

INTERNATIONAL TRAINING WORKSHOP ON GROUNDWATER MODELLING FOR ARID AND SEMI-ARID AREAS

June 11-17 2007

Cold and Arid Regions Environmental and Engineering Research Institute
Chinese Academy of Sciences (CAREERI/CAS)
Lanzhou, China



Organized by
CAREERI/CAS
G-WADI IHP-UNESCO

INTRODUCTION: UNESCO's program for Water and Development Information for Arid Lands - A Global Network (G-WADI) was established following the 15th session of the Intergovernmental Council of the International Hydrological Programme (IHP). G-WADI's concept and objectives were developed by experts from 17 countries representing water authorities and institutions related to arid zones.

Globally, arid and semi-arid areas face the greatest pressures to deliver and manage freshwater resources. Challenges facing water managers in these areas include population growth, agricultural expansion, salinity increases, and agricultural/urban pollution. Goals include resource availability, equity in water management, and strategies to support peace and security.

G-WADI's strategic objective is to strengthen the global capacity to understand water system and manage water resources in arid and semi-arid areas by a global community. Its primary aim is to build an effective global community through integration of selected existing materials from networks, centers, organizations, and individuals who become members of G-WADI. The network promotes international and regional cooperation in arid and semi-arid areas.

Specific objectives include:

- improved understanding of the special characteristics of hydrological systems and water management needs in arid areas
- capacity building of individuals and institutions, matching supply with need
- broad dissemination of understanding of water in arid zones to the user community and the public
- sharing data and exchanging experience to support research and sound water management
- raising awareness of advanced technologies for data provision, data assimilation, and system analysis
- promoting integrated basin management and the use of appropriate decision-support tools

In consideration of the primary impact of groundwater on the water cycle in arid region, a training workshop on groundwater modelling has been repeatedly proposed in G-WADI international symposiums during 2005 and 2006. As a major force engaging in hydrological and water resources research for arid areas in China, CAREERI/CAS will organize the International Training Workshop on Groundwater Modelling for Arid and Semi-Arid Areas during June 11-17 2007, in collaboration with the G-WADI committee of UNESCO.

INTERNATIONAL TRAINING WORKSHOP ON GROUNDWATER MODELLING FOR ARID AND SEMI-ARID AREAS

The ground water is a major component of water resource in arid regions. Additionally, the interaction between ground and surface water is very complex in arid regions. Computer models and other new technologies such as isotope are providing quantitative tools for characterizing these processes.

A better understanding of ground water dynamics through the proper use of groundwater modelling tools will help people to manage precious water resources in watersheds of arid areas.

Ground water modeller, government and watershed manager and decision maker, scientist, graduate student, and local stakeholder are the potential participants for this training workshop. Members of G-

WADI Asia network are also expected to attend this workshop and the following special Asian meeting.

The aim of the proposed workshop is to transfer the technology in ground water modelling and introduce the latest development in this field. The participants will be trained by world class experts in the field of ground water research. They also will be equipped with up-to-date modelling tools, web materials, and a connection with good expertise, which will enable them to have new insights into how to use ground water more appropriately in arid regions.

G-WADI Committee, UNESCO regional offices (Beijing, Almaty, Delhi and Tehran), and CAREERI/CAS are extending financial contribution for organizing this training course.

See appendix 1 for brief introduction to the presented experts.

WORKSHOP PROGRAMME

The topics of this workshop include (1) groundwater modelling in arid areas, (2) the application of stochastic groundwater modelling in arid areas, (3) isotope techniques in groundwater research in arid areas, and (4) the interaction of surface water and groundwater and the modelling in arid areas. Detailed programme see as following.

MONDAY JUNE 11

- 09:00 – 09:30 **Howard Wheater, Xin Li:** Welcome, introduction to Workshop & participants
- 09:30 – 10:00 **Howard Wheater:** Discussion on use of models with workshop participants
- 10:00 – 10:30 **Howard Wheater:** Hydrological processes, recharge and surface water-groundwater interactions in arid and semi arid areas
- 10:30 – 11:00 Tea break
- 11:00 – 12:30 **Waleed Al-Zhubari:** Groundwater modelling in arid and semi-arid areas-management context and state-of-the-art tools
- 12:30 – 13:30 Lunch
- 13:30 – 15:00 **Craig Simmons:** Modelling and management of salt water intrusion 1-state-of-the-art
- 15:00 – 15:30 Tea break
- 15:30 – 17:00 **Craig Simmons:** Modelling and management of salt water intrusion 2-applications
- 17:30 – 19:00 Dinner
- 19:30 – **Craig Simmons, Waleed Al-Zhubari:** Software, case study demos, workshops

TUESDAY JUNE 12

- 09:00 – 11:00 **Mike Edmunds:** Geochemical and isotopic tracers as tools for groundwater systems analysis
- 11:00 – 11:30 Tea break

11:30 – 13:00 **Wolfgang Kinzelbach:** Groundwater quality modelling and management 1
13:00 – 14:00 Lunch
14:00 – 15:30 **Wolfgang Kinzelbach:** Groundwater quality modelling and management 2
15:30 – 16:00 Tea break
16:00 – 16:45 Case Study 1: Africa
16:45 – 17:30 Case Study 2: China
18:00 – 19:00 Dinner
19:30 – **Craig Simmons, Waleed Al-Zhubari & Wolfgang Kinzelbach:** Software, case study demos, workshops

WEDNESDAY JUNE 13

09:00 – 10:30 **Jesus Carrera:** Stochastic methods in groundwater modelling 1
10:30 – 11:00 Tea break
11:00 – 12:30 **Jesus Carrera:** Stochastic methods in groundwater modelling 2
12:30 – 13:30 Lunch
13:30 – 15:30 **Adrian Butler:** Stochastic methods for aquifer protection and management
15:30 – 16:00 Tea break
16:00 – 17:00 **Shakeel Ahmed:** Case Study 3: India
17:30 – 18:30 Dinner
21:00 – Field trip: travel to the Heihe River Basin by train

THURSDAY JUNE 14

05:30 – Arrive at the Zhangye station
(Whole day) Field trip
21:30 – Return to Lanzhou

FRIDAY JUNE 15

09:00 – 10:30 Short presentations of case studies from participants
10:30 – 11:00 General discussion
11:00 – 11:30 Tea break
11:30 – 12:30 Break-out groups – workshop conclusions
12:30 – 13:30 Lunch
13:30 – 14:30 Break-out groups – workshop conclusions
14:30 – 15:30 Break-out groups report / Workshop closure
15:30 – 16:00 Tea break

16:00 – 17:00 Speakers meeting – meeting review/web publication / book publication/discussion of next steps
18:00 – 20:00 Dinner

JUNE 16-17

(2 days) G-WADI Asia meeting

METHODOLOGY: During the programme, participants will be exposed to concepts through lectures presentations, discussions, case study and PC training to advanced modelling techniques. Participants will travel to the Heihe River Basin (see appendix 2), a typical inland river basin in West China, for field experiment. Participants will be encouraged to bring data and work on a real case study of their own to make presentation to the other audiences.

FACULTY: The faculty members from UNESCO/G-WADI, G-WADI Asia Network, UNESCO regional offices, CAREERI/CAS, and local universities will conduct the lectures and practical sessions.

WORKING LANGUAGE: English

BOARDING AND LODGING:

Participants will be picked up at the Lanzhou Airport. Reservations for accommodation will be made for participants at both Lanzhou Hotel (4 stars) and Guest House of CAREERI.

Standard furnished double bed rooms (in Lanzhou Hotel) and single bed rooms (in Guest House of CAREERI) are provided to participants. The basic condition includes 24 hours hot water, breakfast, separate bath room, colour TV. Food (Lunch and Dinner) will be served. If there is any special requirements for food please indicate your preference to the workshop local organizer who will try to satisfy your need.

VENUE

The Conference will be held at the CAREERI/CAS, which is about 10-min walk from the Lanzhou Hotel. CAREERI/CAS is a newly re-organized institute in June 1999 from three institutes of Chinese Academy of Sciences in Lanzhou: Institute of Glaciology and Geocryology, Institute of Desert Research and Institute of Plateau Atmospheric Physics. This new institute aims at disciplinary integration and scientific synthesis, plus reserving unique and distinguished disciplines such as permafrost, glaciology, and arid region hydrology. Now there are over 260 full-time employees, with 55 titled as professor, in this institute.

Wireless Internet coverage is available in the workshop place. See appendix 3 and 4 for information on the map of workshop venue and hotel and about the city of Lanzhou.

TRAVEL EXPENDITURES:

The travel expenditures of international experts to Lanzhou will be covered by G-WADI Committee. For Asian G-WADI members, you may try to get support for travel from your organization or try to apply for partial support from the regional UNESCO Office or other donors. Local organizer will be happy to cover your local expenses (board and lodge) at Lanzhou.

EXPENDITURE TO BE BORNE BY PARTICIPANTS/NOMINATING AGENCIES:

Daily Subsistence Allowances (DSA) if any, cost incurred by participants with respect to medical insurances, loss or damage to personal property, compensation in the event of death or disability of participants while attending the workshop and any other claim by the participants towards any other expenses incurred during the program and travel; also, in the event of hospitalization during the program, the participants have to bear the related expenditures.

INSURANCE

All the participants are advised to take adequate insurance towards health, medical, accident or any other health related incidences/cases during their stay in China, UNESCO and CAREERI/CAS shall not be responsible for such expenses.

Interested participants should send their application in the appendix 5 duly forwarded and recommended by the National IHP Committee / UNESCO National Commission

APPLICATION SHOULD REACH CAREERI/CAS WITH A COPY TO UNESCO OFFICE BEIJING BY MARCH 31, 2007.

LOCAL CORRESPONDENCE

Professor, Dr. Xin Li
Cold and Arid Region Environmental and Engineering Research Institute,
Chinese Academy of Sciences
E-mail: lixin@lzb.ac.cn
Office telephone: +0086-931-4967249
Fax: +0086-931-8279161
Cell phone: +0086-13993176251

Associate Professor, Dr. Zhuotong Nan
Cold and Arid Region Environmental and Engineering Research Institute,
Chinese Academy of Sciences
E-mail: nztong@lzb.ac.cn
Office telephone : +0086-931-4967298
Fax : +0086-931-8279161
Cell phone: +0086-13008757351

APPENDIX 1: BRIEF INTRODUCTION TO PARTIAL EXPERTS

Shakeel Ahmed

Senior scientist at National Geophysical Research Institute (NGRI), India. At present, he heads the Indo-French Centre for Groundwater Research from Indian side.

(photo)

Adrian Butler

(information absence)

(photo)

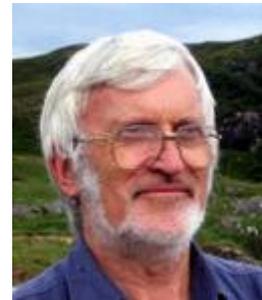
Jesús Carrera

Professor of Civil Engineer in Technical University of Madrid. He is acknowledged for significant contributions to groundwater resources modelling and management. He has co-authored more than 200 publications, including more than 30 in international refereed journals. His main expertise is in Stochastic methods in groundwater modelling. He has been awarded several prizes: Gomez-Navarro (1979), Rafael Escalona (1979), INAPE (1981), Harshbarger (1983), Royal Academy of Sciences (1993) and silver medal (1998).



W. Mike Edmunds

Research Director and professor of the Oxford Centre for Water Research in Oxford University. Honorary Research Associate, British Geological Survey (Hydrogeology), Wallingford. Distinguished Research Associate. His main expertise is in water quality issues, especially groundwater, hydrogeochemistry and palaeohydrology. He has been involved in the supervision of 12 PhD theses in UK and overseas and has evaluated theses in several European countries as well as UK. In 1999 he received the Whitaker Medal of the Geological Society for his achievements in hydrogeology. In October 2001 he gave the Society's Ineson Lecture.



Wolfgang Kinzelbach

Professor and Director of institute of Hydromech & Water Resources Management in Swiss Federal Institute of Technology. Member of Water Research Commission of DFG, Member of ETH research commission, and Visiting Professor at University of Oslo. His main expertise is in water resource management and contamination controlment.



Craig Simmons

Professor in Hydrogeology of School of Chemistry, Physics & Earth Sciences in Flinders University of Australia. Academic Coordinator Centre for Groundwater Studies . Managing Editor of the international scientific journal Hydrogeology Journal, the official journal of the International Association of Hydrogeologists (IAH). Academic Coordinator Centre for Groundwater Studies, Chair of School Courses and Curricula Committee, School Space Committee, and School Information Technology Committee.



Howard Wheeler

Professor of Hydrology and Head of the Environmental and Water Resource Engineering Section in Imperial College London and Director of the Hydrology postgraduate programme. He is past-President of the British Hydrological Society, a Fellow of the Royal Academy of Engineering, a Fellow of the Institution of Civil Engineers, and is a life member of the International Water Academy (Oslo).



Waleed Khalid Al Zubari

President of the Water Sciences and Technology Association, and Vice Dean of the college of Graduate Studies, Arabian Gulf University. His main expertise is in groundwater resources.

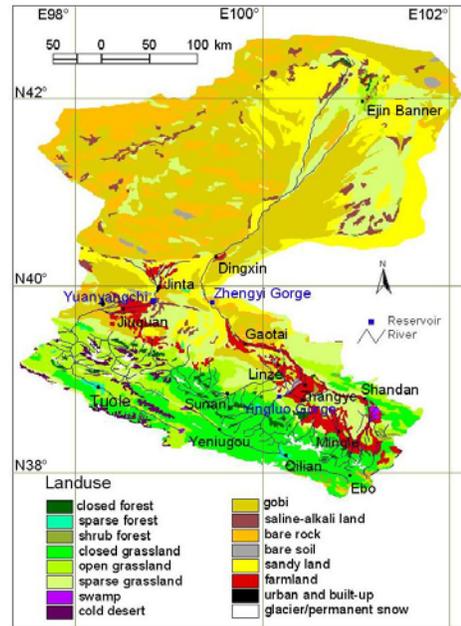
(Photo)

APPENDIX 2: HEIHE RIVER BASIN

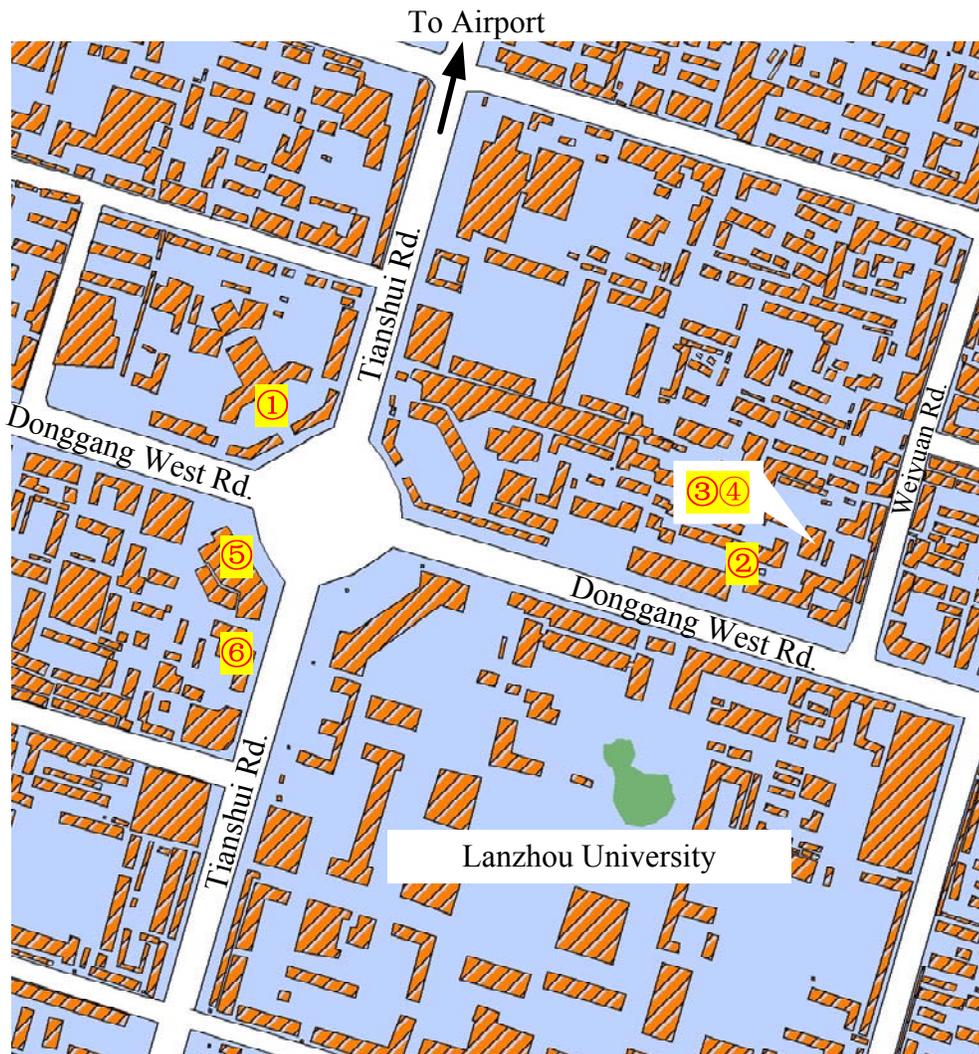
The Heihe River Basin (HRB: following figure) is the second largest inland river basin, with an area of 140 000 km², in arid and semi-arid areas in Northwest China.

The HRB is located between 96°42' ~ 102°00'E, 37°41' ~ 42°42'N, originating from middle branch of Qilian Mountain. (see the figure on left)

The HRB lies in the zone between the Qinghai-Tibet plateau and Mongolia plateau. The elevation is falling down from south to north as well as from west to east. There are high mountain, oasis, gobi and desert in the basin. Based on the elevation distribution, the land forms can be classified into alpine glacier-snow-frozen-soil zone in the Qilian Mountains, hilly grassland-forest zone in the Qilian Mountains, plain agricultural zone in corridor oasis and desert-grassland zone in the downstream area. The elevation of alpine glacier-snow-frozen-soil zone ranges from 2 500 to 4 000 m; there are snow and glaciers in the zone above 4 000 m all the year around. The hilly grassland-forest zone distributes in the elevation between 2 300 to 3 400 m in the Qilian Mountains area; there are dense forest composed of shrubs and arbors. With the distribution of forest for conservation of water supply, hilly grassland-forest zone is also the runoff generating area of the HRB. With the elevation ranging from 1 000 to 2 000 m, the agricultural zone is the main runoff-consuming area. The elevation of desert-grassland zone ranges from 1 000 to 1500 meters. (The landuse map show on left)



APPENDIX 3: A SIMPLIFIED MAP OF WORKSHOP VENUE



- ① Lanzhou Hotel
- ② CAREERI/CAS
- ③ Guest House of CAREERI
- ④ Workshop venue
- ⑤ Legend Hotel
- ⑥ China Bank (for currency exchange)

APPENDIX 4: LANZHOU CITY

Lanzhou (36°5'N, 103°88'E, 1518 meters or 4980 feet above sea level), the capital city of Gansu Province, identified as the geometrical center of China, is a center in the northwest China in terms of transportation, telecommunication and the Silk Road tourism ring. With an area of 1631.6 square kilometers (629.96 square miles), Lanzhou has a population of 3.14 million, including a number of nationalities such as Han, Hui, Bao'an, Dongxiang, Tibetan, Yugu and Sala etc.

Lanzhou is a key point connecting the central China with the western areas, known as the most important city on the ancient Silk Road, neighbouring Maiji Caves to the east, Bingling Thousand Buddha Caves to the west, Labrang Monastery to the south and Dunhuang Mogao Caves to the north.

The topography of Lanzhou is formed by three parts. They are valleys, basins, hilly land and Huangtumao ditch and gully area. The Yellow River is flowing through the whole city. Most parts of the area are semi-dry climate in the temperate zone.

Attractions/ theme parks:

Watermill Park
White Pagoda Park
Five-Spring Mountain Park
Dongfanghong Square
Shifogou National Forest Park
Xinlong Mountain Park

Shopping:

Ya'ou shopping center
Guofang shopping center

Climate:

	June
 Avg. Temperature	70F/21°C
 Avg. Max Temperature	82F/28°C
 Avg. Min Temperature	58F/14°C
 Avg. Rain Days	8
 Avg. Snow Days	0

APPENDIX 5: REGISTER SHEET

**International Training Workshop on
Groundwater Modelling for Arid and Semi-arid Areas**

**June 11-17, 2007
CAREERI/CAS, Lanzhou, China**

1. Name:
2. Date of Birth and Gender (M /F):
3. Designation
4. Name of the Nominating authority:
5. Educational Qualification:
6. Previous knowledge of groundwater modelling:
7. Motivation for attending the Course and future plans:

8. Address for contact:

Phone No. (office):
Phone No. (home):
Fax (office / home):
Email:

9. Passport details:
Number:
Date of Issue:
Data of Expiry:
Place of Issue:

I have read the terms and conditions mentioned in this brochure, and agree to abide by them.

Date:

Signature of Applicant

Signature and Stamp of
Nominating Authority
(National IHP Committee/ UNESCO National
Commission)