Reasons Why We Should be Mindful of Microbes When We Consider Karst Systems: Impacts on Karst Development

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Abstract

A 1998 study of interstitial fluid geochemistry within Charonís Cascade in the Echo River/River Styx area of the Mammoth Cave System found carbon dioxide pressures higher than that of the fluids of the cave stream itself. This was confirmed by a limestone weight loss experiment in which samples dissolved at various levels below the streambed despite the low fluid velocities. The high CO_2 pressures appear to influence both conduit dissolution rates and geometry and presumably result from the microbial degradation of organics within the sediments. To explore the relationship between the geochemical environment of fluids and microbial ecology, additional samples were collected from the same location. Eight *Coliform* bacteria were identified to species level and inoculated in 65 milliliters of thioglycollate broth along with a calcite crystal of known weight and incubated at 12°C for 92 days. In the presence of five of the bacterial species, calcite dissolved more than the control, ranging up to 18.1 milligrams per square centimeter per year for *Escherichia coli*. Preliminary results suggest that in typical southeastern U.S. cave environments, bacteria within cave sediments may influence limestone dissolution. Further experiments are underway to better understand the relationships between microbial ecology and limestone dissolution kinetics.