

Table of contents

Keynote address: Environmental and engineering problems of karst geology in China <i>Yuan Daoxian</i>	1
 1. Regional studies of sinkholes and karst	
Case histories of induced sinkholes in the eastern United States <i>J.G.Newton & J.Mark Tanner</i>	15
Inventory of karst subsidence in the Valley and Ridge Province of East Tennessee <i>R.H.Ketelle & J.G.Newton</i>	25
Thickly mantled karst of the Interlachen, Florida area <i>Daniel V.Arrington & Robert C.Lindquist</i>	31
Solution-subsidence-collapse in central Texas: Ordovician to Quaternary <i>Ernst H.Kastning</i>	41
Valley poljes in Florida karst <i>James H.Jensen</i>	47
Fluvial and collapse influences on cockpit karst of Belize and eastern Guatemala <i>Tom Miller</i>	53
Karst, sebkhas, and neotectonics in Rio de Oro Coastal Region, western Sahara, northwest Africa <i>Richard L.Bowen</i>	59
Some ancient dolines in the karst of Ireland <i>David J.Burdon</i>	65
Solution cavities in the limestone of Eastern Saudi Arabia <i>Jonathan J.Grosch, Fadlo T.Touma & Donald P.Richards</i>	73
Sinkholes and the morphogeny of the Central Styrian Karst (Austria) <i>Josef G.Zötl</i>	79
Ordered and stochastic arrangements within regional sinkhole populations <i>William B.White & Elizabeth L.White</i>	85
Croatian karst sinkhole experience <i>Srećko Božičević & Zlatko Pepeonik</i>	91
Influence of impermeable beds on the collapse of bedrock voids in the vadose zone <i>John E.Mylroie</i>	95
Fracture permeability: Implications on cave and sinkhole development and their environmental assessments <i>George Veni</i>	101
 2. Case studies of sinkhole occurrence	
The hydrologic effects from intense ground-water pumpage in East-Central Hillsborough County, Florida <i>Terrance O.Bengtsson</i>	109

Sinkhole development along 'untreated' highway ditchlines in East Tennessee <i>Harry L. Moore</i>	115
Limestone quarrying and sinkhole development in the English Peak District <i>John Gunn & Peter Gagen</i>	121
Development of the Wink Sink in west Texas due to salt dissolution and collapse <i>Kenneth S. Johnson</i>	127
Karst in gypsum and its environmental impact on the Middle Ebro Basin (Spain) <i>G. Benito & M. Gutiérrez</i>	137

3. Geophysical studies of sinkholes and karst

Cone-penetrometer exploration of sinkholes: Stratigraphy and soil properties <i>D. Bloomberg, S.B. Upchurch, M.L. Hayden & R.C. Williams</i>	145
Strength of material in and around sinkholes by in situ geophysical testing <i>P. Fisk, C. Gover, R. Holt & G. Jones</i>	153
Quantification of rock caving within sinkholes by time domain reflectometry <i>Kevin O'Connor, Charles H. Dowding & Miao-Bin Su</i>	157
Assessment and long term monitoring of localized subsidence using ground penetrating radar <i>Richard C. Benson & Lynn B. Yuhr</i>	161
Use of ground penetrating radar techniques to aid in site selection for land application sites <i>Herbert G. Stangland & Shiou-San Kuo</i>	171
Direct detection of shallow subsurface voids using high-resolution seismic-reflection techniques <i>Don W. Steeples & Richard D. Miller</i>	179
Locating groundwater conduits in carbonate rocks <i>Steven J. Stokowski, Jr.</i>	185
Ground penetrating radar: Its application in the identification of subsurface solution features – A case study in west-central Florida <i>Anthony E. Gilboy</i>	197
Use of vertical gravity gradient analyses to detect near-surface dissolution voids in karst terranes <i>Douglas L. Smith & Gary L. Smith</i>	205
Geophysical studies of a karst aquifer in the southern Harz foreland of Western Germany <i>Reinhard K. Frohlich</i>	211
The use of spontaneous potential in the detection of groundwater flow patterns and flow rate in karst areas <i>R.A. Erchul & D.W. Slifer</i>	217
Application of electrical resistivity methods to identify leakage zones in drained lakes <i>Douglas L. Smith & Anthony F. Randazzo</i>	227

4. Hydraulics and groundwater pollution in karst terranes

Assessment of flow in fractured rock and karst environments <i>Richard C. Benson & John Scaife</i>	237
Potential recharge and ground-water contamination from selected sinkholes in west-central Florida <i>J.W. Stewart</i>	247
A landfill site in a karst environment, Madison County, Florida – A case study <i>Ronald W. Hoenstine, Ed Lane, Teresa O'Carroll & Steven M. Spencer</i>	253

Wastewater reuse in karst terrain – A case study <i>Philip B.Hildebrand & Robert Oros</i>	259
Ground water hydraulics of a large karstic conduit – Sinkhole drainage and spring discharge in Drama area, Greece <i>Paul G.Marinos, Agoro A.Dimadi, George S.Xidakis & Christopher G.Koutitas</i>	261
Quantitative dye tracing techniques for describing the solute transport characteristics of ground-water flow in karst terrane <i>J.L.Smoot, D.S.Mull & T.D.Liebermann</i>	269
How often should samples be taken at relevant locations for reliable monitoring of pollutants from an agricultural, waste disposal, or spill site in a karst terrane? – A first approximation <i>James F.Quinlan & E.Calvin Alexander, Jr.</i>	277
Groundwater occurrence and development in coastal karst terrains of oceanic islands in the lower latitudes <i>David L.Tarbox</i>	287
 5. Drainage and flooding in karst terrane	
Sinkhole management and flooding in Jamaica <i>Medardo Molina & Franklin McDonald</i>	293
Catastrophic flood in the polje of Cetinje in February 1986, a typical example of the environmental impact of karst <i>Borivoje F.Mijatović</i>	299
Sinkholes and gabions – A solution to the solution problem <i>Harry Moore & Dominick Amari</i>	305
Multi-disciplinary analysis and design of class V drainage wells for a large commercial development <i>Phillip R.Kemmerly, Lawrence C.Weber & Charles S.Higgins, Jr.</i>	311
 6. Planning for development of karst terranes	
Planning & design considerations in karst terrain <i>J.A.Fischer, R.W.Greene, R.S.Ottoson & T.C.Graham</i>	323
The engineering-geological evaluation of sites proposed for development in the dolomite karst regions of southern Africa <i>Paul Roux</i>	331
The engineering geological properties of a residual soil commonly found in the dolomite karst region of southern Africa <i>David B.Buttrick</i>	337
Constraints on the utilization of ground-water resources in dolomitic strata, South Africa <i>J.R.Vegter</i>	343
The dewatering of dolomite by deep mining in the West Rand, South Africa <i>Derek W.Warwick, Ian J.A.Brackley, Geoff Campbell & Richard J.Connelly</i>	349
Evaluation of data for sinkhole-development risk models <i>Sam B.Upchurch & James R.Littlefield, Jr.</i>	359
Subsurface indicators of potential sinkhole activity at the Maitland Colonnades project in Maitland, Florida <i>Gary L.Kuhns, Laurence M.Phelps, Bryant P.Marshall & Ernest A.Cox, III</i>	365
Soil mechanics analysis of plastic soil deformation over a bedrock cavity <i>R.H.Ketelle, E.C.Drumm, J.Ben-Hassine & W.E.Manrod</i>	383

Use of percussion probes to determine rock mass quality of cavernous carbonate formations before and after grouting <i>Dorairaja Raghu, David R.Antes & Joseph J.Lifrieri</i>	389
Determination of pile lengths and proofing of the bearing stratum of piles in cavernous carbonate formations <i>Dorairaja Raghu</i>	397
 7. Remedial treatment of sinkhole collapse and other karstic engineering problems	
Some recent Florida legal cases regarding sinkhole related losses <i>William G.Salomone</i>	405
Sinkholes in airport pavements: Engineering implications <i>Robert M.Belesky, H.Reginald Hardy, Jr. & Francis F.Strouse</i>	411
Sinkhole repair: The bottom line <i>Matthew M.Gordon</i>	419
The Macungie sinkhole, Lehigh Valley, Pennsylvania: Cause and repair <i>Percy H.Dougherty & Michael Perlow, Jr.</i>	425
The use of geosynthetics to support roadways over sinkhole prone areas <i>R.Bonaparte & R.R.Berg</i>	437
The application of compaction grouting to karstic foundation problems <i>James F.Henry</i>	447
Using flow-meters to monitor sinkhole remediation <i>Robert M.Felton</i>	451
A geomorphological approach to restoration blasting in limestone quarries <i>Peter Gagen & John Gunn</i>	457
Use of a concrete diaphragm wall to prevent cavernous underflow at a dam <i>Hasan A.Hejazi</i>	463