



# Water Research Centre

First point of contact for Water Researchers in Oman

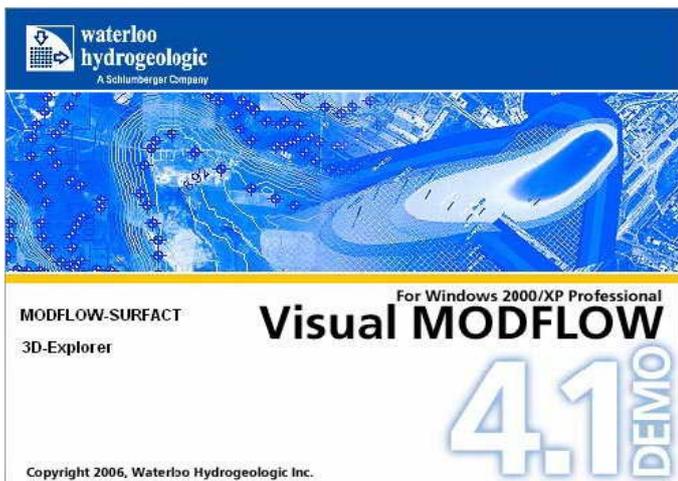
May 2011

## Groundwater Modeling Course Planned

In Collaboration with Schlumberger Water Services, The SQU Water Research Center is planning to hold an Introductory groundwater modeling course in Fall 2011. This course is routinely offered as a part of "The Waterloo Training Series." Topics to be covered include.

- An introduction to the structured process of groundwater modeling
- The fundamentals of finite difference flow modeling using MODFLOW
- Basic principles of efficient model grid design using Visual MODFLOW
- Particle tracking using MODPATH to model the movement of particles through the flow system
- Water budget analysis using ZoneBudget
- Contaminant transport processes and simulation using MT3D and RT3D
- Calibration of groundwater flow models and the use of PEST as a calibration tool
- Visualization of model input and model result in 2 and 3 dimensions.

If you are interested in attending this course please contact [wrc@squ.edu.om](mailto:wrc@squ.edu.om) at your earliest convenience



**Announcement!!!!!!**

**Water Security Conference**

The Public Authority for Electricity and Water, (PAEW) Oman is organizing a Water Security Conference from 10<sup>th</sup> till 12<sup>th</sup> October 2011. Further details may be obtained from Mr. Hamed Said Al Hassani at PAEW (GSM 9926 8240).

## HM project to Quantify Hydrologic Fluxes



On the 11<sup>th</sup> University Day, Prof Amer Al Rawas announced that a proposal submitted by Dr. Osman Abdalla and his team to quantify fluxes will be funded by HM's Trust Fund. The abstract of the proposal is below. SQU WRC

Congratulates Dr. Osman Abdalla and his team.

Groundwater recharge and discharge fluxes are important components in any hydrologic cycle and they are necessary for water budget analysis, especially in arid areas like Oman. Reasonable assessment of these fluxes will provide key information for water development/management plans and water legislations and abstractions. The envisaged research project will assess natural groundwater recharge and discharge fluxes for the first time in northern Oman using multiple techniques. Hydrochemical and modeling approaches are employed to estimate temporal and spatial recharge/discharge rates and to assess the water quality and its chemical evolution along its flow path. The study also intends to quantify groundwater residence time and identifies areas of replenishment and depletion to suggest zones of sustainable/endangered resources and enhance the feasibility of water management plans.

## Water Facts: Solar Desalination

In pursuit of cheaper desalination methods, researchers are attempting to use solar energy for seawater desalination for years. But did you know that approximately 35% of precipitation on land is from solar desalination. This is how it works. Evaporation from land is estimated to be 75 km<sup>3</sup>, while precipitation on land is estimated to be 115 km<sup>3</sup> per annum. The difference of 40 km<sup>3</sup> is the vapor which moves from oceans to land annually.



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## Water, Sanitation and Health Electronic Library

The World Health Organization (WHO) maintains an electronic library named "Water, Sanitation and Health". The documents included provide information on water supply and sanitation, recreational/bathing waters, achieving the Millennium Development Goals on water, sanitation and hygiene, drinking-water quality, water resources management and health-care waste. Included are full text books and guidelines, facts sheets, facts and figures, posters, advocacy materials and other information products. The CD-ROM is intended to assist all those interested in water, sanitation and health by providing them with comprehensive up-to-date information. Users include public health specialists, scientists, policy makers, practitioners, academics, non-governmental organizations in developing and developed countries. By assisting these and other user groups the electronic library is intended to contribute towards the International Decade for Action, Water for Life: 2005-2015. For further details:

Water, Sanitation and Health (WSH)  
World Health Organization (WHO)  
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## Maximizing the Use of Reclaimed Water for Crop Production in Arid Regions



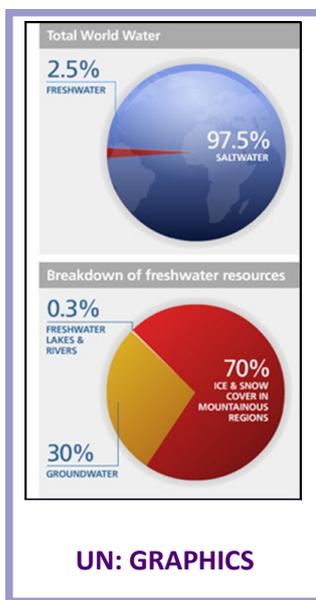
There were 42 STPs in different regions of Oman producing 30,756 m<sup>3</sup> /day. OWSC (Haya) expects 78,000 m<sup>3</sup>/day of treated effluent in 2010, and the volume is expected to increase to 160,700 m<sup>3</sup>/day in 2015. Currently most of the Gulf states,

including Oman use reclaimed water (RW) to irrigate public gardens and green strips in urban area. Irrigation demands of these amenities vary during the year, while the supply of reclaimed water from sewage treatment plants (STPs) remains reasonably steady. If Oman decides not to use expensive water from desalination plants or fresh groundwater to supplement RW from STPs to irrigate amenities, then the maximum area of amenities will be determined by the day on which the evaporative demand is maximum. Consequently, during other days of the year, there will be surplus of reclaimed water.

The surplus RW can be used to grow seasonal crops, or stored for future in aquifers, or disposed in the sea. Often, water quality requirements for aquifer storage are very stringent, and meeting these requirements is costly. Disposing RW to the sea is not prudent either. With the increasing scarcity of freshwater resources which are available to agriculture, use of reclaimed water in agriculture is intuitively obvious. However, it is a challenge to optimize the benefits of reclaimed water as a source of both water and the nutrients it contains, and to minimize the negative impacts of its use on human health.

There is a need to maximize the use of RW, by identifying short season crops, and changing the area under cultivation of such crops. In order to achieve that, sequence of crops and their extent of each crop, which will maximize the use of RW during the year should be identified; feasibility of crop rotation around the year need to be assessed; characteristics and yield components of crops grown with RW need to be evaluated, and impact of RW irrigation on soil physical, chemical and biological properties need to be monitored. Desktop studies, field trials and laboratory analyses are currently underway to meet these objectives.

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