

Burke J. Minsley

U.S. Geological Survey
Crustal Geophysics and Geochemistry Science Center
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Denver Federal Center
Denver, Colorado 80225

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EDUCATION

Ph.D. in Geophysics

Received June 2007

Massachusetts Institute of Technology; Cambridge, Massachusetts
Advisor: Prof. Frank Dale Morgan
Thesis title: Modeling and inversion of self-potential data

Bachelor of Science in Applied Physics

Received May 1997

Purdue University; West Lafayette, Indiana
Minor: Mathematics

EMPLOYMENT

Research Geophysicist

April 2008 - present

U.S. Geological Survey; Denver, Colorado
Crustal Geophysics and Geochemistry Science Center

- Development and implementation of novel hydrogeophysical methods
- Improved strategies for processing and interpretation of airborne electromagnetic data
- Stochastic techniques for improved geophysical model assessment and data integration

Postdoctoral Research Fellow

June 2007 – March 2008

Massachusetts Institute of Technology; Cambridge Massachusetts
Department of Earth, Atmospheric, and Planetary Sciences
Earth Resources Laboratory/Kuwait-MIT Center for Natural Resources and the Environment

- Geophysical monitoring of aquifer storage and recovery in Kuwait
- Modeling and inversion of self-potential data

Research Assistant

August 2002 – May 2007

Massachusetts Institute of Technology; Cambridge Massachusetts
Department of Earth, Atmospheric, and Planetary Sciences
Earth Resources Laboratory/Kuwait-MIT Center for Natural Resources and the Environment

- Modeling and inversion of self-potential data
- Geophysical monitoring of aquifer storage and recovery in Kuwait
- Geothermal studies in Nevis, West Indies
- Characterization of fractured reservoirs from seismic data

Research Assistant

February 2000 – August 2002

Massachusetts Institute of Technology; Cambridge Massachusetts
Department of Earth, Atmospheric, and Planetary Sciences
Experimental Sedimentology and Geomorphology Laboratory

- Helped design, build, and run scale model laboratory experiments to study turbidity flows
- Wrote data acquisition code for acoustic imaging of experimental flows

Field Geophysicist

August 1997 – June 2002

Schlumberger Geco-Prakla/WesternGeco; offshore worldwide

- Lead in-field data processing team responsible for large 2D and 3D marine seismic surveys
- Assisted with all aspects of data acquisition and ship's operations

TEACHING EXPERIENCE

Teaching Assistant/ Co-instructor

January 2004, 2006, 2007, 2008

Massachusetts Institute of Technology; Cambridge, Massachusetts
Department of Earth, Atmospheric, and Planetary Sciences

Course Title: *Alternate Energy Sources*

- Assisted with Independent Activities Period (IAP) class organization and instruction
- Co-organized class field trip: Alternate Energy in Jamaica (March 2007)

Teaching Assistant

Spring 1996

Purdue University; West Lafayette, Indiana
Department of Physics

Course Title: *Mechanics for Engineers*

- Taught three recitation sections for freshman introductory physics class

AFFILIATIONS & SERVICE

- Member of AGU, SEG, EEGS
- AGU Hydrogeophysics Technical Committee member (July 2010 – June 2012)
- Reviewer for Geophysics, Water Resources Research, Geophysical Research Letters, Journal of Applied Geophysics, Ground Water, Hydrogeology Journal, Journal of Environmental and Engineering Geophysics journals, and Department of Energy research proposals
- Session convener at Fall AGU (2004, 2006, 2007, 2008) and SAGEEP (2010, 2011) conferences
- Co-instructor for short course on Dams and Levees (SAGEEP 2010)
- Thesis committee member A. Araj (Colorado School of Mines, M.S., completed 12/2010), S. Ikard (Colorado School of Mines, Ph.D., expected graduation 6/2012)
- Supervisor for K. Huppert, USGS student volunteer through MIT Externship program (January 2011)
- Scientific mentor for C. Johnson, USGS student volunteer through UNAVCO RESSES program (June – August 2011)

HONORS & AWARDS

- Paper one of 'Ten Best of SAGEEP' 2010, 2011
- USGS Geology Venture Capital Project, Funded FY2010
- Outstanding Student Paper Award, Near Surface section, Fall AGU, 2006
- NSF student travel award: Biogeophysics session at Spring AGU, May 2005
- Martin Family Society Fellowship for Sustainability, MIT, 2004 – 2005

INVITED TALKS

- Hydrogeophysics at the watershed-scale using airborne electromagnetics, NovCare Conference, Brewster, Massachusetts, May 2011
- Beyond the best model: Improved model assessment using trans-dimensional Bayesian Markov chain Monte Carlo sampling, Heiland Lecture, Colorado School of Mines, Golden, Colorado, February 2011
- Electrical resistivity parameter estimation and model appraisal using Bayesian inference, 3rd USGS Modeling Conference, Denver, Colorado, June 2010
- Interpretation of self-potential data in contaminated environments, AGU Chapman Conference on Biogeophysics, Portland, Maine, October 2008
- Modeling and inversion of self-potential data, Schlumberger-Doll Research, Cambridge, Massachusetts, May 2007

PUBLICATIONS

Bedrosian, P.A., B.L. Burton, M.H. Powers, **B.J. Minsley**, J. Phillips, L.E. Hunter (2011), Geophysical investigations of geology and structure at the Martis Creek Dam, Truckee, California, *Journal of Applied Geophysics*, 77, 7-20, doi:10.1016/j.jappgeo.2011.11.002.

- Minsley, B.J.**, B.L. Burton, S. Ikard, and M.H. Powers (2011), Hydrogeophysical investigations at Hidden Dam, Raymond, California, *Journal of Environmental and Engineering Geophysics*, 16, 145-164, doi: 10.2113/JEEG16.4.145.
- Elmore, A.J., S.M. Guinn, **B.J. Minsley**, A.D. Richardson, and J.I. Fisher (2011), Landscape controls on the timing of spring, autumn, and growing season length in mid-Atlantic forests, *Global Change Biology*, doi: 10.1111/j.1365-2486.2011.02521.x.
- Minsley, B.J.** (2011), A trans-dimensional Bayesian Markov chain Monte Carlo algorithm for model assessment using frequency-domain electromagnetic data, *Geophysical Journal International*, 187, 252-272. doi: 10.1111/j.1365-246X.2011.05165.x.
- Karaoulis, M., A. Revil, D.D. Werkema, **B.J. Minsley**, W.F. Woodruff, and A. Kemna (2011), Time-lapse three-dimensional inversion of complex conductivity data using an active time constrained (ATC) approach, *Geophysical Journal International*, doi: 10.1111/j.1365-246X.2011.05156.x.
- Linde, N., J. Doetsch, D. Jougnot, O. Genoni, Y. Dürst, **B.J. Minsley**, T. Vogt, N. Pasquale, J. Luster (2011), Self-potential investigations on a gravel bar in a restored river corridor, *Hydrology and Earth Systems Sciences, special issue on restored river corridor dynamics* 15(3): 729-742. doi:10.5194/hess-15-729-2011.
- Minsley, B.J.**, J.B. Ajo-Franklin, A. Mukhopadhyay, and F.D. Morgan (2011), Hydrogeophysical methods for analyzing aquifer storage and recovery systems, *Ground Water*, 49(2), 250-269. doi: 10.1111/j.1745-6584.2010.00676.x.
- Ferré, T., L. Bentley, A. Binley, N. Linde, A. Kemna, K. Singha, K. Holliger, J.A. Huisman, and **B. Minsley** (2009), Critical steps for the continuing advancement of hydrogeophysics, *EOS*, 90(23), doi:10.1029/2009EO230004.
- Minsley, B.J.**, D. Coles, Y. Vichabian, and F.D. Morgan (2008), Minimization of self-potential survey mistakes acquired with multiple reference locations, *Geophysics*, 73(2), F71-F81, doi:10.1190/1.2829390.
- Minsley, B.J.** (2007), Modeling and inversion of self-potential data, Ph.D. Thesis, Massachusetts Institute of Technology, Cambridge, Massachusetts, 251 p.
- Ajo-Franklin, J.B., **B.J. Minsley**, and T.M. Daley (2007), Applying compactness constraints to seismic traveltimes tomography, *Geophysics*, 72(4), R67-R75, doi:10.1190/1.2742496.
- Minsley, B.J.**, J. Sogade, and F.D. Morgan (2007), 3D source inversion of self-potential data, *Journal of Geophysical Research*, 112, B02202, doi:10.1029/2006JB004262.
- Minsley, B.J.**, J. Sogade, and F.D. Morgan (2007), Three dimensional self potential inversion for subsurface DNAPL contaminant detection at the Savannah River Site, South Carolina, *Water Resources Research*, 43, W04429, doi:10.1029/2005WR003996.
- Willis, M.E., D.R. Burns, R. Rao, **B. Minsley**, M.N. Toksöz, and L. Vetri (2006), Spatial orientation and distribution of reservoir fractures from scattered seismic energy, *Geophysics*, 71(5), 43-51, doi:10.1190/1.2235977.

USGS PUBLICATIONS

- Ball L.B., Smith B.D., **Minsley B.J.**, Abraham J.D., Voss C.I., Astley B.N., Deszcz-Pan M., Cannia J.C. (2011) Airborne electromagnetic and magnetic geophysical survey data of the Yukon Flats and Fort Wainwright areas, central Alaska, June 2010. US Geological Survey Open-File Report 2011-1304: 28 p.
- Wellman, T.P., S.S. Paschke, **B. Minsley**, and J.A. Dupree (2011), Hydrogeologic setting and simulation of groundwater flow near the Canterbury and Leadville drainage tunnels, Leadville, Colorado, U.S. Geological Survey Scientific Investigations Report 2011-5085, 56 p.
- Anderson, E.D., Smith, S.M., Giles, S.A., Granitto, Matthew, Eppinger, R.G., Bedrosian, P.A., Shah, A.K., Kelley, K.D., Fey, D.L., **Minsley, B.J.**, and Brown, P.J., 2011, Geophysical, geochemical, and mineralogical data from the Pebble Cu-Au-Mo porphyry deposit area, southwest Alaska: Contributions to assessment techniques for concealed mineral resources: U.S. Geological Survey Data Series 608, 46 p.
- Smith, B.D., J.D. Abraham, J.C. Cannia, **B. J. Minsley**, L.B. Ball, G.V. Steele, and M. Deszcz-Pan (2011), Helicopter electromagnetic and magnetic geophysical survey data, Swedeburg and Sprague study areas, eastern Nebraska, May 2009: U.S. Geological Survey Open-File Report 2010-1288, 37 p.
- Minsley, B.J.** and S. Ikard (2010), Geophysical investigations at Hidden Dam, Raymond, California—Flow simulations, U.S. Geological Survey Open-File Report 2010-1153, 64 p.
- Smith, B.D., J.D. Abraham, J.C. Cannia, **B.J. Minsley**, M. Deszcz-Pan, and L.B. Ball (2010), Helicopter electromagnetic and magnetic geophysical survey data, portions of the North Platte and South Platte Natural Resources Districts, Western Nebraska, May 2009, U.S. Geological Survey Open-File Report 2010-1259, 33 p.

- Eppinger, R.G., K.D. Kelley, D.L. Fey, S.A. Giles, **B.J. Minsley**, and S.M. Smith (2010), USGS exploration geochemistry studies at the Pebble porphyry CU-Au-Mo deposit, Alaska- PDF of presentation, U.S. Geological Survey Open-File Report 2010-1225, 64 p.
- Minsley, B.J.**, B.L. Burton, S. Ikard, and M.H. Powers (2010), Geophysical Investigations at Hidden Dam, Raymond, CA: Summary of Fieldwork and Data Analysis, U.S. Geological Survey Open-File Report 2009-1013, 25 p.
- Minsley, B.J.**, L.B. Ball, B.L. Burton, J.S. Caine, E. Curry-Elrod, and A.H. Manning (2010), Geophysical characterization of subsurface properties relevant to the hydrology of the Standard Mine in Elk Basin, Colorado, U.S. Geological Survey Open-File Report 2009-1284, 46 p.

PUBLICATIONS IN PROGRESS

- Minsley, B.J.**, J.D. Abraham, B.D. Smith, J.C. Cannia, C.I. Voss, M.T. Jorgenson, M.A. Walvoord, B.K. Wylie, L. Anderson, L.B. Ball, M. Deszcz-Pan, and T.P. Wellman (in press), Airborne electromagnetic imaging of discontinuous permafrost, *Geophysical Research Letters*.
- Minsley, B.J.**, B.D. Smith, R. Hammack, J. Sams, and G. Veloski (submitted July 2011), Calibration and filtering strategies for frequency domain electromagnetic data, *Journal of Applied Geophysics*.
- Araji, A.H., A. Revil, A. Jardani, **B.J. Minsley**, and M. Karaoulis (submitted February 2011), Imaging with cross-hole seismoelectric tomography, *Geophysical Journal International*.

ABSTRACTS & CONFERENCE PROCEEDINGS (PAST 12 MONTHS)

- Minsley, B.J.**, J.D. Abraham, P.A. Bedrosian, J.C. Cannia, and B.D. Smith (2011), Hydrogeophysics at the watershed-scale using airborne electromagnetic, Abstract H42F-08 presented at 2011 Fall Meeting, San Francisco, Calif., 4-8 Dec.
- Abraham, J.D., **B.J. Minsley**, J.C. Cannia, B.D. Smith, M.A. Walvoord, C.I. Voss, M.T. Jorgenson, B.K. Wylie, and L. Anderson (2011), Airborne electromagnetic mapping of subsurface permafrost, Abstract C51B-02 presented at 2011 Fall Meeting, San Francisco, Calif., 4-8 Dec. **INVITED**
- Pastick, N., B.K. Wylie, **B.J. Minsley**, M.T. Jorgenson, L. Ji, M.A. Walvoord, B.D. Smith, J.D. Abraham, and J. Rose (2011), Using remote sensing and ancillary data to extend airborne electromagnetic resistivity surveys for regional permafrost interpretation, Abstract C41B-0390 presented at 2011 Fall Meeting, San Francisco, Calif., 4-8 Dec.
- Smith, B.D., M.A. Walvoord, B.K. Wylie, C.I. Voss, N. Pastick, **B.J. Minsley**, S.M. Jepsen, M.T. Jorgenson, J.C. Cannia, J.D. Abraham, and L. Anderson (2011), New perspectives of permafrost distribution and its influence on groundwater flow and ecosystem performance for the Yukon Flats area, Northern Alaska, Abstract C41B-0389 presented at 2011 Fall Meeting, San Francisco, Calif., 4-8 Dec.
- Jepsen, S.M., C.I. Voss, M.A. Walvoord, **B.J. Minsley**, J. Rose, and B.D. Smith (2011), Disappearing Twelvemile Lake in Alaska's discontinuous permafrost: Scoping analysis of water budget, Abstract C21B-0469 presented at 2011 Fall Meeting, San Francisco, Calif., 4-8 Dec.
- Johnson, C.E., **B.J. Minsley**, J.S. Caine, D.V. Fitterman, and V.J.S. Grauch (2011), Delineation of aquifer heterogeneities using transient electromagnetic soundings in the Great Sand Dunes National Park, Geological Society of America Abstracts with Programs, 42(5), 277.
- Wellman, T.P., M.A. Walvoord, C.I. Voss, and **B.J. Minsley** (2011), Examination of Lake Talik Evolution and Recent Lake Drying in Yukon Flats, Alaska, using Coupled Groundwater and Heat Transport Modeling with Freeze-Thaw Capabilities, Modflow and More 2011: Integrated hydrologic modeling, Golden, Colorado.
- Minsley, B.J.**, G. Hodges, B.D. Smith, and J.D. Abraham (2011), Multi-elevation calibration of frequency domain electromagnetic data, 17th European Meeting of Environmental and Engineering Geophysics of the Near Surface Geoscience Division of EAGE, Leicester, England. **INVITED**
- Abraham, J.D., L.B. Ball, J.C. Cannia, T. Jorgenson, **B.J. Minsley**, B.D. Smith, M.A. Walvoord, B.K. Wylie, and C.I. Voss (2011), Airborne electromagnetic mapping of subsurface permafrost: Quantifiable characterization for now and in the future, Sixth International Conference on Arctic Margins, Fairbanks, Alaska.
- Minsley, B.J.**, J.D. Abraham, P.A. Bedrosian, J.C. Cannia, and B.D. Smith (2011), Hydrogeophysics at the watershed-scale using airborne electromagnetic, NovCare Conference, Brewster, Massachusetts. **INVITED KEYNOTE**.
- Minsley, B.J.**, G. Hodges, B.D. Smith, and J.D. Abraham (2011), Multi-elevation calibration of frequency domain electromagnetic data, 24th Symposium on the Application of Geophysics to Engineering and Environmental Problems, Charleston, South Carolina. **BEST PAPER AWARD**

- Smith, B.D., G. Hodges, **B.J. Minsley**, B. Astley, J.D. Abraham, and C. Snyder (2011), Results from two helicopter electromagnetic test lines to map permafrost, Ft. Wainwright, Fairbanks, Alaska, 24th Symposium on the Application of Geophysics to Engineering and Environmental Problems, Charleston, South Carolina.
- Sams, J., B.D. Smith, G. Veloski, B.J. Minsley, and B.L. Burton (2011), Fourth year of subsurface drip irrigation monitoring using GEM-2 electromagnetic surveys, Powder River Basin, Wyoming, 24th Symposium on the Application of Geophysics to Engineering and Environmental Problems, Charleston, South Carolina.
- Viezzoli, A., J.D. Abraham, P.A. Bedrosian, J.C. Cannia, **B.J. Minsley**, and B. Brown (2011), Fast and effective groundwater mapping from 10 to 300 m with accurate processing and inversion of SkyTEM data, 24th Symposium on the Application of Geophysics to Engineering and Environmental Problems, Charleston, South Carolina.
- Bedrosian, P.A., **B.J. Minsley**, E. Auken, A.V. Christiansen, and J.D. Abraham (2011), An intercomparison of airborne electromagnetic systems for hydrogeologic studies, 24th Symposium on the Application of Geophysics to Engineering and Environmental Problems, Charleston, South Carolina.

*** Full abstract and conference proceedings list available upon request ***