

JAMES JOHNSON BUTLER, JR.

General Information

Present Address: Kansas Geological Survey
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Date of Information: December 2008

Education

Stanford University, Department of Applied Earth Sciences (3/83-3/87); Ph.D. in Applied Hydrogeology, March 1987.
Stanford University, Department of Applied Earth Sciences (9/78-3/82); M.S. in Applied Hydrogeology, March 1982, National Science Foundation Graduate Fellowship.
College of William and Mary (9/74-5/78); B.S. in Geology, May 1978, Phi Beta Kappa.
University of Indiana (6/77-8/77); Summer field course in Montana.

Professional Experience

January 2007-present, Section Chief, Geohydrology Section, Kansas Geological Survey, University of Kansas, Lawrence, KS. Leader of section comprised of 14 research scientists and support personnel.

August 1986-present, Senior/Associate/Assistant Scientist, Geohydrology Section, Kansas Geological Survey, University of Kansas, Lawrence, KS. Investigation of groundwater quality and quantity problems of significance to the State of Kansas. Primary research interests are groundwater flow and transport in complex geologic settings, stream-aquifer interactions, and groundwater consumption by plants.

June 2003-August 2003, Visiting Scientist, Center of Applied Geoscience, University of Tübingen, Tübingen, Germany. Development and evaluation of direct-push methods for estimating spatial variations in hydraulic conductivity.

January 1995-June 1995, Visiting Scientist, Geohydrology Department, Sandia National Laboratory, Albuquerque, NM. Design and analysis of convergent-flow tracer tests performed in the Culebra Dolomite at the Waste Isolation Pilot Plant near Carlsbad, NM.

August 1988-present, Courtesy Full/Assistant Professor, Department of Geology, University of Kansas, Lawrence, KS. Taught the groundwater hydraulics portion of graduate- and undergraduate-level introductory courses in hydrogeology. Organized and cotaught a semester length course on field and laboratory techniques in hydrogeology.

March 1983-December 1986, Dissertation Research, Department of Applied Earth Sciences, Stanford University. Analysis of pumping tests in nonuniform aquifers. Finite element simulation of pumping tests in aquifers with nonuniform permeability structures based on both deterministic and stochastic descriptions. Research directed towards evaluating the

applicability of traditional methods of pumping test analysis to nonuniform aquifers.
July 1985-February 1986, Part-time Consultant, Data Systems Group, Perkin-Elmer Corporation, Tinton Falls, NJ. Assessment of computer uses in the earth sciences in China.
March 1982-March 1983, September-October 1984, Graduate Researcher, Institute of Geology, State Seismological Bureau, Beijing, China. Worked with Chinese scientists on water-resources management in the North China Plain.
October 1980-March 1982, Part-time Consultant, subcontractor to U.S. Department of Justice. Determined the hydrologic difference between historic and state-of-nature conditions within six Indian reservations in southern California.
April 1980-December 1981, M.S. Thesis Research, Department of Applied Earth Sciences, Stanford University. Created a network of computer programs to automate the tasks of hydrogeologic modeling investigations. Network evaluated in a regional study of the Cambrian-Ordovician aquifer system of northeastern Illinois.
June 1979-September 1979, Geologist, Exxon Production Research Company, Houston, TX. Formulated relationships for permeability prediction in chloritic sandstones.

Professional Registration

Registered Professional Geologist, Kansas #384 (2000-).

Honors, Memberships, and Scientific Service

Henry Darcy Distinguished Lecturer, National Ground Water Association (2007).
DAAD (German Academic Exchange Service) Study Visit Grant (2003).
Sabbatical Leave Award, University of Kansas (1994, 2003).
Committee on Scholarly Communication with the People's Republic of China Graduate Fellowship - administered by the U.S. National Academy of Sciences (1982).
National Science Foundation Three Year Graduate Fellowship (1978).
Phi Beta Kappa (1977).
National Merit Scholarship Finalist (1974).

Associate, Center for East Asian Studies, University of Kansas (1987-).
Member, American Geophysical Union (1982-), International Association of Hydrogeologists (2003-), National Ground Water Association (1987-).

Appointed Member, Darcy Task Force, National Ground Water Association (2008-).
Appointed Member (1994-), Deputy Chair (5/02-7/04), Chair (7/04-6/06), Groundwater Technical Committee, American Geophysical Union.
Appointed Member (Alternate), Kansas Water Resources Research Institute Policy Committee (1992-95).
Associate Editor - Ground Water (2002-), Hydrogeology Journal (2006-), Journal of Hydrology (2000-2005), Water Resources Research (1995-2001).
Appointed Representative for the University of Kansas, Consortium of Universities for the Advancement of Hydrologic Science, Inc. (12/01-).
Panelist

AAAS Research Competitiveness Service, Panel for Review of New Mexico NSF EPSCoR Program (4/04, 4/06).

Environmental Protection Agency Peer Review Panel on Physics/Chemistry of Water (1992-95).

National Science Foundation - ITR Medium Proposal Panel (6/01), Water Cycle Proposal Panel (11/04)

Reviewer – Advances in Water Resources, ASCE Journal of Hydraulic Engineering, ASCE Journal of Hydrologic Engineering, ASCE Journal of Irrigation and Drainage, ASCE Journal of Water Resources Planning and Management, ASCE Practical Periodical of Hazardous, Toxic, and Radioactive Waste Management, Canadian Geotechnical Journal, CRC/Lewis Press, Department of Energy, Environmental and Engineering Geoscience Journal, Environmental Protection Agency, Eos, Geophysical Research Letters, Ground Water, Ground Water Monitoring and Remediation, Hydrogeology Journal, Hydrological Processes Journal, Hydrological Sciences Journal, John Wiley Co., Journal of American Water Resources Assoc., Journal of Engineering Geology, Journal of Geophysical Research – Solid Earth, Journal of Hydrology, National Institute of Water Resources, National Science Foundation, Natural Sciences and Engineering Research Council of Canada, Restoration Ecology, Sandia National Laboratory, Water Resources Research, Wisconsin Water Resources Institute.

Academic Activities

University of Kansas

Student Advising

Creator and Director, KGS Applied Geohydrology Summer Research Assistantship Program, 1997, 1999-.

Chair, M.S. Committee, Steven Sellwood, Dept. of Geology, 2000-2001.

Chair, M.S. Committee, Terrance Huettl, Dept. of Geology, 1992-94.

Chair, M.S. Committee, Sandra Vogelai, Dept. of Civil Eng., 1990-91.

Chair, M.S. Committee, Xiaosong Jiang, Dept. of Geology, 1988-91.

Member, M.S. Committee, Jenny Hall, Dept. of Geology, 1997-98.

Member, M.S. Committee, Garry Gould, Dept. of Chem. and Pet. Eng., 1990-91.

Extensively advised five other students in the Dept. of Geology (Marcia Schulmeister, Allan Wade, Mary Bitney, Christine Mennicke, and Tianming Chu), two students in the Dept. of Civil Eng. (Wenzhi Liu and Zafar Hyder), and one student in the Dept. of Chem. and Pet. Eng. (Eric Evans) on their graduate research.

Postdoctorate Fellows

Wei Jin (2007-), Jesse Nippert (2007), Xiaoyong Zhan (2002-06), Marcia Schulmeister (2000-02), and Mingshu Tsou (1999-2001).

Teaching

Geology 552, Intro. to Hydrogeology (3 credits), 1994-1996, taught 1/3 of the semester.

Geology 752, Intro. to Field and Laboratory Methods in Hydrogeology, 1992 (3 credits) and 1990 (2 credits), coordinated course and taught 2/3 of the semester.

Geology 751, Hydrogeology (2 credits), 1988, taught 1/3 of the semester.

Committee Service

Chair, KGS Geohydrology Scientist Search Committees (1993, 1999, 2005, 2008).
Chair, KGS Promotion and Review Committee (2000-2001, 2008).
Co-Chair, KGS Strategic Planning Committee (2004-2005).
Member, KGS Stratigraphic Res. Assistant Scientist Search Committee (2006, 2008).
Member, KGS Exploration Services Research Assistant Search Committee (2006).
Member, KGS Geohydrology Field Hydrogeologist Search Committee (2006).
Member, KGS Promotion and Review Committee (1999-2003, 2006, 2008).
Member, KGS Deputy Director Search Committees (1991, 1997, 2006).
Member, University of Kansas Review Panel of KGS Director (2004).
Member, KGS Evaluation System Review Committee (2003-).
Member, KGS Director Search Committee (1999).
Member, Department Chair Search Committee, Department of Geology (1999).

Other Universities

External Committee Member

John Keller doctoral dissertation, Dept. of Geology, Southern Illinois University (2007-).

Liangwen Zhang doctoral dissertation, Dept. of Earth Sciences, University of Waterloo, Canada (1997).

Hermann Schad doctoral dissertation, Dept. of Geosciences, University of Tübingen, Germany (1996).

Post-tenure Review Evaluator, University of Wisconsin-Extension (1999).

Promotion and Tenure Evaluator

Dept. of Earth Sciences, University of Memphis (2008).

Dept. of Geological Sciences, University of Hawaii (2007).

Dept. of Environ. Eng. and Earth Science, Clemson University (2007).

Dept. of Geological Sciences, University of Colorado (2006).

Dept. of Geology and Geophysics, Texas A&M University (2006).

Dept. of Geo. and Geo. Eng., University of Mississippi (2005).

Dept. of Geology, Hamilton College, New York (1998).

Dept. of Geo. and Pet. Eng., University of Missouri-Rolla (1998).

Workshop Instructor

Analysis of Pumping Tests with AQTESOLV (sole instructor), Division of Water Resources, Kansas Dept. of Agriculture, Topeka, KS, June 20, 2008.

Aquifer Testing for Improved Hydrogeologic Site Characterization Featuring AQTESOLV and the In-Situ LevelTroll (taught half of course), Fort Collins, CO, Oct. 21-22, 2008; Waterloo, Ontario, Feb. 19-20, 2008; Fort Collins, CO, Oct. 16-17, 2007; Calgary, Alberta, Aug. 16-17, 2007; Fort Collins, CO, Oct. 17-18, 2006.

Advanced Aquifer Testing Analysis Featuring AQTESOLV: New Concepts, Field Methods, and Data Analysis Procedures (taught half of course), St. Johns River Water Management District (Florida), June 23-25, 2008; University of Texas at

San Antonio, Feb. 27-29, 2008; University of San Diego, Feb. 27-March 1, 2007; GES Inc., Exton, PA, May 2-3, 2006; University of Miami, Feb. 28-March 2, 2006.

- Design and Analysis of Pumping Tests with AQTESOLV (sole instructor), Division of Water Resources, Kansas Dept. of Agriculture, Topeka, KS, Oct. 11, 2006.
- Advances in Pumping and Slug Testing for Improved Site Characterization: New Concepts, Field Methods, and Data Analysis Techniques (sole instructor), Hudson-Mohawk Valley Prof. Geologists Assoc., Albany, NY, April 19, 2004.
- Advances in Pumping and Slug Testing for Improved Site Characterization: New Concepts, Field Methods, and Data Analysis Techniques (lead instructor - presented classroom, field, and computer sessions), University of Minnesota, St. Paul Campus, May 21-22, 2003; Fermi National Accelerator Laboratory, Batavia, IL, Sept. 11-12, 2001.
- Designing Slug Tests to Improve Estimates of Hydraulic Conductivity (sole instructor - lecture broadcast over Internet), Environmental Institute for Continuing Education, Oct. 22, 2002.
- Advances in Characterizing Ground Water Movement Through Glacial Sequences (presented classroom and field sessions on slug tests), University of Massachusetts at Amherst, June 18-19, 2002.
- Slug Test Seminar (sole instructor), URS Corp., Kansas City, MO, Feb. 26, 2002.
- The Design and Analysis of Pumping Tests for Aquifer Evaluation (sole instructor - presented classroom and computer sessions), Division of Water Resources, Kansas Dept. of Agriculture, Topeka, KS, Oct. 16, 2001.
- Advances in Slug Testing for Improved Site Characterization: New Concepts, Field Techniques, and Data Analysis (lead instructor - presented classroom, field, and computer sessions), University of Texas at Arlington, June 22-23, 2000.
- Improving the Performance and Analysis of Slug Tests (lead instructor - presented classroom, field, and computer sessions), University of Wisconsin at Madison, Sept. 16, 1999.
- Practical Guidelines for the Design and Analysis of Slug Tests (lead instructor - presented classroom, field, and computer sessions), Kansas Dept. of Health and Environment, Topeka, KS, May 3, 1999.
- Improving Hydrogeologic Investigations: Advances in Characterizing Ground Water Movement Through the Glacial Sequence (presented classroom and field presentations on slug tests), Fermi National Accelerator Laboratory, Batavia, IL, Oct. 1-2, 1998.
- Applied Groundwater Technology Short Course (director and chief lecturer), Kansas Geological Survey, University of Kansas, Lawrence, Ks, March 1987 (United Nations Fellowship Service short course in applied groundwater technology for a delegation of hydrogeologists from the People's Republic of China).

Special Session Convener

- Linked Hydrologic Processes Across Surface Water, Vadose Zone Water, and Groundwater, Fall Mtg. of the American Geophysical Union, San Francisco, Dec.

2006.

Beyond Theis and Hantush: New Advances in Aquifer and Aquitard Characterization, Fall Mtg. of the American Geophysical Union, San Francisco, Dec. 2005.

Recent Advances in Well Testing, Fall Mtg. of the American Geophysical Union, San Francisco, Dec. 2001.

Recent Advances in Direct-Push Technology for Characterization of Physical and Chemical Variations in Unconsolidated Formations, Spring Mtg. of the American Geophysical Union, Washington, D.C., June 2000.

Field Methodologies for Estimation of Spatial Variations in Hydraulic Conductivity, Fall Mtg. of the American Geophysical Union, San Francisco, Dec. 1996.

Languages

Conversant in Mandarin Chinese.

Intermediate reading knowledge of French.

External Grant Support

Principal Investigator, Collaborative research - High-resolution dynamic characterization of transport pathways: Providing new insights into subsurface processes, \$147,107, National Science Foundation, 2008-2010.

Principal Investigator, Multilevel slug tests at the Boise Research Site: Data review and analysis, \$15,028, Boise State University, 2008-2009.

Co-Principal Investigator, Collaborative Research - Refinement of techniques for estimating evapotranspiration from narrow riparian zones - Water balance and atmospheric measurements, \$219,277, National Science Foundation, 2008-2010.

Co-Principal Investigator, Design and construction of groundwater model for Southwest Kansas GMD#3, Kansas Water Office, \$151,507, 2008-2009.

Co-Principal Investigator, Smoky Hill ground water model, Kansas Water Office, \$90,000, 2007-2008.

2007 Henry Darcy Distinguished Lecturer Travel Support, National Ground Water Research and Educational Foundation, \$25,000, 2007.

Principal Investigator, Assessment of changes in ground water availability associated with a salt cedar control project in Clark County, Kansas, Kansas Water Office, \$25,637, 2004-2006.

Co-Principal Investigator, Numerical modeling of the Middle Arkansas Subbasin, Division of Water Resources of the Kansas Department of Agriculture, \$96,000, 2004-2006.

Principal Investigator, A field assessment of methods for estimation of groundwater consumption by phreatophytes, Kansas Water Resources Research Institute, \$108,673, 2003-2008.

Principal Investigator, In-situ methods for estimation of hydraulic conductivity, DAAD (German Academic Exchange Service) Study Visit Grant Program, \$6,360, 2003.

Principal Investigator, Two aquifer pumping tests at the O'Rourke Bridge site on the Arkansas River in Pawnee County, Kansas, Division of Water Resources of the Kansas Department of Agriculture, \$7,500, 2002-2004.

Principal Investigator, Phreatophyte investigation on the Arkansas River: Construction of groundwater monitoring wells at the O'Rourke Bridge site in Pawnee County, Kansas and detailed monitoring of water levels, Groundwater Management District #5, \$4,424, 2002.

Principal Investigator, Stream-aquifer investigations on the Solomon River, Division of Water Resources of the Kansas Department of Agriculture, \$9,750, 2002.

Co-Principal Investigator, Construction and slug testing of groundwater observation wells in Clay County, Kansas, Division of Water Resources of the Kansas Department of Agriculture, \$6,000, 2002.

Co-Principal Investigator, Stream-aquifer interaction investigations on the middle Arkansas River: Construction of groundwater observation wells in Barton, Pawnee, and Edwards County, Kansas, Division of Water Resources of the Kansas Department of Agriculture, \$12,900, 2001.

Principal Investigator, A field assessment of direct-push technology for site characterization investigations, Kansas Water Resources Research Institute, \$60,692, 2000-2002.

Principal Investigator, AASG Mentored Field Research Experience Program, American Association of State Geologists, \$2,500, 2000.

Principal Investigator, A new method for identification of preferential flow paths at sites of groundwater contamination, National Science Foundation, \$226,538, 1999-2004.

Co-Principal Investigator, Ground-penetrating radar: A tool for the next generation of outcrop studies? National Science Foundation, \$32,020, 1999-2000.

Principal Investigator (Kansas), Hydraulic characterization of the stream-aquifer interface: Theory, field implementation, and practical ramifications - A multi-state proposal, USGS Regional Water Resources Competitive Grants Program - North Central Region, \$105,000, 1998-2001.

Co-Principal Investigator, Evaluation of the potential impact of ground-water withdrawals on the Dakota Aquifer in the vicinity of the Hays well field, contract with City of Hays, Kansas, \$24,549, 1997-1998.

Principal Investigator, Assessment of hydraulic and tracer tests at the Waste Isolation Pilot Plant, Sandia National Laboratory, \$9,767, 1996.

Principal Investigator, Identification of preferential flow paths at sites of groundwater contamination, National Science Foundation, \$49,998, 1996.

Co-Principal Investigator, Field verification of the dipole flow test: A new approach for the in-situ determination of transport parameters, USGS Regional Water Resources Competitive Grants Program - North Central Region, \$40,000, 1996-1998.

Principal Investigator, Slug tests in unconfined aquifers, Kansas Water Resources Research Institute, \$25,632, 1992-1994.

Co-Principal Investigator, Characterization of heterogeneities controlling transport and fate of pollutants in unconsolidated sand and gravel aquifers, University Research Initiative, Research Initiation Program, United States Department of Defense, \$314,984, 1991-1994.

Principal Investigator, Well-testing methodologies for characterizing heterogeneities in alluvial-aquifer systems, United States Geological Survey Water Resources Research Program, \$101,300, 1991-1994.

Co-Principal Investigator, Slug testing at the N & M Arco Mini-Market Site, California Environmental Consultants, \$4,900, 1990.

Principal Investigator, Well tests in the Dakota Aquifer of Kansas, Kansas State Water Plan, \$23,760, 1990-91 (portion of larger project on the hydrology of the Dakota Aquifer).

Principal Investigator, Hydrogeologic characterization of hazardous waste sites, Kansas Water Resources Research Institute, \$30,115, 1989–91.

Principal Investigator, Applied Groundwater Technology Short Course, Delphi Research Associates, \$4,900, 1987.

BIBLIOGRAPHY

Books

Butler, J.J., Jr., *The Design, Performance, and Analysis of Slug Tests*, Lewis Publishers, Boca Raton, 252 pp., 1998.

Journal Articles (bold when corresponding author)

Liu, G., G.C. Bohling, and J.J. Butler, Jr., Simulation assessment of the direct-push permeameter for characterizing vertical variations in hydraulic conductivity, *Water Resour. Res.*, v. 44, W02432, doi:10.1029/2007WR006078, 2008.

Dietrich, P., J.J. Butler, Jr., and K. Faiß, A rapid method for hydraulic profiling in unconsolidated formations, *Ground Water*, v. 46, no. 2, pp. 323-328, 2008.

Butler, J.J., Jr., P. Dietrich, V. Wittig, and T. Christy, Characterizing hydraulic conductivity with the direct-push permeameter, *Ground Water*, v. 45, no. 4, pp. 409-419, 2007.

Bohling, G.C., J.J. Butler, Jr., X. Zhan, and M. D. Knoll, A field assessment of the value of steady-shape hydraulic tomography for characterization of aquifer heterogeneities, *Water Resour. Res.*, v. 43, W05430, doi:10.1029/2006WR004932, 2007.

Butler, J.J., Jr., X. Zhan, and V.A. Zlotnik, Pumping-induced drawdown and stream depletion in a leaky aquifer system, *Ground Water*, v. 45, no. 2, pp. 178-186, 2007.

Butler, J.J., Jr., G.J. Kluitenberg, D.O. Whittemore, S.P. Loheide, II, W. Jin, M.A. Billinger, and X. Zhan, A field investigation of phreatophyte-induced fluctuations in the water table, *Water Resour. Res.*, v. 43, W02404, doi:10.1029/2005WR004627, 2007.

Loheide, S.P., II, J.J. Butler, Jr., and S.M. Gorelick, Estimation of groundwater consumption by phreatophytes using diurnal water table fluctuations: A saturated-unsaturated flow assessment, *Water Resour. Res.*, v. 41, W07030, doi:10.1029/2005WR003942, 2005.

Sellwood, S.M., J.M. Healey, S. Birk, and **J.J. Butler, Jr.**, Direct-push hydrostratigraphic profiling: Coupling electrical logging and slug tests, *Ground Water*, v. 43, no. 1, pp. 19-29, 2005.

Cain, S., III, G.A. Davis, S.P. Loheide, II, and **J.J. Butler, Jr.**, Noise in pressure transducer readings produced by variations in solar radiation, *Ground Water*, v. 42, no. 6, pp. 939-944, 2004.

Butler, J.J., Jr., and X. Zhan, Hydraulic tests in highly permeable aquifers, *Water Resour. Res.*, v. 40, W12402, doi:10.1029/2003WR002998, 2004.

Butler, J.J., Jr., E.J. Garnett, and J.M. Healey, Analysis of slug tests in formations of high hydraulic conductivity, *Ground Water*, v. 41, no. 5, pp. 620-630, 2003.

Schulmeister, M.K., J.J. Butler, Jr., J.M. Healey, L. Zheng, D.A. Wysocki, and G.W. McCall, Direct-push electrical conductivity logging for high-resolution hydrostratigraphic characterization, *Ground Water Monit. and Remed.*, v. 23, no. 3, pp. 52-62, 2003.

Butler, J.J., Jr., and M.-S. Tsou, Pumping-induced leakage in a bounded aquifer: An example of a scale-invariant phenomenon, *Water Resour. Res.*, v. 39, no. 12, doi: 10.1029/2002WR001484, 2003.

Schulmeister, M.K., J.M. Healey, J.J. Butler, Jr., and G.W. McCall, Direct-push geochemical profiling for assessment of inorganic chemical heterogeneity in aquifers, *Jour. of*

- Contaminant Hydrology, v. 69, no. 3-4, pp. 215-232, 2003.
- Butler, J.J., Jr.**, A simple correction for slug tests in small-diameter wells, *Ground Water*, v. 40, no. 3, pp. 303-307, 2002.
- Butler, J.J., Jr.**, J.M. Healey, G.W. McCall, E.J. Garnett, and S.P. Loheide, II, Hydraulic tests with direct-push equipment, *Ground Water*, v. 40, no. 1, pp. 25-36, 2002.
- Zurbuchen, B.R., V.A. Zlotnik, and J.J. Butler, Jr., Dynamic interpretation of slug tests in highly permeable aquifers, *Water Resour. Res.*, v. 38, no. 3, 10.1029/2001WR000354, 2002.
- McCall, W., J.J. Butler, Jr., J.M. Healey, A.A. Lanier, S.M. Sellwood, and E.J. Garnett, A dual-tube direct-push method for vertical profiling of hydraulic conductivity in unconsolidated formations, *Environ. & Eng. Geosci.*, v. 8, no. 2, pp. 75-84, 2002.
- Bohling, G.C., X. Zhan, J.J. Butler, Jr., and L. Zheng, Steady-shape analysis of tomographic pumping tests for characterization of aquifer heterogeneities, *Water Resour. Res.*, v. 38, no. 12, 10.1029/2001WR001176, 2002.
- Butler, J.J., Jr.**, V.A. Zlotnik, and M.-S. Tsou, Drawdown and stream depletion produced by pumping in the vicinity of a partially penetrating stream, *Ground Water*, v. 39, no. 5, pp. 651-659, 2001.
- Butler, J.J., Jr.**, C.D. McElwee, and G.C. Bohling, Pumping tests in networks of multilevel sampling wells: Motivation and methodology, *Water Resour. Res.*, v. 35, no. 11, pp. 3553-3560, 1999.
- Butler, J.J., Jr.**, and J.M. Healey, Relationship between pumping-test and slug-test parameters: Scale effect or artifact? *Ground Water*, v. 36, no. 2, pp. 305-313, 1998.
- Butler, J.J., Jr.**, C.D. McElwee, and W.Z. Liu, Improving the reliability of parameter estimates obtained from slug tests, *Ground Water*, v. 34, no. 3, pp. 480-490, 1996.
- Butler, J.J., Jr.**, Slug tests in site characterization: Some practical considerations, *Environmental Geosciences*, v. 3, no. 3, pp. 1-10, 1996.
- McElwee, C.D., G.C. Bohling, and J.J. Butler, Jr., Sensitivity analysis of slug tests I: The slugged well, *Jour. of Hydrology*, v. 164, pp. 53-67, 1995.
- McElwee, C.D., J.J. Butler, Jr., G.C. Bohling, and W.Z. Liu, Sensitivity analysis of slug tests II. Observation wells, *Jour. of Hydrology*, v. 164, pp. 69-87, 1995.
- Hyder, Z., and **J.J. Butler, Jr.**, Slug tests in unconfined formations: An assessment of the Bouwer and Rice technique, *Ground Water*, v. 33, no. 1, pp. 16-22, 1995.
- Butler, J.J., Jr.**, and Z. Hyder, An assessment of the Nguyen and Pinder method for slug test analysis, *Ground Water Monit. and Remed.*, v. 14, no. 4, pp. 124-131, 1994.
- Hyder, Z., **J.J. Butler, Jr.**, C.D. McElwee, and W.Z. Liu, Slug tests in partially penetrating wells, *Water Resour. Res.*, v. 30, no. 11, pp. 2945-2957, 1994.
- Macfarlane, P.A., J.H. Doveton, H.R. Feldman, J.J. Butler, Jr., J.M. Combes, and D.R. Collins, Aquifer/aquitard units of the Dakota aquifer system in Kansas: Methods of delineation and sedimentary architecture effects on ground-water flow and flow properties, *Jour. of Sed. Res.*, v. B64, no. 4, pp. 464-480, 1994.
- Butler, J.J., Jr.**, G.C. Bohling, Z. Hyder, and C.D. McElwee, The use of slug tests to describe vertical variations in hydraulic conductivity, *Jour. of Hydrology*, v. 156, pp. 137-162, 1994.
- Butler, J.J., Jr.**, and W.Z. Liu, Pumping tests in nonuniform aquifers: The radially asymmetric case, *Water Resour. Res.*, v. 29, no. 2, pp. 259-269, 1993.

- McElwee, C.D., J.J. Butler, Jr., and J.M. Healey, A new sampling system for obtaining relatively undisturbed cores of unconsolidated coarse sand and gravel, *Ground Water Monit. Rev.*, v. 11, no. 3, pp. 182-191, 1991.
- Butler, J.J., Jr.**, A stochastic analysis of the effects of lateral variations in hydraulic conductivity on pumping tests, *Water Resour. Res.*, v. 27, no. 9, pp. 2401-2414, 1991.
- Butler, J.J., Jr.**, and W.Z. Liu, Pumping tests in nonuniform aquifers - the linear strip case, *Jour. of Hydrology*, v. 128, pp. 69-99, 1991.
- Butler, J.J., Jr.**, and C.D. McElwee, Variable-rate pumping tests for radially symmetric nonuniform aquifers, *Water Resour. Res.*, v. 26, no. 2, pp. 291-306, 1990.
- Butler, J.J., Jr.**, The role of pumping tests in site characterization: Some theoretical considerations, *Ground Water*, v. 28, no. 3, pp. 394-402, 1990.
- Butler, J.J., Jr.**, Pumping tests in nonuniform aquifers - the radially symmetric case, *Jour. of Hydrology*, v. 101, no. 1/4, pp. 15-30, 1988.
- Li, C., J.M. Bahr, E.G. Reichard, J.J. Butler, Jr., and I. Remson, Optimal siting of artificial recharge: An analysis of objective functions, *Ground Water*, v. 25, no. 2, pp. 141-150, 1987.
- Butler, J.J., Jr.**, Earth sciences education in the People's Republic of China, *Jour. of Geological Education*, v. 34, pp. 173-179, 1986.

Book Chapters

- Butler, J.J., Jr., Hydrogeological methods for estimation of hydraulic conductivity, in *Hydrogeophysics*, edited by Y. Rubin and S. Hubbard, Springer, The Netherlands, pp. 23-58, 2005 (invited contribution).
- Schulmeister, M.K., J.J. Butler, Jr., E.K. Franseen, D.A. Wysocki, and J.A. Doolittle, High-resolution stratigraphic characterization of unconsolidated deposits using direct-push electrical conductivity logging: A floodplain margin example, in *Aquifer Characterization, SEPM Concepts in Hydrogeology and Environmental Geology Vol. 2*, edited by J. S. Bridge, and D.W. Hyndman, SEPM, pp. 67-78, 2004.
- Butler, J.J., Jr., and J.M. Bahr, Summary of field and laboratory testing methods for flow and nonreactive transport parameters, in *Consequences of Spatial Variability in Aquifer Properties and Data Limitations for Groundwater Modelling Practice: IAHS Pub. No. 175*, edited by Peck, Gorelick, deMarsily, Foster, and Kovalesky, pp. 56-77, 1988 (contribution invited by the International Commission on Groundwater of the IAHS).

Technical Commentaries

- Butler, J.J., Jr., Pumping tests for aquifer evaluation – Time for a change? *Ground Water*, in press.

Book Reviews

- Butler, J.J., Jr., A review of “Manual of Applied Field Hydrogeology” by W.D. Weight and J.L. Sonderegger, *Ground Water*, v. 41, no. 5, p. 564, 2003.
- Butler, J.J., Jr., A review of “A Practical Guide to Groundwater and Solute Transport Modeling” by K. Spitz and J. Moreno, *Computers & Geosciences*, v. 24, no. 4, pp. 403-404, 1998.

- Butler, J.J., Jr., A review of “Water Wells - Implementation, Maintenance, and Restoration” by M. Detay, *Hydrological Sciences Journal*, v. 43, no. 2, p. 322, 1998.
- Butler, J.J., Jr., A review of “Introduction to Aquifer Analysis” by M. Kasenow, *Ground Water*, v. 36, no. 6, pp. 869-870, 1998.

Discussions and Replies

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Butler, J.J., Jr., Automated hydrogeology: A simple system (abstract), Assoc. of Eng. Geologists 24th Annual Meeting Program with Abstracts, p. 26, 1981.

Invited Presentations

- Butler, J.J., Jr., W. Jin, G.A. Mohammed, G.J. Kluitenberg, D.O. Whittemore, and E.C. Reboulet, Site characterization using well responses to natural stimuli: Examples from the Larned Research Site, invited presentation at the Fall Meeting of the American Geophysical Union, Dec. 17, 2008.
- Butler, J.J., Jr., What the heck is a phreatophyte: A field investigation of ecohydrologic processes in stream-aquifer systems, an invited presentation to the Dept. of Geological Sciences, Univ. of South Carolina, Columbia, SC, April 17, 2008.
- 2007 Henry Darcy Distinguished Lectureship Invited Presentations (in temporal order)– Univ. of Kansas, Emporia State Univ., Univ. of Missouri Kansas City, Kansas State Univ., San Diego State Univ., Univ. of Northern Arizona, Univ. of Arizona, Texas A&M Univ., Southwest Research Institute, Oklahoma State Univ., Univ. of Hawaii, Peking Univ., Chinese University of Geosciences, National Central Univ. (Taiwan), National Ground Water Assoc. Ground Water Summit, Los Alamos National Lab., Free Univ. of Brussels, Delft Univ. of Technology (The Netherlands), Univ. of Neuchatel (Switzerland), Univ. of Tübingen (Germany), Univ. of Göttingen (Germany), Univ. of Graz (Austria), Technical Univ. of Dresden, Helmholtz Centre for Environmental Research-UFZ (Leipzig, Germany), Polytechnic Univ. of Valencia, Polytechnic Univ. of Barcelona, Geological Society of London, Boise State Univ., Montana Tech, Univ. of Montana, Michigan State Univ., Western Michigan Univ., Univ. of Maryland Baltimore County, Penn State Univ., Univ. of Memphis, Univ. of Mississippi, Univ. of Alabama, Univ. of Illinois, Wright State Univ., Univ. of Colorado, Furman Univ., College of William and Mary, Colorado School of Mines, Canadian Geotechnical Soc. Conf., Geological Soc. of America Conf., Univ. at Buffalo, Univ. of Toronto, Stanford Univ., USGS-Menlo Park, Beloit College, Univ. of Wisconsin-Madison, New Mexico Inst. of Mining and Technology, Univ. of New Mexico, National Ground Water Assoc. Ground Water Expo., and International Assoc. of Hydrogeologists XXXVI Congress (Toyama, Japan – given in 2008).
- Bohling, G.C., J.J. Butler, Jr., and G. Liu, High resolution aquifer characterization with hydraulic tomography and the direct-push permeameter, invited presentation to the Annual Meeting of the Association of Environmental and Engineering Geologists, Los Angeles, CA, Sept. 27, 2007.
- Butler, J.J., Jr., Slug tests for hydrogeologic site characterization: Some practical guidelines, an invited teleconference presentation to the Earth Tech Site Investigation Technical Practice Group, July 31, 2007.
- Liu, G., G. Bohling, J.J. Butler, Jr., and P. Dietrich, Theoretical investigation of the direct-push permeameter for characterizing vertical variations in hydraulic conductivity, invited presentation at the Ninth International In Situ and On-Site Bioremediation Symposium, Baltimore, Maryland, May 7, 2007.
- Butler, J.J., Jr., Hydrogeological methods for estimation of spatial variations in hydraulic conductivity, an invited presentation at the High Resolution Site Characterization and Monitoring Symposium of the Groundwater Resources Association of California, Long

- Beach, CA, Nov. 14, 2006.
- Butler, J.J., Jr., New methods and scales for estimation of spatial variations in hydraulic conductivity, an invited presentation to the Department of Geology, Southern Illinois Univ., Carbondale, IL, March 9, 2006.
- Butler, J.J., Jr., An ecohydrologic investigation of groundwater consumption by phreatophytes, an invited presentation to the Environmental Resources and Policies Program, Southern Illinois Univ., Carbondale, IL, March 8, 2006.
- Butler, J.J., Jr., New methods and scales for estimation of spatial variations in hydraulic conductivity, an invited presentation to the Department of Geosciences, University of Missouri at Kansas City, Kansas City, MO, February 16, 2006.
- Butler, J.J., Jr., Diurnal water-table fluctuations: An underutilized indicator of groundwater consumption by plants, an invited presentation given as part of the Environmental Seminar Series at the Desert Research Institute, Reno, NV, November 4, 2005.
- Arnold D., and J.J. Butler, Jr., Salt-cedar control activities and water-table monitoring on the Arnold Ranch, Clark County, Kansas, an invited presentation to the CPR for Wetlands and Streams II Conference, Wichita, KS, Sept. 28, 2005.
- Butler, J.J., Jr., New methods for high-resolution characterization of spatial variations in hydraulic conductivity, an invited presentation at the International Symposium on Hydrogeological Investigation and Remedial Technology, National Central University, Jhongli, Taiwan, November 15, 2004 (presentation given by Professor Chia-Shyun Chen in my place because of illness).
- Butler, J.J., Jr., Direct-push methods for characterization of spatial variations in hydraulic conductivity, an invited presentation at the Fall 2004 Conference of the Association of Engineering Geologists, Kansas City/Omaha Section, Kansas City, MO, October 23, 2004.
- Butler, J.J., Jr., Groundwater flow in interconnected stream-aquifer systems: From models to the field, an invited presentation to the Department of Geological and Atmospheric Sciences, Iowa State University, Ames, IA, March 12, 2004.
- Billinger, M., and J.J. Butler, Jr., Phreatophyte study in Solomon and Middle Arkansas River Basins, an invited presentation to the Kansas Department of Agriculture, Division of Water Resources Fall 2003 Conference, Topeka, KS, October 15, 2003.
- Butler, J.J., Jr., High-resolution methods for characterizing spatial variations in hydraulic conductivity in unconsolidated formations, an invited presentation to the groundwater research group at Vrije Universiteit, Amsterdam, The Netherlands, July 4, 2003.
- Butler, J.J., Jr., Some interesting aspects of groundwater flow in interconnected stream-aquifer systems: A report from America's Heartland, an invited presentation to the Center for Applied Geoscience (ZAG) at the Eberhard-Karls-University of Tuebingen, Germany, July 2, 2003.
- Butler, J.J., Jr., Slug tests in small diameter wells, invited presentation given as part of Site Investigation Methods Session at the 15th Annual UST/LUST National Conference, Environmental Protection Agency, San Francisco, CA, March 11, 2003.
- Butler, J.J., Jr., High-resolution methods for characterizing spatial variations in hydraulic conductivity in unconsolidated formations, invited presentation given at 2003 AFCEE (Air Force Center for Environmental Excellence) Technology Transfer Workshop, San

- Antonio, TX, February 27, 2003.
- Butler, J.J., Jr., Field methods for characterizing spatial variations in hydraulic conductivity, invited presentation given as part of the Hydrology Seminar Series, Stanford University, Stanford, CA, November 13, 2002.
- Butler, J.J., Jr., J.M. Healey, and M.K. Schulmeister, Direct-push technology for hydrogeologic investigations, invited presentation given at the 2002 Annual Convention of the Kansas Ground Water Association, Great Bend, KS, January 16, 2002.
- Butler, J.J., Jr., Quantitative assessment of stream-aquifer interactions: New models and field methods, invited presentation given as part of the Department of Geology & Geophysics Seminar Series, Texas A&M University, College Station, TX, November 29, 2001.
- Butler, J.J., Jr., and J.M. Healey, Utilization of direct-push technology: Introduction and explanation of new technology for obtaining geologic and hydrologic data, invited presentation to the Kansas Department of Agriculture, Division of Water Resources Fall 2000 Conference, Topeka, KS, October 11, 2000.
- Butler, J.J., Jr., Improving the design and analysis of slug tests, invited presentation given as part of the Advances in Site Characterization for Environmental and Engineering Projects at Glaciated Sites Workshop, Minneapolis, MN, October 7, 2000.
- Butler, J.J., Jr., and J.M. Healey, The influence of test method on hydraulic conductivity estimates: Implications for studies of scale dependence, invited presentation in Special Session T81 (Investigations into the Effect of Measurement Scale on Determining Hydraulic Conductivity: Field and Modeling Studies) at the 1999 Annual Mtg. of the Geological Society of America, October 26, 1999.
- Butler, J.J., Jr., Well tests for characterization of spatial variations in hydraulic conductivity, invited presentation given as part of the Hydrology and Water Resources Seminar, Univ. of Arizona, Tucson, AZ, October 21, 1998.
- Butler, J.J., Jr., Slug tests in site characterization: Some practical considerations, invited presentation given at the Fall Conf. of the Missouri Groundwater Association, Kansas City, MO, September 20, 1996.
- Butler, J.J., Jr., Will it be safe? Use of well tests to quantify flow and transport mechanisms at the Waste Isolation Pilot Plant, southeastern New Mexico, invited presentation given as part of the Univ. of Kansas Dept. of Geology Colloquium Series, December 1, 1995.
- Butler, J.J., Jr., The slug test: Useful or useless?, invited presentation given as part of the Hydrogeology Seminar Series, New Mexico Inst. of Mining and Technology, Socorro, NM, May 24, 1995.
- Butler, J.J., Jr., Well testing in heterogeneous formations, invited presentation given as part of the T. Mylan Stout Lecture Series of the Dept. of Geology of the Univ. of Nebraska, Lincoln, NE, January 31, 1992.