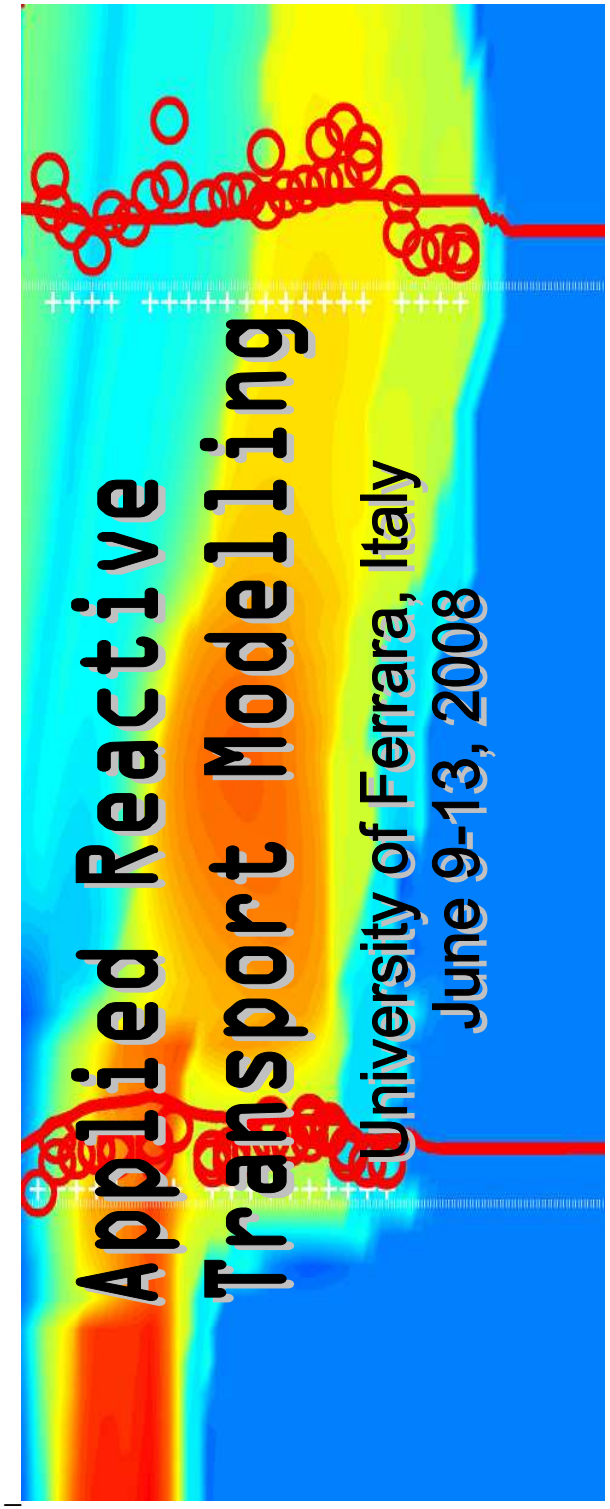


An international specialist short-course for consultants, engineers, regulators, postgraduate students and research scientists

OVERVIEW

The course is designed to provide an introduction to the model-based quantification of a wide range of water quality problems from various industries and disciplines, including contaminant hydrology, mining and water supply.

Taking this short course will help groundwater practitioners to:

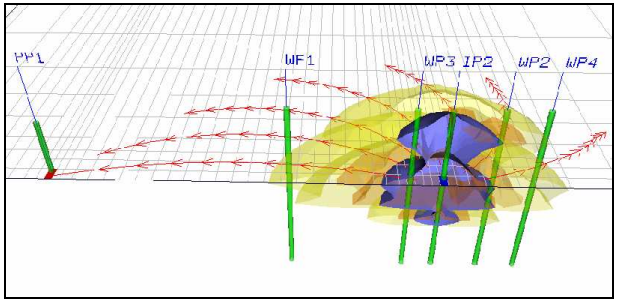
- Understand the basics of coupled geochemical transport modeling.
- Learn how to apply state-of-the-art models to real-world water quality problems.
- Apply the theoretical framework with hands-on experience in the computer lab.
- Use the modeling tools MODFLOW, MT3DMS, PHREEQC-2 and PHT3D (which couples MT3DMS and PHREEQC-2).

COURSE AUDIENCE

The course is aimed at consultants, engineers, students and researchers who undertake modeling studies of groundwater flow, transport and (bio)geochemical reactions as part of their work or studies.

COURSE INSTRUCTORS

The course will be presented by international experts, including: **Dr. Chunmiao Zheng,** Professor of Hydrogeology at the University of Alabama and developer of the world's most widely used solute transport model *MT3D/MT3DMS*; **Dr. Henning Prommer,** Principal Research Scientist at CSIRO Land and Water Australia and author of the MODFLOW/MT3DMS-based reactive transport model *PHT3D.* **Dr. Boris van Breukelen,** Assistant Professor at the VU University Amsterdam and international expert for modeling of biogeochemical processes and isotope fractionation effects.

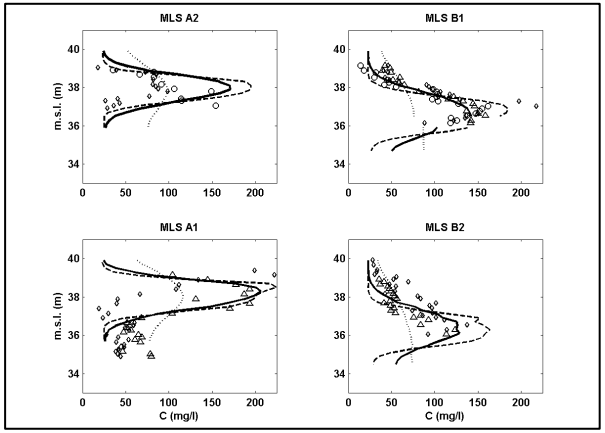


COURSE TOPICS

- Basics of advective and dispersive solute transport
- Development of conceptual models
- Numerical solution schemes
- Constructing MODFLOW/MT3DMS flow and solute transport models
- Overview of hydrochemical processes
- Principles of modeling biogeochemical processes such as complexation reactions, sorption, mineral dissolution/precipitation, ion exchange, NAPL dissolution, biodegradation, and microbial growth/decay
- Modeling of equilibrium and kinetically controlled reactive processes with PHREEQC-2

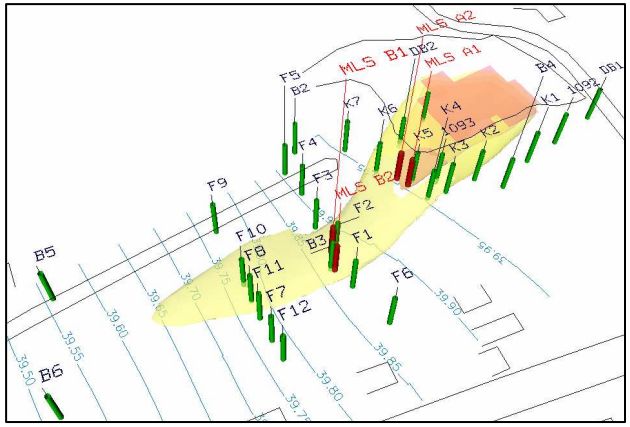
- Coupled modeling of transport and chemical reactions using PHT3D.
- Selected model applications for organic pollution problems (e.g., natural attenuation of aromatic/chlorinated hydrocarbons and pesticides, bioremediation), fate of inorganic pollutants (e.g., ammonium plumes, mine tailings impact on groundwater, and water supply (ASR, deepwell injection) will be presented and studied in lab exercises.
- Introduction to the modeling of isotopic fractionation effects associated with biodegradation of chlorinated solvents
- Model calibration, sensitivity analysis, uncertainty analysis

Approximately half of the course will be devoted to computer labs. This involves simplified modeling exercises that are based on real-world problems to help participants translate theory into practice.



PREREQUISITES

Participants will benefit the most from this course if they have a 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.



COURSE CREDIT

Upon request, the CFR will award 4 Continuing Education Units (CEUs) for completion of the course.

COURSE LOCATION

The course will be held in BLOCK F, Rm. INFO1, at the Scientific & Technologic Pole of Ferrara University, Italy. A city and campus map will be sent to you upon course enrollment.

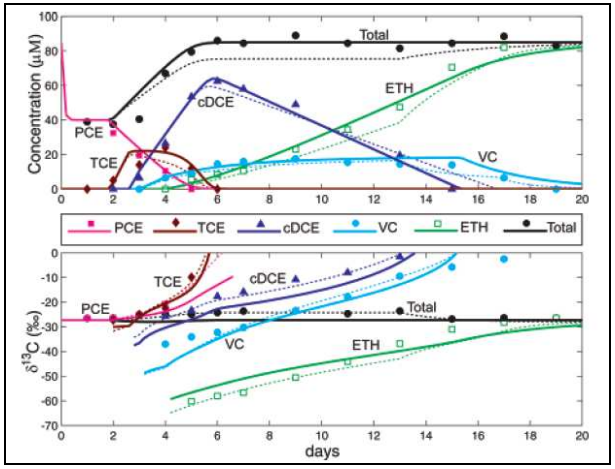
ENROLLMENT & REGISTRATION

The fee for the short course is € 1250 and € 850 for PhD students. The fee covers instruction, course notes, refreshments, and certificate of participation. Full payment must be received prior to the beginning of the course. The registration fee may be paid by check, VISA, MasterCard or purchase order.
If a cancellation is made before the 9 May 2008, tuition fees will be refunded. Cancellations made after that date will forfeit a €150 processing fee in addition to the €100 deposit. In the event of a cancellation, the right to course material is also forfeited. Substitutions are permitted at any time prior to the start of the course. Please be advised that if the program is cancelled due to insufficient enrollment, CFR will return all course fees, but will not be liable for any other expenses incurred by the prospective attendees.

INFORMATION & REGISTRATION

Consortium Ferrara Researches
Scientific & Technologic Pole Ferrara University
44100 Ferrara, Italy
VoIP Phone +39 0532 762404
Fax: +39 0532 767347
e-mail: convegni@unife.it

http://www.consorzioferrararicerche.it/

TRANSPORTATION AND LODGING

The Scientific & Technologic Pole of Ferrara University, is 30 minutes east of Bologna, 1 hour west of Venice. Both International Airports of Bologna and Venice can be reached by taxi, train + airport shuttle or rental car. Lodging is available in Ferrara, within walking distance of the campus. Information regarding transportation, parking, and lodging will be sent upon registration.