



# ON THE ROCKS



## A Newsletter of the Michigan Basin Geological Society

2009-2010 Number 1

[www.mbgs.org](http://www.mbgs.org)

September 2009

### EVENTS

**Monday, September 9, 2009:** MBGS meeting will be held at Michigan State University, Natural Science building at 7:00 pm in room 116. The speaker is Dr. Richard R. Sauve II, Leica Geosystems, Inc., presenting "On the Utilization of GNSS Technology in Modern Geology and Geophysics". See talk details and location information below.

### **CONGRATULATIONS TO THE MBGS EXECUTIVE MEMBER COMMITTEE 2007-2008**

Please join us in welcoming the 2009-2010 MBGS officers!

President – Craig R. Johnson  
Vice President – Mike Olson  
Secretary - Jennifer Jennings  
Treasurer – Tom Hoane  
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Past President – EZ Manos  
Newsletter Editor – Arlene M. Anderson-Vincent

### Notes from the editor:

- MDEQ-Office of Geological Survey, will be celebrating the 200th birthday of Douglass Houghton, Michigan's first State Geologist. The OGS is planning an open house on or close to the date, September 21, 2009. For more details, please call Dave Davis, DEQ-OGS, (517) 241-1714.
- MBGS is looking for speakers for the 2009-2010 year. If you have a topic of interest (Geology/Hydrogeology/Geophysics) or know someone who has an interesting topic who is willing to speak to the membership, please contact Mike Olson at [mo@abletech.com](mailto:mo@abletech.com)
- Welcome back!! We hope everybody had a great summer. Please feel free to share with the membership any exciting geological excursions you experienced this summer. Send a note to newsletter editor along with any pictures you would like to share to Arlene Anderson-Vincent at [aanderson-vincent@golder.com](mailto:aanderson-vincent@golder.com).
- Exciting news!!! MBGS and the Michigan Geological Repository for Research and Education are sponsoring the 2010 AAPG Eastern Section Meeting in Kalamazoo, Michigan, September 26 – 28, 2010 !! Mark your calendars and plan on joining us in showing the Eastern Section AAPG what a great host Michigan can be!!!

## FIELD TRIPS



**WHAT:** Caves and Karst of the Mitchell Plateau  
**WHEN:** October 24-25, 2009  
**WHERE:** Bedford Indiana, South Central Indiana  
**COST:** \$10 per person to cover printed materials and rental equipment. All travel, lodging and meals are the responsibility of the participant.

**REGISTRATION DEADLINE:** Thursday, October 1, 2009. Space is limited so register fast!!

A detailed trip itinerary and the registration form are included in the newsletter.



## MEMBER CORNER

This section will be used to share information submitted by members. Attend an interesting conference? Hear an exciting lecture? Please feel free to submit any information you would like to share to the membership to: Arlene at [aanderson-vincent@golder.com](mailto:aanderson-vincent@golder.com)

- Lee Smith just returned from a conference on carbon dioxide storage and submitted the following summary. Thank you Lee for your contribution to the newsletter!!

### **What's Happening with the Geologic Storage of Carbon Dioxide?** **Lee Smith, Optimal Value Energy LLC, [OptimalValueEnergy.com](http://OptimalValueEnergy.com)**

Geological storage of carbon dioxide has evolved from a theoretical concept to multiple ongoing research efforts, pilot field-test demonstration, and commercial applications. Every week brings the notice of a newly scheduled conference on carbon dioxide storage / sequestration. What CO<sub>2</sub> topics are discussed at these conferences, who goes to these conferences, and what opportunities exist to go to a conference on the geologic storage of CO<sub>2</sub>?

At the AAPG/SEG/SPE Hedberg Research Conference, Geological Carbon Sequestration: Prediction and Verification, held in Vancouver, British Columbia from August 16-20, 2009 sessions were organized around the themes of case studies, geochemistry, simulation, monitoring, and risk assessments. Attendees invited to the Hedberg Conference included those from academic institutions, research organizations, governmental bodies, oil companies, and a few from consulting organizations like myself.

Discussions at the Hedberg Conference focused on saline reservoirs as the place to store CO<sub>2</sub>. Unmineable coal seams and fractured shales reported in past publications and conferences as possible candidates for CO<sub>2</sub> storage sites were scarcely mentioned. This focus on saline reservoirs as the hot prospect for CO<sub>2</sub> storage brings to mind a paraphrase of an old expression: it's the volume, stupid. As was frequently pointed out by participants in the conference, in order to make a dent in CO<sub>2</sub> emissions huge storage volumes are needed and saline reservoirs have this volume.

The largest project discussed at the Hedberg conference was the Gorgon Project in North-West Australia where drilling approval has been received for wells to dispose of more than 100 million

metric tons of CO<sub>2</sub>. The Gorgon presentation described the modeling, well evaluations, seismic data interpretations, and quantifications of uncertainty conducted to define the development plan for the project and demonstrate that the CO<sub>2</sub> would remain in the subsurface.

Abstracts of all of the oral presentations and posters from the Hedberg Conference will be available on the AAPG website in October 2009.

Other conferences are scheduled in the near future. An international conference, “CO<sub>2</sub> Capture, Storage, and Utilization”, will be held November 2-4, 2009 in San Diego sponsored by the Society of Petroleum Engineers ([www.spe.org/events/co2](http://www.spe.org/events/co2)). Co-chairpersons for this conference include representatives from the electric power industry, academic institutions, research organizations, governmental bodies, oil companies, and consulting organizations.

Another conference, the American Association of Petroleum Geologists (AAPG) Annual Convention scheduled in New Orleans for April of 2010 will include a session on carbon capture and geologic sequestration. Conveners for the AAPG’s carbon capture and geologic sequestration session are planning to invite world-class specialists for the oral session and will select a few additional oral and poster presentations. For more information on the New Orleans Convention, go to <http://www.aapg.org/neworleans/topics.cfm#>.

## UPCOMING EVENTS



**September 1-2, 2009** – OGS/PTTC Workshop, “Reservoir Engineering for Petroleum Geologist” by Richard Green, Columbus Ohio, more info: <http://www.ohgeosoc.org/>

**September 17, 2009**– MI-AIPG September meeting, “Clearing Up Csat Criteria, Multiple Contaminants, and Mixing Zone”, by Patty Brandt and Sara Peterson, MDEQ, Tony-M’s Banquet, Lansing, Michigan, more info: <http://mi.aipg.org/>

**September 17, 2009** – OGS Golf Outing, 18 hole scramble, more info: <http://www.ohgeosoc.org/abstracts/GolfOGSForm09.pdf>

**October 4-6, 2009**– Forum on the Geology of Industrial Minerals 2009, “Building the Future”, Delaware, Ohio, Additional information is available on the Ohio Geological Society web site, <http://www.ohgeosoc.org/>

Cell 517-719-8321 [wollensak@voyager.net](mailto:wollensak@voyager.net)

and

LEONARD ESPINOSA, Retired  
2331 Hulett, Okemos, 48864  
Ph: 517-349-1917  
[espinosl@comcast.net](mailto:espinosl@comcast.net)

**NEWSLETTER EDITOR**  
ARLENE ANDERSON-VINCENT  
Golder Associates, Inc.  
15851 S. US 27, Suite 50, Lansing, 48906  
Ph: 517-318-3246, Fax 482-2460  
[aanderson-vincent@golder.com](mailto:aanderson-vincent@golder.com)

**ELECTRONIC PUBLICATIONS**  
MARK WOLLENSAK

**AAPG DELEGATES**  
WILLIAM STELZER  
920 Long Lake Blvd., Suite 12  
Lansing, MI 48911  
Ph: 517-694-4770 fax 517-694-7130  
[stelzrb@aol.com](mailto:stelzrb@aol.com)

and

DR. WILLIAM HARRISON  
Western Michigan University, Director  
MGREE  
Department of Geosciences, Kalamazoo,  
49008  
Ph: 269-387-8633, fax 269-387-8669  
[william.harrison\\_iii@wmich.edu](mailto:william.harrison_iii@wmich.edu)

**AAPG ALTERNATES**  
TIM COWEN  
Cowen Oil & Gas LLC  
5241 Plainfield NE, Ste D, Grand Rapids,  
49525  
Ph: 616-361-1137, fax 616-361-1137  
[cowenoil@aol.com](mailto:cowenoil@aol.com)

and

DR. ROBERT GILLESPIE  
Western Michigan University, MGREE  
Department of Geosciences, Kalamazoo,  
49008  
Ph: 269-387-5364, fax 269-387-5513  
[Robb.gillespie@wmich.edu](mailto:Robb.gillespie@wmich.edu)

## **2009-2010 MBGS Officers**

**The Executive Committee meeting minutes are available on our website at [www.mbgs.org](http://www.mbgs.org)**

### **PRESIDENT**

CRAIG JOHNSON  
NTH Consultants, Ltd  
608 S. Washington Ave., Lansing, Mi 48933  
Ph: 517-702-2950, fax 517-485-8323  
[crjohnson@nthconsultants.com](mailto:crjohnson@nthconsultants.com)

### **VICE PRESIDENT**

MIKE OLSON  
Abletech, Inc.  
6449 Littons Way, Ann Arbor, MI 48105  
Ph: 734-677-2420  
[mo@abletech.com](mailto:mo@abletech.com)

### **SECRETARY**

JENNIFER JENNINGS  
Michigan Department of Environmental  
Quality/OGS  
P.O. Box 30256  
Lansing, MI 48909-7756  
Ph: 517-335-0432  
[jenningsj@michigan.gov](mailto:jenningsj@michigan.gov)

### **TREASURER & PUBLICATIONS**

TOM HOANE  
FMFM, MDNR  
P.O. Box 30452, Lansing, MI 48909-7952  
Ph: 517-241-3769, fax 517-373-2443  
[hoanet@michigan.gov](mailto:hoanet@michigan.gov)

### **BUSINESS MANAGER**

TOM GODBOLD  
OGS, DEQ  
P.O. Box 30256, Lansing, MI 48909-7756  
Ph: 517-241-1545, Fax 517-241-1595  
[godboldt@michigan.gov](mailto:godboldt@michigan.gov)

### **PAST-PRESIDENT**

EZ MANOS  
Detroit Salt Mich  
12841 Sanders Street, Detroit, 48217  
Ph: 313-841-5144, fax 313-841-0466  
[ezmanos@detroitssalt.com](mailto:ezmanos@detroitssalt.com)

### **CO-FIELDTRIP DIRECTORS**

MARK WOLLENSAK, CPG  
Hamp, Mathews & Assoc, Inc.  
15266 Ann Drive, Bath, MI 48808  
Ph: 517-641-7333 Fax 517-641-7337



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<http://www.mbgs.org/publications.html>

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### **Historical CD #1: Nine out-of-print publications from 1949 through 1965 and 1998, 2000, \$15**

- The Stratigraphy of Manitoulin Island, Ontario, Canada, June 19-20, 1954
- The Devonian and Silurian Rocks of Parts of Ontario, Canada and Western New York, June 22-23, 1951
- The Traverse Group of the Northern Part of the Southern Peninsula of Michigan, June 16-17, 1949
- Geology of Central Ontario, Canada, 1965
- The Devonian Strata of the London-Sarnia Area, Southwestern Ontario, Compiled by Erwin C. Stumm, Lewis B. Kellum and Jean Davies Wright, June 9-10, 1956
- The Ordovician Rocks of the Escanaba-Stonington Area, Led by R. C. Hussey , June 2-3, 1950
- The Niagara Escarpment of Peninsular Ontario, Canada, June 18-19, 1955
- Lower Paleozoic and Pleistocene Stratigraphy Across Central Wisconsin, Compiled by C. E. Prouty, Led by L. M. Cline, J. L. Hough and R. F. Black, 1960
- Classic Silurian Reefs of the Chicago Area, by Donald G. Mikulic and Joanne Kluessendorf , June 27, 1998

### **Historical CD #2: Four out-of-print publications from 1947, 1959, 1983 and 1991, 2001, \$15**

- Copper Country Field Trip, Michigan, June 20-22, 1947
- Geology of Mackinac Island and Lower and Middle Devonian, South of the Straits of Mackinac, June 12-14, 1959
- Tectonics, Structure and Karst in Northern Lower Michigan, August 1983
- Geology of the Pictured Rocks, Upper Peninsula, Michigan, July 11-13, 1991

### **Historical CD #3: Six out-of-print publications from 1948, 1952, 1990 - 1995, 2001, \$15**

- Pleistocene and Early Paleozoic of the Eastern Part of the Northern Peninsula of Michigan, June 18-21, 1948
- Stratigraphy and Structure of the Devonian Rocks in Southeastern MI and Northwestern OH, June 20-21, 1952
- Lower Ordovician and Upper Cambrian of Wisconsin , May 10-12, 1990
- Guidebook to the Precambrian Geology and Metallogeny of the Central Upper Peninsula of Michigan September 12-13, 1991

### **Historical CD #4: Six out-of-print publications from 1957, 1958, 1961, 1967, 1968 and 1970, 2004, \$15**

- Silurian Rocks of the Northern Peninsula of Michigan , 1957
- Cambrian Geology of Parts of Dickinson and Iron Counties, Michigan, June 1958
- Geologic Features of Parts of Houghton, Keweenaw, Baraga and Ontonagon Counties, Michigan, May 19-21, 1961
- Correlation Problems of the Cambrian and Ordovician Outcrops Areas, Northern Peninsula of Michigan 1967
- The Geology of Manitoulin Island, June 1968
- Devonian Strata of Alpena and Presque Isle Counties, Michigan, 1970

**Historical CD #5: Five out-of-print publications from 1971, 1989, 2001, and Oil & Gas Fields Vol. 1 & 2, 1969 & 1992, 2006, \$50**

- Oil & Gas Fields Symposium, Volume 1, April 1969, 200 pp., maps, illus., second printing with updates
- Oil & Gas Fields Manual of the Michigan Basin, Volume 2, 1992, 520 pp., maps, illus.
- Glacial Geology of Southwestern Michigan, 1989, 53 pp. by A. Kehew, L. J. Schmaltz, and W. T. Straw
- Geology of the Lake Erie Islands and Adjacent Shores, 1971, 65pp., maps, illus. by Jane L. Forsyth
- Glacial Geology of Southwestern Michigan, Landforms of the Lake Michigan Lobe, Southwestern Michigan, 2001  
AAPG Eastern Section Meeting Field Trip, 32 pp., maps, illus. by A. Kehew and A. Kozlowski

**Historical CD #6: Six out-of-print publications from 1946, 1953, 1963, 1966, 1978 & 1987 plus the Richfield Challenge, 1952 & Tom Knapp's MS Thesis, 2007 \$15.**

- Guidebook for Ontario Geological Excursion to Kettle Point –Owen Sound – Waubaushene, , June 21, 22, 23, 1946 by W. A. Roliff, C. S. Evans and J. F. Caley
- Guidebook for Ordovician Stratigraphy of the Cincinnati, Ohio and Richmond, Indiana Areas, June 12, 13, 1953 by W. H. Shideler and B. T. Sandefur
- Guidebook for the Stratigraphy of the Silurian Rocks in Western Ohio, May 31-June 2, 1963 by C. H. Summerson, Jane L. Forsyth, Karl V. Hoover and J. R. Ulteig
- Guidebook for Cambrian Stratigraphy in Western Wisconsin, May 21, 22, 1966 by Merideth E. Ostrom
- Geology of the Manitoulin Area, Special Papers #3, September 29, 30 and October 1, 1978 by J. T. Sanford
- and R. E. Mosher
- Middle Devonian Cratonic Carbonates and Shales in Southwestern Ontario, November 14, 1987 by Bruce Wilkinson
- The Richfield Challenge, A Review of the Richfield Developments in Michigan, 1952 by Gordon H. Hautan
- A Theory of Rogers City and Dundee Relationships in Central Michigan, Masters Thesis, 1947 by Tom Knapp

**OTHER SPECIAL OFFERS**

- **Historical CD Set - # 1 – 6 (detailed above) for a special purchase price of \$85**
- **NE Lower Peninsula Geological Field Conf., 2004, T. Black, M. Wollensak, On CD \$10**
- **Stratigraphic Lexicon for Michigan, 2001, prepared by MBGS and published by DEQ, \$4**
- **(NEW) Robert E. Mosher Geological Studies** A lifetime of geological research on Silurian Rocks with John T. Sanford. The disks are organized chronologically and include field work in North America and Europe. 2007, 2 CDs \$35.

Price Includes postage, handling and any applicable sales tax. Orders for publications should be prepaid in U.S. Funds and addressed to: MBGS - Publications, P O Box 18074, Lansing MI 48901-8074

# MBGS Meeting

## Wednesday, September 9, 2009

“On the Utilization of GNSS Technology in Modern Geology and Geophysics”

By: Dr. Richard R. Sauve II

Leica Geosystems, Inc.

Location: MSU, Natural Science Building

The talk will begin at 7:00 PM in room 116.

Refreshments will be provided after the talk in the Natural Science Building room 207

No charge for this meeting.

Executive Committee Meeting will be held at 4:30 PM at

Claddaugh's Irish Pub in Lansing (members welcome)

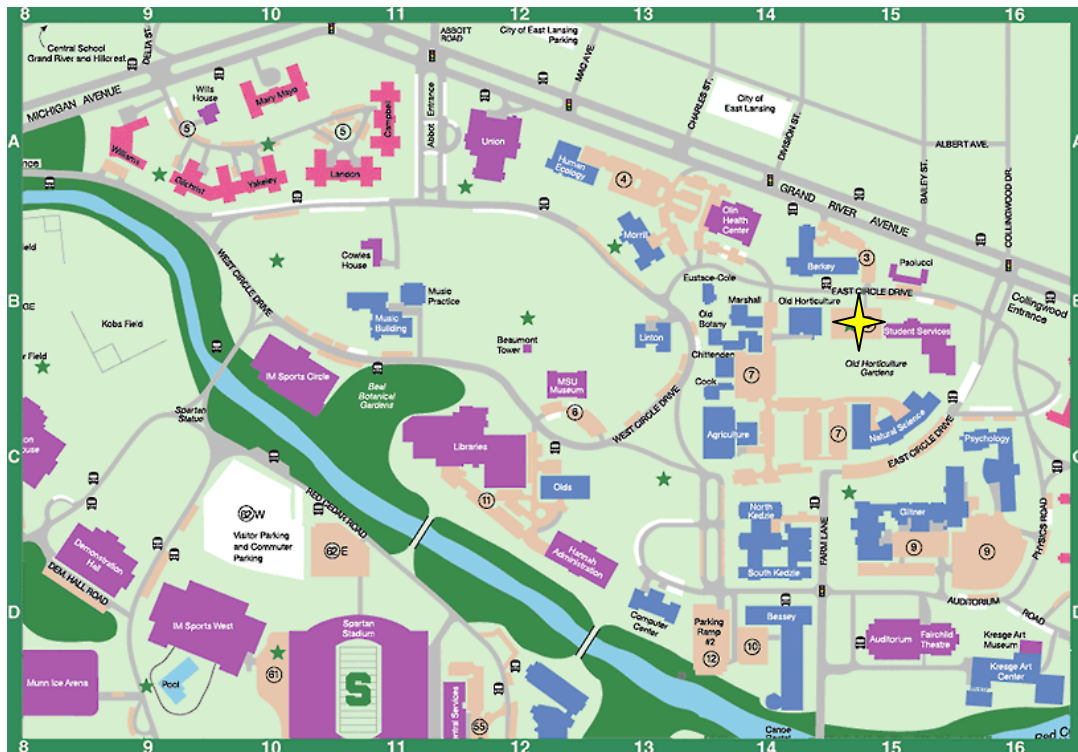
### Please RSVP for this meeting to:

Thomas Godbold

Bus Ph: 517-241-1545, Fax 517-241-1595

E-mail:godboldt@michigan.gov

Between 5pm & 6pm you can park in Lot 9 behind Giltner Hall and the Psychology Building (former Physics and Astronomy building) for free. Otherwise you can try your luck with the metered slots clustered around the Natural Science Building and the adjacent Student Services Bldg, no charge after 6:00pm.



 Parking Lot 9

# **On the Utilization of GNSS Technology in Modern Geology and Geophysics**

**By: Dr. Richard R. Sauve II**  
**Leica Geosystems, Inc.**

## **Abstract:**

Every geologist and geophysist has at one time or another been faced with issues related to the proper mapping of features. There are many questions involving feature mapping ; for instance , how accurate do the positions need to be?, Do I require a precise elevation of the feature, is the feature such that dynamic values will occur and in what spatial reference network does the data need to be referenced? These are typical questions that are at the fore front of all mapping expeditions. Until relatively recently (1980's) the expense related to these most basic mapping operations were for the most part cost prohibited; however, with the advance of GPS (Global Positioning System) in the 1980's and most recently the addition of Glonass / Compass / Galileo and L5 positioning systems the ability to position in 3-D has become a relatively simple task. In this presentation the GNSS (Global Navigation Satellite System) which consists of all of the above satellite systems will be discussed as well as the basic operating parameters (code & phase) as a function of accuracy. In addition applications directly related to the Michigan Basin will be discussed including, The MSRN (Michigan Spatial Reference Network) and it's utilization in measuring plate tectonics, glacial rebound and water vapor and how it's free use can be incorporated into all mapping operations be it academic, commercial, or government.

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## Michigan Basin Geological Society Dues Notice

Please fill out this form when paying your dues for 2009-2010. Dues are \$25.00 for active member and \$10.00 for students.

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# A GEOLOGICAL FIELD EXCURSION

Sponsored by  
Michigan Basin Geological Society  
and Eastern Indiana Grotto

## CAVES AND KARST OF THE MITCHELL PLATEAU SOUTH CENTRAL INDIANA

**SATURDAY OCTOBER 24<sup>th</sup> and SUNDAY OCTOBER 25<sup>th</sup>**

This field excursion will allow participants the opportunity to experience spelunking first hand with the guidance of several experienced members of the Eastern Indiana Grotto. The caves we will visit will be easy, mostly walking, which have been relatively left unplundered of the karst formations. Two caves are planned: Salamander Cave, an easy walking cave in the Bloomington will be visited first and later, Donohue Cave, an easy cave with more technical options (which is walking distance from the suggested hotel). In the evening we may visit an additional cave for those interested. On the return trip Sunday, Todd Thompson and Brian Keith of the Indiana Geological Survey will guide the group to a number of karst and geologic features of the Salem and St. Louis Limestones between Bedford and Bloomington. We will also view a Salem Limestone quarry where the famous "Indiana Limestone" is quarried.

Recommended Lodging: Holiday Inn Express Hotel & Suites Bedford, 2800 Express Lane, Bedford, Indiana 47421, (812) 279-1206. Please make your own reservations for lodging *before October 1st*. A block of rooms has been assigned to the "MBGS" group. *The hotel is booked for this weekend and the block will be dropped if not reserved.*

Who can participate: Open to MBGS members only. Become a member and join in on the field trip if you are not a member! An application is attached.

Cost: \$10 per person to cover printed materials and rental equipment.

Clothing and Equipment Recommendations: Caving is wet and dirty. Cave temperatures average approximately 55 degrees. Old clothing which can get muddy, preferably of synthetic blends or light wool, such as long pants and a long sleeved shirt are suggested. An old light jacket and wool socks are recommended due to the cave temperatures. Coveralls are also recommended. Wear old tennis shoes or light boots which can get soaked and muddy. Knee pads are also highly recommended worn outside the pants. Although the caves are primarily walking caves, knee pads will make the occasional crawls at entrances and exits much more comfortable. Bring leather gloves and a small knapsack/fanny pack to carry your small spare flashlight, extra batteries and water bottle. We will provide hard hats and electric lamps. Everyone is required to provide their own AA batteries. Bring 12 AA alkaline batteries at a minimum per person (for use and backup).

Restrictions: If you are highly claustrophobic, this may not be a trip for you. If you get claustrophobic during the trip, enough Eastern Indiana Grotto guides will be available to assist with your immediate exit from the cave. Much of the cave travel is like walking in an irregular shaped corridor or hallway.

Participation Limit: 20 Participants total.

Registration Deadline: Thursday, October 1st.

What is Provided: Instruction and guidance for entering into and through the caves, hard hats and electric lamps and printed materials. All travel, lodging and meals are the responsibility of the participants.

**Make your reservations** by calling Mark Wollensak, at (517) 719-8321 or write to [wollensak@voyager.net](mailto:wollensak@voyager.net)

**CAVES AND KARST OF THE MITCHELL PLATEAU  
SOUTH CENTRAL INDIANA FIELD EXCURSION 2009**

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Make check out to “**Michigan Basin Geological Society**” in *US Funds*

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E-mail form for quickest delivery to or obtain additional information through [wollensak@voyager.net](mailto:wollensak@voyager.net).

MBGS Membership **required** (for insurance purposes). A membership application is attached and available at [www.mbgs.org/membershipapp.html](http://www.mbgs.org/membershipapp.html)

**Planned Itinerary:**

Saturday Morning: Leave approximately 6:00 am Lansing to Bloomington, Indiana. Total trip is 5.5 hours and 330 miles. Carpooling is recommended to save costs. Bring hand-held two-way radios and spare batteries for driving communications. We suggest taking your breakfast in the car. We will have scheduled rest stops and fuel stops. The second cave and hotel is in Bedford, Indiana.

Saturday Lunch: Lunch will be in Bloomington, Indiana. Participants are responsible for their own meals. First cave is in Bloomington, Indiana. Don clothing and equipment in preparation for Salamander Cave. Meet with Brian “Grandpa Caver” Leavell and members of the Eastern Indiana Grotto for instruction and training. Salamander Cave is a 1 hour cave trip based on 20 participants.

Saturday Afternoon: Drive to hotel and Donohue Cave. Check into hotel prior to entering Donohue Cave. Donohue Cave is a 1.5 to 2 hour cave trip based on 20 participants. We will view flowstone and rimstone dams along the passages. A portion of the passage will be in ankle deep water and there is one short crawl. A map is attached.

Saturday Dinner: Participants are responsible for their own meals. A local restaurant will be recommended.

Saturday Evening: Optional travel to Wesley Chapel Gulf or suggested cave. Wesley Chapel Gulf is a connected series of sinkholes and cavern breakdowns measuring 1,000 feet in length and averages 350 feet in width. The Lost River’s main subterranean course lies within this gulf.

Sunday Morning: Todd Thompson and Brian Keith, Indiana Geological Survey, will meet us at the hotel and we will caravan north to Bloomington making stops along the way. Sunday morning field trip will have stops to examine sedimentary and karst features in the Salem Limestone and St. Louis Limestone.

## ADDITIONAL INFORMATION

**Eastern Indiana Grotto** (<http://caves.org/grotto/eig>)

**Brian Leavell** is presently the Vice-Chairman for the Eastern Indiana Grotto. He has organized and lead several groups on cave trips including the annual caving trips for the Boy Scout Troop 43 of Dimondale, Michigan.

**Todd Thompson**, is an Associate Scientist with the Indiana Geological Survey in the Coal and Industrial Minerals Section. He has worked extensively reconstructing past lake level in the upper Great Lakes as part of the USGS Global Climate Change Program and is remapping south-central Indiana as part of the USGS STATE MAP Program. Todd has been an employee of the Survey for 22 years.

**Brian D. Keith**, is the Research Scientist with the Indiana Geological Survey.

A good website on the Introduction to Caves and Caving is at <http://cavingintro.net/index.html>.

