



Short course on

“Applied Reactive Transport Modeling”

Institute of Geochemistry, CAS
Guiyang, Guizhou, China
August 7th – 11th 2019

Course Instructors:

Henning Prommer
CSIRO Land and Water &
University of Western Australia, Australia

Douglas B. Kent
U.S. Geological Survey (USGS), USA

Jing Sun
University of Western Australia, Australia

Bhasker Rathi
University of Tübingen, Germany

OVERVIEW

The course is designed to introduce the participants to the model-based quantification of a wide range of water quality problems with a major focus on the understanding interactions between rocks, sediments, and aqueous solutions and on modeling the fate of organic and inorganic contaminants in groundwater.

Taking this short course will help to:

- ❑ Understand the basics of coupled geochemical transport modeling.
- ❑ Learn how to apply reactive transport modeling to geogenic and anthropogenic pollution problems.
- ❑ Apply the theoretical framework with hands-on experience on the computer.
- ❑ Use modeling tools such as MODFLOW, MT3DMS, PHREEQC and PHT3D.

AUDIENCE AND PREREQUISITES

The course is designed for PhD and Master students, environmental consultants, government scientists, and researchers who want to undertake modeling studies of groundwater flow, transport and geochemical reactions for contaminated aquifers.

Participants will benefit the most from this course if they have working knowledge of groundwater (flow/transport) processes and at least a basic understanding of geochemical processes.

Prior modeling experience is not an absolute requirement but it will increase the benefits from the course significantly.

The course language will be English.

COURSE TOPICS

- ❑ Basics of groundwater modeling, including advective and dispersive solute transport.
- ❑ Development of conceptual models and understanding of numerical solution schemes.
- ❑ Constructing MODFLOW/MT3DMS flow and solute transport models.
- ❑ Overview of hydrochemical and microbial processes affecting the fate of contaminants. This will include surface complexation reactions, mineral reactions, ion exchange, organic matter mineralization and other redox-controlling processes.
- ❑ Modeling of equilibrium and kinetically controlled reactive processes with PHREEQC, including construction of site-specific surface complexation models.
- ❑ Coupled modeling of multi-dimensional transport and chemical reactions using PHT3D.
- ❑ Selected model applications will be presented and studied in lab exercises:
 - Fate of inorganic pollutants (e.g., arsenic, zinc, uranium and ammonium plumes).
 - Acid mine drainage from mine tailings.
 - Managed aquifer recharge and water supply (e.g. ASR, deepwell injection, use of infiltration basins).

Contact for organization:

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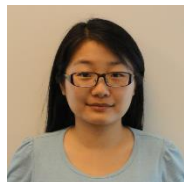
ABOUT THE INSTRUCTORS



Henning is a Winthrop Research Professor at the University of Western Australia and a Principal Research Scientist at CSIRO Land and Water Australia. He is mainly working on the development and application of reactive transport models to water quality issues in porous media. He is coordinating the development of the MODFLOW/MT3DMS-based reactive transport model PHT3D and has a strong interest in the quantification of redox processes and the associated fate of organic and inorganic pollutants.



Doug is a hydrologist with the U.S Geological Survey. Doug's main research interest is the fundamental understanding of chemical reactions at mineral-water interfaces, understanding the coupling between these reactions and physical and biological processes, and to develop conceptual and quantitative models that are broadly applicable to understanding and predicting metal and metalloid transport, mobilization, and sequestration in groundwater and surface water across the range of spatial and temporal scales required in field applications.



Jing is a Research Fellow at the University of Western Australia. Over the last few years, Jing has been working on developing effective remediation strategies for arsenic contaminated aquifers, mainly through the formation and transformation of iron minerals in the sediments. Jing has been using reactive transport models to understand the experimental studies and to design field-scale operation of the remediation strategies.



Bhasker is a Research Fellow at the University of Tübingen, Germany. Bhasker's broad research interest is in the understanding of the fate and transport of chemical species at various scales and under varying bio-geochemical conditions. In his current project, Bhasker is developing quantitative models based on the conceptual understanding of hydrochemical, mineralogical and microbiological data, and is studying their influence on arsenic mobility at the field-scale using reactive transport models.

REGISTRATION FEES

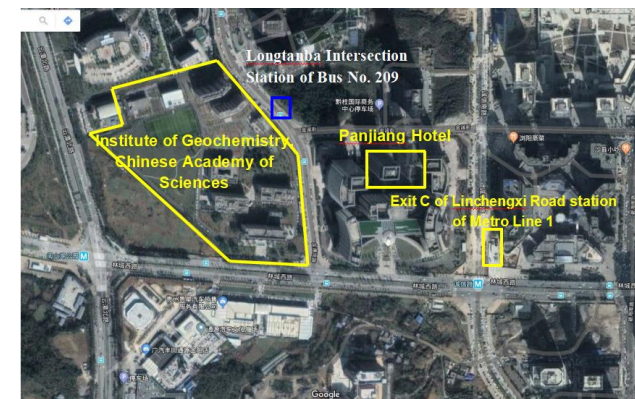
	Early bird (before July 1st 2019)	Regular (after July 1st 2019)
Master/PhD students	2400 RMB	3000 RMB
Private and other researchers	4800 RMB	6000 RMB

HOW TO REGISTER: please compile and resubmit the application form via email with the subject “RTM short course”. Details are provided in the next page.

The course will be limited to max 35 participants.

COURSE MATERIAL: will be provided during the course. Participants should bring their own laptop. All required modeling software will be provided before the course.

COURSE LOCATION:
Institute of Geochemistry, Chinese Academy of Sciences
99 Linchengxi Road, Guiyang, 550081, China
indicated in the map below. More information will be provided by email.





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REGISTRATION FORM (one form per participant) “APPLIED REACTIVE TRANSPORT MODELING”

First name and Surname: _____
PhD/Master Student (Y/N): _____
Institution or Company: _____
Address _____
City, Country: _____
Post code: _____
Contact E-mail: _____
Contact Wechat: _____
Contact Phone: _____

Do you have previous experience with groundwater numerical modeling? If yes, please specify what type of experience you have (e.g. code name, etc.) (max 200 words) :

For any special request, please inform the contact for organization (Email: jing.sun@uwa.edu.au; Wechat: jingsun0118).