

Short Courses

Choose among four courses to expand your knowledge of practical applications of karst science.

Short Course 1: *Geologic Site Characterization in a Karst Setting*

Instructors:

Lynn Yuhr, P.G., President of Technos, Inc., Miami, Florida (retired)

Richard C. Benson, P.G., C.P.G., Founder and Sr. Engineering Geologist of Technos, Inc., Miami, Florida (retired)

Course length – 4 hours

Geologic site characterization is the technical foundation for all geotechnical and environmental projects. The objective of a geologic site characterization is to gain an accurate and complete understanding of subsurface conditions that will impact the engineering or environmental decisions made at a site. If the site characterization is done right, these decisions will be made with a high degree of confidence and be supported by reliable technical data. This effort can be fairly straightforward in a uniform geologic setting; however, karst often provides some of the most variable and diverse geologic settings to deal with.

This 4-hour course is based upon an integrated approach to site characterization. Therefore, we will cover a wide range of topics ranging from a discussion of the problem, a strategy using an integrated systems approach of appropriate methods, and adequate levels of site coverage that consider the impact of scale. Case histories will be presented to illustrate the process.

This topic is covered in detail in the new book out called *Site Characterization in Karst and Pseudokarst Terraines* authored by Richard C. Benson Lynn B. Yuhr and (2016). It is based upon their combined and diverse experience specializing in site characterization with an emphasis on karst.

Short Course 2: *Grouting in Karst*

Instructors:

Joseph A. Fischer, P.E., Geoscience Services

Michael J. Miluski, P.E., Compaction Grouting Services

Course length – 4 hours

There will be an overview of the differing karst environments and how they influence both the site investigation and the possible differing needs for effective grouting procedures in these karst environments. Geotechnical investigation concepts, types of grout, procedures, equipment descriptions and examples will be discussed. Preparing a grouting program concentrating on grout refusal criteria, secondary injection points and grout hole spacing will be discussed. We will provide tools to help you determine what pricing scheme will satisfy the client. Important aspects of field inspection including calibrating pump strokes, determining injection rates and tracking quantities will also be discussed. Handouts of the course content will be provided. Instructors Joseph A. Fischer, P.E. of Geoscience Services and Michael J. Miluski, P.E. of Compaction Grouting Services, Inc. have extensive experience in grouting in karst environments from both the geotechnical engineer's and contractor's viewpoints.

Short Course 3: Stormwater Management in Karst – A Regional Perspective

Instructor:

Robert K. Denton Jr., CPG, LPSS (GeoConcepts Engineering Inc.)

Course length – 4 hours

The short course will detail general principles of karst characterization utilized for the siting and design of stormwater best management practices (BMPs) in karst. Topics to be covered will include:

- 1) Utilization of terrain, hydrogeological, and subsurface investigation analyses (borings, electrical resistivity, etc.) to properly characterize and design stormwater BMPs in karst, with special emphasis on the karst terrain of the Appalachian regions of Virginia, West Virginia and Maryland
- 2) Environmental issues including the mitigation of the transport and migration of soil-adsorbed contaminants into the karst aquifer
- 3) Design of stormwater BMPs for internally drained sites (onsite absorption, dry ponds, Class V injection wells, etc.)
- 4) The impact of limestone saprolite on pond design and failure
- 5) Understanding and utilization of the Karst Reduction Factor
- 6) A review of regional guidelines and regulations governing karst stormwater BMPs

Short Course 4: Identifying closed depressions from lidar-derived digital elevation models

Instructors:

Daniel H. Doctor, Ph.D., Research Geologist, U.S. Geological Survey

John Wall, Ph.D. Candidate, North Carolina State University

Course length – 4 hours

This short course will introduce users to a number of tools and techniques for identifying sinkholes and other closed depressions from lidar-derived elevation data within ESRI ArcGIS software. Topics to be covered will include:

- 1) Semi-automated methods for extracting closed depression features from lidar elevation using filling and contour-tree algorithms
- 2) Hydrologic conditioning of lidar-derived DEMs for removal of false closed depressions along ‘digital dams’, such as roads and railways
- 3) Implementation of flow-routing algorithms for generation of vector stream networks and modeling of sinkhole flooding from lidar elevation models
- 4) Optimized visualization of lidar-derived elevation for identification of karst landscape features
- 5) Derivation of geomorphic parameters of closed depression datasets

Short course participants will be provided with a computer workstation with ArcGIS v.10.3 software, and access to customized toolboxes for processing the lidar to extract closed depressions.

Participants may also bring their own lidar data and laptop computer; however, ArcGIS 10.2 or higher must be pre-loaded on a personal computer.

Additional skills to be learned will include:

- 1) Enhanced visualization of lidar elevation datasets for geologic mapping
- 2) Access to publicly-available lidar data
- 3) Using GIS software to extract closed depression polygon and contour vector data from lidar elevation models
- 4) Export and visualization of lidar data to Google Earth