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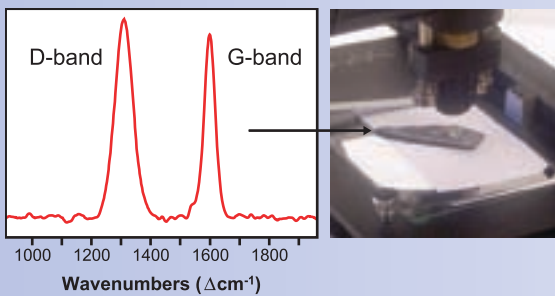
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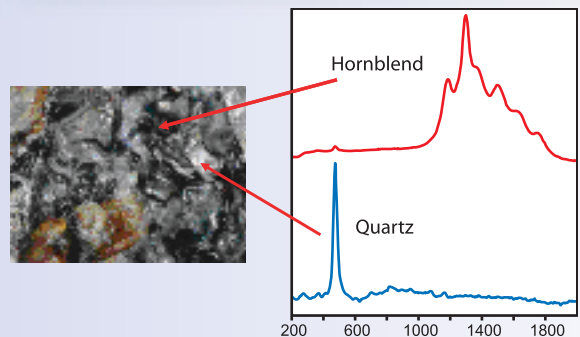


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Cover: Sedimentary structures on and around a car exhumed from the levee breach splay deposit in a New Orleans neighborhood flooded during Hurricane Katrina, 29 August 2005. Planar strata at the base indicate high flow velocities. These cross-beds formed by dunes show two different flow directions as flow from the levee breach was diverted around the car. These cross-beds form climbing bedforms, indicating high aggradation rates. Note lines at various heights on the tree trunk (left background) that represent different levels of standing water. Photo by Stephen Nelson and Suzanne Leclair, February 2006. This car is also shown with its roof protruding through the sand in Figure 5C of Nelson and Leclair; see "Katrina's unique splay deposits in a New Orleans neighborhood," by Stephen A. Nelson and Suzanne F. Leclair, p. 4–10.



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Katrina's unique splay deposits in a New Orleans neighborhood

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ABSTRACT

On 29 August 2005, storm surge from Hurricane Katrina entered the drainage canals in the northern part of the city of New Orleans, Louisiana, USA. Although the floodwalls and levees on these canals were not overtopped, the surge resulted in three levee breaches that flooded 80% of the city. The southern breach on the London Avenue Canal resulted in a blast of water that displaced a house in front of the breach and buried parts of the neighborhood with up to 1.8 m of sandy sediment derived from remobilization of subsurface late-Holocene marsh and beach deposits. These deposits are a rare but spectacular example of crevasse splay deposits in an urban environment. Approximately 26,380 m³ of material, varying in size from fine sand to gravel-size clay balls, along with various human-made objects, was deposited mostly as planar strata, with some small- and medium-scale cross-strata showing climbing bed forms that were deposited on and around obstacles, such as cars and houses. This unique splay deposit has no preservation potential, and this paper reports the first (and probably only) results from the study of its morphology and sedimentology.

INTRODUCTION

On the morning of 29 August 2005, Hurricane Katrina made landfall to the southeast of New Orleans, Louisiana, USA, as a Category 3 hurricane (Knabb et al., 2005). Levees along the New Orleans Industrial Canal, which connects the Mississippi River to Lake Pontchartrain, were overtopped and breached by 7 a.m. central daylight time, resulting in flooding of areas north of the French Quarter (Fig. 1). A catastrophic failure of the floodwall and levee on the eastern side of the canal devastated the Lower Ninth Ward. Over the next few hours, as the hurricane moved inland, the storm surge from Lake Pontchartrain entered canals designed to drain the city of rainwater, resulting in the catastrophic failure of levees at three locations, two on the London Avenue Canal and one on the 17th Street Canal (Fig. 1; see animation from *The Times-Picayune* at www.nola.com/katrina/graphics/flashflood.swf). The failures occurred before the maximum surge level had been reached. Eighty percent of the city of New Orleans was flooded to depths up to 4.6 m due to these floodwall and levee failures.

Three weeks later, after the floodwaters had been pumped out, sand deposits were revealed to have covered the neighborhoods near the breaches of the London Avenue Canal. These deposits will not be preserved and, in fact, have mostly been removed as part of the clean-up effort. We were, however,

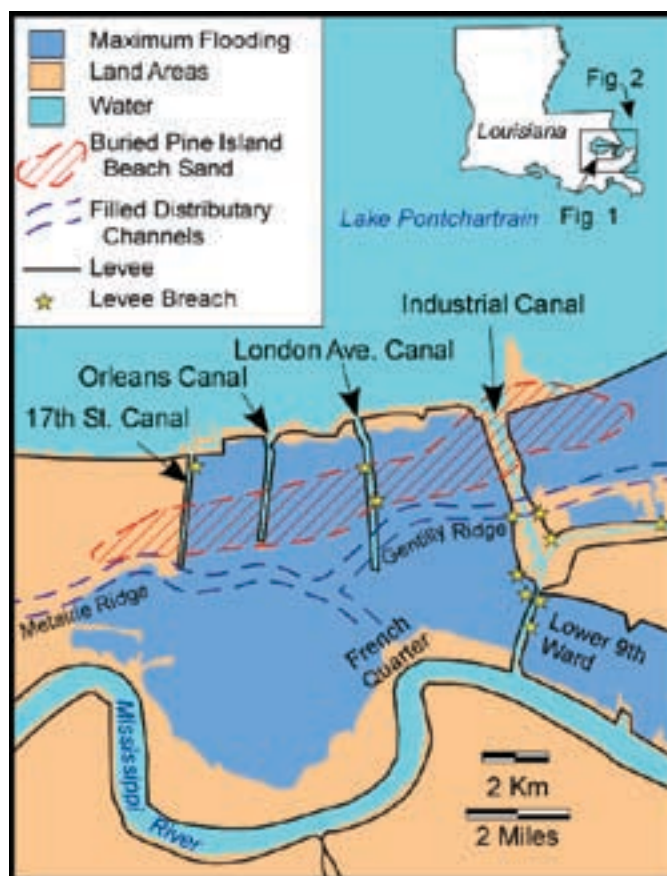


Figure 1. Map of the New Orleans area showing the maximum extent of flooding from levee breaches on 29 August 2005 (based on information from the U.S. Army Corps of Engineers, 2006), the locations of the drainage and navigational canals, breaches on these canals, and the extent of the levee system. The approximate area where the Pine Island sand lies below the surface and the locations of the late-Holocene St. Bernard Delta distributary channel fills that make up the Metairie and Gentilly ridges are also shown (modified after Snowden et al., 1980).

able to observe the deposits soon after their deposition (from aerial photographs) and during the removal process (from field work). This paper focuses on this rare but spectacular example of splay deposits in an urban environment, describes the distribution of these deposits and their physical features, and compares them with modern natural splays.

GEOLOGICAL SETTING AND HISTORY OF STUDY AREA

In order to explain the origin of the levee-breach deposits, we first discuss the geological and historical setting of New Orleans. Five thousand years ago, the future location of New Orleans was offshore of the southern coast of this part of North America (Otvos, 1978; Snowden et al., 1980; Fig. 2A). As sea level rose due to the continuing melting of continental glaciers, longshore currents produced a sand spit extending from what is now southwestern Mississippi toward the present-day location of New Orleans (the Pine Island Trend in Fig. 2B). At about the same time, the Mississippi River began building the

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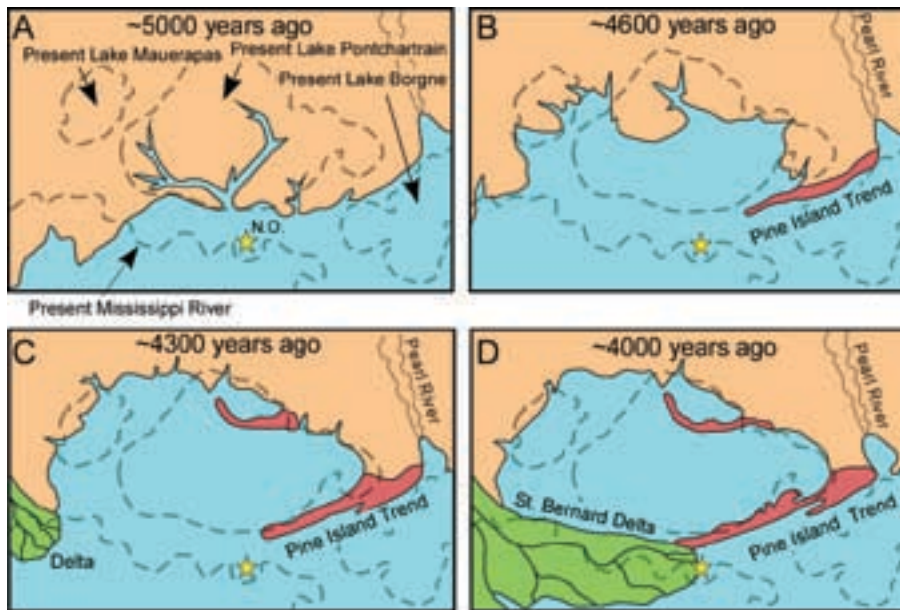


Figure 2. Development of the Pine Island Trend as sea level rose between 5000 and 4000 yr ago. Dotted lines indicate the current locations of Lakes Mauerepas and Borgne and the present trace of the Mississippi River. See insert in Figure 1 for regional location. (A) Site of New Orleans (yellow star) was offshore; (B) a sand spit developed; (C) St. Bernard Delta began building eastward; (D) growing St. Bernard Delta reached and buried the sand spit, resulting in the formation of Lake Pontchartrain (modified from Otvos, 1978; Snowden et al., 1980).

St. Bernard delta complex eastward (Figs. 2C and 2D), eventually burying the Pine Island Trend beach sands (Fig. 1; more on the evolution of the Mississippi River delta lobes can be found in Coleman et al., 1998, and Aslan et al., 2005). Drainage from the north was thus cut off to enclose what would become Lake Pontchartrain (Fig. 2D). About 2000 yr ago,

the Mississippi River shifted its course back to the southwest of New Orleans and abandoned the St. Bernard distributary channels, some of which were filled to become what are now Metairie Ridge and Gentilly Ridge (Fig. 1). The Mississippi River shifted its course back to its present-day position ~1000 yr ago, and New Orleans was founded on the nat-

ural levee of one of its meander bends in 1718. By the late 1800s, the city had spread along the ridges of the former distributary channels, with cypress swamps in between the populated zones. In the early 1900s, pumps were built to drain rainwater into Lake Pontchartrain (~0.6 m above sea level [asl]), and later to drain the swampy areas, providing more habitable land for the growing city (more details in Nelson, 2006). The London Avenue, Orleans, and 17th Street drainage canals normally contain water at the elevation of Lake Pontchartrain and run between levees with elevations of ~1.1 m asl. These levees are capped by concrete floodwalls, built in the 1990s, that rise to an elevation of 3.9 m asl. Katrina's storm surge pushed water from the lake into the canals up to 2.5 m asl; hence, the floodwalls were not overtopped. Yet the levees and floodwalls failed at three locations (Fig. 1). The neighborhood immediately surrounding the southern breach of the London Avenue Canal is at elevations between 1.4 and 1.9 m below sea level (bsl); that is, at as much as 2.5 m below the maximum water level attained in the canal during the storm.

A geological cross section of the east bank of the London Avenue Canal, based on soil borings conducted prior to the construction of the floodwall, is shown in Figure 3 (Eustis Engineering, 1986; U.S. Army Corps of Engineers, 1989). A former distributary-channel fill that

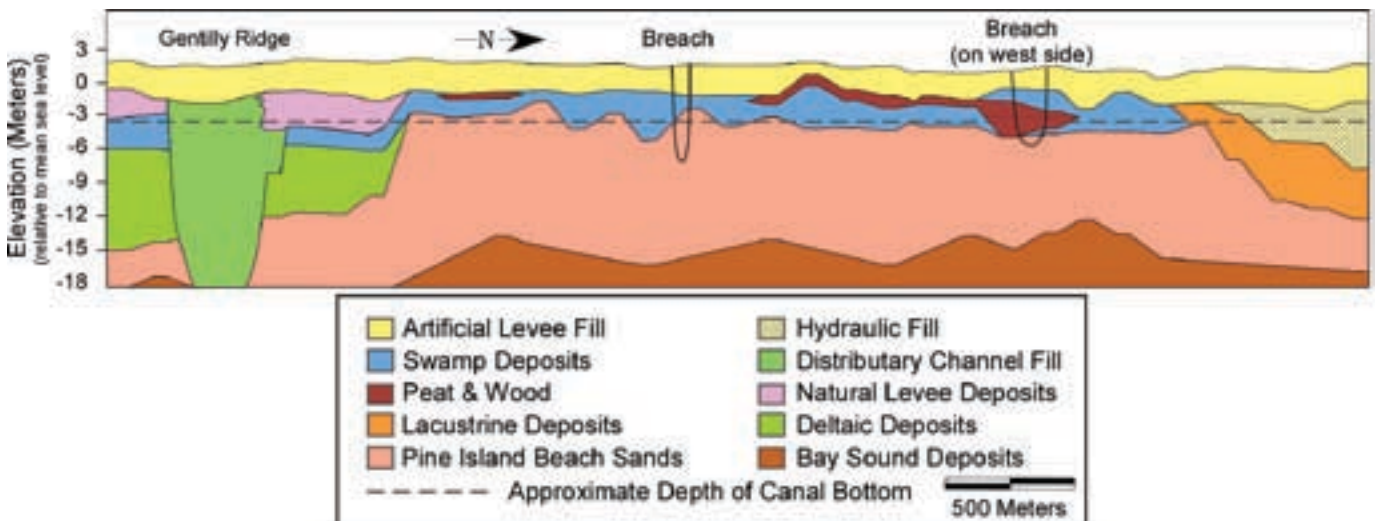


Figure 3. Geological cross-section along the east bank of the London Avenue Canal (Fig. 1), based on soil borings from Eustis Engineering (1986) and the U.S. Army Corps of Engineers (1989). Units pertinent to the study are described in the text. Hydraulic fill consists of lacustrine deposits (silty clay and clayey silt) that were pumped from the bottom of Lake Pontchartrain in the 1940s to build the land area northward into the lake.

forms the Gentilly Ridge occurs at the southern end of the cross section. The artificial levee fill consists mostly of clays with pockets of sand, silt, and occasional logs and shells. The levee fill overlies a 1.5–3-m-thick layer of organic-rich clays that contain peat and wood fragments (particularly at the northern end of the canal under the west-side breach, Fig. 3), consistent with deposition in the swamp that was present here prior to ~100 yr ago. Underlying the swamp deposits, and cut by the deltaic sediments at the south of the cross section, are the 9–12-m-thick Pine Island Trend beach deposits (Fig. 3). These deposits, which consist of fine-grained sand, shells, and shell fragments, have been observed mostly in the subsurface throughout the northern and eastern portion of New Orleans (Fig. 1; Snowden et al., 1980; Miller, 1983). In our study area, the base of this beach sand overlies the fine silty clay deposits of an ancestral bay-sound (Miller, 1983) at elevations ranging from 13 to 17 m bsl. The canal bottom is 3.7 m bsl (Fig. 3). The levee breaches on the London Avenue Canal occurred along stretches of the canal where the Pine Island Trend sands are at or within 2 m below the canal bottom. Although it is beyond the scope of this paper to discuss the causes of the levee breaches, the current consensus is that hydraulic piping through the sand toward the neighborhood side of the levee resulted in a blowout and catastrophic failure (Seed et al., 2006; U.S. Army Corps of Engineers, 2006).

EXTENT AND MORPHOLOGY OF KATRINA'S SPLAY DEPOSITS

The sandy splay deposits near the southern breach of the London Avenue Canal covered an area of ~54,670 m² (excluding areas occupied by houses), with a volume, estimated by dividing the area into small parcels of differing average thickness, of ~26,380 m³. The splay originated from a ~61-m-long breach that occurred between 7 and 8 a.m. on 29 August 2005 (Seed et al., 2006). Repairs started two days later, after the water in the neighborhood stabilized at the level of Lake Pontchartrain (U.S. Army Corps of Engineers, 2006). The variation in flow direction, depth, and velocity prior to the start of repairs is not known because there are no known eyewitnesses. Still, the initial torrent of

water from the breach was powerful enough to remove a house from its concrete foundation, displacing it ~35 m to the east and rotating it ~137° counterclockwise before it came to rest after running into a tree (Fig. 4).

In plan view, the splay deposit shows elongate lobes spreading up to ~400 m from the breach (Fig. 4). This plan shape is clearly different from that of natural splay deposits (e.g., Smith et al., 1989; Gomez et al., 1997), because it was influenced by the street pattern and urban structures. Immediately north of the breach, the flow deposited up to 1.8 m of sand in the backyards and in front of the houses on Warrington Drive (Fig. 4). Along the backyards of these houses, the sand surface shows two ridges parallel to each other and to the canal (Fig. 5A). No sediment was deposited along some driveways between houses (Figs. 4 and 5B), but sand

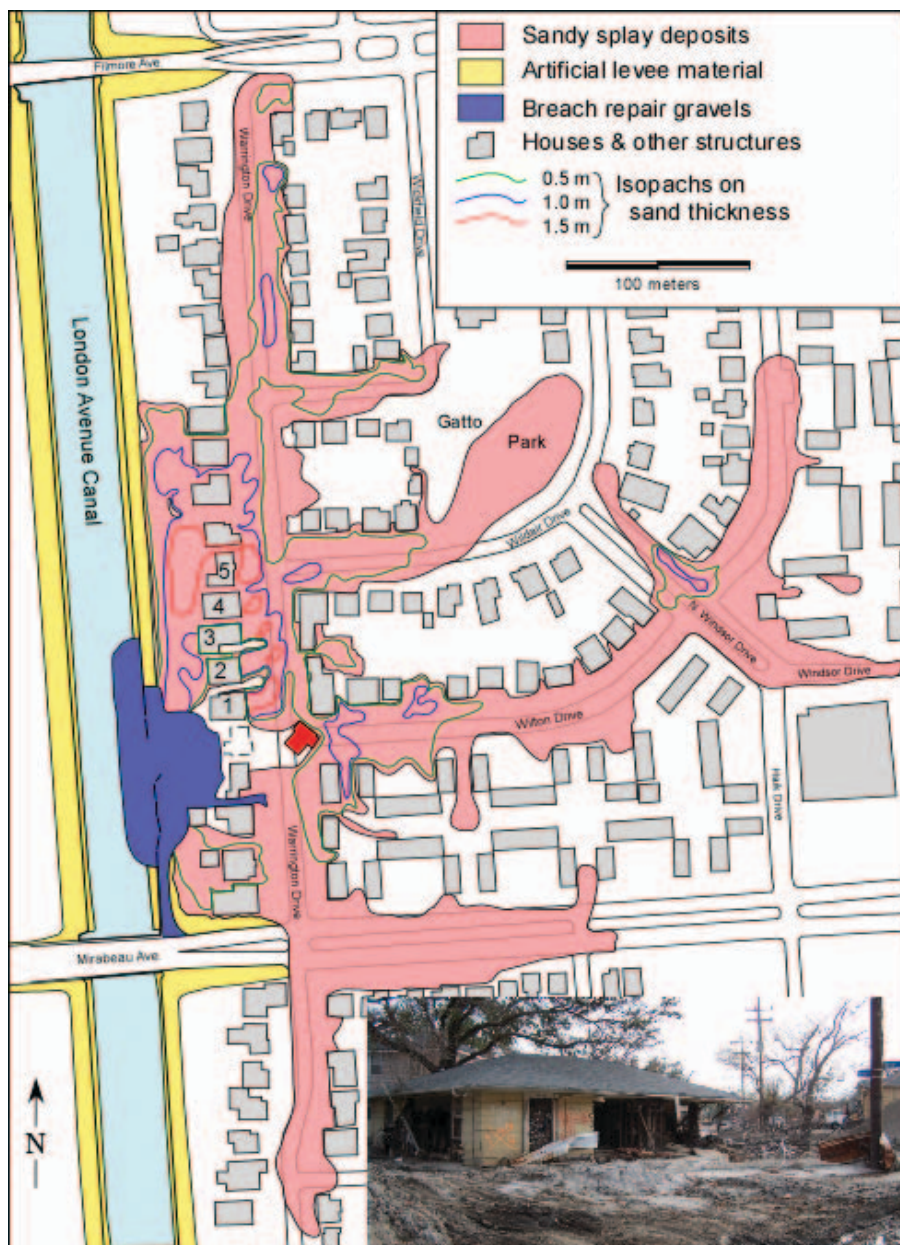


Figure 4. Map, based on field work, showing the distribution and thickness of the sandy splay deposits in the area around the southern breach of the London Avenue Canal. Houses referred to in the text and other figure captions are numbered. Displaced house indicated in red and shown in inset.

buried vehicles in the front yards (Fig. 5C) and was deposited within houses near the breach (Fig. 5D). Sand was also deposited along the streets intersecting Warrington Drive, with thicknesses up to 1 m (Figs. 4 and 5E). The most distal parts of the splay were <0.3 m thick, and hence the gradient of the deposit's upper surface is nearly 0.004.

SEDIMENT AND SEDIMENTARY STRUCTURES

Much of the sand in the streets near the breach was cleared by late December 2005, providing the initial vertical exposure of the deposits. By late February 2006, front yards were entirely cleared, creating exposures along the front of the houses. Although the deposit looked mostly sandy from its surface (Figs. 5A, 5C, and 5E), it contained an appreciable quantity of mud (e.g., dark layers in Figs. 6 and 7), ranging from gravel-size mud clasts >500-mm in diameter to sand-size pellets. Organic material (also of dark color) within strata consisted of leaves and twigs a few millimeters long. Numerous gravel-size clay balls were observed throughout the vertical profiles on Warrington Drive (Figs. 6 and 7A). The sand fraction in all parts of the splay deposit consisted of fine sand (0.125–0.25 mm). Along Warrington Drive, backyard deposits contained less mud than their front-yard counterparts. Various marine shells were found within the strata, typically mollusks from shore-face barrier islands (Hollander and Dockery, 1977), and the largest shells (~10 cm across), mostly found unbroken, were those of *Dinocardium robustum* (Fig. 7A). As no sand occurs in the breached levees, it is clear that the sand originated from the buried Pine Island beach deposits in the subsurface (Figs. 1 and 3).

Overlying a massive clayey-sand layer (Fig. 6), planar strata were dominant and continuous throughout the street exposures on Warrington Drive, interrupted occasionally by objects of various sizes (e.g., pencils, clothes, or window blinds). Low-angle strata (Fig. 7B) reflected the shape of the ridge surfaces (Fig. 5A). Medium-scale cross-strata overlay planar strata only along Warrington Drive (Fig. 7C), and small-scale cross-strata were largely absent, except in protected areas, such as house porches (Fig. 7D). Spectacular cases of climbing dunes were seen on obstacles, such as cars, which were in most cases resting on a layer of sand and not directly on the ground, as if they had been floating for some time. Cross-stratification around obstacles indicates different flow directions (Fig. 7D). In open areas, the upper part of the deposit was composed of fine sand and organic material, such as leaves



Figure 5. Photographs of sandy splay deposits. Refer to Figure 4 for locations. (A) View from backyard of house no. 5, looking south toward the breach; there are two ridges of sand, parallel to flow direction, with a maximum thickness of 1.8 m. (B) Driveway between houses no. 2 and no. 3, with absence of sand along the red brick house, and the open garage across the street where the flow ran through it. (C) Roofs of cars protruding through the sand deposit in front of house no. 5. Note the holes in the house's roof that were used as exits for residents escaping the floodwaters. (D) Sand deposits in the kitchen of house no. 2. Note the water lines on the walls that resulted from three weeks of standing water. (E) View from Wilton Drive, looking west toward the levee breach; sand deposits on the right; displaced house shown below the trees in the middle distance; and brown temporary sheet piling levee repair in the far distance.

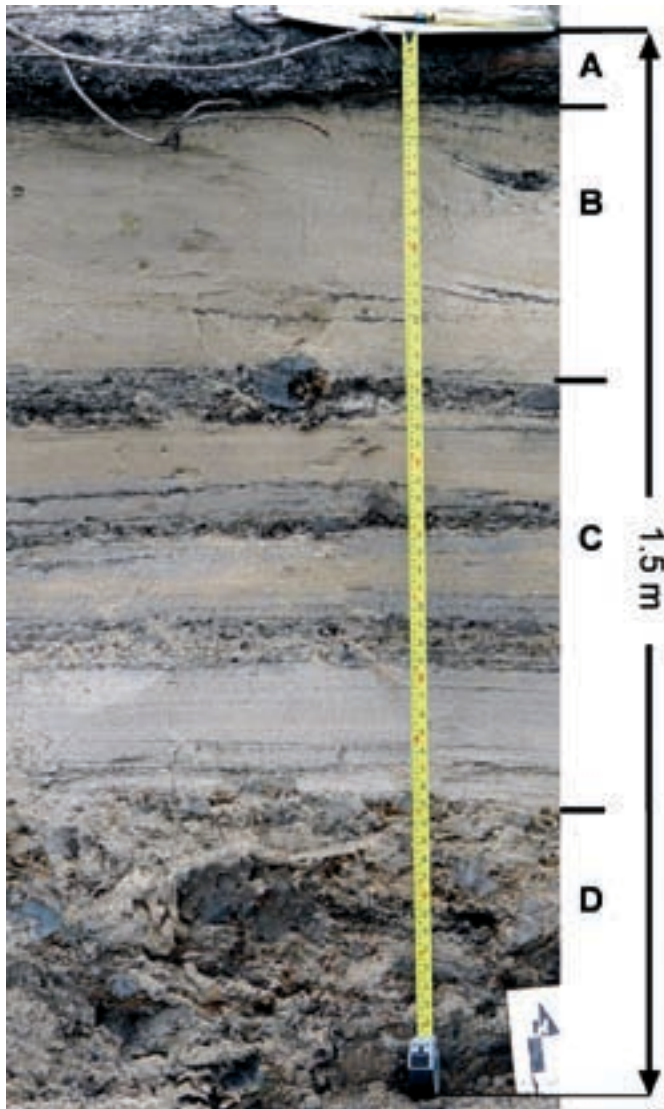


Figure 6. Vertical section of deposit along the west edge of the street in front of house no. 2 (Fig. 4). (A) Organic material consisting of leaves and twigs. (B) Medium-scale cross-strata sets (~10 cm thick). (C) Planar strata; some layers mostly sandy, others with clay balls and concentration of mud and organic material. (D) Massive layer composed of sand and several gray mud balls. The base of the deposit was 10 cm below shown section, in standing water.

and twigs, with no apparent lamination. Away from Warrington Drive, planar strata were observed at ground level, although the thicker deposits at the corner of Wilton and Windsor drives (Fig. 4) showed low-angle cross-strata at their base.

DISCUSSION

There are no descriptions of urban splay deposits with which to compare those described here. Natural (Coleman, 1988; Bristow et al., 1999; and many others [see Bridge, 2003]) and intentional splays (e.g., those created to restore floodplain ecology: Barmore, 2003; Boyer et al., 1997; Florsheim and Mount, 2002) all occurred away from towns. If they existed, deposits from past levee failures in urban environments surely would have been removed and therefore could not be mapped

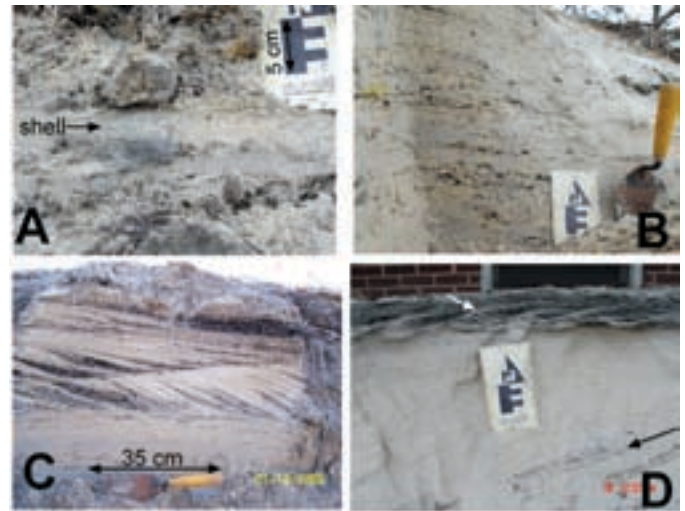


Figure 7. Sedimentary structures in the sand deposits: (A) between house nos. 3 and 4 (see Fig. 4), clay balls and mollusk shell (arrow) in sands; (B) behind house no. 5, low-angle planar strata in ridges, dipping to the right (toward canal); (C) in front of house no. 1, medium-scale cross-strata sets overlying planar strata; darker material consists mostly of a wide size range of clay pellets; and (D) on front porch of house no. 3, climbing-ripple cross-strata (white arrow) over fine-grain planar strata and coarse-grain medium-scale cross-sets (~50 cm thick; black arrow).

in studies of surficial materials (e.g., Vink, 1926; Berendsen, 1982). Similarly, little remains of the sand in our study area.

The most obvious feature of this splay is that its geometry was controlled by the distribution of houses and streets. The levee-breach flow was either erosional or depositional, depending on whether the urban structures caused the flow to converge or expand, respectively. Erosion was evident near the breach, with displaced and damaged structures (Fig. 4), but the spaces between houses on Warrington Drive also created high flow-velocity zones capable of transporting all available material (such as along the “clean” brick wall in Fig. 5B). Elsewhere in the neighborhood, streets also acted as channels, with deposits commonly thicker on just one side of the street (e.g., Fig. 5E) or where the channel expanded, such as at street intersections or at Gatto Park on Wildair Drive (Fig. 4).

The most conservative estimates of sediment deposition rates at any part of this splay deposit (0.3 m to 1.8 m in two days) are notably higher than values previously reported for natural (an average of ~1.5 m/yr in Ethridge et al., 1999) and intentional splays (0.36 m/yr in Florsheim and Mount, 2002), where deposition occurred over a much longer time period. The maximum thickness of this deposit was observed within 125 m of the breach (Fig. 4), and not along a horseshoe-shaped rim, such as in the Sny Island levee break of the 1993 Upper Mississippi Valley flood, where the rim of maximum thickness occurred ~800 m from the levee break (Gomez et al., 1997). Flow from the Sny Island break, however, was not interrupted by urban structures, as was the case at the London Avenue Canal. The margins of the London Avenue deposit did not show avalanche faces, as in some modern crevasse splays (Bridge, 2003), but ended with gently dipping sand lobes. This suggests that the sediment at the splay

margin may have been reworked while the water level in the neighborhood was adjusting to that of Lake Pontchartrain.

The fact that planar strata is the dominant sedimentary structure throughout the exposures indicates that an upper-stage plane bed, and hence an upper flow regime, prevailed during most of the deposition. Decimeter-thick cross-beds formed by dunes or sand bars only occur around obstacles where flow was decelerated and its direction diverted (e.g., Fig. 7D). The lack of small-scale cross-strata formed by ripples suggests that very little deposition from slow-moving currents occurred and that flow velocity decreased rapidly in time. These sedimentary structures are somehow different than those observed in modern sandy crevasse splay deposits, where, although planar strata is very common, climbing-ripple cross-strata and medium-scale cross-strata (from dunes) are also commonly observed at the top and in crevasse channels, respectively (Bridge, 2003).

The volume of this deposit and its composition, which includes a large fraction of fine sand, and the occurrence of gravel-size clay balls and marine shells, indicate that the main source of material was neither Lake Pontchartrain nor the levees. The canal bottom was in the Pine Island beach sands, and thus the sediment deposited in the neighborhood was derived essentially by scour from the canal bottom and beneath the failed portion of the levee (Fig. 3). At the immediate site of the breach, engineers working on repairing the levee have stated that the depth of scour extended to 6.1 m bsl, or ~7.6 m below the surface. This scour depth is shallower than the 22 m reported by Vink (1926) in the Rhine-Meuse delta but still much deeper than the typical range observed in natural and intentional breaches on the Mississippi River (<2 m in Gomez et al., 1997) and its delta (1.5 m to 2.4 m in Boyer et al., 1997). Assuming the area occupied by the breach is ~1022 m², the estimated volume of the hole is ~7800 m³, or only ~29% of the volume of the splay deposit. Therefore, a significant amount of scour must have occurred on the bottom of the canal. This raises concerns regarding the stability of the New Orleans drainage canal levee system, considering the extent of the Pine Island sands in the subsurface beneath all of the drainage canals (Fig. 1). Scouring immediately downstream of overtopped levees and upper-bank breaches is common, mostly in easily erodible sandy material (e.g., Aslan et al., 2005), yet scouring from beneath the levee requires a particular geological setting. In the Netherlands, where the channels of the Rhine-Meuse River system have been embanked—and breached—since ~1100 A.D., several cases of splays have been correlated with sandy channel belts in the subsurface (Fig. 8); these sandy belts promote groundwater flow during high-discharge events, which can undermine the levees and ultimately cause them to collapse (Berendsen, 1982). A similar mechanism has been proposed for the London Avenue Canal breach (Seed et al., 2006; U.S. Army Corps of Engineers, 2006).

CONCLUSIONS

Analysis of the morphological and sedimentological characteristics of the London Avenue splay deposit provides an understanding of the magnitude of the levee breach in one New Orleans neighborhood. The flow was either erosional or depositional depending on the spatial distribution of urban structures, which either helped to confine or expand the many

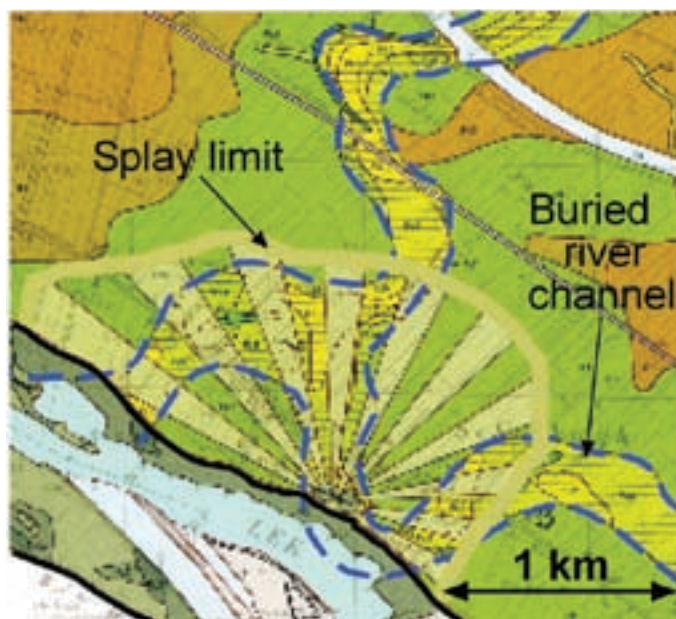


Figure 8. Details of the map of surficial materials of the Rhine-Meuse Delta in the Netherlands, showing typical plan view of a crevasse-splay deposit. Location of sandy river channel is indicated in blue dashed line. Note that breach and origin of splay occurred where levee intersects buried channel. Modified from Berendsen (1982).

intersecting currents. Most of the deposition, up to 1.8 m of sandy material, probably occurred in a short time period from an upper-stage plane bed, and there was little reworking of sediment. This urban splay deposit has no preservation potential and has, in fact, mostly been removed. The only evidence that remains are the data reported here and in future publications of various groups that are currently investigating the Katrina disaster.

ACKNOWLEDGMENTS

We send our most sincere thoughts to all the people who suffered from Katrina, particularly to the New Orleanians who lost their lives in this neighborhood, as well as to those whose homes provided accommodation space to this sadly unique splay deposit. We would like to thank Torbjörn Törnqvist for bringing to our attention some levee-breach examples from the Dutch literature (and for translating excerpts of dissertations) and Rebecca Freeman for interesting discussions on paleo-environments in this study area. We are thankful to John Bridge, Jim Coleman, and John Southard for their thoughtful reviews and for editorial comments from Gerry Ross.

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TO READ MORE about studies in this area, see the **August *Geology*** article by Törnqvist et al. (v. 34, p. 697–700, doi: 10.1130/G22624A.1), “How stable is the Mississippi Delta?”



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GSA'S RESPONSE TO HURRICANE KATRINA



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Following the devastation in New Orleans in August 2005, then-GSA President William A. Thomas initiated a Society-wide effort to assist geoscience libraries that had suffered damage to their collections. Working in concert with AAPG's Publication Pipeline committee, GSA linked Members who had

materials to donate with libraries in need via an electronic bulletin board on the GSA Web site.

GSA MEMBERS MAKE A DIFFERENCE

Fortunately, most geoscience libraries were spared significant losses. One exception was the Gunter Library at the University of Southern Mississippi Gulf Coast Research Laboratory in Ocean Springs. Head Librarian Joyce Shaw writes:

Of all the places our losses were listed, by far the greatest response we received was from the GSA board. Although we were unable to accept all the generous offers, we did secure some replacement copies of books lost in the storm surge water. I received an e-mail today from a geologist who asked if we needed a particular book, so the posting is still helping us.

Thank you for your caring support. We work toward recovery from this historical disaster every day.

YOU CAN STILL HELP

- Visit the bulletin board at <http://rock.geosociety.org/forumRelief/> to view the list of needed items and respond if you are able.
- The Gunter Library has also established a Katrina recovery fund. If you prefer to make a monetary donation to the library, please contact Joyce Shaw, Gunter Library, Gulf Coast Research Laboratory, University of Southern Mississippi, joyce.shaw@usm.edu, +1-228-872-4213.

Details are coming soon!

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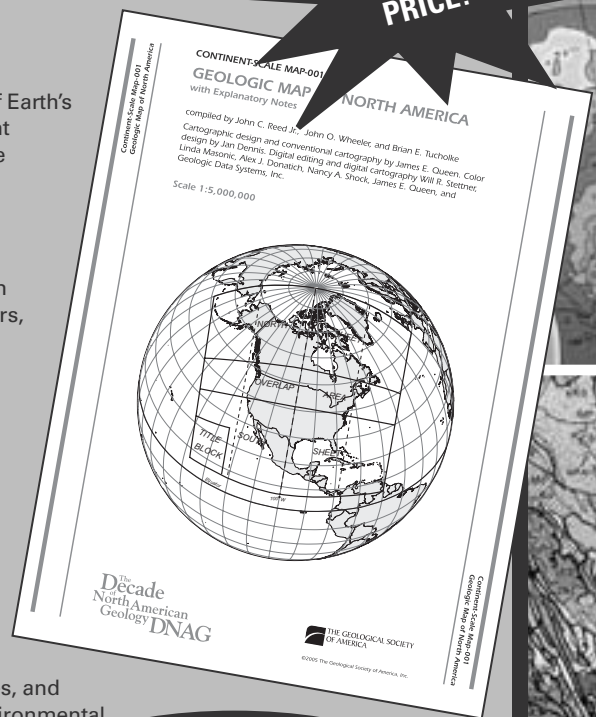
Geologic Map of North America

Compiled by John C. Reed Jr., John O. Wheeler,
and Brian E. Tucholke

The new *Geologic Map of North America* covers ~15% of Earth's surface and differs from previous maps in several important respects: It is the *first* such map to depict the geology of the seafloor, the first compiled since the general acceptance of plate-tectonic theory, and the first since radiometric dates for plutonic and volcanic rocks became widely available. It also reflects enormous advances in conventional geologic mapping, advances that have led to a significant increase in the complexity of the map. The new map, printed in 11 colors, distinguishes more than 900 rock units, 110 of which are offshore. It depicts more than seven times the number of on-land units as are shown on its immediate predecessor, as well as many more faults and additional features such as volcanoes, calderas, impact structures, small bodies of unusual igneous rocks, and diapirs.

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If you wish to be considered, please submit a curriculum vitae and a brief letter describing why you are suited for the position. If you wish to nominate another, submit a letter of nomination and the individual's written permission and CV.

Send nominations and applications to Jon Olsen, Director of Publications, GSA, P.O. Box 9140, Boulder, CO 80301, jolsen@geosociety.org, by 20 October 2006. Questions regarding the positions also may be directed to Mr. Olsen.

GSA is currently soliciting co-editor applications and nominations for these upcoming openings.

GSA Today

GSA's science and news magazine for members and the earth-science community worldwide, *GSA Today* features a "hot-topic" science article most months.

Term: January 2007–December 2010. A phased transition should begin in the fall of 2006. GSA provides a small stipend and funds for mail, telephone, and online access. The editor will work out of his/her current location at work or home as part of a two-editor team.

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NORTHEASTERN

42nd Annual Meeting
Northeastern Section, GSA
Durham, New Hampshire, USA

12–14 March 2007

<http://www.geosociety.org/sectdiv/northe/07nemtg.htm>

The 2007 meeting of the Northeastern Section of the Geological Society of America will be hosted by geoscientists from the University of New Hampshire, Keene State College, Plymouth State University, Dartmouth College, the Geological Society of New Hampshire, the New Hampshire Geological Survey and the U.S. Geological Survey. The meeting will be at the University of New Hampshire's Holloway Commons and adjacent Memorial Union and Huddleston Hall, in downtown Durham. We will meet just upstream from the Great Bay estuary of sea-coast New Hampshire and southern Maine.

CALL FOR PAPERS

Abstract deadline: 5 December 2006

Papers are invited for theme and general discipline sessions in both oral and poster format. Authors interested in submitting papers for symposia should contact the appropriate symposium conveners before submitting. An individual may be a presenter for only one volunteered paper (except symposia papers), but may be co-author on any number of abstracts. Those invited for symposia may present an additional paper. For further information, please contact technical program co-chairs Tim Allen, tallen@keene.edu, or Jo Laird, jl@cisunix.unh.edu. Abstracts of papers must be submitted using the electronic submission form at www.geosociety.org. If you have questions regarding abstract submission, please contact Nancy Carlson, ncarlson@geosociety.org.

REGISTRATION

Standard registration deadline: 12 February 2007

Cancellation deadline: 19 February 2007

GSA Headquarters will handle registration, and further details will be published in the December issue of *GSA Today*. Registration will be available online at www.geosociety.org.

TECHNICAL PROGRAM

The following symposia and theme sessions are planned for the Durham 2007 meeting. Anyone interested in proposing additional symposia or theme sessions should contact the technical program co-chairs; the deadline for new session proposals is 15 September 2006. Presentations for symposia are generally by invitation only, so if you are interested in participating, please contact session coordinators.

SYMPOSIA

1. **New England Hydrology: A Tribute to S. Lawrence Dingman.** Ellen Douglas, UMass-Boston, ellen.douglas@umb.edu, +1-603-862-2730; Matthew Davis, University of New Hampshire, matt.davis@unh.edu, +1-603-862-1718.
2. **Rev. James W. Skehan SJ—Geologist, Teacher, Mentor, Priest: A Jesuit Journey.** Walter Anderson, Maine State Geologist Emeritus, waageo@verizon.net, +1-207-287-2801; Chris Hepburn, Boston College, hepburn@bc.edu, +1-617-552-3640.
3. **Geology in Service to the Public, and the Revival of State and Provincial Geological Surveys in the Northeast.** David Wunsch, New Hampshire State Geologist, dwunsch@des.state.nh.us, +1-603-271-6482; Gary D. Johnson, Dartmouth College, gary.d.johnson@dartmouth.edu, +1-603-646-2371.

THEME SESSIONS

1. **From Rodinia to Pangea—The Lithotectonic Record of Plate Convergence in Eastern North America.** Dick Tollo, George Washington University, rtollo@gwu.edu, +1-202-994-6960; Paul Karabinos, Williams College, paul.karabinos@williams.edu, +1-413-597-2079.
2. **The Neo-Acadian Orogeny and Implications for Tectonic and Depositional Setting of Devonian–Carboniferous Rocks in the Appalachian Orogen.** M.D. Thompson, Wellesley College, mthompson@wellesley.edu, +1-781-283-3029; C.E. White, Nova Scotia Department of Natural Sciences, whitece@gov.ns.ca, +1-902-424-2519.
3. **Tectonic Setting of the Magmatic, Sedimentary and Metamorphic Record of the Alleghanian Orogeny in the Appalachian Mountains.** Bob Wintsch, University of Indiana, wintsch@indiana.edu, +1-812-855-4018; C.K. Kerwin, Keene State College, ckerwin@keene.edu, +1-603-385-2405.
4. **Caledonian Magmatism: Cross-Atlantic Connections—Again.** John Hogan, University of Missouri–Rolla, jhogan@umr.edu, +1-573-341-4618; David Gibson, University of Maine–Farmington, dgibson@maine.edu, +1-207-778-7401; Dan Lux, University of Maine–Orono, dlux@maine.edu, +1-207-581-2152; Martin Feely, National University of Ireland–Galway, martin.feely@nuigalway.ie, +353-91-492129. This session is associated with the Field Trip 4, *Igneous Rocks of the Easternmost Three Terranes in Southeastern New England: Examples from NE Massachusetts and SE New Hampshire*.
5. **Mesozoic Extension, Exhumation, Sedimentation and Magmatism in the Northern Appalachians.** Mary Roden-Tice, SUNY-Plattsburgh, rodenmk@plattsburgh.edu.

- edu, +1-518-564-4032; Greg McHone, University of Connecticut, gregmchone@snet.net, +1-860-486-1391.
6. **Isotopic and Other Indicators of Sediment Provenance and Basement Character.** Sandra Barr, Acadia University, sandra.barr@acadia.ca, +1-902-585-1340; Scott Samson, Syracuse University, sdsamson@syr.edu, +1-315-443-2672.
 7. **Strain Partitioning and Rheological Evolution in Orogens.** Dyk Eusden, Bates College, deusden@bates.edu, +1-207-786-6152; Scott Johnson, University of Maine, johnsons@maine.edu, +1-207-581-2142.
 8. **Sedimentological and Stratigraphic Studies in the Gulf of Maine.** Larry Ward, Jackson Estuarine Laboratory, University of New Hampshire, larry.ward@unh.edu, +1-603-862-5132.
 9. **New Insights in Atlantic Continental Margin Processes.** Joel Johnson, University of New Hampshire, joel.johnson@unh.edu, +1-603-862-4080; Jim Gardner, Center for Coastal and Ocean Mapping, University of New Hampshire, jim.gardner@unh.edu, +1-603-862-3473.
 10. **Geologic Records of Biotic Change.** Will Clyde, University of New Hampshire, will.clyde@unh.edu, +1-603-862-3148.
 11. **Teleconnecting Paleobasins Using Stratigraphic and Paleontological Approaches for High Resolution Intra- and Inter-basin Correlations.** Sean Cornell, Shippenburg University, srcornell@ship.edu, +1-315-229-5236; Diane Burns, St. Lawrence University, dburns@stlawu.edu, +1-315-229-5248; Alex Bartholomew, Union College, alexbartholomew_geo@hotmail.com, +1-518-388-6770.
 12. **Atmospheric–Earth Surface Interactions: Solid, Liquid, and Gas.** Rob Griffin, University of New Hampshire and Climate Change Research Center, rob.griffin@unh.edu, +1-603-862-2021.
 13. **Glacial and Paraglacial Coastal Systems.** Dan Belknap, University of Maine, belknap@maine.edu, +1-207-581-2159; Duncan Fitzgerald, Boston University, dunc@bu.edu, +1-617-353-2530.
 14. **Contaminants in Groundwater–Surface Water Systems: Sources, Pathways, and Toxicities.** Rudi Hon, Boston College, hon@bc.edu, +1-617-552-3656; Joe Ayotte, U.S. Geological Survey, jayotte@usgs.gov, +1-603-226-7810; Bill Brandon, EPA-Boston, brandon.bill@epamail.epa.gov, +1-617-918-1391.
 15. **Characterization and Remediation of Contaminated Bedrock Aquifers.** Nancy Kinner, University of New Hampshire, nancy.kinner@unh.edu, +1-603-862-1422.
 16. **Treated Wastewater and Urban and Suburban Runoff as Aquifer Recharge: Issues for Protection of Groundwater Quality.** Denis R. LeBlanc, U.S. Geological Survey, Northborough, Mass., dleblanc@usgs.gov, +1-508-490-5030.
 17. **Glacial and Postglacial Environments on the Frontier: Quaternary Studies in the New England–Canadian Border Region.** Woody Thompson, Maine Geological Survey, woodrow.b.thompson@maine.gov, +1-207-287-7178; P. Thompson Davis, Bentley College, pdavis@bentley.edu, +1-781-891-3479; Brian Fowler, Fowler Management Resources, b2fmr@metrocast.net, +1-603-524-8969.
 18. **Advances in Paleoclimate from the Terrestrial Realm to the Deep Sea.** Amy Frappier, Boston College, a.frappier@unh.edu, +1-603-862-4046; Jon Woodruff, Woods Hole Oceanographic Institution, jwoodruff@whoi.edu, +1-508-289-3437.
 19. **Earthquakes and Volcanoes—Past, Present, and Future, Regional and Global.** Jeffrey B. Johnson, University of New Hampshire, jeff.johnson@unh.edu, +1-603-862-0711; Pedro de Alba, University of New Hampshire, pedro.dealba@unh.edu, +1-603-862-1417.
 20. **Mineral Properties: Geochemical, Petrological, and Environmental Applications.** Cosponsored by *Mineralogical Society of America*. Bruce Watson, RPI, watsoe@rpi.edu, +1-518-276-8838; Jonathan Price, RPI, pricej@rpi.edu, +1-518-276-6000.
 21. **Elemental Cycling within Terrestrial Environments.** Julie Bryce, University of New Hampshire, julie.bryce@unh.edu, +1-603-862-3139; Scott Bailey, USDA Forest Service, Northeastern Research Station and Center for the Environment, swbailey@fs.fed.us, +1-603-535-3262; Kevin McGuire, Plymouth State University, kmcguire1@plymouth.edu, +1-603-535-3250; Steve Kahl, Plymouth State University Center for the Environment, jskahl@plymouth.edu, +1-603-535-3154.
 22. **Innovative Teaching Methods in the Earth Sciences.** Frank Revetta, SUNY-Potsdam, revettfa@potdams.edu, +1-315-267-2289.
 23. **Health and Geology in the Northeast.** Cosponsored by *GSA Geology and Health Division*. Catherine Skinner, Yale University, catherine.skinner@yale.edu, +1-203-432-3787; Nelson Eby, University of Massachusetts–Lowell, nelson.eby@umass.edu, +1-978-934-3907.
 24. **History of Geological Ideas and Understanding of the Northern Appalachians.** Cosponsored by *GSA History of Geology Division*. William R. Brice, University of Pittsburgh–Johnstown, wbrice@pitt.edu, +1-814-269-3950.

GSA Section Meetings

Northeastern Section

12–14 March 2007

University of New Hampshire
Durham, New Hampshire

Abstract Deadline: 5 December 2006

Information: Wally Bothner, University of New Hampshire, Dept. of Earth Sciences, James Hall, 56 College Rd., Durham, NH 03824-3578, USA, +1-603-862-3143, wally.bothner@unh.edu.

Southeastern Section

29–30 March 2007

Hyatt Regency Savannah on the Historic Riverfront
Savannah, Georgia

Abstract Deadline: 12 December 2006

Information: Pranoti Asher, Georgia Southern University, Dept. of Geology and Geography, Statesboro, GA 30460-8149, USA, +1-912-681-0338, pasher@georgiasouthern.edu.

Joint Meeting

North-Central and South-Central Sections

11–13 April 2007

Kansas Memorial Union, University of Kansas
Lawrence, Kansas

Abstract Deadline: 23 January 2007

Information: Greg Ludvigson, +1-785-864-2734, gludvigson@kgs.ku.edu—or—Greg Ohlmacher, +1-785-749-4502, ohlmac@kgs.ku.edu; both at Kansas Geological Survey, University of Kansas, 1930 Constant Ave., Lawrence, Kansas 66047-5317, USA.

Cordilleran Section

4–6 May 2007

Western Washington University
Bellingham, Washington

Abstract Deadline: 6 February 2007

Information: Bernie Housen, Western Washington University, Dept. of Geology, MS 9080, 516 High St., Bellingham, WA 98225-5946, USA, +1-360-650-6573, bernieh@cc.wvu.edu.

Rocky Mountain Section

7–9 May 2007

Dixie Center
Saint George, Utah

Abstract Deadline: 13 February 2007

Information: Jerry Harris, Dixie State College, Science Building, 225 South 700 East, Saint George, UT 84770-3875, USA, +1-435-652-7758, dinogami@gmail.com.



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25. **Google Earth Science: Geological Applications of Interactive Web-Based Maps.** Declan G. De Paor, Worcester Polytechnic Institute, declan@wpi.edu, +1-508-831-5116; Steve Whitmeyer, James Mason University, whitmesj@jmu.edu, +1-540-568-7119.

FIELD TRIPS

Anyone interested in proposing additional field trips should contact the field trip coordinator, Peter Thompson, pjt3@cisunix.unh.edu, by 15 September 2006. For additional field trip information, contact Thompson or the individual field trip leaders.

1. **Bottom Mapping and Characterization of the Great Bay Estuary and Adjacent Coastal Areas.** Larry Mayer, larry.mayer@unh.edu, +1-603-862-2615; Larry Ward, larry.ward@unh.edu, +1-603-862-5132; Semme Dijkstra, semmed@cisunix.unh.edu, +1-603-862-0525; University of New Hampshire, Center for Coastal and Ocean Mapping, and the Jackson Estuarine Laboratory.
2. **Structure of Late Paleozoic Brittle Dextral Strike-Slip Fault Zones in Coastal Maine Exposures.** Mark Swanson, University of Southern Maine, mswanson@maine.edu, +1-207-780-5024.
3. **Glacial and Coastal Geology of Southeastern New Hampshire.** Joseph Licciardi, University of New Hampshire, joe.licciardi@unh.edu, +1-603-862-3135; P. Thompson Davis, Bentley College, pdavis@bentley.edu, +1-781-891-3479; Larry Ward, University of New Hampshire, larry.ward@unh.edu, +1-603-862-5132.
4. **Igneous Rocks of the Easternmost Three Terranes in Southeastern New England: Examples from NE Massachusetts and SE New Hampshire.** Chris Hepburn, Boston College, hepburn@bc.edu, +1-617-552-3642; Rudolph Hon, Boston College, rudy.hon.1@bc.edu, +1-617-552-3640; Jo Laird, University of New Hampshire, jl@cisunix.unh.edu, +1-603-862-3140. This trip runs in connection with Theme Session 4, *Caledonian Magmatism: Cross-Atlantic Connections—Again*.
5. **Geology of the May 2006 Suncook River Avulsion.** Chad Wittkop, cwittkop@des.state.nh.us; Rick Chormann, rchormann@des.state.nh.us, +1-603-271-1974; David Wunsch, dwunsch@des.state.nh.us, +1-603-271-6482; New Hampshire Geological Survey.

SHORT COURSES AND WORKSHOPS

Short courses planned for Sat. and/or Sun., 10–11 March, will be noted in the December issue of *GSA Today* and posted at www.geosociety.org. Workshops for K–12 teachers centered on global information system and Web-based activities will be offered on 11 March. Anyone interested in proposing short courses or K–12 teacher activities should contact short course coordinators Ray Talkington, rtalkington@geospherenh.net, and Lee Wilder, lwilder@des.nh.state.us, by 15 September 2006.

ACCOMMODATIONS

A block of rooms at special rates has been reserved until 17 Feb. 2007 at the New England Center, +1-800-590-4334, and at the Holiday Inn Express, +1-888-465-4329, both within short walking distance from the campus conference center. Reservations may be made directly by phone; you MUST identify yourself as attending the Northeastern GSA meeting when making reservations to get the special rate. Additional housing may be available at the Three Chimneys Inn in Durham, +1-888-399-9777. Reserve early to be within walking distance. Details for other local hotels in the nearby towns of Dover, Newington, and Portsmouth, all less than 10 miles away, will be listed online in the next few weeks. Parking will be available on campus.

EXHIBITS

Exhibits will be located in the Piscataqua Room of Holloway Commons. Exhibit rates are US\$100 for nonprofit organizations and US\$200 for others. For further information, contact the exhibits coordinator, Stefanie Lamb, Nobis Engineering, Concord, N.H., +1-603-486-7606, sgetlamb@gmail.com.

SPECIAL EVENTS

Special events planned for NE-GSA include two special hot topic plenary lectures, the famous map blast, a conference banquet, the Eastern Section SEPM social and business meeting, and the AWG breakfast. Other society and committee business meetings, breakfasts, and lunches may be scheduled by contacting the general chair, Wally Bothner, wally.bothner@unh.edu.

The Mount Washington Observatory is providing the opportunity for nine intrepid earth science adventurers to attend a Mount Washington EduTrip overnight at the top of New England's highest and "weathermost" point. See www.mount-washington.org/education/edutrips/ for details.

MENTORING PROGRAMS

Roy J. Shlemon Mentor Program in Applied Geoscience. Sponsored by *GSA Foundation*. Mon.–Tues., 12–13 March, 11:30 a.m.–1 p.m.

The John Mann Mentors in Applied Hydrogeology Program. Sponsored by *GSA Foundation*. Mon., 12 March, 5–6:30 p.m.

For further information, see "Students—Meet Your Career Mentors" on page 56 of this issue.

GUEST ACTIVITIES

The Seacoast area has a wide array of museums, parks, and other sites of historic and cultural interest. Information on the spouse and guest programs will be available in the December issue of *GSA Today*.

SPONSORSHIP

Corporate sponsors for this meeting will have their names published in the final meeting announcement and in the meeting program. Interested parties may contact the meeting sponsorship coordinator, Tom Shevenell, shevenell@aol.com.

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STUDENT TRAVEL GRANTS

Travel grants are available from the Northeastern Section of GSA in cooperation with the GSA Foundation. These grants are open to both undergraduate and graduate students who are GSA members, currently enrolled in NE Section schools, and are presenting oral or poster papers at this meeting. Applications are available online at www.geosociety.org or through Stephen Pollock, secretary-treasurer, GSA Northeastern Section, pollock@usm.maine.edu.

ACCESSIBILITY

GSA and the University of New Hampshire are committed to ensuring full participation for conference attendees with disabilities at all events at the 2007 meeting. Every attempt is made for full compliance with the Americans with Disabilities Act. You may indicate special requirements on your registration form, and you should inform the local organizing committee of these requirements at least one month prior to the meeting. Accessible hotel rooms are available, but it's best to reserve your room early.

FURTHER DETAILS

Detailed information on times, location, directions, and accommodations will be published in the December 2006 issue of *GSA Today* and posted at www.geosociety.org and www.unh.edu/esci/negsa2007.html.

STUDENTS—Meet Your Career Mentors!

Plan now to attend a Shlemon Mentor Program and/or a Mann Mentor Program in Applied Hydrogeology at your 2007 Section meeting to chat one-on-one with practicing geoscientists. These volunteers will answer your questions and share insights on how to get a job after graduation. When programs are scheduled for multiple days, each day's program will offer a different set of mentors.

Roy J. Shlemon Mentor Program in Applied Geoscience. Sponsored by *GSA Foundation*. This is a chance for students to discuss career opportunities and challenges with professional geoscientists from multiple disciplines. Students will receive FREE lunch tickets in their registration packet to attend the Shlemon Program.

The John Mann Mentors in Applied Hydrogeology Program. Sponsored by *GSA Foundation*. This early evening event presents opportunities for undergraduate and

graduate students and recent graduates interested in applied hydrogeology or hydrology as a career to interact and network with practicing hydrogeologic professionals. Whether you've already decided to head down the hydro career path or whether you just would like to know more about these career options, this meeting is for you! This program is a focused, small-scale event that features a FREE pizza dinner for participants. Students will receive a ticket in their registration packets to attend the Mann Program.

Space for these events is limited, so plan to arrive early: first come, first served. For further information, contact glewis@geosociety.org.



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2007 SECTION MEETING MENTOR PROGRAMS

For program locations, ask at the Section meeting registration desk.

NORTHEASTERN SECTION MEETING

University of New Hampshire, Durham, N.H., USA

Shlemon Mentor Program Luncheons:
Mon.–Tues., 12–13 March, 11:30 a.m.–1 p.m.

Mann Mentors in Applied Hydrogeology Program:
Mon., 12 March, 5–6:30 p.m.

SOUTHEASTERN SECTION MEETING

Hyatt Regency Savannah
on the Historic Riverfront, Savannah, Ga., USA

Shlemon Mentor Program Luncheons:
Thurs.–Fri., 29–30 March, 11:30 a.m.–1 p.m.

Mann Mentors in Applied Hydrogeology Program:
Thurs., 29 March, 5–6:30 p.m.

Joint Meeting

NORTH-CENTRAL SECTION

SOUTH-CENTRAL SECTION

Kansas Memorial Union,
University of Kansas,
Lawrence, Kans., USA

Shlemon Mentor Program Luncheon:
Thurs.–Fri., 12–13 April, 11:30 a.m.–1 p.m.

Mann Mentors in
Applied Hydrogeology Program:
Thurs., 12 April, 5–6:30 p.m.

CORDILLERAN SECTION MEETING

Western Washington University, Bellingham, Wash., USA

Shlemon Mentor Program Luncheons:
Fri.–Sat., 4–5 May, 11:30 a.m.–1 p.m.

Mann Mentors in Applied Hydrogeology Program:
Fri., 4 May, 5–6:30 p.m.

ROCKY MOUNTAIN SECTION MEETING

Dixie Center, Saint George, Utah, USA

Shlemon Mentor Program Luncheons:
Mon.–Tues., 7–8 May, 11:30 a.m.–1 p.m.

Mann Mentors in Applied Hydrogeology Program:
Mon., 7 May, 5–6:30 p.m.



Got an Item for the Auction?

The GSA Annual Meeting is right around the corner, but there is still time to donate an item to the Foundation's 7th Silent Auction. Suggestions are jewelry, fossils, mineral samples, rare books, vacation packages, field gear, and camping equipment. Just contact Donna Russell at the Foundation for further information, +1-303-357-1054, drussell@geosociety.org.

Donations must be received by 30 September 2006.

Is the Foundation in Your Will?

If you have named the Foundation in your will, please check the space on the coupon below. Your name will be added to the Pardee Coterie, which is the Foundation's planned giving roster. All members of the Coterie will be invited to attend a special breakfast, with a guest speaker, during GSA's annual meeting.



Most memorable early geologic experience:

Encountering bobcats, eagles, and lightning while doing field work near Ely, Nevada, in 1953.

—Bernard W. Pipkin

Focus on a Foundation Fund

The Greatest Needs Fund

The Foundation's **Greatest Needs Fund** has been a source of funding and support for many GSA programs over the years. Without the usual parameters of a restricted fund, the **Greatest Needs Fund** can be used in a variety of ways.

Most recently, this fund has supported:

- The Research Grants program
- The GeoCorps America™ internship program
- International travel to the GSA meeting
- The GSA Public Service Award
- Student travel grants to the Section meetings
- Education & Outreach programs
- The Congressional Science Fellowship
- Publications: *Geologic Map of North America*

Continued support from GSA members to the **Greatest Needs Fund** provides a very necessary financial base to augment many other GSA programs, including science and outreach, electronic publications, and member services. As dollars for this fund increase, so will the available support for GSA.

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ANNOUNCEMENTS

MEETINGS CALENDAR

2007

15–16 January	Periglacial and Paraglacial Processes and Environments, Past, Present and Future, London, UK. Information: www.geolsoc.org.uk/template.cfm?name=Periglacial_and_Paraglacial ; Jasper Knight, University of Exeter, UK, +44 1326 371866, j.knight@exeter.ac.uk .
19–22 March	NHA Annual Hydrogen Conference 2007, San Antonio, Texas, USA. Information: www.HydrogenConference.org .

Visit www.geosociety.org/calendar/ for a complete list of upcoming geoscience meetings.

About People

GSA Member **Eric J. Barron** has been named dean of the Jackson School of Geosciences at the University of Texas at Austin. He is currently dean of the College of Earth and Mineral Sciences at Pennsylvania State University.

GSA Senior Fellow and Foundation trustee **Farouk El-Baz** has been elected to the Academy Hassan II of Sciences and Technology of the Kingdom of Morocco.



NOTICE of Council Meeting

Meetings of the GSA Council are open to Fellows, Members, and Associates of the Society, who may attend as observers, except during executive sessions. Only councilors and officers may speak to agenda items, except by invitation of the chair.

The next Council meetings will be held at 1 p.m., Saturday, 21 October, and 8 a.m., Wednesday, 25 October, at the 2006 GSA Annual Meeting in Philadelphia.

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Are You Considering Buying or Leasing a New Car? Read this First!

If you're a current GSA member and have been for at least six months, you may purchase or lease a new Subaru at dealer invoice cost. Before visiting a Subaru dealer in the U.S. (Hawaii not included), contact the **VIP Partners Program Administrator** at GSA and request a Dealer Visit Authorization form and letter of introduction. Present the letter to the participating dealer sales manager upon entry to your preferred Subaru dealership, and before pricing negotiations are initiated. It's that simple! The savings vary by vehicle, but may range from approximately \$1,300 to more than \$3,000.

For every car sale or lease reported, Subaru of America will donate \$100 to the GSA Foundation. Subaru of America and GSA are very pleased to extend their partnership by providing this benefit to GSA members.

For more information or to request a letter of introduction, contact the **VIP Partners Program Administrator**, at gsaservice@geosociety.org, +1-888-443-4472.



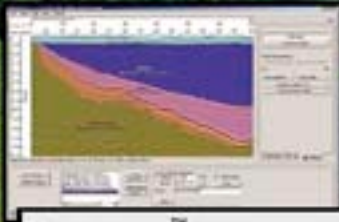
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For more information about course implementation visit us at Booth #611 at the GSA Annual Meeting or on the Web:

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 or contact Elizabeth Mills/Emily Miller: 800-824-0405



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We are interviewing for a new tenure-track faculty position in contaminant hydrogeology at the GSA meeting – please see our ad in GSA Today



GSA Awards Science Fair Excellence



Winners of the 2006 Intel International Science and Engineering Fair GSA Special Award: Maysun Hasan, Hermain Khan, Shannon L. Babb, Scott Hasbrook, and Nathan Hasbrook, with GSA Fellow Barbara Tewksbury, presenter.

GSA awarded science and engineering projects investigating earth and related sciences at the 7–13 May 2006 Intel International Science and Engineering Fair in Indianapolis, Indiana, USA. Award winners and their schools received a free subscription to *GSA Today* as well as a cash prize. Projects were judged on their demonstration of a high level of understanding of earth science concept(s), of how Earth is a system, and use of innovative methods to explain concepts.

\$1,000 AWARD

Maysun Mazhar Hasan, 17, Francis Lewis High School, Fresh Meadows, New York, USA

Hermain Suhail Khan, 16, Staten Island Technical High School, Staten Island, New York, USA

“Tracing early hominid migrations in India: ESR dating at Hathnora and Devni-Khadri.”

\$750 AWARD

Shannon L. Babb, 18, American Fork High School, American Fork, Utah, USA

“Deadly waters: A twelve month water quality study of a newly erupted sulfur spring and its longitudinal effect on Diamond Fork Creek, phase IV.”

\$250 AWARD

Scott Edward Hasbrook, 15, Highland East Junior High School, Moore, Oklahoma

Nathan Tyler Hasbrook, 15, Highland East Junior High School, Moore, Oklahoma

“Waves of destruction, II: Calculating wave intrusion on coastal regions.”

Congratulations to these students for their exemplary science projects!

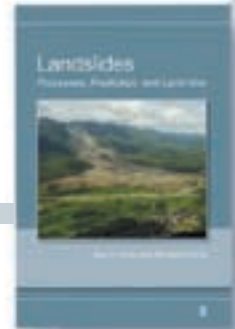
NEW BOOKS FROM AGU

Going to Philadelphia for the 2006 GSA Annual Meeting?

Purchase these and other books at the AGU Booth, #719 in the exhibit hall.

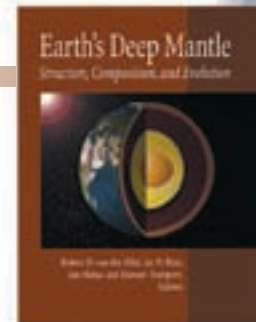
Landslides: Processes, Prediction, and Land Use

Roy Sidle and Hirotaka Ochiai
2006, 370pp., softbound
List Price: \$40.00
AGU Member Price: \$28.00



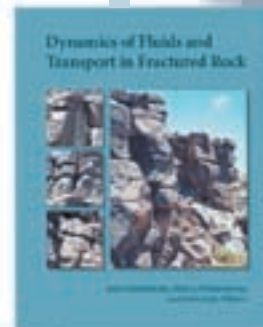
Earth's Deep Mantle: Structure, Composition, and Evolution

Rob D. van der Hilst, Jay Bass, Jan Matas,
Jeannot Trampert, Editors
2005, 350pp., hardbound
List Price: \$82.00
AGU Member Price: \$57.40



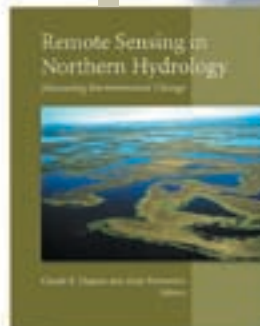
Dynamics of Fluids and Transport in Fractured Rock

Boris Faybishenko, Paul A. Witherspoon,
John Gale, Editors
2005, 250pp., hardbound
List Price: \$78.00
AGU Member Price: \$54.60



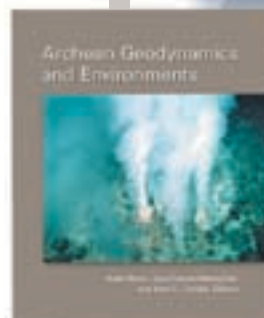
Remote Sensing in Northern Hydrology: Measuring Environmental Change

Claude R. Duguay, Alain Pietroniro, Editors
2005, 150pp., hardbound
List Price: \$60.00
AGU Member Price: \$42.00



Archean Geodynamics and Environments

Keith Benn, Jean-Claude Mareschal,
Kent Condie, Editors
2005, 370pp., hardbound
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AGU Member Price: \$62.30



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Positions Open

TENURE-STREAM APPOINTMENT, EARTH SCIENCE UNIVERSITY OF TORONTO AT MISSISSAUGA

The University of Toronto at Mississauga, Department of Chemical & Physical Sciences, invites applications for a tenure-stream position in Earth Science at the rank of Assistant Professor, effective 1 July 2007. Applications will be accepted in all areas of Earth Science but preference will be given to candidates with research interests in structural geology, tectonics or geochemistry that would complement existing expertise in the areas of geophysics, petrology, paleoclimatology, Precambrian geology and astronomy. Applicants should possess a Ph.D. in Earth Science or allied field, a strong academic background, an excellent research record and potential for excellence in teaching. The successful candidate will be expected to conduct an active and innovative research program as well as teach Earth Science at the undergraduate and graduate levels. Salary will be commensurate with qualifications and experience.

The successful candidate will be located in the Department of Chemical & Physical Sciences, University of Toronto at Mississauga (UTM), and will also be a full member of the Graduate Department of Geology, University of Toronto. Further information can be found at www.utm.utoronto.ca/cps and www.geology.utoronto.ca/.

The University of Toronto is strongly committed to diversity within its community and especially welcomes applications from visible minority group members, women, Aboriginal persons, persons with disabilities, members of sexual minority groups, and others who may contribute to the further diversification of ideas. All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority.

Applications will be accepted until 20 October 2006. Applicants should provide a curriculum vitae, a statement of teaching philosophy and interests, an outline of their proposed research, and should arrange to have three confidential letters of recommendation sent on their behalf to: Professor G.W.K. Moore, Chair, Earth Science Search Committee, Department of Chemical & Physical Sciences, University of Toronto at Mississauga, Mississauga, Ontario, Canada L5L 1C6, e-mail: ers2006@utm.utoronto.ca.

PALEONTOLOGY—UNIVERSITY OF OREGON

The Robert D. Clark Honors College of the University of Oregon invites applications for a tenure track position at the assistant professor level in Paleontology. Although applicants with expertise in all relevant areas are encouraged to apply, we are particularly interested in individuals specializing in the development and evolution of life on Earth through the study of fossil life forms. The Clark Honors College is a select, liberal arts college of 600 students within a state university of 20,000. It features a comprehensive four-year curriculum which combines a broad liberal arts education with a specialized major selected from among the university's departments.

Scientific research and scholarship of the highest quality are expected; tenure standards for scholarship in the sciences and geology will apply. Professional opportunities include interactions with the Department of Geological Sciences, the Ecology & Evolution Program within the Biology Department, the Oregon Institute of Marine Biology, and the Museum of Natural and Cultural

History, with its nationally ranked Condon Collection of over 70,000 fossil specimens, primarily vertebrate fossils from the Pacific Northwest.

The teaching responsibilities for this position differ from analogous positions within UO science departments by having a greater emphasis on undergraduate teaching across the sciences. The successful candidate will teach primarily within the Honors College, and will have principal responsibility for advising on its introductory science curriculum. Honors College courses in all fields are taught in a seminar format. Tenure standards for teaching will be those used in the liberal arts and in the Honors College. Evidence of teaching excellence and breadth is highly desirable.

Completion of the Ph.D. is required. Applicants should send (1) a curriculum vitae, (2) a statement of research and discussion of potential contributions to both the HC and research department, (3) a statement of teaching interests and experience including teaching evaluations, and (4) contact information for at least three referees to: Science Search Committee, Clark Honors College, 320 Chapman Hall, 1293 University of Oregon, Eugene, OR 97403. We will begin reviewing completed applications on 15 November 2006, and will continue until the position is filled.

Additional information about Clark Honors College may be found at <http://honors.uoregon.edu/>. The University of Oregon is an equal opportunity/affirmative action institution committed to cultural diversity and compliance with the Americans with Disabilities Act.

POST-DOCTORAL POSITION QUANTITATIVE SEISMIC GEOMORPHOLOGIST BUREAU ECONOMIC GEOLOGY

Applications are invited for a position in the field of Quantitative Seismic Geomorphology at the Post-Doctoral level. This position is fully funded for 2 years, supported jointly through the Quantitative Clastics Laboratory (QCL) Industrial Associates program at the Bureau of Economic Geology, The University of Texas Jackson School of Geosciences and the John A. and Katherine G. Jackson Endowment. QCL is a long-standing applied research program in clastic continental margin evolution. Please visit our Web site for more information (www.beg.utexas.edu/indusassoc/dm2).

This position is specifically targeted toward the use of mega-scale 3D seismic data sets and supplemental data to develop techniques in paleogeomorphic analysis of ancient landscapes and seascapes. The successful candidate will, as part of a multidisciplinary team, engage in research focused on understanding how to quantify elements in seismic images to calculate physical conditions active in and climatic influences on ancient landscapes. This position offers the opportunity to utilize world-class seismic data to impact advances in seismic geomorphology, paleoclimatology, paleogeomorphology, and biogeography. The position provides an excellent opportunity for scientific achievement and career growth in an exceptional setting.

Qualifications: Applicants must have a Ph.D. in geology or earth resources. Preference will be given to applicants with specialties in 3-D seismic interpretation and visualization. Experience in geomorphology, surface hydrology, or paleoclimatology would be highly advantageous. The successful candidate must demonstrate strong interpersonal and communications abilities, provide a record of successful collaborative research experiences, and have a willingness to work with industry scientists to apply techniques and research results. The candidate absolutely must have a demonstrated record of intent to publish.

To Apply: Applicants must send a letter of application, resume with record of publications, brief statement of professional goals with an emphasis on research objectives, and names and addresses of three professional references to: Ms. Jenny Turner, Bureau of Economic Geology, Jackson School of Geosciences, University Station Box X, Austin, TX 78713-8924, U.S.A. Review of applications will begin no later than 1 October 2006.

The University of Texas at Austin is an Equal Opportunity/Affirmative Action Employer. All positions are security-sensitive; conviction verification conducted on applicants selected.

TENURE TRACK POSITION EARTH SYSTEMS SCIENTIST BOSTON COLLEGE

The Department of Geology and Geophysics at Boston College anticipates approval to hire a faculty member in the broad area of Earth Systems Science to start Fall 2007. Areas of expertise might include, but are not limited to, sedimentary processes, basin analysis, reflection seismology, and biogeochemical processes

in sedimentary systems. The successful candidate will be expected to develop a vigorous externally funded research program integrated with excellence in teaching within the geology/geophysics/ environmental geoscience curriculum at both the undergraduate and graduate levels, including teaching courses in sedimentology and stratigraphy for majors. The appointment is expected to be made at the Assistant Professor level, but outstanding individuals qualified for appointment at a higher rank will be considered. Information on the Department, faculty, and research strengths can be viewed at www.bc.edu/geosciences. Applicants should send a curriculum vita, statements of teaching and research interests, and the names and contact information of at least three references as a single PDF-file e-mail attachment to geo_position@bc.edu. Review of applications will begin on 15 November 2006. Department faculty will be available at the GSA and AGU fall meetings to interview applicants. Boston College is an academic community whose doors are open to all students and employees without regard to race, religion, age, sex, marital or parental status, national origin, veteran status, or handicap.

ARIZONA GEOLOGICAL SURVEY FOUR POSITIONS

Arizona Geological Survey in Tucson expects to fill four positions this fall:

Engineering Geology/Hazards (2 positions, 1 in Phoenix)
Geologic Outreach Section Chief
Cartographer/GIS

See www.azgs.gov/jobs for details.

ASSISTANT PROFESSOR NEAR-SURFACE GEOPHYSICS DEPARTMENT OF GEOLOGY UNIVERSITY AT BUFFALO

The University at Buffalo Department of Geology invites applications for a tenure-track assistant professor position in near-surface geophysics. We seek a scientist who will integrate with our existing departmental strength in geohazards (contaminant hydrogeology, volcanic hazards, climate change, and seismic hazards). Of particular interest are researchers with expertise in hydrogeophysics or inverse methods.

We expect faculty to develop, maintain and publish an innovative, extramurally funded research program. The successful applicant must have a Ph.D. degree at the time of appointment and demonstrated potential to perform teaching duties. Teaching duties will include undergraduate and graduate level courses in the candidates' specialties. More information about our department can be found at www.geology.buffalo.edu.

Send applications to Dr. Matthew Becker, c/o Robyn Wagner by email rlwagner@buffalo.edu or post to Department of Geology, 876 Natural Sciences Complex, University at Buffalo, Buffalo, NY 14260. Applications should include, a CV, statement of research goals and teaching experience and interests, selected reprints, and contact information for at least three references. Applications should be complete by 1 Nov. 2006, when we will begin our review of candidates.

The University at Buffalo is an Equal Opportunity Employer/Recruiter.

FELLOWSHIPS, THE RADCLIFFE INSTITUTE FOR ADVANCED STUDY AT HARVARD UNIVERSITY

The Radcliffe Institute for Advanced Study at Harvard University awards fully funded fellowships each year. Radcliffe Institute fellowships are designed to support scientists of exceptional promise and demonstrated accomplishment. Scientists, in any field, with a doctorate in the area of the proposed project by December 2005 are eligible to apply. Only scientists who have at least one published article or monograph are eligible to apply.

The stipend amount of \$60,000 is meant to complement sabbatical leave salaries of faculty members. Fellows receive office space, computers and high speed links, and access to libraries and other resources of Harvard University during the fellowship year, which extends from early September 2007 through 30 June 2008. Residence in the Boston area is required as is participation in the Institute community. Fellows are expected to present their work-in-progress and to attend other fellows' events.

For more information, including lists of present and past fellows, visit our Web site at www.radcliffe.edu. Applications are due by 4 December 2006. Apply online or write, call, or e-mail for an application: Radcliffe Application Office, 34 Concord Avenue, Cambridge, MA 02138, +1-617-496-3048, science@radcliffe.edu, www.radcliffe.edu.

SEVEN FACULTY POSITIONS UNIVERSITY OF KUWAIT

The Department of Earth and Environmental Sciences (EES) at the University of Kuwait is undergoing an expansion of its academic programs, faculty staff, and facilities and has immediate openings for seven faculty positions. EES is a vibrant, rapidly developing, multidisciplinary academic unit with M.Sc. and B.Sc. teaching and research programs in Marine Sciences, Environmental and Geological Sciences. The department invites applicants for the seven teaching positions listed below and the appointments will be made at the Assistant, Associate or Full Professor to begin September 2006. We will accept applications until the positions are filled.

1. Mineralogy/Petrology—Assistant Professor. The Department of Earth and Environmental Sciences (EES) at the University of Kuwait, has an immediate opening for a full-time faculty position in Mineralogy and Petrology at the Assistant Professor level. The EES department seeks a broadly trained individual with expertise in the areas of: (1) Optical mineralogy and crystallography; (2) General petrology/geo-tectonics; (3) Mineral resources and ore microscopy; (4) High-temperature geochemistry; and (5) Geological mapping/computing skills. Preference will be given to applicants with research background, field experience, and resultant publication in internationally renowned journals.

2. Petroleum Geosciences/Well Logging—Assistant, Associate or Full Professor. The Department of Earth and Environmental Sciences (EES) at the University of Kuwait invites applications for a position at the Assistant, Associate or Full Professor level in Petroleum Geosciences/Well Logging. The EES department seeks a broadly trained individual who can integrate geological, geophysical or petro-physical data in the investigation of subsurface geological systems.

We seek candidates with relevant educational and/or research experience in any of the following areas: (1) Use and understanding of modern tools application in petroleum-related research and education; (2) Seismic and well log interpretation software; (3) Innovative approaches to rock-property modeling; (4) Quantitative basin modeling; (5) subsurface mapping and cross-section construction; (6) Other sub fields related to reservoir characterization.

3. Coastal Physical Oceanography—Assistant/Associate Professor. The department invites applications for an academic position in coastal physical oceanography at the Assistant/Associate Professor level beginning September 2007. We seek a physical oceanographer whose research and teaching interests include: (1) Coastal fluid dynamics; (2) Continental shelf and circulation and cross-shelf transport; (3) Modeling sediment transport within and across near shore system; (4) Coupling between physical, geological and geochemical processes in the coastal environment; (5) Hydrodynamics and particle transport and retention within tidal channel and nearshore estuaries; (6) Deltaic continental shelf, mixed carbonate/caustics and coral reef environments; (7) Use of marine geophysical instruments (e.g. shallow seismic, sonar) with expertise in field observation commensurate with numerical or laboratory modeling.

The individual should have substantial breadth in physical oceanography and has the ability to use numerical, analytical and observational tools and to develop an interdisciplinary field program with focus on interdisciplinary research problems.

Responsibilities: Responsibilities include teaching physical oceanography to marine science majors and undergraduate and master level students in geology, marine science and environmental sciences; develop and maintain a vigorous external/internal-funded research program, to advise and mentor graduate student and to interact with faculty colleagues in this and other departments.

4. Stratigraphy/Palynology—Associate or Full Professor. The Department of Earth and Environmental Sciences (EES) at the University of Kuwait, has an immediate opening for a full-time faculty position in Stratigraphy/Palynology at the Associate or Full Professor level. The EES department seeks an individual who is broadly interdisciplinary with strong background and a field-based research approach in the areas of: (1) Stratigraphy and paleontology with education and research emphasis in biostratigraphy, paleobiology, pale climatology, sedimentation/strata formation, outcrop and subsurface geology, basin analysis and depositional systems, geological interpretation and correlations; (2) Focus on fundamental and applied stratigraphic,

palynologic and biostratigraphic research that has direct application to oil industry, water and natural resources; (3) Experience in one or more of the following areas will be desirable: sequence stratigraphy, facies analysis, chemostratigraphy, geophysical analysis and interpretation, mapping geologic structures using outcrop and subsurface geologic data.

5. Environmental Geochemistry/Clay Mineralogy—Assistant/Associate Professor. The department invites applications for an academic position in Environmental Geochemistry/Clay Mineralogy at the Assistant/Associate Professor level beginning September 2007, in the areas of clay mineralogy, in stable isotope and environmental geochemistry. This position requires expertise in environmental or low temperature geochemistry, analytical marine geochemistry, field oriented air-sea & soil research experience as well as experience with a variety of environmental analytical laboratory techniques. He/she will have strong background in the geological sciences and be able to interface well with other water-related specialties.

We seek an outstanding individual with solid record of scholarly achievement in some areas of clay research including clay mineral as biohazards, environmental or biomedical application of clay minerals, and industrial uses of clays.

Responsibilities: Responsibilities include teaching major and graduate courses related to environmental studies, geology, marine geochemistry and/or analytical environmental geochemistry as well as expanding our teaching and research programs in this area. Set up clay mineralogy/environmental geochemistry laboratory and conduct a strong research program in applied clay mineralogy. Preference will be given to person who is able to run microprobe, run ICP, XRF and XRD (X-ray fluorescence and diffraction), experienced in clay mineral sampling preparation, XRF and GTDA analysis, soil geochemistry of semiarid/arid environment, clay mineralogy of marine/deltaic shelf sediments. Other responsibilities include maintaining an active research program while teaching graduate courses in his/her research specialty to master degree candidates and to undergraduate majors in geology, marine science and environmental sciences.

6. Environmental and Shallow Earth Marine Geophysics—Assistant Professor. The Earth and Environmental Sciences Department is seeking candidates for a full-time teaching position at any academic rank in shallow subsurface marine geophysics. The EES Department seeks a broadly trained individual with expertise in Environmental and Near Surface Geophysics with applications in Coastal and/or Shallow Water Marine Systems. Experience should include: (1) Shallow seismic exploration (refraction and reflection); (2) ground-penetrating radar; (3) gravity and/or magnetism.

Responsibilities including teaching graduate and undergraduate courses in applied geophysics and other courses in the Geosciences for both majors and non-majors.

Experience should include geological and environmental applications of one or more of the following geophysical techniques: Profiling and shallow seismic reflection; receptivity profiling; ground-penetrating radar; microgravity and/or magnetism.

7. Petroleum Geosciences—Reservoir Characterization/Subsurface Geology—Associate/Full Professor. The Department seeks a candidate at Assistant/Full Professor level with a broad experience in the fundamentals of subsurface geology and petroleum geosciences, whose teaching and research interest focuses on the integration between geological, geophysical and petrophysical data. We invite candidates with relevant educational and research expertise in the areas of: reservoir characterization; sedimentary geochemistry and diagenesis; caustic/carbonate depositional systems; sediment logical facies analysis; reservoir and outcrop sedimentology; structural/stratigraphic basin evolution and analysis; physical and sequence stratigraphy, petrophysics and applied seismology. The ability to utilize the latest technologies for computational data processing, reservoir analysis and characterization, modeling and visualization of reservoir and regional petroleum systems would be an advantage.

The successful candidate is expected to supervise M.Sc. student research and teach graduate level petroleum geosciences courses in the joint M.Sc. degree program between the Petroleum Engineering and Earth and Environmental Sciences Departments. He/she will also assist in teaching graduate and undergraduate courses in the geological and environmental sciences. Opportunities exist for teaching participation and research collaboration with colleagues in the Petroleum

Engineering, Chemistry, and Biological Sciences Departments.

Salary: Competitive and commensurate with background, education and experience. Kuwait University offers excellent fringe benefits packages.

Qualifications: Necessary qualifications include: (1) a Ph.D. in Geosciences; (2) Good oral and written communication skills in the English language; (3) a complete resume with e-mail address and phone number; (4) demonstrated university-level teaching experience and computational skills; (5) field work/research experience; (6) evidence of a strong record of research publications in international peer reviewed journals. To be considered applicants must submit all of the following before an on-campus interview is granted: official transcripts of undergraduate and graduate work (copy acceptable); three letters of references attesting to teaching effectiveness; up to 10 reprints as samples of internationally published research may be included with the paper applications. Please use PDF format for all electronic application materials.

Inquiries about the positions can be directed to: ghamry@kuc01.kuniv.edu.kw.

To apply mail to: Prof. Redha Al-Hasan, Dean, Faculty of Science, Kuwait University, P.O. Box 5969 Safat, Kuwait 13060, Phone: (+965) 4985602, Fax: (+965) 483-6127.

**DIVISION OF EARTH SCIENCES
NATIONAL SCIENCE FOUNDATION, ARLINGTON, VA**
NSF's Division of Earth Sciences (EAR) is seeking a qualified candidate for the position of Program Director for the Tectonics Program.

The Tectonics Program supports a broad range of field, laboratory, computational, and theoretical investigations aimed at understanding the evolution and deformation of continental lithosphere through time.

Appointment to this position may be on a one or two year Visiting Scientist appointment or a Federal Temporary appointment, with a salary range of \$91,407 to \$142,449. Alternatively, positions may be filled under the terms of the Intergovernmental Personnel Act. Applicants must have a Ph.D. or equivalent experience in earth sciences or a closely related field, plus six or more years of successful research, research administration, and/or managerial experience beyond the Ph.D.

Announcement E20060115-Rotor, with position requirements and application procedures, is located on the NSF Home Page at www.nsf.gov/jobs. Applicants may also obtain the announcement by contacting the Executive and Visiting Personnel Branch at +1-703-292-8755 (Hearing impaired individuals may call TDD +1-703-292-8044).

NSF is an Equal Opportunity Employer.

PETROLEUM GEOLOGISTS AND GEOPHYSICISTS THE PETROLEUM INSTITUTE ABU DHABI, UNITED ARAB EMIRATES

Positions: The Petroleum Geosciences Program of The Petroleum Institute, Abu Dhabi, United Arab Emirates (UAE), is seeking outstanding candidates to begin January 2007 or August 2007 for several possible positions. Appointment at Assistant Professor, Associate Professor, Professor, and Distinguished Professor will be considered, depending on qualifications. Ph.D. from a first-rank university is required for all positions. Teaching experience and petroleum industry experience are desirable. Experience with carbonate rock systems is also advantageous.

Geoscience Educator: Successful candidate will be primarily responsible for coordinating multiple sections of introductory geoscience, teaching introductory and other undergraduate geoscience courses as needed, and supervising undergraduate laboratories. Research opportunities exist, but research will not be a main responsibility. Ph.D. in a relevant area of geoscience and several years of university-level teaching are required. Candidates must have strong interpersonal, communication, and organizational skills. Candidates must also have a commitment to excellent teaching and have demonstrated use of modern, innovative educational methods.

Reflection Seismology: Candidates must have expertise in seismic acquisition and processing, with skills in advanced processing, seismic inversion, seismic imaging, and multi-component analysis, or in seismic interpretation, including interpretation of seismic attributes. Successful applicants for the possible position will teach undergraduate and graduate courses, develop an active research program that impacts the UAE petroleum industry, and engage in institutional service work. Opportunities exist to work with PI industry stakeholders in research.

Petrophysics-Rock Physics: Petrophysicist with experience in carbonate well log interpretation and rock physics techniques is requested. Rock physics techniques must include fluid substitution, seismic/rock physics reservoir characterization, AVO, and monitoring of recovery processes. Candidates should have good IT, data management, rock laboratory, and teaching skills. Successful applicant will be working in a multidisciplinary department with oil industry projects and teach undergraduate and graduate courses.

The Petroleum Geosciences will consider additional applicants, particularly in the areas of organic geochemistry, stratigraphy and sedimentology, structural geology with experience in fractured reservoirs, quantitative geologic modeling, and petroleum geology, which would support the Program's educational goals.

Salary/Benefits: Salary is competitive and commensurate with qualifications and experience, with an excellent benefits package, including housing and furniture allowance, educational allowance for dependent children, annual air passages and medical care. The UAE levies no income taxes.

Institution: The Petroleum Institute was created in 2001 with aspirations to establish itself as a world-class institution in engineering in areas of significance to the oil and gas and the broader energy industries. The Petroleum Institute's sponsors and affiliates include major oil companies, including four of the five major oil companies in the world. The campus has modern instructional laboratories and classroom facilities and is now in the planning phase of three major research centers on its campus. The Petroleum Institute is an affiliate institute with Colorado School of Mines and in the process of signing working relationships and collaborations with other major universities and research institutions around the world to capitalize on joint collaborations and research areas of interest. For additional information, please refer to the PI Web site: www.pi.ac.ae.

To Apply: Application materials must include (1) a letter of interest, which addresses the applicant's qualifications for the position; (2) a current resume; and (3) the names, email and business address, and home and business telephone numbers of at least three references. Electronic Submission is greatly preferred, and should be sent to The Recruiting Coordinator at The Petroleum Institute (recruiting-coordinator@pi.ac.ae) and submission of materials as an MS Word/PDF attachment is strongly encouraged.

Candidates are encouraged to submit an application as soon as possible and no later than **15 November 2006**, although applications will be considered until vacant positions are filled.

FLORIDA ATLANTIC UNIVERSITY, GEOPHYSICS

The Department of Geosciences at Florida Atlantic University invites applicants for a tenure-track position at the rank of Assistant Professor in the general area of geophysics. Desirable areas of expertise include, but are not limited to, marine and/or environmental geophysics. We seek a dynamic individual who will develop an active research program that will add to the existing strengths of the department. More information about the Department can be found at www.geosciences.fau.edu. The successful candidate will be expected to teach some combination of undergraduate-level courses in Introductory geology, Coastal and Marine Science, Structural Geology, and Geophysics, participate in the field program, and teach a graduate-level course in candidate's specialty. Evidence of successful previous teaching is preferred. Candidates for this position should submit: (1) a letter of application including statements of teaching and research interests, (2) a curriculum vitae, (3) four names and addresses for letters of reference, and (4) graduate school transcripts to Dr. Anton Oleinik, Geophysics Search Chair, Department of Geosciences, Florida Atlantic University, 777 Glades Road, PS 336, Boca Raton, FL 33431. The position will commence in August 2007. Application deadline is 3 November 2006. No e-mail applications will be accepted. A Ph.D. in Geology or closely related field is required at the time of appointment. Florida Atlantic University is an Equal Opportunity/Equal Access Institution.

POMONA COLLEGE FACULTY POSITION IN PETROLOGY/MINERALOGY

The Geology Department at Pomona College invites applications for a tenure-track position at the level of Assistant Professor beginning 1 July 2007. For further details see www.pomona.edu/ADWR/AcademicDean/FacultyJobs.shtml. Applicants should send a letter of interest, curriculum vitae, undergraduate and gradu-

ate transcripts, a statement of teaching philosophy, a summary of research plans and three letters of reference to **Pet-Min Search, Geology Department, Pomona College, Claremont, CA 91711**. Web address: www.geology.pomona.edu; email: GeoFacSearch@pomona.edu. Review of completed applications begins 15 November 2006 and will continue until the position is filled. Pomona College is an equal opportunity employer, and it especially invites applications from women and members of underrepresented groups.

INTEGRATED OCEAN DRILLING PROGRAM TEXAS A&M UNIVERSITY ASSISTANT RESEARCH SCIENTIST/STAFF SCIENTIST

The Integrated Ocean Drilling Program (IODP) at Texas A&M University invites applications for the position of Assistant Research Scientist/Staff Scientist with the Department of Science Operations. A Ph.D. in geosciences or related field, and demonstrated research experience is required. Applicants with expertise in geomicrobiology, inorganic and organic geochemistry, structural geology, and paleomagnetism are encouraged to apply, but all fields of geosciences will be considered. Applicants must have a demonstrated fluency in written and spoken English. An experienced seagoing scientist, especially in scientific ocean drilling, is preferred.

The successful applicant will serve as the Expedition Project Manager to coordinate all aspects of cruise planning and implementation, and postcruise expedition activities. These duties include sailing as the IODP scientific representative on an IODP expedition approximately once per year. Individual research, as well as collaboration with colleagues at Texas A&M University through the university's new interdepartmental ocean drilling initiative, is expected. The applicant will also provide scientific advice on laboratory developments in their area of specialization. Applicants must be able to cooperate and work harmoniously with others. The successful applicant will be required to pass a new employee physical exam and annual seagoing physical exams.

Salary will be commensurate with qualifications and experience of the applicant. This is a regular full time position, contingent upon continuing availability of funds for IODP. Applicants may access the TAMU application at <http://tamujobs.tamu.edu> and apply online with reference to NOV#061348, attach a curriculum vita, including a list of published papers, statement of research interests, and names and addresses of three references.

Integrated Ocean Drilling Program, U.S. Implementing Organization, Texas A&M University, College Station, Texas 77845.

Equal Opportunity/Affirmative Action Employer; Committed to Diversity.

HYDROLOGY POSITION NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY

Assistant Professor of Hydrology. New Mexico Institute of Mining and Technology invites applications for a tenure-track position in the Hydrology Program. The position is a joint appointment between the Department of Earth and Environmental Science and the Geophysical Research Center, a state-funded research agency.

Applicants should have a Ph.D. in Earth Sciences, Civil or Environmental Engineering, or a related field at the time of appointment. We seek candidates with interest in combining hydrological modeling and field studies. Areas of particular interest include, but are not limited to, hydrogeology, karst hydrology, sedimentary-basin hydrology, and hydrological remote sensing/GIS. Potential for excellence in teaching and research are the most important qualifications. Women and underrepresented minorities are encouraged to apply.

Responsibilities will include developing an active program of extramurally funded research, supervising and supporting graduate students, and teaching two graduate or undergraduate courses per year.

The successful candidate will join a program of six full-time Hydrology faculty, eight adjunct faculty, and 30 graduate students. Hydrology is part of the Department of Earth and Environmental Science, consisting of 21 faculty and 120 undergraduate and graduate students. Additional geoscience professionals on campus include over 30 staff members of the Bureau of Geology and Mineral Resources, New Mexico's geological survey. For further information on the position and on New Mexico Tech see www.ees.nmt.edu/professional_ops.html. For detailed inquiries, contact search committee co-chairs, Fred Phillips (Phillips@nmt.edu) and/or

Enrique Vivoni (vivoni@nmt.edu).

Applicants should submit a letter of interest, resume, a statement of teaching and research interests, and the names of three references to Hydrology Search, Human Resources, Box 96, New Mexico Institute of Mining and Technology, Socorro, New Mexico 87801. College transcripts will be required if selected to interview. To receive full consideration all materials must be received by 9 October, 2006. Email applications are not accepted. New Mexico Tech is an equal opportunity/affirmative action employer.

TENURE-TRACK FACULTY POSITION GEOCHEMISTRY EASTERN WASHINGTON UNIVERSITY

The Department of Geology at Eastern Washington University invites applications for a fulltime, tenure-track position in geochemistry. Appointment will be at the rank of Assistant Professor, and a Ph.D. in Geology is required. The successful candidate will be expected to teach courses in introductory geology, environmental science, and geochemistry. Preference will be given to candidates who can make use of existing analytical geochemical lab equipment including ICPMS and AA. The successful applicant will contribute to current departmental strengths in teaching and research and will apply research-based instructional approaches suitable for a diverse student body. Candidates should: (1) send letter of application detailing teaching and research interests with an up-to-date CV, and (2) arrange to have at least three letters of reference sent to: Geochemistry Search Committee, Department of Geology, Eastern Washington University, 130 Science Building, Cheney, WA 99004-2439. Questions may be directed to charbolt@mail.ewu.edu or +1-509-359-2286. Review of applications will begin November 10, 2006 and continue until the position is filled. The position will begin in September, 2007. For more information about Eastern Washington University and the Department of Geology, please see www.ewu.edu. The successful candidate will be required to show proof of eligibility to work in the U.S. pursuant to U.S. immigration laws. Eastern Washington University is an Equal Opportunity/Affirmative Action employer. Applications from members of historically underrepresented groups are especially encouraged to apply.

MASS SPECTROMETRY LABORATORY SCIENTIST BRIGHAM YOUNG UNIVERSITY

The Department of Geological Sciences at Brigham Young University invites applications for a tenure track Professorial Faculty appointment. A Ph.D. at the time of appointment is required. Good laboratory skills are essential and mass spectrometric experience and stable isotope sample preparation are desirable. Duties will involve teaching, collaboration with faculty in a wide range of ongoing research, and independent research in addition to managing the department's mass spectrometry laboratory.

The mass spectrometry laboratory currently houses two Finnigan stable isotope mass spectrometers and associated peripheral sample preparation devices, and we anticipate acquiring an ICP-MS for analysis of rocks, minerals and waters. Additional department facilities include a groundwater dating laboratory (^{14}C , ^3H , and CFCs), inorganic solutions laboratory, high-resolution shallow 3-D seismic reflection equipment, electron microprobe laboratory, XRF spectrometer, and X-ray diffractometers.

The Geology Department consists of 13 professorial faculty, 3 professional faculty, and often has 1 or 2 visiting faculty members. The department offers B.S. and M.S. degrees. Major research areas include hydrogeology, petroleum geology, continental magmatism, shallow and deep geophysics, structure, tectonics, stratigraphy, paleontology, planetary geology, and mineral surface chemistry.

Applicants should send a curriculum vita, graduate transcripts, a statement of research and instrument experience, a statement of teaching philosophy, and the names and contact information for 3 references by 30 September 2006 to Chair, Search Committee, Dept. of Geological Sciences, S-389 ESC, Brigham Young University, Provo, UT, 84602.

Brigham Young University is an equal opportunity employer and does not allow unlawful discrimination on the basis of race, color, national origin, religion, sex, age, veteran status, pregnancy, or disability in academic or employment settings. However, hiring preference will be given to qualified members in good standing of BYU's sponsoring institution, the Church of Jesus Christ of Latter Day Saints.



The Bayerisches Geoinstitut at the University of Bayreuth invites applications for a position of a

Junior Professor (W1) for Geodynamical Modeling

that can be filled as soon as possible. The position will be filled initially for a period of 3 years, with the possibility of an extension for a further 3 years after an evaluation. The position is funded for this 6 year period by the Stifterverband für die Deutsche Wissenschaft from funds of the Claussen-Simon-Stiftung. Depending on successful evaluations, the position (tenure track) will then be converted to a W2 professorship.

We are looking for a young scientist who will develop her/his own independent research program within the Geoinstitut. The main aim of the Geoinstitut is to investigate the structure, composition and processes of the interiors of the Earth and other planets, primarily through experimental investigations at high pressures and temperatures. The successful candidate will complement these directions through research in geodynamical modeling and is expected to interact closely with experimentalists. Research activities should contribute to understanding the evolution of the Earth and other terrestrial planets. The Junior Professor will be expected to participate in teaching, particularly in the education of graduate students and in a planned Masters Course "Experimental Geoscience".

In addition to a Ph.D., applicants should have appropriate postdoctoral experience. Women and handicapped people are especially encouraged to apply.

Applications, accompanied by a curriculum vitae, publication list, copies of university certificates, and an outline of proposed research and teaching interests should be sent before **16 October, 2006**, to the Dekan der Fakultät für Biologie, Chemie und Geowissenschaften der Universität Bayreuth, D-95440 Bayreuth, Germany.

Informal enquires concerning the position can be sent to the Director (dave.rubie@uni-bayreuth.de).

**TENURE-TRACK CONTAMINANT
HYDROGEOLOGIST
DEPARTMENT OF GEOLOGY
BAYLOR UNIVERSITY**

The Department of Geology at Baylor University invites applications for a tenure-track Assistant Professor in Contaminant Hydrogeology, beginning August 2007. A Ph.D. in Hydrogeology or in a related field is required at the time of appointment. The Department currently consists of 13 geoscientists, including both geologists and geographers (please see the Department Web site at www.baylor.edu/Geology/ for further information).

Research: The Department seeks an individual with a strong research agenda that includes both field and modeling studies of contaminant transport in groundwater systems. These contaminant systems might include, but are not limited to, organic solvents, radio-nuclides, pathogens such as viruses and bacteria, or toxic inorganic compounds or metals. The individual must be able to communicate and collaborate with a subset of the Geology faculty members that are currently engaged in studies in the general areas of hydrogeology, surface-water hydrology, aqueous geochemistry, and environmental geology and geophysics, and is expected to carry out a vigorous research program that involves both undergraduates and graduates. We also encourage collaboration with Baylor University faculty members currently engaged in water-related research, including the Center for Reservoir and Aquatic Studies Research (CRASR), the Departments of Biology and Environmental Studies, The Institute of Ecological, Environmental, and Earth Sciences (TIEEES), and the Baylor Wastewater Research Program. Research space for contaminant hydrogeology is available in the two-year-old, 500,000 ft² "state-of-the-art" Baylor Sciences Building.

Teaching: We seek an individual with a strong commitment to excellence in teaching, and require that he/she contribute significantly to both the undergraduate programs in Geology and Earth Science by teaching a freshman course, a contaminant hydrogeology course that includes a significant component of numerical modeling, as well as contribute to the graduate (M.S. and Ph.D.) programs in Geology by teaching graduate courses or seminars in his/her areas of specialization. A laboratory that includes high-performance computers and software, as well as two large plotters, is available for both instruction and research. Ancillary research support is provided by CAGSR (Center for Applied Geographic and Spatial Research).

Application Process: Send letter of application, including statement of teaching and research interests, curriculum vitae, copies of transcripts, and the names and contact information for three references to: Dr. Steven G. Driese, Chair, Search Committee, Department of Geology, Baylor University, One Bear Place #97354, Waco, TX 76798-7354 (Tel: +1-254-710-2361; e-mail: Steven_Driese@baylor.edu). The review of applications will begin December 1, 2006 and will be accepted until the position is filled. To ensure full consideration, application must be completed by 15 December 2006. Baylor is a Baptist university affiliated with the Baptist General Convention of Texas. As an Affirmative Action/Equal Opportunity employer, Baylor encourages minorities, women, veterans and persons with disabilities to apply.

**ENVIRONMENTAL SCIENTIST AND CHAIR
MACALESTER COLLEGE**

The Environmental Studies Department of Macalester College seeks candidates specializing in environmental science to serve as Department Chair, starting Fall 2007. Appointment will be at the Associate or Full Professor rank. Areas of expertise could include physical geography, climatology, biogeography, agriculture or natural resource management, applied mathematics/modeling, environmental chemistry, or other areas. We seek applicants who can provide leadership, help develop and implement a new curriculum, and have experience in an environmental studies/science program. Send letter of application, CV, statements of teaching philosophy and research plans, and three letters of reference to Dr. Dan Hornbach, Acting Chair, Department of Environmental Studies, Macalester College, St. Paul, MN 55105. Applications received by 15 November 2006 will receive first consideration. More information is at www.macalester.edu/provost/positions/. Macalester College is an Equal Opportunity/Affirmative Action employer and strongly encourages applications from women and minorities.

ION MICROPROBE STAFF SCIENTIST, UCLA

The W.M. Keck Foundation Center for Isotope Geochemistry at UCLA is seeking an experienced research scientist to support operation of our CAMECA IMS 1270 SIMS facility. The center is a collection of

faculty, students, and researchers engaged in wide-ranging geo/cosmochemical fields of study and is partly supported by NSF to host external users from the geological and related communities (see <http://oro.ess.ucla.edu/ionprobe/home.html>).

The individual will:(1) provide primary support for SIMS analysis by visitors to the National facility; (2) carry out analysis programs designed by principal investigators; (3) perform instrument alignment; (4) advise and train other facility users; (5) perform maintenance; (6) create and improve applications software; (7) develop new SIMS applications; (8) design and implement hardware modifications; (9) undertake independent, externally funded research, and (10) publish in peer-reviewed scientific literature.

Requirements include a Ph.D. in geochemistry or related field, substantial experience with secondary ion mass spectrometry, ability to work collaboratively with a broad spectrum of geoscientists, demonstrated ability to design and undertake original research, and a working knowledge of LabView.

The position is available immediately and evaluation of applications will commence starting 10/01/06. While we seek to fill a long-term position, we will guarantee only the initial year of employment. The salary and benefits package offered will be competitive, with the exact rank commensurate with the candidate's prior experience. UCLA is an equal opportunity employer.

Please e-mail resumes complete with current contact information for references to search06k@ess.ucla.edu

**TENURE-TRACK FACULTY POSITION
APPLIED GEOPHYSICS
UNIVERSITY OF KENTUCKY**

The Department of Earth and Environmental Sciences at the University of Kentucky invites applications for a tenure-track faculty position at the Assistant Professor level in Applied Geophysics, beginning August 2007. Field and modeling oriented candidates working in areas such as hydrogeophysics and environmental geophysics are particularly encouraged to apply. We are seeking candidates interested in interdisciplinary research, and who would interact with our existing programs in near-surface geophysics, hydrogeology, tectonics, and energy resources. A broad range of opportunities also exists for cooperation with other departments and agencies on campus (Kentucky Geological Survey, Department of Civil Engineering, Kentucky Transportation Center, Water Resources Research Institute, Center for Applied Energy Research, and the Tracy Farmer Center for the Environment).

In addition to developing a productive externally funded research program, the new faculty member will be expected to teach challenging courses at the undergraduate and graduate levels. Applicants will be expected to demonstrate a track record of publication and funding; experience beyond the Ph.D. is desirable.

Interested applicants should submit (e-mail PDF format and hard copy) curriculum vitae, a brief statement of research and teaching interests, copies of relevant research publications, and contact information for at least three references to: Dr. Edward W. Woolery, Search Committee Chair, Department of Earth and Environmental Sciences, 101 Slone Research Building, University of Kentucky, Lexington, KY 40506-0053, woolery@uky.edu.

Closing date for applications is 15 Dec. 2006. The University of Kentucky is an Affirmative Action employer, and applications from minority and female applicants are particularly encouraged. Upon offer of employment, successful applicants for certain positions must undergo a national background check as required by University of Kentucky Human Resources.

**EARTH SURFACE PROCESSES
ASSISTANT PROFESSOR, DENISON UNIVERSITY**

The Department of Geosciences at Denison University invites applications for a new tenure track position in the areas of physical geography, earth surface processes or earth systems science to begin in Fall 2007. A Ph.D. at the time of appointment is required. We seek a broadly-trained scientist who shows potential as an outstanding teacher/scholar to teach introductory Physical Geography or Physical Geography and courses in the applicant's areas of expertise that will enhance the diversity of our program. Some fields of interest include hydrology, geomorphology, low temperature geochemistry, surface geophysics, biogeography, land use and resources, atmospheric sciences, and ocean sciences. Expertise in remote sensing and/or geographic information science is a plus. All candidates engaged in the study of modern surface processes—broadly defined—and environmental change will be seriously considered.

We seek a colleague who is committed to teaching

excellence in the liberal arts tradition, is field-oriented, has broad interests beyond their specialty, and will provide a balance of classroom, field and laboratory experiences for our majors. Denison is a highly selective liberal arts college strongly committed to, and supportive of, excellence in teaching and active faculty research that involves undergraduate students. Please submit the following: a letter of application; a statement of your approach to teaching and research in a liberal arts setting as well as ways in which your expertise would expand, enrich and complement our program; a vita; academic transcripts; and contact information for three references to Dr. Tod Frohling, Department of Geosciences, Denison University, Granville, OH 43023; +1-740-587-6217; frohling@denison.edu. Application materials should arrive by 30 October 2006 for full consideration, although the search will remain open until the position is filled. We encourage early applications as we would like to meet with those attending GSA in late October. Denison University is an Affirmative Action, Equal Opportunity Employer. In a continuing effort to diversify our Campus Community, we strongly encourage women and people of color to apply.

**GEOLOGIST/ASSISTANT PROFESSOR
(SEDIMENTOLOGY/STRATIGRAPHY), WISCONSIN
GEOLOGICAL AND NATURAL HISTORY SURVEY**

Full-time, tenure-track faculty position to conduct fundamental and applied research in the areas of sedimentology and stratigraphy through field-based investigations, including geologic mapping, focusing on the stratigraphic and hydrostratigraphic framework of the Paleozoic rocks of Wisconsin. Work is performed in cooperation with other WGNHS staff, university personnel, and collaborating governmental agencies whose interests include geology, geophysics, hydrogeology, and mineral/energy resources. Ph.D. in geology or closely related field is preferred; Master's degree in geology or related field with 4 years experience also acceptable. \$50,000 minimum salary with excellent benefits package. Office located in Madison. For a complete position description and instructions on how to apply, see www.uwex.edu/ces/hr.

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**YALE UNIVERSITY
PROFESSOR IN ISOTOPE GEOCHEMISTRY**

The Department of Geology and Geophysics at Yale University invites applications for a professorship, at either the junior or senior level, for research in radioactive, radiogenic, or light stable isotopes.

We seek a candidate with outstanding prospects for research and scholarly leadership who will complement the existing strengths of the Department. A successful applicant must be willing to develop and implement independent, externally funded research programs, advise students, and facilitate interdisciplinary research.

Yale University is an equal opportunity/affirmative action employer. Applications from women and minority scientists are strongly encouraged. Applicants should submit curriculum vitae, a statement of research and teaching interests, and a list of publications, plus the names, addresses and e-mail addresses for four references to Professor David Bercovici, Chair, Department of Geology and Geophysics, Yale University, P. O. Box 208109, New Haven, CT 06520-8109. Applications that arrive before 30 September 2006 will receive full consideration.

For full information regarding Yale Geology and Geophysics, visit our Web site at www.yale.edu/geology.

**VANDERBILT UNIVERSITY
DEPT. OF EARTH AND ENVIRONMENTAL SCIENCES
TENURE-TRACK POSITION, SOLID-EARTH
DYNAMICS**

The Department of Earth and Environmental Sciences at Vanderbilt University invites applications for a tenure-track faculty position in the general area of Solid-Earth dynamics. This position, effective the Fall 2007 semester, is at the Assistant Professor level.

We seek an individual who is aimed at the highest standards of scholarship in research and teaching at both the undergraduate and graduate (M.S., Ph.D.) levels, and who will be attracted by opportunities at Vanderbilt for interaction with a diverse, enthusiastic faculty and student body in the Earth and environmental sciences and related fields. We welcome applications from candidates pursuing theoretical, experimental, and/or field-based work. The specific research specialty is open, but we are especially aiming at those studying the dynamics and evolution of Earth's surface and upper crust, with interest in processes in both ancient and modern systems. Examples include, but are not limited



USGS Mendenhall Postdoctoral Research Fellowship Program (Fiscal Year 2008)

The U.S. Geological Survey (USGS) invites applications for the Mendenhall Postdoctoral Research Fellowship Program for Fiscal Year 2008. The Mendenhall Program provides opportunities to conduct research in association with selected members of the USGS professional staff. Through this Program the USGS will acquire current expertise in science to assist in implementation of the science strategy of its programs. Fiscal Year 2008 begins in October 2007.

Opportunities for research are available in a wide range of topics including: petroleum system modeling; non-linear behavior in mineralizing systems; improved earthquake monitoring; 3D geologic mapping; tsunami sources and characteristics; effects of ground water dynamics on volcanism; Holocene climate/future climate; use of wireless sensor networks in the study of dynamic earth processes; biogeochemistry of Fe, S, C, and Hg; submarine ground water systems; environmental impact of uranium mining; uncertainty in probabilistic seismic hazard maps; ecosystem health indicators; geophysical technique development for aquifer heterogeneity characterization; coastal landscape evolution; earthquake physics; community resilience to hurricanes; geologic controls on continuous hydrocarbon accumulations; undiscovered mineral resources under cover; linkages between watershed change and ecosystem health; and field experiments to constrain mass wasting transport laws.

The postdoctoral fellowships are 2-year appointments. The closing date for applications is November 15, 2006. Appointments will start October 2007 or later, depending on availability of funds. A description of the program, research opportunities, and the application process are available at <http://geology.usgs.gov/postdoc>. The U.S. Geological Survey is an equal opportunity employer.

U.S. Department of the Interior
U.S. Geological Survey

to, neotectonics, landscape dynamics, and physical volcanology.

Applications should include a vita, a statement of research and teaching interests, and names of at least three references (including mail and e-mail addresses and phone numbers). Select applicants will be later asked to provide student evaluations of teaching (if available). Applications should be submitted by e-mail in PDF, MS-Word or Corel-WP format to: EESposition@vanderbilt.edu. Up to three representative papers may be sent via normal mail to: Calvin Miller, Search Committee Chair, Department of Earth and Environmental Sciences, Vanderbilt University, 2301 Vanderbilt Place, Nashville, TN 37235. Review of applications will begin 15 December 2006. Vanderbilt is an equal opportunity/affirmative action employer. Women and minorities are especially encouraged to apply.

SENIOR GEOLOGIST OR HYDROLOGIST WALLACE-KUHL & ASSOCIATES

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Mail resumes to: Wallace-Kuhl & Associates, Inc., Attn: Ms. DeMers, Dept. 3, 3050 Industrial Blvd. West, Sacramento, CA 95691; Fax: 916-290-5429; E-mail: careers@wallace-kuhl.com.

VISITING ASSISTANT PROFESSOR IN GEOLOGY ALLEGHENY COLLEGE

The Geology Department invites applicants for a three-semester position from January 2007 through May 2008. We seek an enthusiastic teacher with expertise in hydrogeology, geomorphology, or a related field of earth surface processes. The teaching load for the position is two lab courses per semester with the possibility to advise senior research projects. The successful candidate will be expected to teach introductory physical geology and

an upper level course in their field of expertise. Other courses may include introductory environmental geology and a college-wide freshman/sophomore seminar that emphasizes writing and speaking. Allegheny College is a selective private liberal arts college with an emphasis on teaching. The Geology Department has a strong record of student-faculty research and emphasizes field-based learning. More information about Allegheny College can be found at www.allegheny.edu. To apply please send a letter that describes your qualifications for the position, a curriculum vitae, teaching and research statements, and three letters of recommendation. Allegheny College is an Equal Opportunity Employer: Women and minorities are encouraged to apply.

Opportunities for Students

Tulane University—Graduate Opportunities in Earth & Environmental Sciences. We consider graduate applications throughout the year. In addition to teaching assistantships, research assistantships are available for top applicants to the Ph.D. program, both through competitive fellowships and funded projects. Annual stipends range from \$18,000 to \$20,000. The department has a strong focus on river-ocean studies, with access to a research vessel and a variety of analytical and computing facilities. We are particularly interested in applicants who are excited by the many challenges faced by the Gulf Coast in the recovery from Hurricane Katrina. Particular strengths are in sedimentology, stratigraphy, marine geology, paleoclimatology, neotectonics, structural geology, geological hazards and environmental geochemistry; there are also opportunities in paleontology, petrology and volcanology. Applications should be submitted online at www.tulane.edu/%7Egradprog/ and should include a clear statement of research interests and career goals, a CV, transcripts, GRE scores, TOEFL scores (for international applicants), and 3 recommendation forms. More information about the department can be obtained via our Web site (www.tulane.edu/~eens/). Women and minorities are encouraged to apply.

Nine Funded Research and Teaching Assistantships (starting Jan. 2007) recently became available for M.S. and Ph.D. students at UNLV. The Department of Geoscience at the University of Nevada Las Vegas

(UNLV) has funding for Research Assistantships in Hydrogeology and Structural Geology (a total of 4 assistantships), as well as 5 Teaching Assistantships. These positions are available for students who begin their graduate program in January 2007; the deadline for applying for spring admission is 1 October 2006. An application checklist can be found at www.unlv.edu/Colleges/Sciences/Geoscience/Students/Grad_admission_checklist.pdf. Teaching assistants may work with any of the 17 faculty members in the department. For information on our graduate program, departmental areas of expertise, faculty members, and other relevant information, please visit our Web site at <http://geoscience.unlv.edu>. For additional information please contact Dr. Andrew Hanson, the departmental graduate coordinator, at andrew.hanson@unlv.edu or via phone at +1-702-895-1092.

Visiting Fellowships—Institute for Rock Magnetism. Applications are invited for visiting fellowships (regular and student) lasting for up to 10 days during the period from 1 January through 30 June 2007. Topics for research are open to any field of study involving fine particle magnetism, but preference will be given to projects relating magnetism to geological or environmental studies, or to fundamental physical studies relevant to the magnetism of Earth materials.

A limited number of travel grants of up to \$750 are available to cover actual travel costs. No funds are available for per diem expenses. Application forms and information necessary for proposal preparation may be obtained from IRM manager Mike Jackson at the address below, or online at www.irm.umn.edu.

Short proposals (two pages, single-spaced text plus two forms and necessary figures and tables) are due by 30 October 2006 for consideration by the IRM's Review and Advisory Committee. Successful applicants will be notified in December 2006. Proposals should be sent by e-mail to irm@umn.edu, or by post to: Facilities Manager, Institute for Rock Magnetism, University of Minnesota, 291 Shepherd Laboratories, 100 Union St. SE, Minneapolis, MN 55455-0128

Rock Chart Poster

This rock chart poster is a perfect resource to hang in any classroom. It shows the major sedimentary, metamorphic, and igneous rock types and their textural characteristics. It is 19"x 36" in size and also has great background images of erupting volcanoes and wide panoramas.

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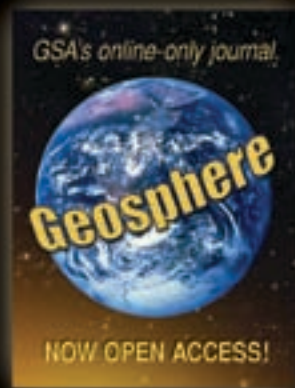


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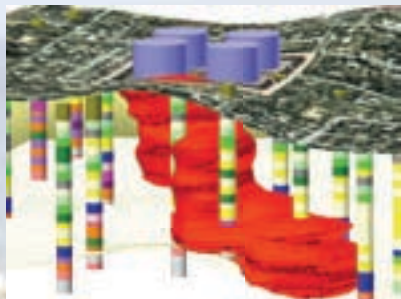
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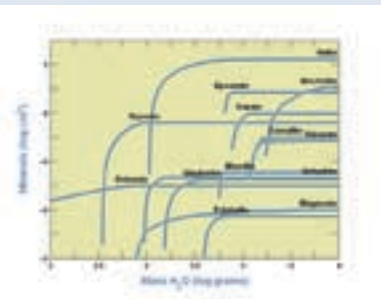


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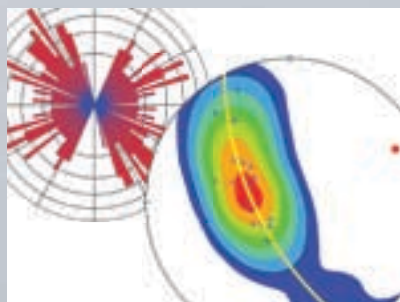


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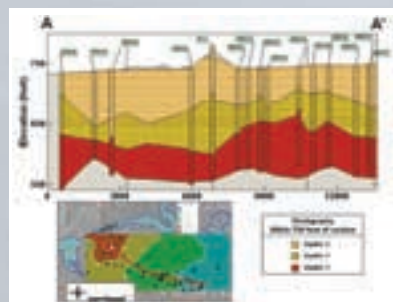


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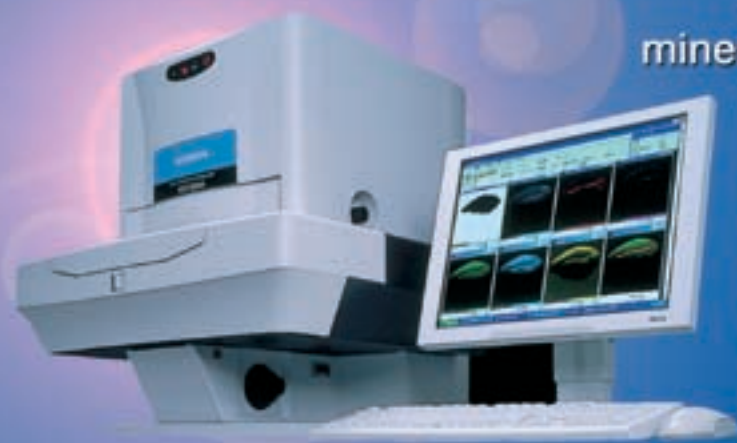
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