

CURRICULUM VITA

A. Personal

JOSEPH D. HUGHES

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Areas of Interest

Mathematical modeling of hydraulic and hydrologic systems, with emphasis on surface water and ground water interactions, variably saturated ground water flow, ground water flow in variable-density environments, and surface water and ground water quality. Development of sophisticated numerical simulation codes to solve surface water and ground water flow and transport equations. Use of statistical and geostatistical methods to analyze meteorological, surface water, and ground water data. Theory and application of aquifer performance test models to ground water flow systems.

Degrees Received:

DEGREE	INSTITUTION	YEAR
B.S.	University of South Florida	1992
M.S.	University of Michigan	1994
Ph.D.	University of South Florida	2006

B. Selected Publications

1. Refereed Articles

- Jacobsen, T., Macdonald, A., Kalaote, K., and **Hughes, J.D.**, in review, *Integrated Hydrological Model Applied for Water Management Planning of the Okavango Delta*, Botswana, submitted to ASCE Journal of Water Resources Planning and Management.
- Hughes, J.D.**, Decker, J.D., and Langevin, C.D., 2011, *Use of upscaled elevation and surface roughness data in two-dimensional surface water models*, submitted to Advances in Water Resources, DOI: 10.1016/j.advwatres.2011.02.004.
- Hughes, J.D.**, Langevin, C.D., and Brakefield-Goswami, L., 2009, *Effect of hypersaline cooling canals on aquifer salinization*, Hydrogeology Journal, DOI: 10.1007/s10040-009-0502-7.
- Hughes, J.D.**, Vacher, H.L., and Sanford, W.E., 2009, *Temporal response of hydraulic head, temperature, and chloride concentrations to sea-level changes, Floridan aquifer system, USA*, Hydrogeology Journal, v. 17, no. 4, DOI: 10.1007/s10040-008-0412-0.

- Hughes, J.D.**, and Liu, J., 2008, *MIKE SHE: Software for Integrated Surface Water/Ground Water Modeling*, Ground Water, v. 46, DOI: 10.1111/j.1745-6584.2008.00500.x.
- Hughes, J.D.**, Vacher, H.L., and Sanford, W.E., 2007, *Three-dimensional flow in the Florida Platform: Theoretical analysis of Kohout convection at its type locality*, Geology, v. 35, no. 7, DOI: 10.1130/G23374A.1.
- Hughes, J.D.**, Sanford, W.E., and Vacher, H.L., 2005, *Numerical simulation of double-diffusive finger convection*, Water Resources Research, v. 41, no. 1, W01019 10.1029/2003WR002777
- Nyer, E., Mayfield, P., and **Hughes, J.D.**, 1998. *Beyond the AFCEE Protocol for Natural Attenuation*, Ground Water Monitoring and Remediation, v. 18, no. 3, p. 70-77.

2. Published USGS Reports

- Brakefield-Goswami, L., Langevin, C.D., **Hughes, J.D.**, and Chartier, K.L., in review, *Determination of Contributing Areas to Municipal Well Fields in Miami-Dade County, Florida using an Unconstrained Monte-Carlo Analysis*, USGS Scientific Investigations Report XXXX-XXXX, 125 p.
- Hughes, J.D.**, Langevin, C.D., and Chartier, K.L., in review, *Documentation of the Surface-Water Routing (SWRI) Package for modeling surface-water flow with MODFLOW*, USGS Techniques and Methods XXXX-XXXX, 162 p.
- Lee, T.M., Sacks, L.A., and **Hughes, J.D.**, 2010, Effect of groundwater levels and headwater wetlands on streamflow in the Charlie Creek Basin, Peace River Watershed, West-Central Florida, USGS Scientific Investigations Report 2010-5189, 85 p.
- Hughes, J.D.** and Sanford, W.E., 2004, *SUTRA-MS: A version of SUTRA modified to simulate heat and multiple-solute transport*, USGS Open-File Report 2004-1207, 141 p.

3. Proceedings

- Hughes, J.D.**, White, J.T., Brakefield-Goswami, L., Walsh, V.M., and Langevin, C.D., 2011, *Simulating surface-water management and surface-water/groundwater interactions in Miami-Dade County, Florida using the Surface-Water Routing Process for MODFLOW-2005*, MODFLOW and More 2011, June 5-8, 2011, Golden, Colorado.
- Brakefield, L.K., Langevin, C.D., and **Hughes, J.D.**, 2011, Estimating well-field contributing areas in the presence of lakes using an unconstrained Monte-Carlo analysis, MODFLOW and More 2011, June 5-8, 2011, Golden, Colorado.
- Hanson, R.T., Schmid, W., Leake, S., Mehl, S., Niswonger, R.G., **Hughes, J.D.**, and Maddock, T., 2011, Advances in Conjunctive Use Analysis with MODFLOW-FMP, MODFLOW and More 2011, June 5-8, 2011, Golden, Colorado.
- Langevin, C.D., Panday, S., Niswonger, R.G., **Hughes, J.D.**, and Ibaraki, M., 2011, Evaluation of Mesh Alternatives for an Unstructured Grid Version of MODFLOW, MODFLOW and More 2011, June 5-8, 2011, Golden, Colorado.

- Schaars, F.W., Bakker, M., **Hughes, J.D.**, Dausman, A.M., Langevin, C.D., 2011, Modeling Regional Seawater Intrusion with MODFLOW2005 and the SWI package, MODFLOW and More 2011, June 5-8, 2011, Golden, Colorado.
- White, J.T., and **Hughes, J.D.**, 2011, *An unstructured GPGPU preconditioned conjugate gradient solver for MODFLOW 2005*, MODFLOW and More 2011, June 5-8, 2011, Golden, Colorado.
- White, J.T., **Hughes, J.D.**, and Peterson, R., 2011, *Rainfall-runoff modeling in a baseflow-dominated surface water basin using MODFLOW-2005*, MODFLOW and More 2011, June 5-8, 2011, Golden, Colorado.
- Hughes, J.D.**, White, J.T., and Langevin, C.D., 2011, *Simulating surface-water management and surface-water/groundwater interactions using MODFLOW-2005*, USGS National SW Conference and Hydroacoustics Workshop, March 28-April 1, 2011, Tampa, Florida.
- Lee, T.M., and **Hughes, J.D.**, 2011, *Modeling the effects of headwater wetlands and groundwater interactions on stream flow from a central Florida basin*, USGS National SW Conference and Hydroacoustics Workshop, March 28-April 1, 2011, Tampa, Florida.
- Hughes, J.D.**, Decker, J.D., and Jawitz, J.W., 2010, *Upscaling topographic and hydraulic resistance data in a two-dimensional hydrodynamic model of the Everglades ridge and slough landscape*, AGU Fall Meeting 2010, December 13-17, 2010, San Francisco, California.
- Swain, E., Decker, J.D., and **Hughes, J.D.**, 2010, *Determining the Implications of Hydrodynamic Formulations with Field Measurements*, AGU Fall Meeting 2010, December 13-17, 2010, San Francisco, California.
- White, J.T. and **Hughes, J.D.**, 2010, *On the Inclusion of Surface Water Observations into the Ground Water Model Calibration Process*, AGU Fall Meeting 2010, December 13-17, 2010, San Francisco, California.
- Hughes, J.D.**, Langevin, C.D., and White, J.T., 2010, *Use of time series and harmonic constituents of tidal propagation to enhance estimation of coastal aquifer heterogeneity*, Proceedings of the 21st Salt Water Intrusion Meeting, June 21-26, 2010, Ponta Delgada, Azores, Portugal.
- Langevin, C.D., Zygnerski, M.R., White, J.T., and **Hughes, J.D.**, 2010, *Effect of sea-level rise on future coastal groundwater resources in southern Florida, USA*, Proceedings of the 21st Salt Water Intrusion Meeting, June 21-26, 2010, Ponta Delgada, Azores, Portugal.
- White, J.T., Langevin, C.D., and **Hughes, J.D.**, 2010, *Evaluating the effect of Tikhonov regularization schemes on predictions in a variable-density groundwater model*, Proceedings of the 21st Salt Water Intrusion Meeting, June 21-26, 2010, Ponta Delgada, Azores, Portugal.
- Langevin, C.D. and **Hughes, J.D.**, 2009, *Effect of Numerical Dispersion on Calibration of a Highly Parameterized Saltwater Intrusion Model*, Proceedings of the 2009 PEST Conference, November 2-4, Potomac, Maryland.
- Hughes J.D.**, Swain, E.D., Brakefield-Goswami, L., Langevin, C.D., and Niswonger, R.G., 2008 – *Dynamic Simulation of Canal Stages and Surface-Water Structure*

Operations in SEAWAT to Evaluate Conjunctive Water Use in Miami-Dade County, Florida Integrated Science Center Meeting, November 22-23, 2008, Orlando, Florida.

Hughes, J.D., Loinaz, M., Hosseinipour, E.Z., and Nath, A., 2007, *Development of an Integrated Surface Water-Groundwater Model for Wetland Restoration and Habitat Evaluation in a Southwest Florida Basin Using MIKE SHE Part II- Development of a Regional Scale Model*, Proceedings of the 2007 World Environmental and Water Resources Congress, May 15-19, Tampa, Florida; Sponsored Environmental and Water Resources Institute (EWRI) of ASCE.

Hosseinipour, E.Z., **Hughes, J.D.**, Loinaz, M., and Nath, A., 2007, *Development of an Integrated Surface Water-Groundwater Model for wetland restoration and habitat evaluation in a Southwest Florida Basin using MIKE SHE: Part I- Hydraulic Design Tool*, Proceedings of the 2007 World Environmental and Water Resources Congress, May 15-19, Tampa, Florida; Sponsored Environmental and Water Resources Institute (EWRI) of ASCE.

Kobor, J.S., Loinaz, M.L., **Hughes, J.D.**, Anderson, M.B., Borden, C.J, and Cotton, Q.M., 2006, *A phased approach to simulating existing and future hydrologic conditions in Napa County, CA Using Integrated Surface Water and Groundwater Models*, Proceedings of MODFLOW and More 2006: Managing Ground Water Systems, v. 4, May 22-24, 2006, Colorado School of Mines, Golden, Colorado.

Loinaz, M., Nath, A., **Hughes, J.D.**, and Hosseinipour, E.Z., 2006, *Application of Integrated Surface-Groundwater Model for Large Scale Wetland Restoration*, Proceedings of the AWRA 2006 Annual Water Resources Conference, November 6-9, Baltimore, Maryland.

Hughes, J.D. and Feng, K., 2003, *Simulation of groundwater and conjunctive irrigation in Florida*, Proceedings of MODFLOW and More 2003, v. 2, Sept. 16-19, Colorado School of Mines.

Hughes, J.D., and Wilkinson, B.H., 1993, *On the use of textural criteria in evaluating the importance of diagenetic processes in carbonates*. Geological Society of America Abstracts with Programs 25(6), National Meeting, October 25-28, 1993, Boston, MA.

Hughes, J.D., Allmon, W.D., and Kohn, A.J., 1992, *Ecology of Conid gastropod communities in the Pliocene Pinecrest Beds, Southwest Florida*. Geological Society of America Abstracts with Programs 24(2), Southeastern Section Meeting, March 18-20, 1992, Winston-Salem, NC.

4. Graduate Work

Hughes, J.D., 2006, *Salinity- and temperature-dependent groundwater flow in the Floridan aquifer system of South Florida*. Ph.D. Dissertation, University of South Florida.

Hughes J.D., 1994. *Timing and progression of diagenetic alteration in the Oligocene Suwannee Limestone, west-central Florida: Implications for rates of calcitic carbonate diagenesis*. Master's Thesis, The University of Michigan.

C. Scientific Leadership

1. Professional Service

Peer Reviewer:

German Research Foundation (proposals); Ground Water; Hydrogeology Journal; Hydrologic Processes; Journal of Hydrology; Journal of Soil Science and Plant Nutrition; Lee County, Florida (consultant's reports); the South Florida Water Management District-Interagency Modeling Center (consultant's reports); the Southwest Florida Water Management District (consultant's reports); internal reviewer for journal articles, reports, and abstracts written by U.S. Geological Survey scientists.

Professional Registrations and Associations:

- Florida Licensed Professional Geologist (FL Reg. No. 2193)
- American Geophysical Union

Graduate Student Advising:

- Eric Stone, University of South Florida, Department of Geology, M.S. Certificate, 2010
- William C. Hutchings, University of South Florida, Department of Geology, Ph.D. (expected graduation 2011)
- Bruce LaFrenz, University of South Florida, Department of Geology, Ph.D. (expected graduation 2012)
- Quanghee Yi, University of South Florida, Department of Geology, Ph.D. (expected graduation 2014)
- Jill Hood, University of South Florida, Department of Marine Science, Ph.D. (expected graduation 2013)

2. Teaching

- Instructor for five-day advanced MODFLOW groundwater class using MODFLOW – session on use of the SWR1 Surface-Water Routing Package, Lakewood, Colorado, November 2010.
- Instructor for a five-day density-dependent groundwater class using SEAWAT, Ponta Delgada, Azores, Portugal, June 2010
- Instructor for a three-day integrated surface-water/ground-water class using MIKE SHE, Tampa, Florida, April 2008
- Instructor for a three-day integrated surface-water/ground-water class using MIKE SHE, Cambridge, Ontario, October 2007
- Instructor for three-day integrated surface-water/ground-water class using MIKE SHE, Golder and Associates, Calgary, Alberta, August 2007
- Lead instructor for three-day integrated surface-water/ground-water class using MIKE SHE, Earth Tech, Miami, Florida, August 2006
- Lead instructor for a three-day integrated surface-water/ground-water class using MIKE SHE, Interagency Modeling Center, South Florida Water Management District, December 2006
- Instructor for informal three-day advanced integrated surface-water/ground-water class using MIKE SHE, City of Portland Bureau of Environmental Services, Portland, Oregon, November 2005
- Instructor for a four-day integrated surface-water/ground-water class using MIKE SHE, U.S. Bureau of Reclamation, Sacramento, California, April 2004
- Assistant Instructor for an informal three-day integrated surface-water/ground-water class using MIKE SHE, Tampa, Florida, April 2003

- Instructor for five-day integrated surface-water/ground-water class using MIKE SHE, St. Johns River Water Management District, Palatka, Florida, November 2002
- Instructor for five-day integrated surface-water/ground-water class using MIKE SHE, South Florida Water Management District, West Palm Beach, Florida, October 2002
- Instructor for an informal one-day integrated surface-water/ground-water class using MIKE SHE, U.S. Army Corps of Engineers, Jacksonville, Florida, June 2002
- Instructor for an informal five-day integrated surface-water/ground-water class using ISGW (explicit coupling of HSPF and MODFLOW) , Waterstone Environmental Engineering & Hydrology, Inc., Boulder, Colorado, August 2001
- University of Michigan, Geological Sciences Department, Ann Arbor, Michigan, 1993 Fall Semester, Physical Geology.

3. Special Assignments

- Invited to participate in a UNESCO Groundwater Resources Assessment under the Pressures of Humanity and Climate Change (GRAPHIC) meeting in Nassau, Bahamas (March 2-4, 2009) as a U.S. Geological Survey representative to provide input on data needs for development of a density-dependent ground-water flow and transport model of the Andros aquifer capable of assessing the susceptibility of the aquifer to sea-level rise and climate changes such as increased hurricane frequency.

D. Unpublished Reports

Hughes J.D., Stewart, M.T., Tara, P., 2009, *Technical Peer Review – District Wide Regulation Model, Version 2 Southwest Florida Water Management District*. A report prepared for the Southwest Florida Water Management District, 60 p.

Earth Tech and DHI Water and Environment, 2007, *Kissimmee Basin Modeling and Operations Study KBMOS AFET Model Documentation / Calibration Report*, prepared for the South Florida Water Management District, 317 p. plus appendix.

Parsons Water and Infrastructure, DHI Water and Environment, and ADA Engineering, 2007, *PSRP H&H Modeling - Phase 2: Deliverable 2.4.1 – Technical Memorandum: Model Calibration*, prepared for the South Florida Water Management District, 82 p. plus appendix.

SDI Environmental Services, BPC Group, and DHI Water and Environment, 2007, *Southwest Florida Feasibility Study Integrated Hydrologic Model: Model Documentation Report*, prepared for the South Florida Water Management District, 117 p. plus appendices (4).

DHI Water and Environment, 2006, *BDR Technical Appendix: Water Quantity and Water Quality Report, Napa County, CA*, prepared for Napa County, California, 90 p. plus appendices (5).

Earth Tech and DHI Water and Environment, 2006, *Kissimmee Basin Modeling and Operations Study, Phase II, Alternate Formulation and Evaluation Tool Development – Acceptance Test Plan*, prepared for the South Florida Water Management District, 89 p.

- HydroGeoLogic, 2006, *Development of a Density-Dependent Saltwater Intrusion Model for the Lower East Coast Project Area*, prepared for the South Florida Water Management District, 166 p. plus appendices (3).
- HydroGeoLogic, DHI Water and Environment, and Applied Technology and Management, 2006, *Hydrologic-Hydraulic and Environmental Assessment for the Camp Keais Flowway*, prepared for the South Florida Water Management District – Big Cypress Basin Field Office, 94 p. plus appendix.
- Parsons Water and Infrastructure, DHI Water and Environment, and ADA Engineering, 2006, *PSRP H&H Modeling - Phase 1: Deliverable 3.3.5.2 – Final Technical Memorandum – Model Documentation*, prepared for the South Florida Water Management District, 97 p.
- Camp Dresser and McKee and DHI Water and Environment, 2005, *Tiger Bay/Bennett Swamp Integrated Groundwater/Surface Water Model – Phase 3*, prepared for the St. Johns River Water Management District, 181 p. plus appendix.
- DHI Water and Environment and Camp Dresser and McKee, 2005, *Task 4.2 South Area Drainage Assessment MIKE SHE Model Report: Broward County, Florida*, prepared for Broward County, 173 p.
- DHI Water and Environment, 2004, *Big Cypress Basin Integrated Surface/Ground Water Model Development and Calibration Report*, prepared for the South Florida Water Management District, 70 p. plus appendices (3).
- HydroGeoLogic and DHI Water and Environment, 2004, *Conceptual Hydrogeologic Model for the Northern District Water Resources Assessment Project Area*, prepared for the Southwest Florida Water Management District, 73 p.
- Kimley-Horn and Associated and DHI Water and Environment, 2004, *Everglades Agricultural Area Storage Reservoirs – Phase 1: B.2 Hydraulics, B.2.3 Hydrologic Model Calibration and Verification*, prepared for the South Florida Water Management District and the United States Army Corps of Engineers, 115 p. with attachments (2).
- Camp Dresser and McKee and DHI Water and Environment, 2002, *Tiger Bay/Bennett Swamp Integrated Groundwater and Surface Water Model Numerical Model Development & Calibration Report*, prepared for the St. Johns River Water Management District, 147 p. plus appendix.
- DHI Water and Environment, 2002, *Fanno Creek Watershed Model*, consultant's report prepared for the Portland Bureau of Environmental Services, 73 p. plus appendix.
- DHI Water and Environment, 2002, *Tidal Caloosahatchee Basin Model, Model Calibration and Validation*, prepared for the South Florida Water Management District, 92 p. plus appendices (4).
- SDI Environmental Services, 2001, *Mass transport model simulation of the City of Clearwater well field*, prepared for the City of Clearwater, 93 p. plus appendices (2).
- Berryman and Henigar and SDI Environmental, 2000, *Phase I Mitigation Plan - Candidate Sites Evaluation Study*, prepared for the Tampa Bay Water Authority.
- SDI Environmental Services, 1999, *Update to Integrated Hydrologic Model of Central Northern Tampa Bay Area: ISGW/CNTB Model Run No. 121*, prepared for the Tampa Bay Water Authority, 87 p. plus appendices.

SDI Environmental Services, 1999, *Water Resource Evaluation and Cone Ranch Integrated Hydrologic Model*, prepared for the Tampa Bay Water Authority, 92 p. plus appendices.