

Atlanta Geological Society Newsletter

Next meeting of the Atlanta Geological Society is
September 20, 2011
Fernbank Museum of Natural History (Clifton Road)
Social begins at 6:30 pm

September 2011

Bits and Pieces

Ben Bentkowski, Newsletter Editor

By the time you wake up next Friday, it will officially be fall. Right after Labor Day this year, the temperatures dropped and it sure felt like the heat of summer was over. For us geologists, that signals the start of field trip season. Look inside for details about the Georgia Geological Society field trip to the Pine Mountain terrane. Also coming up is Earth Science Week October 9-13. There will be an event at Fernbank on October 13th and look inside for details.

Personally, I'll be exploring the Petrified Forest and Meteor Crater on the way to the Grand Canyon that week. However you choose to explore, please get outside and enjoy, as is this year's theme for Earth Science Week, "Our Ever-Changing World".

New word for you: tsunamigenesis
Look for it inside!
Hope you enjoy this issue.

The September Meeting

Join us Tuesday, September 20, 2011 at the Fernbank Museum of Natural History, 760 Clifton Road NE, Atlanta GA. For the September meeting, we will have Anthony Martin speaking on:

Life Traces of the Georgia Coast

The scientific realm of ichnology, the study of modern and fossil organismal traces (tracks, trails, burrows, and borings) and how organismal behavior can alter host substrates, such as soils, sands, muds, wood, shells, and bones, or even affect environments along the Georgia coast.

See inside for the complete abstract and beaker's bio. As usual, the social will start at 6:30 with the meeting at 7:00. Come and enjoy the meeting.

Life Traces of the Georgia Coast

Anthony (Tony) Martin

Abstract

The Georgia barrier islands are arguably the most scientifically famous barrier islands in the world, owing to intensive study of their ecological and geological processes. These scientific realms overlap through ichnology, the study of modern and fossil organismal traces (tracks, trails, burrows, and borings) and how organismal behavior can alter host substrates, such as soils, sands, muds, wood, shells, and bones, or even affect environments. Fortunately, ichnology has been applied to the Georgia barrier islands since the 1960s, resulting in studies that have greatly influenced the development of sedimentary geology since.

Among the revelations gained from ichnological research on the Georgia coast are: better understanding plant and animal traces are formed and preserved as trace fossils; how these trace fossils can be used to interpret ancient environments; and how certain types of behavior have evolved. Furthermore, some of the Georgia barrier islands, such as Cumberland, Sapelo, and St. Catherines, are composite islands, made of both Pleistocene and Holocene sediments. Accordingly, trace fossils preserved in their Pleistocene formations can be readily compared to modern traces observed in equivalent coastal environments, such as salt marshes, beaches, dunes, maritime forests, and storm-washover fans. This talk, a summary of an upcoming book with the same title, will provide a broad and well-illustrated overview of plant, invertebrate, and vertebrate traces made in terrestrial and marginal-marine environments of the Georgia barrier islands. Furthermore, it will show how the ichnology of the Georgia coast has a thriving future ahead of it, contributing not just to sedimentary geology, but also environmental education, invasion ecology, and studies of global-climate change.

Anthony (Tony) Martin - Short Biography

Anthony (Tony) Martin is a paleontologist and geologist who specializes in ichnology, the study of modern and ancient traces caused by behavior, such as tracks, trails, burrows, and nests. As a Professor of Practice at Emory University, where he has been for more than 20 years, he teaches a wide variety of courses in paleontology, geology, and the environmental sciences on campus and in field courses, including study-abroad programs. Along with his interest in the ichnology of the Georgia barrier islands, he has studied modern traces and trace fossils from elsewhere in the U.S. and other countries, with his most significant recent discoveries in Australia. He has published many peer-reviewed articles on traces and trace fossils made by plants, invertebrates, and vertebrates, from the Precambrian to the modern. He frequently presents his research results at professional meetings, but also enjoys speaking for general audiences on a wide range of topics in geology, paleontology, and ichnology. Martin has written two editions of a college textbook on dinosaurs ([*Introduction to the Study of Dinosaurs*](#)), a field guidebook to trace fossils of the Bahamas (*Trace Fossils of San Salvador*), and a book for teenagers (*The Dinosaur that Dug Its Burrow*) about the first known burrowing dinosaur, which he co-discovered. Most recently, he scripted and performed lectures for The Teaching Company ([*The Great Courses*](#)) for a DVD course on evolution and the fossil record, titled [*Major Transitions in Evolution*](#).

The **PG Exams** will be given on the following dates. The Georgia Secretary of State web site is not updated regularly, but they follow the ASBOG schedule, as everyone takes the same test the same day across the country.

	2011	2012	2013	2014
Spring Examination Date	4-Mar	2-Mar	1-Mar	7-Mar
Fall Examination Date	30-Sep	5-Oct	4-Oct	10-Oct

You should start the registration process 75-days before the exam you are interested in taking. Registration is done through the Georgia Secretary of State web site; <http://sos.georgia.gov/plb/geologists/>.



**The 46th Annual Field Trip of the Georgia Geological Society
October 21-23, 2011**

The Geologic History of the Inner Piedmont at the
NE End of the Pine Mountain Window Based on Detailed Geologic
Mapping, Geochronology, Structural and Petrochemical Analysis
Led by Bob Hatcher, Matt Huebner and Chris Howard

Optional Sunday Afternoon Excursion: Evidence for a Large
Astrobleme in the Pine Mountain Terrane, Woodland, GA
Led by Steven Jaret & Scott Harris

The 2011 Georgia Geological Society Field Trip will be held October 21-23, headquartered at the Comfort Suites, McDonough, GA. . This year's annual Georgia Geological Society field trip will be held in the Inner Piedmont at the northeast end of the Pine Mountain window ~65 km southeast of Atlanta, GA. The field trip will involve characteristic exposures of the Inner Piedmont terranes (Tugaloo and Cat Square) and the Pine Mountain window, as well as the major faults that bound them. Stops at major fault zones will include the Brindle Creek fault, which separates the Tugaloo and Cat Square terranes, and the dextral-then-sinistral Towaliga fault, which frames the northwest side of the Pine Mountain window, then continues through the Inner Piedmont possibly as far northeast as the Savannah River. Participants will see Grenville basement gneiss, Ordovician through Permian granitoids, amphibolite-facies metasedimentary rocks, and faults active during two Paleozoic orogenies and the Mesozoic breakup of Pangea; all vital pieces in understanding the complex geologic history that encompasses the area.

Our headquarters will be at the Comfort Suites in McDonough, Georgia (I-75, Exit 218). As soon as a block of rooms are reserved, we will post the registration CODE. We will have our traditional introduction and icebreaker on Friday evening at 7:00 p.m. and overview technical sessions beginning at 8:00pm in the Comfort Suites meeting room. Buses will depart from the hotel to the field at 8:00 a.m. Saturday and Sunday mornings. The trip will conclude with lunch and our annual business meeting at High Falls State Park.

Registration includes an introductory Social on Friday evening beginning at 7:00 pm. Following lunch on Sunday, Steven Jaret (Harvard University) and Scott Harris will lead an optional afternoon excursion to Woodland, Georgia to discuss the evidence for a large asteroid impact structure in the middle of the Pine Mountain terrane. We ask that anyone interested in attending the optional trip contact us as soon as possible (gagesociety@gmail.com) in addition to checking the appropriate box on the registration form. Current information will be posted at Georgia Geological Society on Facebook. Additional details can be requested by e-mailing rkath@westga.edu or tchowens@westga.edu or www.westga.edu/~ggsweb

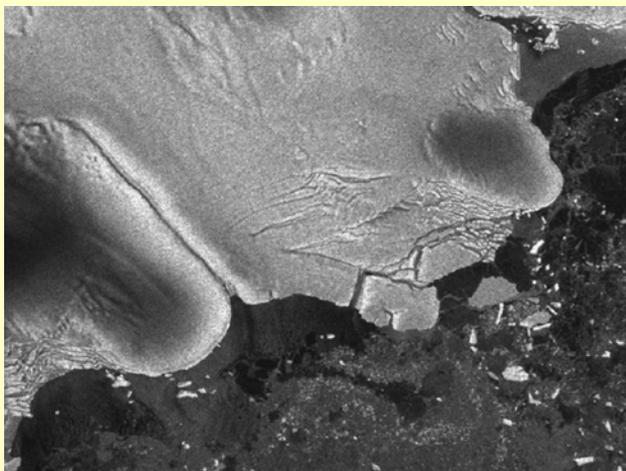
TSUNAMIGENESIS

A NASA scientist and her colleagues were able to observe for the first time the power of an earthquake and tsunami to break off large icebergs a hemisphere away. Kelly Brunt, a cryosphere specialist at Goddard Space Flight Center, Greenbelt, Md., and colleagues were able to link the calving of icebergs from the Sulzberger Ice Shelf in Antarctica following the Tohoku Tsunami, which originated with an earthquake off the coast of Japan in March 2011. The finding, detailed in a paper published online today in the *Journal of Glaciology*, marks the first direct observation of such a connection between tsunamis and icebergs.

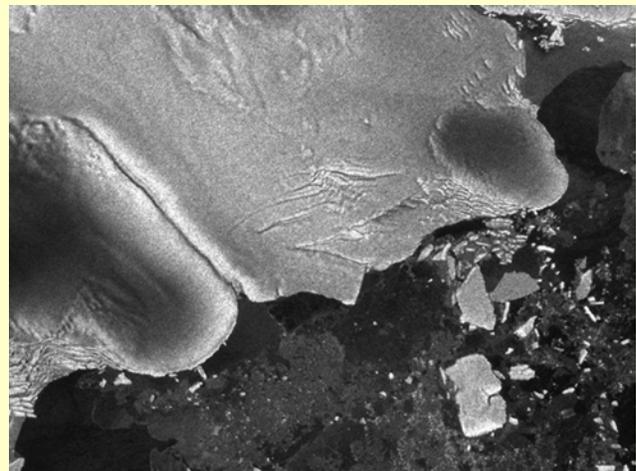
The birth of an iceberg can come about in any number of ways. Often, scientists will see the towering, frozen monoliths break into the polar seas and work backwards to figure out the cause.

So when the Tohoku Tsunami was triggered in the Pacific Ocean on March 11 this spring, Brunt and colleagues immediately looked south. All the way south. Using multiple satellite images, Brunt, Emile Okal at Northwestern University and Douglas MacAyeal at University of Chicago were able to observe new icebergs floating off to sea shortly after the sea swell of the tsunami reached Antarctica.

To put the dynamics of this event in perspective: An earthquake off the coast of Japan caused massive waves to explode out from its epicenter. Swells of water swarmed toward an ice shelf in Antarctica, 8,000 miles (13,600 km) away, and about 18 hours after the earthquake occurred, those waves broke off several chunks of ice that together equaled about two times the surface area of Manhattan. According to historical records, this particular piece of ice hadn't budged in at least 46 years before the tsunami came along.



March 12, 2011



March 16, 2011

Where Does All Earth's Gold Come From? Precious Metals the Result of Meteorite Bombardment, Rock Analysis Finds

ScienceDaily (Sep. 9, 2011) — Ultra high precision analyses of some of the oldest rock samples on Earth by researchers at the University of Bristol provides clear evidence that the planet's accessible reserves of precious metals are the result of a bombardment of meteorites more than 200 million years after Earth was formed. The research is published in Nature.

During the formation of Earth, molten iron sank to its centre to make the core. This took with it the vast majority of the planet's precious metals -- such as gold and platinum. In fact, there are enough precious metals in the core to cover the entire surface of Earth with a four-metre thick layer. The removal of gold to the core should leave the outer portion of Earth bereft of bling. However, precious metals are tens to thousands of times more abundant in Earth's silicate mantle than anticipated. It has previously been argued that this serendipitous over-abundance results from a cataclysmic meteorite shower that hit Earth after the core formed. The full load of meteorite gold was thus added to the mantle alone and not lost to the deep interior. To test this theory, Dr Matthias Willbold and Professor Tim Elliott of the Bristol Isotope Group in the School of Earth Sciences analysed rocks from Greenland that are nearly four billion years old, collected by Professor Stephen Moorbath of the University of Oxford. These ancient rocks provide a unique window into the composition of our planet shortly after the formation of the core but before the proposed meteorite bombardment.

The researchers determined the tungsten isotopic composition of these rocks. Tungsten (W) is a very rare element (one gram of rock contains only about one ten-millionth of a gram of tungsten) and, like gold and other precious elements, it should have entered the core when it formed. Like most elements, tungsten is composed of several isotopes, atoms with the same chemical characteristics but slightly different masses. Isotopes provide robust fingerprints of the origin of material and the addition of meteorites to Earth would leave a diagnostic mark on its W isotope composition.

Dr Willbold observed a 15 parts per million decrease in the relative abundance of the isotope ^{182}W between the Greenland and modern day rocks. This small but significant change is in excellent agreement with that required to explain the excess of accessible gold on Earth as the fortunate by-product of meteorite bombardment. The impacting meteorites were stirred into Earth's mantle by gigantic convection processes. A tantalising target for future work is to study how long this process took. Subsequently, geological processes formed the continents and concentrated the precious metals (and tungsten) in ore deposits which are mined today. Dr Willbold continued: "Our work shows that most of the precious metals on which our economies and many key industrial processes are based have been added to our planet by lucky coincidence when the Earth was hit by about 20 billion billion tonnes of asteroidal material."

Matthias Willbold, Tim Elliott, Stephen Moorbath. The tungsten isotopic composition of the Earth's mantle before the terminal bombardment. Nature, 2011; 477 (7363): 195 DOI:

10.1038/nature10399 <http://www.sciencedaily.com/releases/2011/09/110907132044.htm>



Earth Science Week... promotes understanding and appreciation of the value of Earth Science research and its applications and relevance to our daily lives.

Our Ever-Changing Earth – The 2011 Earth Science Week Theme Alexandria, VA – The American Geological Institute (AGI) is pleased to announce the theme of Earth Science Week 2011 will be “Our Ever-Changing Earth.” This year’s event will engage the public in actively learning about the varied and interconnected natural processes that shape our planet over time.

Earth Science Week 2011 support materials and activities will demonstrate how evidence of change can be found everywhere, from the soil beneath our feet to the oceans and the atmosphere around us. Learn how the fossil record displays the history of change in plant and animal life. The evidence of change touches our lives in many ways, as we see in headlines about topics such as resource availability, evolution, and climate. <http://www.earthsciweek.org/index.html>

Objectives

- To engage students in discovering the Earth sciences.
- To remind people that Earth science is all around us.
- To encourage Earth stewardship through understanding.
- To motivate geoscientists to share their knowledge and enthusiasm about the Earth.

Georgia Event: Earth Science Day at the Fernbank Science Center

Saturday, October 15 from noon to 5:00 pm - The Fernbank Science Center will host Kylie Ferguson, the discoverer of a fossil cat skull from Badlands National Park. See page 11 for more info.

The September 24, 2011 Atlanta Geological Society PG Candidate Workshop will feature Benjamin Black, P.G.

The class will be held Saturday, September 24, 2011, from 10:00 am to 12:00 pm at the Fernbank Science Center, located at 156 Heaton Park Drive, N.E. Atlanta, GA 30307, The Science Center is about a mile north of the Fernbank Science Museum off Ponce De Leon. The meeting will be held in the classroom annex building behind the Science Center. For more information about the Science Center go to <http://fsc.fernbank.edu/> or phone: [678-874-7102](tel:678-874-7102).

Ben will be giving a presentation on engineering geology. The class will cover: Soil Mechanics and Soil Strength Testing (Laboratory and Field Methods), Geologic Hazards (Slope Stability, Earthquakes, etc.), Engineering Geological Mapping, Site Investigation, and time permitting, some discussion on rock mechanics.

Mr. Black works as geological engineer for ARCADIS US, Inc. and has fourteen years of experience in hydrogeological analysis and geotechnical assessment and analysis. He has a B.S. in Geology from Eastern Michigan University, an M.S. in Geological Engineering from the University of Idaho, and a Certificate in Applied Geotechnics from the University of Idaho. Mr. Black is a registered Professional Geologist in Georgia, South Carolina, North Carolina, and Mississippi (via ASBOG and reciprocity). He is experienced in a wide variety of geotechnical subsurface investigation methods, including geophysical surveys, geotechnical soil borings, and coring of various types of soft and hard rock. In particular, Mr. Black is experienced with the assessment and analysis of rock mass strength with application to slope stability and engineered structures.

Ben is experienced in shallow and deep foundation design including piles and drilled shafts, slope stability analysis and stabilization techniques, seepage analysis, excavation design and materials handling, tunnel design and construction, surveying, and ground reinforcing techniques. He has conducted slope stability analysis for open pit mines and transportation corridors. He was responsible for processing and interpretation of rock mass properties, joint frequencies, selection of design sections, and other pertinent data. He developed a stability model and performed all calculations necessary to determine factor of safety and recommendations for slope stabilization for both planar and wedge failure modes.

Most recently, Ben has been working on U.S. Army Corps of Engineers projects in New Orleans, Louisiana and Miami, Florida. These projects include levee and deep foundation assessment and design in soft sediments and statistical analysis based on load and resistance factor design.

Please forward this announcement to anyone that might be interested. Two Professional Development Hours will be offered and everyone is invited to attend. Let John or I know if you have any questions, additions, or comments.

Ken Simonton, P.G., John Salvino, P.G.

Atlanta Geological Society Professional Registration Committee

AGS Members... Geology Enthusiasts Needed

If you are an AGS member and would like to contribute to the Professional Registration Committee by leading a lecture on one of the subjects listed below, then please contact me either by e-mail or at the monthly AGS meetings. The lecture should be for one hour followed by a Q&A session. We need different speakers for each workshop. Your volunteering to teach on one of these subjects is essential to the success of the Professional Registration Committee – we need more widespread participation by the AGS membership. Speakers can be compensated for expenses and will receive certificates to acknowledge their participation.

The following content domains are covered in the Georgia Professional Geologist exams:

- | | |
|---|---|
| A. General Geology | B. Mineralogy, Petrology, & Petrography |
| C. Sedimentology, Stratigraphy, & Paleontology | D. Economic Geology & Energy Resources |
| E. Structure, Tectonics, & Seismology | F. Hydrology & Environmental Geochemistry |
| G. Engineering Geology | |
| H. Quaternary Geology, Geomorphology, & Surficial Processes | |

We do not "teach the test" our aim is to review fundamental concepts of the earth sciences and acquaint candidates with industry specific information not easily obtainable from the literature. Please inform anyone who might be interested in becoming a professional geologist of our workshop. Please consider joining us even if you are not a P.G. candidate. The workshops are interesting and informative.

Ken Simonton, P.G. and John Salvino, P.G.
Professional Registration Committee

www.atlantageologicalsociety.org

The Cause of Earth's Largest Environmental Catastrophe

ScienceDaily (Sep. 14, 2011) — The eruption of giant masses of magma in Siberia 250 million years ago led to the Permo-Triassic mass extinction when more than 90 % of all species became extinct. A widely accepted idea is that LIPs originate through melting within thermal mantle plumes. The high buoyancy of purely thermal mantle plumes, however, should cause kilometer-scale uplift of the lithosphere above the plume head, but such uplift is not always present. Moreover, estimates of magmatic degassing from many LIPs are considered insufficient to trigger climatic crises. The team of scientists presents a numerical model and new geochemical data with which unresolved questions can now be answered. They suggest that the Siberian mantle plume contained a large fraction of about 15 percent of recycled oceanic crust; i.e. the crust that had long before been subducted into the deep mantle and then, through the hot mantle plume, brought back to Earth's lithosphere. This recycled oceanic crust was present in the plume as eclogite, a very dense rock which made the hot mantle plume less buoyant. For this reason the impingement of the plume caused negligible uplift of the lithosphere. The recycled crustal material melts at much lower temperatures than the normal mantle material peridotite, and therefore the plume generated exceptionally large amounts of magmas and was able to destroy the thick Siberian lithosphere thermally, chemically and mechanically during a very short period of only a few hundred thousand years.

Stephan V. Sobolev, Alexander V. Sobolev, Dmitry V. Kuzmin, Nadezhda A. Krivolutsкая, Alexey G. Petrunin, Nicholas T. Arndt, Viktor A. Radko, Yuri R. Vasiliev. Linking mantle plumes, large igneous provinces and environmental catastrophes. *Nature*, 2011; 477 (7364): 312 DOI: 10.1038/nature10385 <http://www.sciencedaily.com/releases/2011/09/110914131335.htm>


FERNBANK MUSEUM
 of NATURAL HISTORY

Fernbank Museum of Natural History
Upcoming Public Programs and Events

(All programs require reservations, including free programs)

LOCATION:

767 Clifton Rd, NE Atlanta,
 GA 404-929-6400

For tickets and details on exhibits,
 films, and events, please visit our
 website at

www.fernbankmuseum.org

Follow us on Facebook or
 Twitter for the latest news and
 updates!

On Exhibit:

- *Entrance Plaza, featuring a family of Lophorhothon dinosaurs*

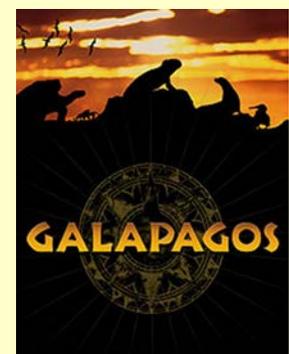
Martinis and IMAX: Friday
 evenings, 5:30 p.m. – 10 p.m.

**Now Showing in the Fernbank IMAX
 movie theater:**

(Check our website for special
 screenings)

Current Daytime Schedule:

- Galapagos
- Hubble



Martinis & IMAX® Who says a museum needs to be quiet? Shake it up with Atlanta's perfect mix of culture and cocktails! Often replicated, but never duplicated, **Martinis & IMAX®** offers a unique alternative to the "so last year" bar scene. Join us every Friday* from 6:30pm to 11pm for live music or a DJ, a full bar featuring [signature cocktails](#), [tasty nibbles](#) prepared to order and cap off the evening with a [flick](#) on the biggest screen in town in Fernbank's IMAX® Theatre. **Purchase tickets [online](#) or by calling 404.929.6400.** Please be aware that some shows do sell out and may not be available.

Martinis & IMAX® tickets, which include admission to the IMAX® Theatre, are \$12 for adults, \$11 for students and seniors and \$7 for members. For those who wish to enjoy the atmosphere of **Martinis & IMAX®** without attending a film presentation, there is a \$7 cover charge. Cover charge is waived for members & patrons who purchase an IMAX® ticket. <http://fernbankmuseum.org/experience-imax/martinis-and-imax/>

Fernbank Museum of Natural History

767 Clifton Rd, NE Atlanta, GA 404-929-6400

Upcoming Programs

- September 24 – Darwin Exhibit Opens On view September 24, 2011 - January 1, 2012 Set a course for adventure as you enjoy a unique look into the life of one of the world's most intriguing scientists. This special exhibition features live animals, amazing fossils and an array of scientific tools used by Charles Darwin.
- Earth Science Day – Saturday October 15 from noon to 5:00 pm - The Fernbank Science Center will host Kylie Ferguson, the discoverer of a fossil cat skull from Badlands National Park We will have a graphic panel display about the story of her find and a case display with casts of fossil cats. In addition to Kylie, we will have other fossil presentations, fossil displays, fossil cast painting, shark-tooth dig, face painting, door prizes, and a paleo art contest for students in our local school system. Contact: Rick Spears

Programs are free to Museum Members.

For tickets and details on exhibits, films, and events, please visit our website at www.fernbankmuseum.org Follow us on Facebook or Twitter for the latest news and updates!



<http://www.fernbankmuseum.org/naturequest/>

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www.atlantageologicalsociety.org

AGS 2011 Meeting Dates

Listed below are the planned meeting dates for 2011. Please mark your calendar and make plans to attend.

September 20 NOTE!!! DIFFERENT DAY Tony Martin - Life Traces of the Georgia Coast

October 25 TBD

November 29 TBD

December No meeting

CALENDAR OF UPCOMING GEOLOGICAL ORGANIZATIONS' EVENTS**September**

- 20 AGS lecture (6:30-8:30 at the Fernbank Museum). Tony Martin, Life Traces of the Georgia Coast **NOTE DIFFERENT DATE!!**
- 23 GGWA lecture (12:00-1:00 at the GAWP office). TBA.

October

- 20 SME lecture/webinar (6:30-8:30 at GC&SU or webinar). John Murphy, 2011 SME President – Seeking Opportunities for Dialogue with SME Sections.
- 21-23 **The 46th Annual Field Trip of the Georgia Geological Society**
Headquarters Comfort Suites, McDonough, Georgia

The Geologic History of the Inner Piedmont at the NE End of the Pine Mountain Window Based on Detailed Geologic Mapping, Geochronology, Structural and Petrochemical Analysis

21-23 Carolina Geological Society Field Trip.

- 25 AGS lecture (6:30-8:30 at the Fernbank Museum). TBA.

November

- 18 GGWA lecture (12:00-1:00 at the GAWP office). TBA.
- 29 AGS lecture (6:30-8:30 at the Fernbank Museum). TBA.

December

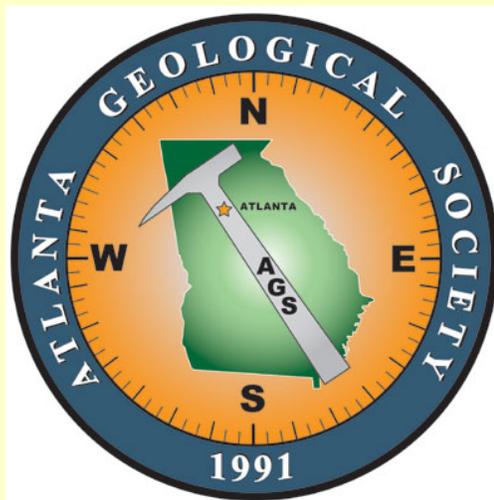
No AGS meeting this month.

ATLANTA GEOLOGICAL SOCIETY

atlantageologicalsociety.com

ANNUAL MEMBERSHIP FORM

Please print the required details and check the appropriate membership box.



DATE: _____

NAME: _____

ORGANIZATION: _____

TELEPHONE (1): _____ TELEPHONE (2): _____

EMAIL (1): _____ EMAIL (2): _____

STUDENT \$10

PROFESSIONAL MEMBERSHIP \$25

CORPORATE MEMBERSHIP \$100

(Includes 4 professional members, please list names and emails below)

NAME: _____ EMAIL: _____

NAME: _____ EMAIL: _____

NAME: _____ EMAIL: _____

NAME: _____ EMAIL: _____

For further details, contact the AGS Treasurer: Stacy Durden-Phillips; telephone: 678.594.9893, ext 205; sdurden@lbgatlanta.com.

Please make checks payable to the "Atlanta Geological Society" and remit with the completed form to:

Atlanta Geological Society, Stacy Durden-Phillips, Treasurer,
1925 Vaughn Road NW, Suite 100, Kennesaw, GA 30144-4560.

CASH

CHECK (CHECK NUMBER: _____.)