

Feng Pan Ph. D

USDA-ARS Environmental Microbial & Food Safety Laboratory
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EDUCATION

Hydrogeology, Ph.D, University of Nevada Las Vegas (UNLV), May 2009

Dissertation: Uncertainty, sensitivity and geostatistical studies of flow and contaminant transport in heterogeneous unsaturated zone.

Water Resources Management, M.S., UNLV, August 2005

Thesis: Uncertainty analysis of radionuclide transport in the unsaturated zone of Yucca Mountain

Hydrology and Water Resources, B.E., Sichuan University, China, July 2000

RESEARCH INTEREST

- Numerical modeling on vadose zone and groundwater hydrology
- Spatial variability and heterogeneity characterization of hydraulic parameters
- Geostatistical and stochastic study of basin-scale hydrologic processes
- Uncertainty and sensitivity analysis of flow and contaminant transport in heterogeneous porous media
- Streamflow simulation using distributed hydrologic model in small watershed

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher, USDA-ARS Environmental Microbial & Food Safety Lab, and Department of Environmental Science & Technology, University of Maryland, 05/2009 to Present

- Conduct the project of “Integrating Model Abstraction into Monitoring Strategies” funded by U.S. Nuclear Regulatory Commission
- Data collection and interpretation in USDA-ARS “Optimizing Production Inputs for Economic and Environmental Enhancement” (OPE3) experimental watershed
- Infiltration calculation using HYDRUS1D in OPE3
- Flow and solute transport simulation using HYDRUS3D and TOUGH2

Research Assistant, Desert Research Institute (DRI), 10/2004 to 04/2009

- Conduct the project of “Geostatistical and stochastic study of flow and tracer transport in the unsaturated zone of Yucca Mountain” funded by U.S. Department of Energy
- Conceptual model development
- Collection and interpretation of hydraulic data
- Probability distribution identification of hydraulic parameters
- Random field generation of hydraulic parameters using geostatistical techniques
- Unsaturated flow and contaminant transport simulation using TOUGH2 code and Monte Carlo method

- Uncertainty assessment of unsaturated flow and contaminant transport
- Sensitivity analysis of hydraulic parameters on flow and transport uncertainty
- Spatial correlation structure estimation of hydraulic parameters using Bayesian geostatistical inference method
- Soil sampling, soil hydraulic conductivity measurement, and pumping test design
- Publications in peer-review journals, presentations in national conferences, and technical report writing

Research Assistant, University of Nevada Las Vegas, 04/2003 to 09/2004

- Conduct the project of “Streamflow simulation using Hydrologic Model System (HMS) in the Emei watershed, China” funded by U.S. National Science Foundation.
- Conceptual model development
- Geological, land-use and land-cover survey
- Streamflow measurement and digital elevation model (DEM) digitization
- Streamflow network and watershed boundary delineation using ArcGIS
- Data preparation and streamflow simulation using HMS
- Model calibration and streamflow prediction
- Publications in peer-review journals and presentations in national conferences

Research Assistant, Sichuan University, China, 09/2000 to 03/2003

- Regional flood frequency analysis for NuoZhadu Hydroelectric Plant
- Evaluation on regional sustainable water resources utilization by fuzzy matter-element method in Xi’an city, China
- Bid assessment of water-saving irrigation projects in Sichuan Province
- Water quality evaluation using fuzzy theory for five rivers in Beijing
- Software design of flood frequency curve using Visual Basic
- Teaching assistant of Advanced Mathematics class

AWARDS

- Colin Warden Memorial Endowment Award, DRI, December 2008
- Bernada E. French Scholarship in Geology, UNLV, July 2008
- Bernada E. French Scholarship in Geology, UNLV, July 2007
- George Burke Maxey Award in Water Resources Research, DRI, April 2007
- The Aileen and Sulo Maki Hydrogeology/Hydrology Fellowship, DRI, September 2005
- NSF EPSCoR Advanced Computing in Environmental Sciences (ACES) Scholarship, May 2005

MEMBERSHIP

- Sigma Xi, The Scientific Research Society
- American Geological Union (AGU)
- Geological Society of America (GSA)
- American Nuclear Society (ANS)

SERVICES

- Convener and Chair of a Session on “Multimodeling: Consideration of Alternative Conceptual Models of Groundwater and Surface Water Systems” in the 2009 AGU Annual Meeting (with Yakov Pachepsky and Mary Hill)
- Reviewers of Manuscripts for Stochastic Environmental Risk & Research Assessment, Transport in Porous Media, Soil Science Society of America Journal

PEER-REVIEWED JOURNAL ARTICLE (12)

- **Pan, F., M. Ye, J. Zhu, Y.S. Wu, B.X. Hu, and Z. Yu, 2009. Numerical evaluation of uncertainty in water retention parameters and effect on predictive uncertainty.** Vadose Zone Journal, 8: 158-166, doi: 10.2136/vzj2008.0092.
- **Pan, F., M. Ye, J. Zhu, Y.S. Wu, B.X. Hu, and Z. Yu, 2009. Incorporating layer- and local-scale heterogeneities in numerical simulation of unsaturated flow and tracer transport.** Journal of Contaminant Hydrology, 103: 194-205, doi: 10.1016/j.jconhyd.2008.10.012.
- **Ye, M., F. Pan, Y.S. Wu, B.X. Hu, C. Shirley, and Z. Yu, 2007. Assessment of radionuclide transport uncertainty in the unsaturated zone of Yucca Mountain.** Advances in Water Resources, 30: 118-134.
- **Yu, Z., F. Pan, C. Liang, Z. Liang, Z. Lin, and L. Ren, 2006. Application of hydrologic model system to the flood simulation in the Emei stream watershed.** Advances in Water Science, 17(5): 645-652 (Chinese).
- **Pan, F., Q. Fu., C. Liang, and D. Liu, 2004. Applying PP model based on RAGA in water environment quality evaluation.** Journal of Northeast Agricultural University (English Edition), 11(2): 171-175.
- **Wang, C., and F. Pan, 2004. Fuzzy matter-element model for evaluating geotechnical slope stability.** Water Resources and Hydropower Engineering, 35(9): 34-26 (Chinese).
- **Pan, F., Q. Fu, and C. Liang, 2003. Application of fuzzy comprehensive evaluation based on AHP in quality evaluation of water environment.** Water Resources and Hydropower of Northeast China, 21(8): 22-24 (Chinese).
- **Pan, F., C. Liang, Z. Wang, and Q. Fu, 2003. Fuzzy matter-element model for evaluating sustainable utilization of regional water resources.** Advances in Water Science, 14(3): 271-275 (Chinese).
- **Pan, F., C. Liang, and Q. Fu, 2002. Application of matter element model based on stratification analysis method in soil quality evaluation.** Research of Agricultural Modernization, 23(2): 93-97 (Chinese).
- **Pan, F., C. Liang, L. Wang, and Q. Fu. Application of fuzzy matter-element model based on AHP in the bid evaluation water-saving irrigation project.** China Rural Water and Hydropower, 10: 6-9 (Chinese).
- **Pan, F., Q. Fu, and C. Liang, 2002. Applying fuzzy synthesize judgement in the study of water environment quality evaluation.** Environmental Engineering, 20(2): 58-61 (Chinese).

- Fu, Q., **F. Pan**, and J. Jin, 2002. **Self-exciting Threshold auto-regressive model for water requirement forecasting of well irrigation rice.** Water Resources and Hydropower Engineering, 33(7): 31-34 (Chinese).

PEER-REVIEWED TECHNICAL REPORT (1)

- Ye, M., **F. Pan**, B.X. Hu, and J. Zhu, 2007. **Geostatistical and stochastic study of flow and tracer transport in the unsaturated zone at Yucca Mountain.** Project Technical Report, TR-07-003. Nevada System of Higher Education.

CONFERENCE PROCEEDINGS (3)

- **Pan, F.**, J. Zhu, M. Ye, Y.S. Wu, and Z. Yu, 2008. **Sensitivity analysis of unsaturated flow uncertainty at Yucca Mountain.** Proceedings of 2008 International high-level radionuclide waste management conference (IHLRWM), September 7 – 11, Las Vegas, NV, 73-80.
- **Pan, F.**, M. Ye, B.X. Hu, Z. Yu, and C. Shirley, 2006. **Yucca Mountain unsaturated zone radionuclide transport uncertainty assessment.** Proceedings of 2006 International high-level radionuclide waste management conference (IHLRWM), April 30 – May 4, Las Vegas, NV, 111-118.
- **Pan, F.**, C. Liang, and Q. Fu, 2003. **Evaluating regional water resources development using a fuzzy matter-element model with the Euclid approach.** Proceedings of International Conference on Water-Saving Agriculture and Sustainable Use of Water and Land Resources, Xi'an, China, p. 699-703.

CONFERENCE ABSTRACTS (12)

- **Pan, F.**, A. Yakirevich, A.K. Guber, Y.A. Pachepsky, T.J. Gish, T.J. Nicholson, and R.R. Cady, 2009. **Simulating tracer transport in variably saturated soils and shallow groundwater.** American Geophysical Union (AGU) Fall Meeting, San Francisco, CA.
- **Pan, F.**, J. Zhu, M. Ye, and Z. Yu, 2008. **An estimation of correlation structure of hydraulic parameters using Bayesian inference approach.** American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, H43A-0972.
- **Pan, F.**, J. Zhu, M. Ye, and Z. Yu, 2008. **Sensitivity analysis of contaminant transport uncertainty in unsaturated zone.** Geological Society of America (GSA) Joint Annual Meeting, Houston, TX, 82-10.
- **Pan, F.**, J. Zhu., M. Ye, and Z. Yu, 2008. **Effect of water retention parameter uncertainty on unsaturated flow in heterogeneous fractured rocks.** 2008 Symposium: Understanding Near-surface Environmental Processes, Desert Research Institute and Nevada Water Resources Association, Las Vegas, NV.
- **Pan, F.**, J. Zhu, M. Ye, Y.S. Wu, Z. Yu, and B.X. Hu, 2007. **Sensitivity analysis of hydraulic parameters on radionuclide transport uncertainty in the unsaturated zone of Yucca Mountain.** American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, H23B-1300.

- **Pan, F., M. Ye, Y.S. Wu, and B.X. Hu, 2006. Simulation of radionuclide transport in heterogeneous unsaturated zone of Yucca Mountain.** American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, H23C-1522.
- **Pan, F., M. Ye, Y.S. Wu, B. X. Hu, 2006. Uncertainty analysis of radionuclide transport in the unsaturated fractured rock at Yucca Mountain, Nevada.** Geological Society of America (GSA) Annual Meeting, Philadelphia, PA, 191-9.
- **Pan, F., M. Ye, Y.S. Wu, B.X. Hu, and Z. Yu, 2005. Assessment of uncertainty of radionuclide transport in the Yucca Mountain unsaturated zone: parametric and parameter estimation uncertainty.** American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, H11D-1292.
- **Pan, F., M. Ye, Z. Yu, Y.S. Wu, B.X. Hu, and C. Shirley, 2005. Uncertainty analysis of radionuclide transport in the unsaturated zone at Yucca Mountain.** Geological Society of America (GSA) Annual Meeting, Salt Lake City, UT, p.437.
- **Yu. Z., F. Pan, and Z. Lin, 2004 (invited). On simulating hydrologic processes during extreme storm events with a coupled climate and hydrology model.** CAS-TWAS-WMO Forum on International Symposium on Extreme Weather and Climate Events – Their Dynamics and Predictions, Beijing, China, p. 103-104.
- **Koonce, J., F. Pan, Z. Yu, and K. Stetzenbach, 2004. On evaluating the regional groundwater flow system in Southern Nevada with an integrated hydrogeochemical approach.** Geological Society of America (GSA) Annual Meeting, Denver, CO, p. 326.
- **Pan, F., Z. Yu, and C. Liang, 2003. Streamflow simulations with Hydrological Model System in the Emei Watershed, China.** Geological Society of America (GSA) Annual Meeting, Seattle, WA, p.130-3.