

Field Trip Road Log: Karst Features of the Mammoth Cave Kentucky Area, Thursday, May 29, 2008

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This field trip is in collaboration with the Fourth US Geological Survey Karst Interest Group Conference, Western Kentucky University.

The trip log begins at the Hampton Inn Hotel, 233 Three Springs Road, Bowling Green, KY 42104

| <i>interval</i> | <i>total</i> | |
|-----------------|--------------|--|
| 0 | 0 | Leave parking lot of Hampton Inn (see Figure 1) |
| 0.1 | 0.1 | Turn left onto Three Springs Road |
| 0.4 | 0.4 | Turn right on Scottsville Road (Rt. 231) |
| 0.6 | 0.6 | Take exit for I65 north |
| 4.5 | 4.5 | I65 crosses over the Barren River, which is the main base level stream draining the Pennyroyal karst plain in Warren County. It drains westward to the Green River, the base level stream for the Mammoth Cave System and other large caves of Hart, Barren, and Edmonson Counties in and around Mammoth Cave National Park (for background see Palmer, 1981; White and White, 1989). |
| 6 | 6 | Take exit 28 |
| 6.7 | 6.7 | Turn north on Rt. 31-W |
| 9.5 | 9.5 | Light at Rt. 526 |
| 10.8 | 10.8 | Pass Kentucky Trimodal Transpark (KTT) on right. The proposed KTT entails siting a 4,000-acre air-, rail-, and truck-terminal facility and associated industrial park on the karst plain, 8 miles from Mammoth Cave National Park near Bowling Green. A large automotive parts plant is in operation at the site, and more heavy industry is being encouraged to locate there. The siting of such a large facility in this setting on a sinkhole plain has been controversial because of the interactions between political considerations and the environmental concerns that had been detailed by a list of credible hydrogeologists and biologists. A measure of the level of controversy that ultimately developed within the local community was expressed one night in May 2004, when armed police were stationed at a County Planning and Zoning Commission rezoning hearing. |
| 16.9 | 16.9 | Buttram's Cave on left. The entrance to Buttram's Cave is in a sinkhole that has formed from the actual collapse of the ceiling of a cave passage. In contrast, most of the other sinks in the area are formed by focused dissolution at and thus lowering of the soil/bedrock interface underneath the soil. The cave is about one km long and is subject to dramatic flooding, even though nearly nine km from the Green River. |
| 18.9 | 18.9 | Cross into Edmonson County |
| 18.7 | 18.7 | Dripping Springs Community and Liberty Hill Church. We are at the physiographic boundary between the Pennyroyal Plateau limestone sinkhole plain to our right and the overlying sandstone capped Mammoth Cave Plateau to the left. The boundary between the two is called the Dripping Springs Escarpment, which gets its name from the small community here that goes back at least into the 1830s. |

Both of these plateau surfaces fall within the larger Interior Low Plateaus physiographic province. The Mammoth Cave System and other mapped caves with a combined length of more than 800 kilometers are formed in and around the dissected Mammoth Cave Plateau, ultimately draining to springs along the Green River to the north. We are not far from the divide between the karst groundwater drainage system that sends water north to the Green River in the Turnhole Bend Groundwater Basin, and south to the Barren River in the Graham Springs Basin.

All rocks that we will see up close on this trip are of Mississippian age.

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| 19.3 | 19.3 | Turn right on Upper Smiths Grove Rd. (Rt. 422) |
| 21.3 | 21.3 | STOP ONE: SMITHS GROVE UVALA. We are passing a large uvala (elongated, compound sinkhole) that extends for almost a kilometer. The large main passage of Crump's Cave, our next stop, is truncated along the far wall of the depression. Here we will take a longitudinal or "down-valley" view of this feature. The uvala has a maximum topographic relief of more than 30 meters on its east end. Also note the general flatness of the topography farther to the east. This is caused by a semi-confining layer of chert within the upper part of the St. Louis Limestone, concordant with the ground surface here and which that to some degree protects the underlying karst features in this locale. This uvala may have formed where the chert layer was breached, ultimately resulting in collapse of the cave ceiling. |
| 22.1 | 22.1 | STOP TWO: CAVE SPRING CAVERNS. Turn into parking area of Cave Springs Caverns. Long known as Crump's Cave, this is a site of geologic, archeological, and historic interest. Research investigating epikarst hydrogeology and its influence on the fate and transport of agricultural contaminants is underway at the site (Groves and Bolster, 2005), funded by the USDA Agricultural Research Service. |
| 0 | 22.1 | After finishing at Cave Springs Caverns, go back (right) |
| 0.7 | 22.8 | Turn right at uvala |
| 4.1 | 26.2 | Turn left on Rt. 259 at Rocky Hill |
| 5.7 | 27.8 | Cross 31-W |
| 9 | 31.1 | Pig Community and Porky Pig Diner |
| 9 | 31.1 | After finishing at Pig go back (left) on 259 |
| 10.2 | 32.3 | Turn left on Chaumont Rd. at Cedar Spring Community |
| 11.2 | 33.3 | The entrance to Whigpistle Cave, at the bottom of the karst valley to the right, was discovered in 1976 and explored over the next seven years by summer field crews of cavers working for Jim Quinlan. Quinlan was for years the geologist for Mammoth Cave National Park and a pioneer in delineating karst groundwater basins and their boundaries. By 1984 the cave had grown to had grown to about 35 km. Subsequent exploration in the 1990s of several nearby caves resulted in connection of Whigpistle Cave to both Jackpot and Martin Ridge Caves, with the system subsequently exceeding 50 km in length. Exploration continues. For more information see < http://www.uweb.ucsb.edu/~glennon/martin/ >. |
| 12.7 | 34.8 | Bear right on Chaumont Rd. |
| 14.4 | 36.5 | Turn right on 31-W |
| 16.7 | 38.8 | Turn left on Park Mammoth Rd. |
| 17.3 | 39.4 | Just past Slave Cave Rd. go straight, up the hill |
| 17.5 | 39.6 | STOP THREE: PARK MAMMOTH OVERLOOK. Park to right of the gate, not blocking it, and walk to the overlook by walking straight ahead along the small gauge railroad. Bear to the left where the tracks reach an intersection. At the overlook, on the property of the Park Mammoth resort, we are on the Big Clifty Sandstone. The Girkin Limestone below is exposed in the face of the steep |

escarpment that falls away below us. Dipping gently towards the north, the rocks of the Ste. Genevieve and St. Louis limestones floor the vast sinkhole plain below.

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| 0 | 39.6 | After returning to bus, go back to 31-W |
| 0.8 | 40.4 | Turn left on 31-W |
| 1.9 | 41.5 | Turn left on Route 255 at Parkland Motel (note gorilla in parking lot) |
| 2.3 | 41.9 | Enter Mammoth Cave National Park |
| 3.5 | 43.1 | Pass Diamond Caverns on right. This is a very well decorated show cave with many different styles of travertine speleothems, or cave formations, in contrast to the more typical scenes of bare or muddy rock walls seen in much of the Mammoth Cave System and other nearby caves. In those areas passages are overlain with clastic rocks that inhibit infiltration of waters above the cave. |
| 4.5 | 44.1 | Turn left on Rt. 70 |
| 7.1 | 46.7 | Turn left on Rt. 70 |
| 10.9 | 50.5 | STOP FOUR: GREEN RIVER. Pull off at Turnhole Bend Trail parking area. This short walk goes across the sandstone Caprock past some large steep sinks, to an overlook of the Green River gorge. Turnhole Spring, the largest of the Green River springs draining the Mammoth Cave area, emerges here (see White and White, Glennon, 2002; Glennon and Groves, 2002). The river has cut downward through here in the last several million years, with a number of the details having been worked out by Granger <i>et al.</i> (2001) using the cosmogenic isotopes ²⁶ Al and ¹⁰ Be. They have tied absolute dating of major abandoned cave stream levels to the down cutting evolution of the Green, and thus the Ohio, Rivers. |
| 0 | 50.5 | When done at Turnhole go back east on Rt. 70 |
| 0.4 | 50.9 | Turn right on Cedar Sink Road (Rt. 422) |
| 0.9 | 51.4 | Rock fall on left hand side |
| 1 | 51.5 | Go past Cedar Sink Trail parking area |
| 2.8 | 53.3 | Go straight on Rt. 422 across Rt. 259 at Pig |
| 5.7 | 56.2 | Turn right on Rt. 31-W |
| 18.2 | 68.7 | Take exit for I65, onto access road |
| 18.9 | 69.4 | Go right on I65 south |
| 24.3 | 74.8 | Take Bowling Green exit 22 |
| 24.5 | 75 | Turn right on Scottsville Rd. (Rt. 231), get into left lane asap |
| 24.8 | 75.3 | Turn left on Three Springs Road |
| 24.9 | 75.4 | Turn right into Hampton Inn parking area, end of field trip |

REFERENCES

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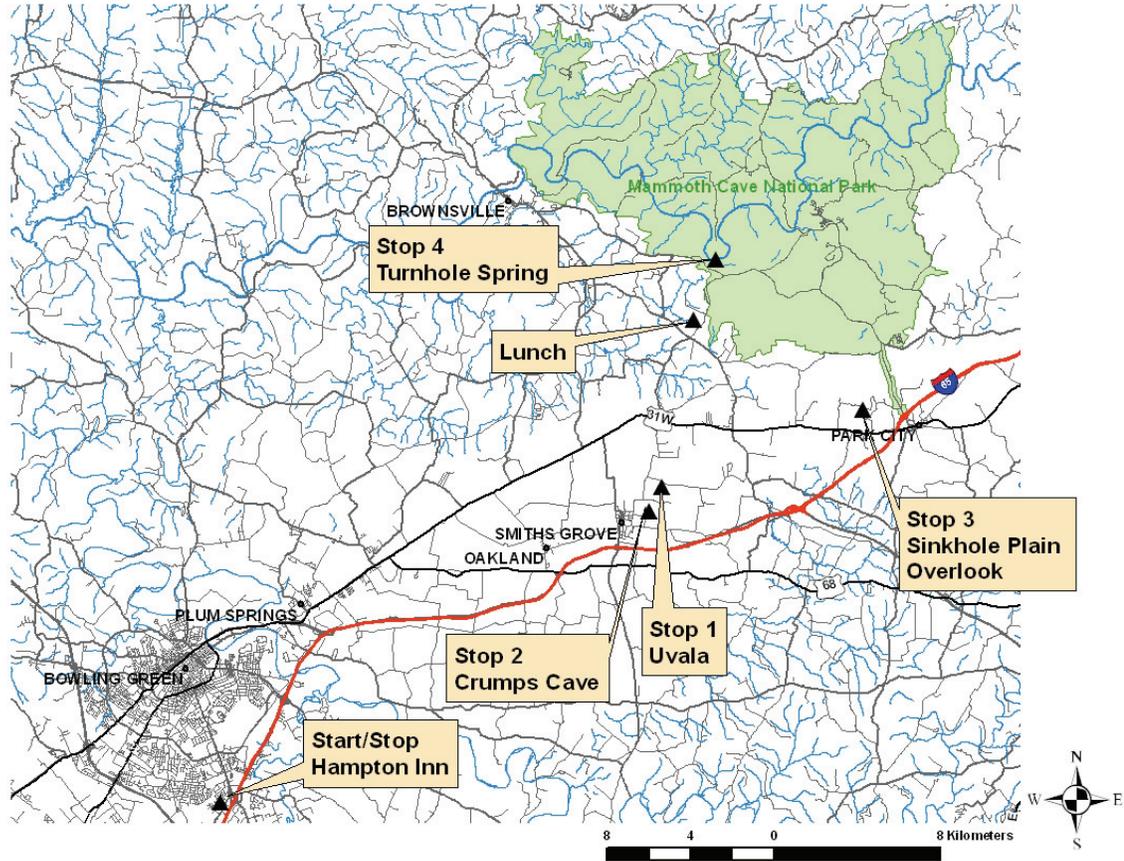


Figure 13. Map of field trip area, showing principal stops.