Israel**  
 Coffee break  
 16:30 **Round table**  
 17:00-19:00 "Groundwater Use Rights Inventory in Spain: The Alberca Program"  
**Jesús Yagüe, Ministerio de Medio Ambiente, Spain**  
 "Is self regulation the way forward? Groundwater governance in Spain"  
**Dr. Elena López Gunn, London School of Economics, UK**  
 "Unpacking Groundwater Governance Through the Lens of a Trialogue"  
**Dr. Anthony Turton, Council for Scientific and Industrial Research, South Africa**  
**Aditi Mukherji**  
**Dr. Jennifer McKay**  
**Dr. Eran Feitelson**  
 21:00 Farewell buffet dinner

## Friday, January 27

8:30-18:00 **Field trip**  
 "Water management in Alicante: Hydrogeology, Economics, Environment and Institutions"  
 The field trip is open to IAP members, sponsors and invited speakers and panelists only.

# International Symposium on Groundwater Sustainability

Registration Form



Last Name \_\_\_\_\_ First Name \_\_\_\_\_  
 Institution or Company \_\_\_\_\_  Standard registration  
 Student  IAP Member \_\_\_\_\_ City \_\_\_\_\_  
 Address \_\_\_\_\_ Country \_\_\_\_\_  
 Province \_\_\_\_\_ Do you plan to attend: Welcome cocktail  Yes  No  
 e-mail \_\_\_\_\_ Farewell buffet dinner  Yes  No

Please include proof of payment with registration form

