

## INTRODUCTION AND ACKNOWLEDGMENTS

Karst aquifer systems are present throughout parts of the United States and some of its territories. The complex depositional environments that form carbonate rocks combined with post-depositional tectonic events and the diverse climatic regimes under which these rocks were formed result in unique hydrologic systems. The dissolution of calcium carbonate and the subsequent development of distinct and beautiful landscapes, caverns, and springs have resulted in some karst areas of the United States being designated as national or state parks and commercial caverns. Karst aquifers and landscapes that form in tropical areas, such as the north coast of Puerto Rico, differ greatly from karst areas in more arid climates, such as central Texas or western South Dakota. Many of these public and private lands contain unique flora and fauna associated with the hydrologic systems in these karst areas. As a result, multiple Federal, State, and local agencies have an interest in the study of karst terrains.

Carbonate sediments and rocks (limestone and dolomite) are composed of greater than 50 percent carbonate minerals and the predominant carbonate mineral is calcium carbonate or limestone (CaCO<sub>3</sub>). Unlike terrigenous clastic sedimentation, the depositional processes that produce carbonate rocks are complex, involving both biological and physical processes. These depositional processes impact greatly the development of permeability of the sediments. Carbonate minerals readily dissolve or precipitate depending on the chemistry of the water flowing through the rock, thus the study of both marine and meteoric diagenesis of carbonate sediments is multidisciplinary. Even with a better understanding of the depositional environment and subsequent diagenesis, the dual porosity nature of karst aquifers presents challenges to scientists attempting to study ground-water flow and contaminant transport.

Many of the major springs and aquifers in the United States are developed in carbonate rocks and karst areas. These aquifers and the springs that discharge from them, serve as major water-supply sources and as unique biological habitats. Commonly, there is competition for the water resources of karst aquifers, and urban development in karst areas can impact the ecosystem and water quality of these aquifers.

The concept for developing a Karst Interest Group evolved from the November 1999 National Ground-Water Meeting of the U.S. Geological Survey (USGS), Water Resources Division. As a result, the Karst Interest Group was formed in 2000. The Karst Interest Group is a loose-knit grass-roots organization of USGS employees devoted to fostering better communication among scientists working on, or interested in, karst hydrology studies.

The mission of the Karst Interest Group is to encourage and support interdisciplinary collaboration and technology transfer among USGS scientists working in karst areas. Additionally, the Karst Interest Group encourages cooperative studies between the different disciplines of the USGS and other Department of Interior agencies and university researchers or research institutes.

The first Karst Interest Group workshop was held in St. Petersburg, Florida, February 13-16, 2001, in the vicinity of karst features of the Floridan aquifer system. The proceedings of that first meeting, Water-Resources Investigations Report 01-4011 are available online at:

<http://water.usgs.gov/ogw/karst/>

The second Karst Interest Group workshop was held August 20-22, 2002, in Shepherdstown, West Virginia, in close proximity to the carbonate aquifers of the northern Shenandoah Valley. The proceedings of the second workshop were published in Water-Resources Investigations Report 02-4174, which is available online at the previously mentioned website.

The third workshop of the Karst Interest Group was held September, 12-15, 2005, in Rapid City, South Dakota, which is in close proximity to karst features in the Madison Limestone in the semi-arid Black Hills of South Dakota and Wyoming, including Wind Cave National Park and Jewell Cave National Monument. The proceedings of the third workshop were published in Scientific Investigations Report 2005-5160, which is available online at the previously mentioned website. The USGS, Office of Ground Water, provides support for the Karst Interest Group website and public availability of the proceedings from these workshops.

This fourth workshop is sponsored by the USGS; the Hoffman Environmental Research Center and Center for Cave and Karst Studies at Western Kentucky University in Bowling Green, Kentucky; the National Cave and Karst Research Institute; and Mammoth Cave National Park. The majority of funding for the proceedings preparation and workshop was provided by the USGS Ground-Water Resources Program and the USGS Eastern Region. Western Kentucky University provided the rooms and facilities for the technical and poster presentations of the workshop. The National Cave and Karst Research Institute provided funds for the printed copies of these proceedings distributed at the meeting. The superintendent of Mammoth Cave National Park graciously agreed to allow the Karst Interest Group access to Mammoth Cave for a private evening tour of the cave system.

The session planning committee for this fourth workshop included Randall Bayless, Thomas D. Byl, Kevin F. Dennehy, Daniel H. Doctor, Brian G. Katz, Barbara J. Mahler, Randall C. Orndorff, Rodney A. Sheets, W. Barclay Shoemaker, Bruce D. Smith, Lawrence E. Spangler, Charles J. Taylor, and J. Judson Wynne of the USGS. The field trip committee included Joe Meiman, National Park Service; Chris Groves, Director of the Hoffman Environmental Research Institute, Western Kentucky University; and Rickard Toomey, Director, Mammoth Cave International Center for Science and Learning and Department of Geography and Geology, Western Kentucky University. Local logistics for the meeting were coordinated by Eve Kuniansky, USGS, along with Pat Kambesis and Amber Williams, Western Kentucky University. We sincerely hope that this workshop promotes future collaboration among scientists of varied backgrounds and improves our understanding of karst systems in the United States and its territories.

The extended abstracts of USGS authors were reviewed and approved for publication by the U.S. Geological Survey. Articles submitted by university researchers and other Department of Interior agencies did not go through the USGS review process and, therefore, may not adhere to USGS editorial standards or stratigraphic nomenclature. All articles were edited for consistency of appearance in the published proceedings. The use of trade names in any article does not constitute endorsement by the U.S. Government.

The cover illustration was designed by Ann Tihansky, USGS, St. Petersburg, Florida, for the first Karst Interest Group workshop.

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