On the Rocks

A Newsletter of the Michigan Basin Geological Society

2011-2012 Number 5 **www.mbgs.org** **January 2012**

MBGS Membership Meeting, January 11, 2012: The January meeting will be held at Michigan State University, Natural Science building at 7:00 pm in room 204. The speaker is Dr. Michael Velbel. (Department of Geological Sciences, Michigan State University) presenting, "**Recent Meteorite Recoveries in Michigan**." Refer to newsletter for presentation abstract, speaker biography and venue location information.

Notes from the editor:

- It's that time of year again….the Michigan Basin Geological Society dues are due. **Please take a moment to update your information and mail in your 2011-2012 dues.** After January newsletters will no longer be sent to members who have not sent in 2011-2012 dues. If you are not sure if you are up to date or not, please contact Tom Hoane at **hoanet@michigan.gov**

- MBGS donated $1000 to the local event, "Darwin Discovery Days" to be held on February 12th, 2012 from 1-5pm at the Michigan State University Museum. MBGS will be on hand with the core display and will give away rock and mineral kits to the first 100 kids to visit our MBGS display. Mark your calendars; this should be a great family event. More information on the event is included in the "Upcoming Events" section of the newsletter.

- MBGS is planning exciting field trips for 2012 and 2013. So watch your monthly newsletter details in the months ahead.

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MBGS Meeting
Wednesday, January 11, 2012

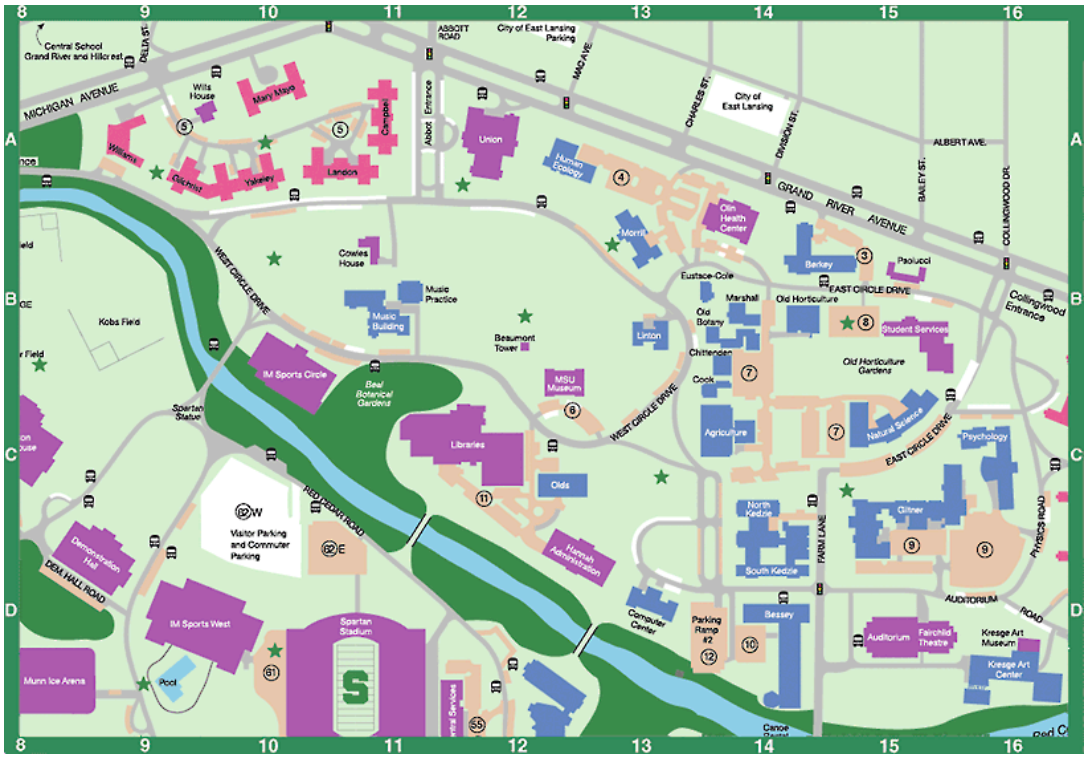
"Recent Meteorite Recoveries in Michigan
Dr. Michael Velbel, Department of Geological Sciences, Michigan State University

Executive Meeting starting at 4:30 PM at Claddagh Irish Pub, Lansing
Please contact Thomas Godbold by if you have any questions tgodbold07@gmail.com.

MSU, Natural Science Building
The talk will begin at **7:00 PM in Room 204**

Refreshments will be provided after the talk in the Natural Science Building
No charge for this meeting.

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.



Recent Meteorite Recoveries in Michigan

Returned samples of solar-system materials are of the highest scientific value because they are known to come from bodies for which other kinds of information are available to complement studies of the samples in terrestrial laboratories. However, only a few solar-system bodies other than Earth have been sampled by human or robotic missions. Lunar rocks returned by Apollo and Luna missions, comet dust returned from comet 81P/Wild 2 by NASA's Stardust mission, and mineral grains from the regolith of asteroid 25143 Itokawa recently returned by the Hayabusa mission, sample only a few specific solar-system bodies (the Moon, one comet, and one asteroid).

Meteorites are naturally delivered samples that are our only direct samples from a large a variety of parent bodies throughout the solar system. In their chemical compositions, minerals, and textures they preserve direct evidence of the processes by which our solar system's planets and small bodies originated, were modified, and evolved to their present state.

At the broadest level of compositional classification, meteorites include objects that consist mainly of metal (*irons*), predominantly of silicate minerals (*stones* or *stony meteorites*), and subequal abundances of metal and silicates (*stony irons*). Stony meteorites are subdivided into those with textural evidence of familiar (to geologists) igneous differentiation processing on their parent bodies, and those containing textural evidence of cooling and solidification of individual grains from vapor and melted dust followed by assembly of the solids into rocks and parent bodies that did not differentiate to produce magmas and igneous rocks. The defining features of the latter group are *chondrules*, generally spherical mm to sub-mm-sized silicate-dominated solids that are solidified droplets formed by flash heating and rapid cooling of precursor solids in the early solar nebula. Stony meteorites containing chondrules, and closely related meteorites in which evidence of chondrules may have been destroyed during the meteorite's history, are called *chondrites*. Stony meteorites with igneous textures lack chondrules and are called *achondrites*. Meteorites from large, differentiated parent bodies (*e.g.* Mars, the Moon, differentiated Main Belt asteroids) complement scientific understanding of those parent bodies arrived at by other means, including ground-based astronomical observations and orbital and landed missions. Undifferentiated meteorites are important sources of information about primitive asteroids.

The natural delivery process involves ejection of a meteoroid from its parent body, interplanetary transit, dramatic passage through Earth's atmosphere, and arrival at Earth's surface as a meteorite. Freshly fallen meteorites, recovered promptly after their witnessed fall, are referred to as 'falls.' Most meteorites available for scientific study are referred to as 'finds,' recovered after unwitnessed arrival and some exposure to the terrestrial surface environment, often over millennial or longer timescales. Meteorites are named for major geographic features near their recovery site.

Michigan's meteorites are typical of meteorites recovered around the world. Irons are the most easily recognized among finds; all Michigan finds are irons. Stony meteorites are best recognized when their fall is witnessed; all Michigan stony meteorites are falls. All documented Michigan stony meteorites are ordinary chondrites, the most common variety among falls.

BIOGRAPHICAL SKETCH

MICHAEL ANTHONY VELBEL (Ph.D., Yale University, 1984) is Professor of Geological Sciences at Michigan State University, East Lansing, MI. He studies regolith geoscience, and the rates and mechanisms of mineral-water interactions during rock and mineral weathering, emphasizing the geological, mineralogical, geochemical, and geomorphic factors which control mineral alterations at the Earth's surface and the migration of chemical elements through the landscape; and small-watershed geochemistry. Related areas of research include terrestrial weathering of Antarctic meteorites; rock-, mineral-, and chemical-weathering on Mars and in Martian meteorites; pre-terrestrial aqueous alteration on other meteorite parent bodies; and preservation of sample integrity for future sample-return missions. He was a member of the Mineralogy-Petrology subteam of the NASA Stardust mission Preliminary Examination Team (2006). In addition to MSU, Prof. Velbel has held visiting appointments at the University of Cincinnati, the Université Paul Cézanne (Université d'Aix-Marseilles III), and the Australian National University, and held NASA/ASEE Summer Faculty Fellowships at the NASA Johnson Space Center in 1987 and 1999.

MICHAEL ANTHONY VELBEL, Professor of Geological Sciences, Michigan State University, East Lansing, MI 48824-1115 (517) 355-4626

Education:

Ph.D.,	1984	Yale University (Geology/Geochemistry)
B.A.,	1978	Northwestern University (Geological Sciences)

Academic Appointments:

Chair, Department of Geological Sciences, Michigan State University, 1999-present
NASA/ASEE Summer Faculty Fellow, NASA Johnson Space Center, 1999
Visiting Fellow, Department of Geology and Cooperative Research Centre for Landscape Evolution and Mineral Exploration, Australian National University, Jan.-April, 1998.
Professor of Geological Sciences, Michigan State University, 1993-present.
Visiting Associate Professor of Geology, Faculté des Sciences-St Jérôme, Université Paul Cézanne (formerly d'Aix-Marseilles III), April, 1992.
Visiting Associate Prof. of Geology, University of Cincinnati, 1990-1991.
Assoc. Prof., Geological Sciences, Michigan State University, 1988-1993.
NASA/ASEE Summer Faculty Fellow, NASA Johnson Space Center, 1987
Asst. Prof., Geological Sciences, Michigan State University, 1983-1988.

Five publications most relevant to proposed research

Velbel, M.A., 1999. Bond strength and the relative weathering rates of simple orthosilicates. American Journal of Science, v. 299, p. 679-696.
Velbel, M.A., 1999. Rate and duration of aqueous alteration on the carbonaceous chondrite parent body: Petrographic studies of kinetically controlled olivine replacement textures. NASA Contractor Report, pp. 19-1 to 19-15.

Velbel, M.A., Basso, C.L., Jr., and Zieg, M.J., 1996. The natural weathering of staurolite: Crystal-surface textures, relative stability, and the rate-determining step. American Journal of Science, v. 296, p. 453-472.

Velbel, M.A., 1993. Formation of protective surface layers during silicate-mineral weathering under well-leached, oxidizing conditions. American Mineralogist **78**:408-417.

Velbel, M.A., 1989. Weathering of hornblende to ferruginous products by a dissolution-reprecipitation mechanism: Petrography and stoichiometry. Clays and Clay Minerals **37**:515-524.

Five other significant research publications

Velbel, M.A., 1998. Geochemical Kinetics of Mineral-Water Interactions: Chemical Reaction Rates and Rate Processes in Mineral and Rock Weathering. Short Course Notes, Cooperative Research Centre for Landscape Evolution and Mineral Exploration, Canberra, ACT, Australia, 6-9 April 1998, 66 pp.

Osborn, W., Matty, D., Velbel, M., Brown, P., and Wacker, J., 1997. Fall and recovery of the Coleman chondrite and its associated fireball. Meteoritics & Planetary Science, v. 32, p. 781-790.

Velbel, M.A., 1996. Some effects of clay minerals on the kinetics of silicate-mineral weathering. Short papers from the Fourth International Symposium on the Geochemistry of the Earth's Surface (S.H. Bottrell, ed.), Department of Earth Sciences, University of Leeds, pp. 520-524.

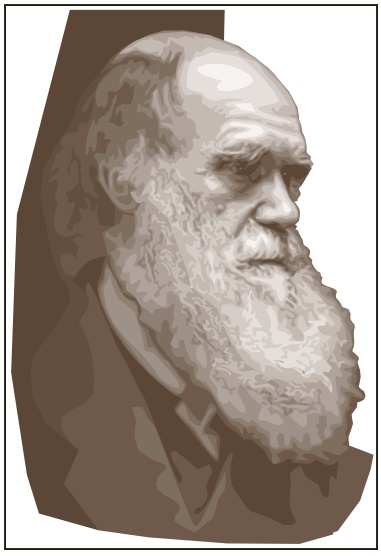
Velbel, M.A., 1993. Temperature dependence of silicate weathering in nature: How strong a negative feedback on long-term accumulation of atmospheric CO_2 and global greenhouse warming? Geology **21**:1059-1062.

Velbel, M.A., 1992. Geochemical mass balances and weathering rates in forested watersheds of the southern Blue Ridge, III. Cation budgets and the weathering rate of amphibole. American Journal of Science, v. 292, p. 58-78.

RESEARCH & PUBLICATIONS: Publications include 31 articles and 50 abstracts. Research emphasizes determination of rates and mechanisms of mineral-water interactions in various compartments of the rock cycle, primarily of silicate minerals at surface and near-surface temperatures (e.g., weathering, groundwater environments), with secondary focii involving higher temperatures (e.g., burial diagenesis of sandstones) and highly soluble non-silicate minerals (e.g., halite & other evaporite minerals). Quantification of rates of mineral-water reactions from thermodynamic and kinetic modeling of solute data, primarily from small forested watersheds. Ongoing and recently completed projects include: Mechanisms, stoichiometries, and rates of weathering reactions involving ferromagnesian silicate minerals; compositional determinants of rate-limiting mechanisms and alteration textures during silicate mineral weathering and diagenesis; effect of temperature on mineral weathering rates in natural systems, and implications for global-change models; mineralogic, thermodynamic, kinetic, and hydrologic factors influencing discrepancies between lab and field rates of mineral-water interactions; mathematical forward and inverse models of mineral weathering rates in small hydrologic catchments; mineral weathering rates and clay-mineral formation in watersheds of the southern Blue Ridge & the Colorado Rockies; role of element uptake by forest biota on silicate-mineral weathering rates; formation of evaporite and oxide minerals by terrestrial weathering of Antarctic meteorites; burial diagenesis of rift-valley redbed sequences.

UPCOMING EVENTS

- January 20, 2012 – Ohio Geological Survey 14th Annual Winter Gala, The Ohio Geological Society cordially invites allgeologists, associates, and friends to a gala winter celebration, www.ohgeosoc.org
- February 6, 2012 – SPE Meeting, Sources of Productivity Impairment in Openhole Completions by Richard Hodge, www.michigan.spe.org
- February 12, 2012 – Darwin Discovery Day, Michigan State University Museum, 1-5pm Free, http://museum.msu.edu/index.php?q=node/358
- February 23, 2012 - OGS Meeting, Overview of Horizontal Shale Completion Process, www.ohgeosoc.org
- May 10, 2012 – Drilling and Completion Activities Related Rock Mechanics by Francisco Henriques Ferreira, www.michigan.spe.org
- April 18, 2012 - Michigan Oil And Gas Association (MOGA) and the Northern Michigan Chapter of the American Petroleum Institute (API) 10th Annual Michigan Petroleum Conference, http://www.michiganoilandgas.org/2012PetroleumConference.aspx



Discovery Day and Annual Natural History Identification Day
Michigan State University Museum
February 12, 2012 from 1-5 p.m. – Free

Check out a new exhibit, "It Started with a Rock Collection: Charles Darwin, Geologist," opening on Feb. 12, 2012 in the Heritage Gallery. The exhibit traces Darwin's earliest scientific investigations with rocks and minerals - as well as a very modern look at geoscience research going on at Michigan State University.

The Michigan State University Museum joins natural history museums and science centers around the world in observing naturalist Charles Darwin's birthday with special programs. Science institutions worldwide have created special programs around Darwin's birthday that help promote an appreciation for the benefits of scientific knowledge acquired through human curiosity and ingenuity. Learn more at http://darwinday.org

Additional activities in the works:

- Ask an expert: museum curators and MSU specialists can help you identify backyard curiosities: bring in a rock, bone, fossil, tooth or other natural object*
- Ask Darwin: Rich Bellon, MSU Darwin scholar will answer questions about Darwin's life and work.
- Interesting and unusual specimens from MSU Museum's natural science collections
- Live critters with the MSU Herpetology Club and MSU Museum's naturalist, Jim Harding the Critterguy.
- Tours of the MSU Museum's "Bug Room," where beetles help prepare animal skeletons for inclusion in the collections.
- Rare, behind-the-scenes tours of MSU Museum research collections.
- Dinosaur casts in Habitat Hall.
- Hands-on activities for kids with MSU 4-H Children's Garden and Department of Horticulture.
- Books and educational resources at the Museum Store.
- Seismometer demonstration, hosted by MSU geophysicists from Department of Geological Sciences
- Birthday cake and refreshments!

*The MSU Museum cannot provide estimates on the commercial value of any specimen nor provide expertise on human-made artifacts at this program.

2011-2012 MBGS Officers

The Executive Committee meeting minutes are available on our website at www.mbgs.org

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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
- 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
- Geology of Central Ontario, Canada, 1965

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 Ordovician Stratigraphy of the Cincinnati, Ohio and Richmond, Indiana Areas, June 12, 13, 1953 by W. H. Shideler and B. T. Sandefur
- 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 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

(NEW) Historical CD #7: Six out-of-print Field Guidebooks from 1962, 1969, 1977, 1980, 1985 & 1988, $15

- Silurian Rocks of the Southern Lake Michigan Area, 1962, James H. Fisher, Chairman, MBGS Annual Field Conference
- Studies of the Precambrian of the Michigan Basin, by Harold B. Stonehouse, 1969
- The Geology of the Marquette District: a Field Guide By F. W. Cambray, 1977
- Ordovician and Silurian Geology of the N. Peninsula of Michigan, 1980, R.B. Votaw, 40 pp., illus., maps
- Special Paper #4: Ordovician and Silurian Rocks of the Michigan Basin and its Margins, 1985 K.R. Cercone and J.M. Budai (eds.), 96 pp., illus.
- Upper Keweenawan Rift-Fill Sequence, Mid-Continent Rift System, Michigan, 1988, P.A. Daniels and R.D. Elmore, M.S. Wollensak, ed., 150 pp., illus., maps

OTHER SPECIAL OFFERS

- **Historical CD Set - # 1 – 7 (detailed above) for a special purchase price of $95**

- **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

- **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.

Michigan Basin Geological Society Dues Notice

Please fill out this form when paying your dues for 2011-2012. Dues are $25.00 for active member and $10.00 for students.

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Grand Rapids, MI 49506