



A Geologic Approach to Simulation of Subsurface Hydrology
By Dr. Graham Fogg, University of California at Davis

The unknown heterogeneity of the subsurface remains a major obstacle to reliable simulation of subsurface flow and transport processes. Characterization of spatial patterns in properties with typically sparse data requires knowledge of the geologic processes that created the patterns. A geostatistical approach provides a means for quantitative modeling of three-dimensional hydrostratigraphy through the use of commonly available field data as well as geologic fundamentals and knowledge of the depositional processes.

By modeling inter-facies transition probabilities with Markov chains, an intuitive method for building three-dimensional models from basic geologic principles is developed. This geologic/geostatistical technique, implemented with the software TProGS, uses the hard data together with interpretive input on proportions, average lengths, and juxtapositioning of geologic facies to create multiple realizations of heterogeneity. The resulting characterizations honor fundamental probability laws while preserving observed or inferred facies proportions, continuity, asymmetries (e.g., fining upward sequences), and facies relations (e.g., levee adjacent to channel facies). Lateral facies relations, which are typically undersampled, can be modeled based on the observed vertical patterns in facies through the use of Walther's Law. Furthermore, the approach can incorporate nonstationarities such as spatially varying dip angles, or more severe nonstationarity, such as unconformities and transitions between different depositional environments.

Example applications in alluvial fan and fluvial environments depict the resulting hydrostratigraphic models and demonstrate the significance of highly resolved heterogeneity in the simulation of flow and

transport, while providing a fair degree of field validation with hydraulic and groundwater age-date data.

About The Speaker: Dr. Fogg is the Geological Society of America 2001-2002 Birdsall-Dreiss Distinguished Lecturer. He is a professor of Hydrogeology and Hydrogeologist at the University of California at Davis. Dr. Fogg received his B.S. in Hydrology at the University of New Hampshire and completed his graduate studies at the University of Arizona. He received his Ph.D. in Geology from the University of Texas at Austin. His research interests include ground water contaminant transport, ground water basin characterization and management, and numerical modeling of ground water flow and contaminant transport.

The meeting will take place on Wednesday, April 10 at the Genesee Inn, 1060 East Genesee Street, Syracuse, NY. There will be a cocktail hour from 5:30 p.m. to 6:30 p.m. Dinner will be at 6:30 p.m. and our featured speaker, Dr. Fogg, will begin his talk at 7:30 p.m. The cost of dinner is \$17 for members, \$20 for non-members and \$10 for students. Please RSVP by Friday, April 5 to Bonnie at Parratt-Wolff via e-mail at bolney@pwinc.com or 437-1429.

Directions: To get to the Genesee Inn, take the Route 690E exit from Route 81S. Take the first exit off of 690 (Teal Avenue) and turn right at the bottom of the off-ramp. Go approximately 1 mile (crossing Erie Boulevard) and turn west (right) onto Genesee Street. The inn is on the south side of the street, between Crouse and University Avenues.

Calendar

Wednesday, April 17, 2002	BAPG Monthly Dinner Meeting, BAPG Monthly Dinner Meeting. "Treatment Wetlands for Environmental Remediation" PLUS Short Presentations from the Recipients of the BAPG Student Awards. TBA. Contact Lea Cervi (e-mail lcervi@ene.com) or call 716-684-8060.
Saturday, April 6, 2002	CNYAPG field trip to Lackawanna Coal Mine Tour & Anthracite Heritage Museum. A coach bus will leave Syracuse at 8:00 a.m., arrive in Scranton for a picnic lunch (provided), and arrive back in Syracuse by 6:00 p.m. Call Sarah McCulloch at 607-836-4400 or e-mail sarah@geologic.net with any questions.
Wednesday, April 10, 2002	CNYAPG Monthly Dinner Meeting In Conjunction With Syracuse University Department Of Earth Sciences Lecture Series, Genesee Inn, Syracuse, NY. "A Geologic Approach to Simulation of Subsurface Hydrology", By Dr. Graham Fogg. From 5:30 p.m. to 6:30 p.m. cocktail hour; followed by dinner at 6:30 p.m., and our speaker's talk will begin at 7:30 p.m.

OUR PRESIDENT'S VOICE

By Bill Morrow


The 80-20 rule doesn't just apply to your client list! For most of us in business, 80 percent of our revenues come from 20 percent of our clients. If you are a teacher – I would bet that 80 percent of your headaches come from 20 percent of your students. Volunteer organizations like your church, Little League Board, etc. are no different – the work of a few keep the organization running for many!

This is a critical time for CNYAPG. This year's Board of Directors (BOD) has run a variety of successful programs from using isotopes in groundwater investigations to bioterrorism. Meeting attendance has been up, averaging about 45 for our last 6 meetings. Our field trip to the Lackawanna Coal mine was sold out in three weeks! Thanks to you, the members, this has been a great year for CNYAPG. The problem is your BOD is ready to move on to other endeavors! We need committed folks who will take just one year to serve in a leadership position.

Each month these newsletters get harder to write – and I have only been doing this job for one year. It makes me very thankful for folks like Sarah McCulloch, Vita DeMarchi, Dave Palmerton, Meg Harris, Ed Hinchey, Buck Gabriel and Nancy Gensky who took the time to step up to the plate and take a shot as president of this great organization. Over the last 9 years, 32 different professionals have served on CNYAPG's BOD in one capacity or another. With our membership rolls hovering around 120 for the nine years, a few are doing the work for many. If CNYAPG is going to continue as a strong, viable organization, we need the following:

- A committed and active BOD,
- Members who both regularly attend the meetings and provide feedback to the BOD, and
- Regular membership renewals.

As a benefit of service, you get to work closely with some



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great people, have the satisfaction of running some wonderful programs and shaping the organization to fit some of your personal interests. The time required for each position varies from Secretary (about 5 to 6 hours per month) to President (about 4 hours per month). The time commitment for a directorship is typically less than an hour per month. What about you...? Where do you fit into this organization? Is this your year to take a leadership role?

Why is membership renewal important? As of March, over half of the 130 geologist and associate members in our data base have not renewed their memberships for 2002. Your renewal is critical for several reasons:

- The \$25.00 dues permit the organization to run at a break even point each year. The dues cover the publishing of our internal newsletter 3 times a year, our fees for publishing in the Technologist, fees for maintaining our website, liability insurance and programming fees.
- Your renewal also provides us with a mailing list by which we can communicate with you on a regular basis. Although some have followed our activities on the web, most still rely on newsletters.
- The last reason to renew and perhaps most importantly is to show your continued support of the organization. We realize that \$25.00 is \$25.00, but by writing that check you are more likely to get involved and support CNYAPG in a tangible way if you are also making an investment in the group.

If in doubt as to whether your membership is current, please check the mailing label on your last CNYAPG newsletter or contact Lynette Mokry at lm@bbl-inc.com or (315) 446-9120.

Membership Directories - Using Lynette Mokry's data base, Steve Rosello did a great job pulling together a membership directory this winter. The directories are being distributed at the monthly meetings to all members from the year 2001 and to all new members. Make sure you pick one up at the next meeting.

A different CNYAPG sponsor's ad will be posted in each issue of the Technologist. In addition to monthly participation in the Technologist, CNYAPG prepares a September, December, and April newsletter for its members. For more information regarding CNYAPG, please contact Bill Morrow, President (315.437.1429, wmorrow@pwinc.com) or Lynette Mokry, Secretary (315.446.9120, LM@BBL-INC.COM).