



References

- Alexander, E.C. Jr. S.C. Scott, J.J. Piegat, K.D. Barr, and B. Nordberg. . 2005. "Dye tracing sewage lagoon discharge in a sandstone karst, Askov, Minnesota." in Beck, B.F. ed. *Sinkholes and the Engineering and Environmental Impacts of Karst. Proceedings of the Tenth Multidisciplinary Conference. The Geo-Institute of the American Society of Civil Engineers. Geotechnical Special Publication No. 144.* Geotechnical Special Publication No. 144.
- Anderson, M. P., and W.W. Woessner. 1992. "Applied Groundwater Modeling: Simulation of Flow and Advective Transport." *Academic Press, Inc.*
- Anderson, R., S. Bender, S. Clegg, A. Cousin, M.D. Dyar, C. Fabre, O. Forni, J. Frydenvang, O. Gasnault, J. Lasue, S. Maurice, V. Sautter,, and R. Wiens R. Tokar. 2015. "ChemCam DAta Processing-Quantitative Calibration." *Lunar and Planetary Science Conferencew March 18 2015.*
- Aronson, D.A., and P.H. Howard. . 1997. "Anaerobic Biodegradation of Organic Chemicals in Groundwater: A Summary of Field and Laboratory Studies." *Prepared for American Petroleum Institute by Syracuse Research Corporation, Syracuse, New York*,:262.
- ASTM. 1994a. "Standard Guide for Comparing Ground-Water Flow Model Simulations to Site-Specific Information. Standard." *ASTM D5490-93.*
- ASTM. 1994b. "Standard Guide for Conducting a Sensitivity Analysis for a Ground-Water Flow Model Application." *Standard D5611-94.*
- ASTM. 1994b. "Standard Guide for Defining Boundary Conditions in Ground-Water Flow Modeling. Standard ." *ASTM D5609-94.*
- ASTM. 1994c. "Standard Guide for Conducting a Sensitivity Analysis for a Ground-Water Flow Model Application. ." *Standard D5611-94.*
- ASTM. 1995a. "Standard Guide for Subsurface Flow and Transport Modeling." *ASTM D5880-95.*
- ASTM. 1995b. "Standard Guide for Documenting a Ground-Water Flow Model Application." *ASTM D5718-95.*
- ASTM. 1996. "Standard Guide for Calibrating a Ground-Water Flow Model Application. ." *ASTM D5981-96.*
- ASTM. 1998. "Standard Guide for Selecting a Ground-Water Modeling Code. Standard." *ASTM D6170-97.*
- ASTM. 2014. "Standard practice for rock core drilling and sampling of rock for site exploration." *ASTM D2113-14.*
- Baston, D.P., and B.H. Kueper 2009. "Thermal Conductive Heating in Fractured Bedrock: Screening Calculations to Assess the Effect of Groundwater Influx." *Advances in Water Resources* 32:231 – 238.
- Berkowitz, B. . 2002. "Characterizing Flow and Transport in Fractured Geological Media." *Advances in Water Resources* 25 (8-12):861 – 884.
- Blasland, Bouck & Lee, Inc. . 1998. "Remedial Investigation Report. Solvents Recovery Service of New England, Inc., ."
- Blatt, H., G. Middleton, R. Murray. 1980. "Origin of Sedimentary Rocks." *Published by Prentice Hall Text Book.*
- Bonacci, O. . 1993. "Karst springs hydrographs as indicators of karst aquifers." *Hydrological Sciences* 38:51 – 62. doi: 10.1080/02626669 309492639.
- Bordas, J.M. 2005. "Modeling Groundwater Flow and Contaminant Transport in Fractured Aquifers." *Air Force Institute of Technology, Air University.* Thesis.
- Bruine. 2003. "Laminar Ground Water Flow through Stochastic Channel Networks in Rock." *École Polytechnique Fédérale de Lausanne.* Thesis Ph.D.
- Chapman, S.W. and B.L. Parker. . 2005. "Plume Persistence Due to Aquitard Back Diffusion Following Dense Nonaqueous Phase Liquid Removal or Isolation." *Water resource Research* 41 (12).
- Cho, H. J., R. J. Fiacco, and M. Daly. 2002. "Soil Vapor Extraction and Chemical Oxidation to Remediate Chlorinated Solvents in Fractured Crystalline Bedrock: Pilot Study Results and Lessons Learned." *Remediation* 12 (2):35 – 50.
- Connair, D.P., Engel, S.A., and Murray, B.S., . 2002. "Karst Groundwater Basin Delineation, Fort Knox, Kentucky." *Engineering Geology* 65:125 – 131.
- Cook, P.G., and J.K. Böhle. 2000. "Determining Timescale for Groundwater Flow and Solute Transport in EDS."

- Cooley, T. L. . 2005. "Development and evolution of epikarst in mid-continent US carbonates. in Beck, B.F. Sinkholes and the Engineering and Environmental Impacts of Karst." *Proceedings of the Tenth Multidisciplinary Conference. The Geo-Institute of the American Society of Civil Engineers Geotechnical Special Publication No. 144*:13 – 24.
- Coplen, T.B., A.L. Herczeg, and C. Barnes. 1999. "Isotope Engineering Using Stable Isotopes of the Water Molecule to Solve practical Problems in Eds."
- Cvijic, J. . 1893. "Das Karstphanomen." *Geographische Abhandlungen* 5 (217 – 325).
- Dalglish, J. and E.C. Alexander, Jr., . 1984. "Sinkhole distribution in Winona County, Minnesota. in Beck, B.F. ed. Sinkholes: their geology, engineering, and environmental impact." *Proceedings of the First Multidisciplinary Conference on Sinkholes. Orlando, Florida.*
- Davis, S. N. and R. J. M. De Wiest. 1966a. "Hydrogeology." *John Wiley & Sons, New York*:318 – 417.
- Davis, S. N. and R. J. M. De Wiest. 1966b. "Hydrogeology." 318 – 417.
- Day-Lewis, F.D., Johnson, C.D., Robinson, J.L., Williams, J.H., Boyden, C.L., Werkema, D., and Lane, J.W., . 2016. "A Fractured Rock Geophysical Toolbox Method Selection Tool." *Ground wWater*. doi: 10.1111/gwat.12397.
- Dershowitz, W.S. 2006. "Hybrid Discrete Fracture Network and Equivalent Continuum Model for Shaft Sinking." *41st U.S. Symposium on Rock Mechanics(USRMS)* (17 – 21).
- Dershowitz, W.S. . 1985. "Rock joint systems. ." *Ph.D. thesis, Massachusetts Institute of Technology, Cambridge.*
- Dershowitz, W.S., P.R. La Pointe, T.W. Doe. . 2004. "Advances in discrete fracture network modeling. ."
- Doran, G. T. . 1981. "There's a S.M.A.R.T. Way to Write Management's Goals and Objectives." *Management Review* 70 (11):35 – 36.
- Evans, D.D., T.J. Nicholson, and T.C. Rasmussen, eds. . 1987. "Flow and Transport through Unsaturated Fractured Rock. ." *Geophysical Monograph Series, American Geophysical Union* 42.
- Faybinshenko, B., P.A., Witherspoon, and S.M. Benson, eds. . 2000. "Dynamics of Fluids in Fractured Rock." *Geophysical Monograph Series, American Geophysical Union* 122.
- Ford, D. and Williams, P., . 2007. "Karst Hydrology and Geomorphology. ." *John Wiley and Sons, Ltd. West Sussex, England*:562.
- Freeze, R.A., and Cherry, J.A. 1979. "Groundwater." Englewood Cliffs, NJ, Prentice-Hall:604.
- Fritts, C. E. . 1963. "Bedrock Geology of the Southington Quadrangle, Connecticut." *United States Geological Survey (USGS) Map GQ-200.*
- Goldstein, K.G., A.R. Vitols, D. Navon, B.L. Parker, S. Chapman, and G.A. Anderson, . 2004. "Characterization and pilot-scale studies for chemical oxidation remediation of fractured shale." *Remediation* Autumn 2004:19 – 37.
- Gupta, Singhal B.B.S. and R. P. 1999. "Applied Hydrogeology of Fractured Rocks."
- Halliday, W. R. 2007. "Pseudokarst in the 21st Century." *Journal of Cave and Karst Studies* 69 (103 – 113).
- Haneberg, W.C., P.S. Mozley, J.C. Moore, and L.B. Goodwin. . 1999. "Faults and Subsurface Fluid Flow." *Geophysical Monograph Series, American Geophysical Union* 113.
- Hobbs B. E., Means WD, & Williams PF. 1976. "An outline of structural geology." *John Wiley & sons*:73.
- Hohnstock-Ashe, A.M. S.M. Plummer, R.M. Yager, P. Baveye, E.L. Madsen. 2001. "Further Biogeochemical Characterization of a Trichloroethene-contaminated Fractured Dolomite Aquifer, Electron Source and Microbial Communities Involved in Reductive Dechlorination." *Environmental Science and Technology* 35:4449 – 4456.
- Hubert, J. F., Reed, A. A., Dowdall, W. L., and Gilchrist, M. J. 1978. "Guide to the Mesozoic Redbeds of Central Connecticut." *State Geological and Natural History Survey of Connecticut, Department of Environmental Protection. Guidebook No. 4. .*
- Ijiri, Y., H. Saegusa, A. Sawada, M. Ono, K. Watanabe, K. Karasaki, C. Doughty, M. Shimo, and K. Fumimura. . 2009. "Evaluation of uncertainties originating from the different modeling approaches applied to analyze regional groundwater flow in the Tono area of Japan. ." *Journal of Contaminant Hydrology* 103:168 – 181.
- Illman, W.A. . 2014. "Hydraulic tomography offers improved imaging of heterogeneity in fractured rocks. ." *Groundwater* 52 (5):659 – 684.
- ITRC. 2003. "DNAPL Guidance – An Introduction to Characterizing Sites with DNAPL." *Interstate Technology and Regulatory Council.*
- ITRC. 2005. "Technical and Regulatory Guidance for In situ Chemical Oxidation of Contaminated Soil and Groundwater, Second Edition " *Interstate Technology and Regulatory Council.*
- ITRC. 2007. "Vapor Intrusion Pathway: Investigation Approaches for Typical Scenarios (A Supplement to VI-1)."

Interstate Technology and Regulatory Council.

- ITRC. 2008. "In Situ Bioremediation of Chlorinated Ethene: DNAPL Source Zones. BioDNAPL-3." *Interstate Technology & Regulatory Council*, .
- ITRC. 2010. "Use and Measurement of Mass Flux and Mass Discharge." Washington, D.C.: Interstate Technology & Regulatory Council, Integrated DNAPL Site Strategy Team (MASSFLUX-1).
- ITRC. 2011. "Integrated DNAPL Site Strategy." *Washington, D.C.: Interstate Technology & Regulatory Council, Integrated DNAPL Site Strategy Team.* (IDSS-1.).
- ITRC. 2012a. "Incremental Sampling Methodology." *Interstate Technology and Regulatory Council* ISM-1.
- ITRC. 2012b. "Using Remediation Risk Management to Address Groundwater Cleanup Challenges at Complex Sites." *Interstate Technology and Regulatory Council.*
- ITRC. 2013. "Groundwater Statistics and Monitoring Compliance Website." *Interstate Technology and Regulatory Council.*
- ITRC. 2014. "Petroleum Vapour Intrusion." *Interstate Technology and Regulatory Council.*
- ITRC. 2015a. "Integrated DNAPL Site Characterization and Tool Selection. ISC-1. ." *Interstate Technology & Regulatory Council.*
- ITRC. 2015b. "Integrated DNAPL Site Characterization and Tools Selection (ISC-1)." *Washington D.C.: Interstate Technology and Regulatory Council, DNAPL Site Characterization Team.*
- ITRC. 2016. "Geospatial Analysis for Optimization at Environmental Sites." *Interstate Technology and Regulatory Council.*
- ITRC. 2017. "Light Nonaqueous Phase Liquids (LNAPL) Update." *Interstate Technology and Regulatory Council, Washington, D.C.: Interstate Technology & Regulatory Council, LNAPL UpdateTeam.*
- Johnson, C.D., C.S. Kochiss, and C.B. Dawson. 2005. "Hydraulic characterization of a fractured-rock aquifer using discrete-zone monitoring systems at the University of Connecticut landfill, Storrs, Connecticut: 1999 to 2002." *U.S. Geological Survey Water-Resources Investigations Report* 03-4338:104.
- KDHE. 2016. "Kansas Vapor Intrusion Guidance." *Kansas Department of Health and Environment.*
- Kruseman, G.P., and N.A. de Ridder. . 1990. "Analysis and Evaluation of Pumping Test Data." *International Institute for Land Reclamation and Improvement, Wageningen, The Netherlands*:377.
- Kueper, B.H. and Davies, K. L. 2009. "Assessment and Delineation of DNAPL Source Zones at Hazardous Waste Sites." *EPA Ground Water Issue Paper. EPA/600/R-09/119.*
- Lebrón, C.A, Phelan, D., Heron, G., LaChance, J., Nielsen, S.G., Kueper, B., Rodriguez, D., Wemp, A., Baston, D., Lacombe, P., and Chapelle, F.H. . 2012. "Dense Non Aqueous Phase Liquid (DNAPL) Removal from Fractured Rock Using Thermal Conductive Heating (TCH)." *Contract Report CR-NAVFAF ESC-EV-1202*:427.
- Lima, D.B., B. Parker, J. Meyer. 2012. "Dechlorinating Microorganisms in a Sedimentary Rock Matrix Contaminated with a Mixture of VOCs." *Environmental Science and Technology* 46 (11):5756 – 5763.
- Long, J.C.S. . 1983. "Investigation of equivalent porous medium permeability in networks of discontinuous fractures." *Journal of Contaminant Hydrology* 61 (1-4):157 – 174.
- Mazurek, M., A. Jakob, P. Bossart. . 2003. "Solute transport in crystalline rocks at Äspö – I: Geological basis and model calibration." *Journal of Contaminant Hydrology* 61 (1-4):157 – 174.
- McCaughey, M.C., C.E. Divine, M.J. Gefell and S. McGrane. IN PRESS. "Using Tracers to Quantify Drilling Water Influence and Obtain Representative Groundwater samples." *Using tracers to quantify drilling water influence and obtain representative groundwater samples.*
- Michigan Department of Environmental Quality. 2014. "Groundwater Modeling, Remediation and Redevelopment Division Resource Materials." *RRD-Resource Material* 25-2013-01.
- Morris, D.A. and Johnson, A.L. 1967. "Summary of hydro- logic and physical properties of rock and soil materials, as analyzed by the Hydrologic Laboratory of the U.S. Geological Survey, 1948-60." *Geological Survey Water-Supply Paper* 1839-D, 42 p. .
- NAS. 2015. "Characterization, Modeling, Monitoring, and Remediation of Fractured Rock." *National Academy of Sciences, Engineering and Medicine.* 2015 244. doi: <http://doi.org/10.17226/21742>.
- Neuman, S. P. 2005. "Trends, Prospects and Challenges in Qualifying Flow and Transport through Fractured Rocks." *Hydrogeology Journal* 13 (1):124 – 147. doi: 10.1007/s10040-004-0397-2.
- Neuman, S. P., C. L. Winter and C. M. Newman. 1987. "Stochastic Theory of Field-scale Fickian Dispersion in anisotropic Porous Media." *Water Resource Research* 23 (3):453 – 466.
- NRC. 2001. "Conceptual models of Flow and Transport in the Fractured Vadose Zone. ." *Panel on Conceptual Models of*

Flow and Transport in Fractured Vadose Zone, U.S. National Committee for Rock Mechanics, Board on earth Sciences and Resources 392.

- NRC. 2015. "Characterization, Modeling, Monitoring, and Remediation of Fractured Rock." *Committee on Subsurface Characterization, Modeling, Monitoring, and Remediation of Fractured Rock; Committee on Geological and Geotechnical Engineering; Board on Earth Sciences and Resources; Division on Earth and Life Studies; The National Academies of Sciences, Engineering, and Medicine.* :244.
- NRC, National Research Council. 1996. "Rock Fractures and Fluid Flow: Contemporary Understanding and Applications." *National Academies Press.*
- Oron, A. P. and B. Berkowitz. 1998. "Flow in rock Fractures: The local cubic law assumption reexamined." *Water Resource Research* 34:2811 – 2825.
- Palmer, A.N., Palmer, M.V., and Sasowsky, I.D. eds. 1999. "Karst Modeling." *Karst Waters Institute Special Publication* 5.
- Parker, B.L., R.W. Gillham, J.A. Cherry 1994. "Diffusive Disappearance of Immiscible-phase Organic Liquids in Fractured Geologic Media." *Ground Water* 32 (5):805-820.
- QJEG. 2007. "The Description of Rock Masses for Engineering Purposes." *Quarterly Journal of Engineering Geology and Hydrology*. Volume 10, Issue 4
- Quinlan, J. F., P.L. Smart, G.M. Schindel, E.C. Alexander, A. J. Edwards, and A.R. Smith. . 1991. "Recommended Administrative/regulatory Definition of Karst Aquifer, Principles for Classification of Carbonate Aquifers, Practical Evaluation of Vulnerability of Karst Aquifer, and Determination of Optimum Sampling Frequency at Springs." *in Proceedings of the Third Conference on Hydrogeology, Ecology, Monitoring, and Management of Ground Water in Karst Terranes. U.S. EPA and the Association of Ground Water Scientists and Engineers. National Ground Water Association. December 4-6, 1991.*
- Quinlan, J.F., J.A. Ray. 1996. "Normalized base-flow discharge of groundwater basins: a useful parameter for estimating recharge area of springs and for recognizing drainage anomalies in karst terranes." *International Journal of Rock Mechanics and Mining Sciences and Geomechanics* 33. doi: 10.1016/0148-9062(96)83864-2.
- Robinson, P. . 1984. "Connectivity, flow and transport in network models of fractured media. ." *PhD Diss., Oxford University.*
- Rogers, J. . 1985. "Bedrock Geological Map of Connecticut." *Connecticut Geological and Natural History Survey in Cooperation with the U.S. Geological Survey.*
- Sale, T., C. Newell, H. Stroo, R. Hinchee, and P. Johnson, . 2008. "Frequently Asked Questions Regarding Management of Chlorinated Solvent in Soils and Groundwater." *ESTCP ER-0530.*
- Sale, T. C., and C. Newell. . 2011. "Guide for Selecting Remedies for Subsurface Releases of Chlorinated Solvents." *ESTCP (ER-200530).*
- Sausse, J.; E. Jacquot; B. Fritz; J. Leroy; M. Lespinasse. 2001. "Evolution of Crack Permeability During Fluid Rock Interaction. Example of Brezouard Gramnite (Vosges, France)." *Tectonophysics* 336 (1-4):199 – 214. doi: 10.1016/S0040-1951(01)00102-0.
- Scanlon, B.R., Mace, R.E., Barrett, M.E., and B. Smith. . 2003. "Can we simulate regional groundwater flow in a karst system using equivalent porous media models? Case study, Barton Springs Edwards aquifer." *Journal of hydrology* 276:137 – 158.
- Schaefer, C.E., E.B. White, G.M. Lavorgna, and M.D. Annable 2016. "Dense nonaqueous-phase liquid architecture in fractured bedrock: Implications for treatment and plume longevity." *Environmental Science & Technology* 50:207 – 213.
- Schaefer, C.E., R.M. Towne, D. Root, and J.E. McCray. 2012. "Assessment of Chemical Oxidation for Treatment of DNAPL in Fractured Sandstone Blocks." *Journal of Environmental Engineering* 257:174 – 188.
- Selroos, J.-O., D.D. Walker, A. Ström, B. Gylling, and S. Follin. . 2002. "Comparison of alternative modeling approaches for groundwater flow in fractured rock." *Journal of Hydrology* 257:174 – 188.
- Sen, Z. 1989. Volumetric Approaches to multi aquifer and Horizontal Fracture Wells, *Journal of Hydraulic Engineering*, V 115, Issue 12 Pgs 1646 – 1666.
- Shapiro, A.M, P.A. Hsieh, W.C. Burton, and G.J. Walsh. 2007. "Integrated Multi-scale Characterization of Groundwater Flow and Chemical Transport in Fractured Crystalline Rock at the Mirror Lake Site, New Hampshire,." *Subsurface Hydrogeology: Data Interpretation for Properties and Processes, Geophysics Monogram. AGU WASHINGTON D.C.* Series 171:201 – 225.
- Shapiro, A.M. 1987. "Advances in Transport Phenomena in Porous Media (Chapter 3 Transport Phenomena in Fractured

- Rocks) Edited by Jacob Bear and M. Yavuz Corapcioglu." *Nato ASI Series Series E: Applied Sciences* (28).
- Shevenell, L. 1996. "Analysis of Well Hydrographs in a Karst Aquifer: Estimates of Specific Yields and Continuum Transmissivities." *Journal of Hydrology* 74:331 – 355.
- Siegrist, R.L., M. Crimi, and T.J. Simpkin, (editors). . 2011. "In Situ Chemical Oxidation for Groundwater Remediation." *Springer Science & Business Media, New York*:678.
- Smith, R.T. . 2010. "The Effect of Thermally and Chemically Enhanced Biostimulation on the Hydraulic Properties of a Discreet Fracture Network in a Bedrock Aquifer." *M.S. Thesis Department of Civil Engineering, Queen's University, Kingston, Ontario*.
- Snow, D. T. 1969. "Anisotropic permeability of fractured media." *Water Resources Research* 5 (6):1273-1289.
- Snow, D.T. . 1968. "Rock Fracture Spacings, Openings, and Porosities." *Journal of . Soil Mech. Found. Div., Proc. Amer. Soc. Civil Engrs* 94 (73 – 91).
- Sokol, D. 1963. "Positions and Fluctuations of Water Level in Wells Perforated in More than One Aquifer." *Journal of Geophysical Research* 68 (4):1079 – 1080.
- Stearns, D. W. 1968. "Certain aspects of fractures in naturally deformed rocks,." *R. E. Riecker, ed., Rock mechanics seminar: Bedford, Terrestrial Sciences Laboratory*:97 – 118.
- Sterling, S. N., B L Parker , J A Cherry , J H Williams , J W Lane , F P Haeni. 2005. "Vertical Cross Contamination of Trichloroethylene in a Borehole in Fractured Sandstone." *Ground Water* 43 (4):557 – 573.
- Suarez, M.P., and H.S. Rifai. 1999. "Biodegradation rates for fuel hydrocarbons and chlorinated solvents in groundwater." *Bioremediation* 3 (4):337 – 362.
- Sudicky, E.A., and E.O. Frind. 1982. "Contaminant transport in fractured porous media: Analytical solutions for a system of parallel fractures." *Water Resources Research*, 18:1634 – 1642.
- Sudicky, E.A., and E.O. Frind. 1986. "A Natutal Gradient Esperiment on Solute Transport in a Sand Aquifer: Spatial Variability of Hydraulic Conkductivity and its Role in the Dispersion Process." *Water Resourses Research*. doi: 10.1029/WR022i013p02069.
- Suthersan, S. S. 2005. "In Situ Bioremediation." *CRC Press, Boca Raton, Florida*.
- Swain, L.A., Mesko, T.O., and Hollyday, E.F., . 2004. "Summary of the hydrogeology of the Valley and Ridge, Blue Ridge, and Piedmont Physiographic Provinces in the Eastern United States." *U.S. Geological Survey Professional Paper* 1422-A:23.
- TCEQ, Texas Commission on Environmental Quality. 2004. "Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones." *TCEQ-F-0585-Instructions, Revision 10-01-04*.
- Triad Resource Center, Web. "Conceptual Site Model Development."
- USEPA. 1988. "Application of dye-tracing techniques for determining solute-transport characteristics of ground water in karst terranes." EPA 904/6-88-001.
- USEPA. 1992. "Estimating Potential for Occurrence of DNAPL at Superfund Sites." *Office of Emergency and Remedial Response. Publication 9355.4-07FS*.
- USEPA. 2002a. "OSWER draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils." *Subsurface Vapor Intrusion Guidance. EPA 530-D-004* November 2002.
- USEPA. 2002b. "QTRACER2 Program for Tracer-Breakthrough Curve Analysis for Tracer Tests in Karstic Aquifers and Other Hydrologic Systems. ." *EPA/600/R-02/001*:179.
- USEPA. 2008. "A systematic Approach for Evaluation of Capture Zones at Pump and treat Systems Final Project Reporet." (EPA 600/R-08/003).
- USEPA. 2011. "Environmental Cleanup Best Management Practices: Effective Use of the Project Life cycle Conceptual Site Model ".
- USEPA. 2014. "Groundwater Remedy Completion Strategy. Moving Forward with an End in Mind." *Office of Solid Waste and Emergency Response, OSWER irective 9200.2-144*.
- USGS. 1992. "Study and Interpretatio of the Chemical Chracteristics of Natural Water." *United States Geological Survey* 2254.
- Watanabe, K., Y. Sugumura, Y. Morita, and T. Tatsuya. 1997. "Channel network modeling of the fractured granite in the Hinachi area, Japan." *Developments in Geotechnical Engineering* 81:247 – 262.
- Weary, D.J., and Doctor, D.H., . 2014. "Karst in the United States: A digital map compilation and database." *Geological Survey Open-File Report* 2014-1156:23.

- White, W.B. 1969. "Conceptual models for carbonate aquifers." *Ground Water* 7 (3):15 – 21.
- Williams, P.W. 1983. "The role of the subcutaneous zone in karst hydrology." *Journal of Hydrology* 61 (45 – 67).
- Witherspoon, P. A., I. K. Wang and J. E. Gale. 1980. "Validity of cubic law or fluid-flow in a deformable rock fracture." *Water Resources Research* 16:1016 – 1024.
- Wray, R. A. L. 1997. "Quartzite dissolution: karst or pseudokarst. ." *Cave and Karst Science* 24 (2):81 – 86.
- Zeigler, T. W. . 1976. "Determination of Rock Mass Permeability." *Vicksburg, U.S. Army Engineer Waterways Experiment Station. Prepared for Office, Chief of Engineers, U.S. Army.*
- Zhu, J., Taylor, T.P., Currens, J.C. and Crawford, M.M., . 2014. "Improved karst sinkhole mapping in Kentucky using LiDAR techniques: a pilot study in Floyds Fork watershed." *Journal of Cave and Karst Studies*, 76 (3):207 – 216. doi: Doi: 10.4311/2013ES0135
- Zyvoloski, G., E Kwiclis, A.A. Eddebbarh, B. Arnold, C. Faunt, B.A. Robinson. . 2003. "The site-scale saturated zone flow model for Yucca Mountain: Calibration of different conceptual models and their impact on flow paths." *Journal of Contaminant Hydrology* 62-63:731 + 750.