



# Improving Hydrogeologic Analysis of Fractured Bedrock Systems

## From Field Methods to Advances in Solute Transport Modeling

### Day 1: 03 August 2011

- 7:30 **Registration**  
8:00 **Hydrogeologic settings for fractured rock**  
- rock types where fractures are important  
- formation of fractures  
- continuum vs. discrete conceptual models  
- scale issues  
- the role of the regional setting  
- problems with monitoring in fractured rock environments
- 9:30 **Break and discussion**  
9:45 **Physical Characterization of Fractures**  
- characteristics of fractures  
- field measurement techniques  
- data display and presentation methods  
- statistical descriptions of fractures sets  
- exercise: fracture data display
- 11:00 **Fractured aquifer characterization in the field**  
- bulk properties  
- identification of hydraulically important fractures  
- surface and borehole geophysics  
- outcrop/stratigraphic analysis
- 12:00 **Lunch**  
1:00 **Groundwater monitoring in fractured rock**  
- overview of challenges  
- temporal variations  
- multi-level systems with examples
- 2:30 **Packer testing**  
- test history and applications  
- mechanics and stepwise procedures  
- common mistakes and pitfalls
- 4:00 **Topodrive exercise**  
5:00 **Adjourn for the day**

### Day 2: 04 August 2011

- 8:00 **Introduction to hydrogeology of basalt plains**  
- groundwater behavior  
- issues around Melbourne and Victoria
- 9:15 **Break and discussion**  
9:30 **Downhole flow meters**  
- emerging technologies  
- spinner and heat pulse flow meters  
- OBI / acoustic and optical televiwers  
- temperature distribution systems
- 11:00 **Break and discussion**  
11:15 **Borehole characterization exercise**  
12:00 **Lunch**

### Day 2: 04 August 2011 (cont.)

- 1:00 **Rock core logging**  
- drilling methods and project objectives  
- rock core recoveries and RQD  
- description and stratigraphic characterization  
- core boxes, labeling, archiving
- 2:00 **Rock core logging exercises**  
- series of hands on exercises
- 3:00 **Field management QA/QC techniques**  
- project and field management philosophies  
- roles and responsibilities  
- benefits of field data analysis
- 4:00 **Q&A Session / self test / discussion**  
5:00 **Adjourn for Day 2**

### Day 3: 05 August 2011

- 8:00 **Solute transport through fractured rocks**  
- transport characteristics  
- analytical solutions  
- dispersion, dilution, sorption  
- non-aqueous phase contaminant
- 9:15 **Applications of tracers, temperature, and isotopes in fractured-rock hydrogeology and karst**  
- types of tracers and tracer experiments  
- logistics of tracer studies  
- examples
- 10:30 **Break and discussion**  
10:45 **Transport through fractured aquifer exercise**  
11:30 **Numerical models of fracture flow - Part One**  
- porous medial equivalent  
- fracture network  
- dual porosity
- 12:00 **Lunch**  
1:00 **Numerical models of fracture flow - Part Two**  
- stochastic  
- applicability of models  
- available modeling codes
- 2:00 **Demonstration of fracture-flow models**  
- MODFLOW applications  
- trial software: FRACWORKS, STRATAFRAC  
- fracture network generation  
- stratigraphic modeling  
- porous media conversion
- 3:30 **Break and discussion**  
4:00 **Group analysis of problems submitted by participants**  
5:00 **Course wrap-up and final adjournment**

## Education Level

Intermediate to advanced. This course begins with a brief overview of hydrogeologic principles and continues at an advanced level throughout the course to match the range of realistic project conditions.

## Fees (inclusive of GST)

Earlybird\* ACLCA members — **AUS \$ 1,400**

ACLCA members — **AUS \$ 1,700**

Earlybird\* non-ACLCA-members — **AUS \$ 1,700**

Non-member — **AUS \$ 1,900**

*\* Earlybird registrations must be received before June 30, 2011*

Register Now at:

[www.aclca.org.au](http://www.aclca.org.au)

## Course Location

Karstens at CQ, Conference & Training Centre  
123 Queen Street,  
Melbourne, Victoria

[www.karstensatcq.com.au](http://www.karstensatcq.com.au)

## Accommodations

Crown Plaza Melbourne  
(located adjacent to the World Trade Center  
and about 7 city blocks from classroom venue)  
1-5 Spencer Street, MelbourneVIC, 3005,  
Australia Phone: +61-3-9648 2776

## Contact Info

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