

# Geophysics for USGS Groundwater/Surface-water Interaction Studies: Recent Publications from the USGS Hydrogeophysics Branch

## Hydroecology

- Anderson, R.B., Naftz, D.L., Day-Lewis, F.D., Henderson, R.D., Rosenberry, D.O., Stolp, B.J., and Jewell, P., 2014, Quantity and quality of groundwater discharge in a hypersaline lake environment: *Journal of Hydrology*, vol. 512, pp. 177-194, <http://dx.doi.org/10.1016/j.jhydrol.2014.02.040>.
- Briggs, M.A., and Hare, D.K., 2018, Explicit consideration of preferential groundwater discharges as surface water ecosystem control points: *Hydrological Processes*, Invited Commentary, <http://dx.doi.org/10.1002/hyp.13178>.
- Briggs, M.A., Day-Lewis, F.D., Zarnetske, J.P., and Harvey, J.W., 2015, [A physical explanation for the development of redox microzones in hyporheic flow](#): *Geophysical Research Letters*, vol. 42, <http://dx.doi.org/10.1002/2015GL064200>.
- Briggs, M.A., Lutz, L.K., Buckley, S.F., Lane, J.W., 2014, Practical limitations on the use of diurnal temperature signals to quantify groundwater upwelling: *Journal of Hydrology*, vol. 519, pp. 1739-1751. <http://dx.doi.org/10.1016/j.jhydrol.2014.09.030>.
- Briggs, M.A., Lutz, L.K., Hare, D.K., and González-Pinzón, R., 2013, Relating hyporheic fluxes, residence times, and redox-sensitive biogeochemical processes upstream of beaver dams: *Freshwater Science*, vol. 32, no. 2, <http://dx.doi.org/10.1899/12-110.1>.
- Rosenberry, D.O., Briggs, M.A., Voytek, E.B., and Lane, J.W., 2016, Influence of groundwater on distribution of dwarf wedgemussels (*Alasmidonta heterodon*) in the upper reaches of the Delaware River, *Hydrology and Earth System Sciences*, 20, <http://dx.doi.org/10.5194/hess-20-4323-2016>.

## Climate Change

- Briggs, M.A., Campbell, S., Nolan, J., Walvoord, M.A., Ntarlagiannis, D., Day-Lewis, F.D., and Lane, J.W., 2017, Surface Geophysical Methods for Characterising Frozen Ground in Transitional Permafrost Landscapes, *Permafrost and Periglacial Processes*, 28(1), <http://dx.doi.org/10.1002/ppp.1893>.
- Briggs, M.A., Johnson, Z.C., Snyder, C.D., Hitt, N.P., Kurylyk, B.L., Lutz, L., Irvine, D.J., Hurley, S.T., and Lane, J.W., 2018, Inferring watershed hydraulics and cold-water habitat persistence using multi-year air and stream temperature signals: *Science of the Total Environment*, <http://dx.doi.org/10.1016/j.scitotenv.2018.04.344>.
- Briggs, M.A., Lane, J.W., Snyder, C.D., White, E., Johnson, Z.C., Nelms, D., and Hitt, N.P., 2018, Shallow mountain bedrock limits seepage-based headwater climate refugia, *Limnologia*, <http://dx.doi.org/10.1016/j.limno.2017.02.005>.

Briggs, M.A., Walvoord, M.A., McKenzie, J.M., Voss, C.I., Day-Lewis, F.D., and Lane, J.W., 2014, [New permafrost is forming around shrinking arctic lakes, but will it last?: Geophysical Research Letters](https://doi.org/10.1002/2014GL059251), <http://dx.doi.org/10.1002/2014GL059251>.

Lane, J.W., Briggs, M.A., Kulongoski, J.T., and Pollock, A., 2013, Evaluating hydrologic response to land cover and climate change -- An example from Palmyra Atoll National Wildlife Refuge [abs.], in AGU fall meeting, San Francisco, California, 9-13 December 2013: Washington, D.C., American Geophysical Union.

## **Water Quality and Contaminant Transport**

Anderson, R.B., Naftz, D.L., Day-Lewis, F.D., Henderson, R.D., Rosenberry, D.O., Stolp, B.J., and Jewell, P., 2014, Quantity and quality of groundwater discharge in a hypersaline lake environment: *Journal of Hydrology*, vol. 512, p. 177-194, <https://doi.org/10.1016/j.jhydrol.2014.02.040>.

Briggs, M.A., Day-Lewis, F.D., Dehkordy, F.M., Hampton, T., Zarnestke, J., Scruggs, C.R., Singha, K., Harvey, J., and Lane, J.W., 2018, Direct observations of hyporheic exchange occurring with less-mobile porosity and the development of anoxic microzones in sandy lakebed sediments: *Water Resources Research*, <http://dx.doi.org/10.1029/2018WR022823>.

Briggs, M.A., Day-Lewis, F.D., Ong, J.B.T., Curtis, G.P., and Lane, J.W., 2013, [Simultaneous estimation of local-scale and flow path-scale dual-domain mass transfer parameters using geoelectrical monitoring](http://dx.doi.org/10.1002/wrcr.20397): *Water Resources Research*, vol. 49, p. 5615-5630, <http://dx.doi.org/10.1002/wrcr.20397>.

Briggs, M.A., Gooseff, M.N., Arp, C.D. and Baker, M.A., 2009, A Method for estimating surface transient storage parameters for streams with concurrent hyporheic storage, *Water Resources Research*, vol. 45, no. 4, 13 p., <http://dx.doi.org/10.1029/2008WR006959>.

Day-Lewis, F.D., Linde, N., Haggerty, R., Singha, K., and Briggs, M.A., (2017), Pore-Network Modeling of the Electrical Signature of Solute Transport in Dual-Domain Media, *Geophysical Research Letters*, <http://dx.doi.org/10.1002/2017GL073326>.

Dehkordy, F.M.P., Briggs, M.A., Day-Lewis, F.D., and Bagtzoglou, A.C., 2018, Simulation of less-mobile porosity dynamics in contrasting groundwater/surface water interface sediments: submitted for publication in *Hydrologic Processes*, <http://dx.doi.org/10.1002/hyp.13134>.

Johnson, T.C., Slater, L.D., Ntarlagiannis, D., Day-Lewis, F.D., and Elwaseif, M., 2012, Monitoring groundwater/surface-water interaction using time-series and time-frequency analysis of transient three-dimensional electrical resistivity changes, *Water Resources Research*, vol. 48, W07506, <http://dx.doi.org/10.1029/2012WR011893>.

McCobb, T., Briggs, M.A.; LeBlanc, D., Day-Lewis, F.D., and Johnson, C.D., 2018, Evaluating long-term patterns of decreasing groundwater discharge through a lake-bottom permeable reactive barrier: *Journal of Environmental Management*, v. 220: p. 233–245, <http://dx.doi.org/10.1016/j.jenvman.2018.02.083>.

- Mwakanyamale, K., Day-Lewis, F.D., Slater, L., 2013, Statistical mapping of zones of focused groundwater/surface-water exchange using fiber-optic distributed temperature sensing, *Water Resources Research*, 49, 6979–6984, <http://dx.doi.org/10.1002/wrcr.20458>.
- Mwakanyamale, K., Slater, L., Day-Lewis, F.D., Elwaseif, M., Ntarlagiannis, D., and Johnson, C.D., 2012, Spatially variable stage-driven groundwater-surface water interaction inferred from time-frequency analysis of distributed temperature sensing data, *Geophysical Research Letters*, <http://dx.doi.org/10.1029/2011GL050824>.
- Slater, L.D., Ntarlagiannis, D., Day-Lewis, F.D., Mwakanyamale, K., Versteeg, R.J., Ward, A., Strickland, C., Johnson, C.D., and Lane, J.W., Jr., 2010, Use of electrical imaging and distributed temperature sensing methods to characterize surface water-groundwater exchange regulating uranium transport at the Hanford 300 Area, Washington, *Water Resources Research*, 46, W10533, <http://dx.doi.org/10.1029/2010WR009110>.

### Coastal Studies

- Henderson, R.D., Day-Lewis, F.D., and Harvey, C.F., 2009, Investigation of aquifer-estuary interaction using wavelet analysis of fiber-optic temperature data, *Geophysical Research Letters*, 36, L06403, <http://dx.doi.org/10.1029/2008GL036926>.
- Henderson, R.D., Day-Lewis, F.D., Harvey, C.F., Abarca, E., Karam, H.N., Liu, L. and Lane, J.W., Jr., 2010, Marine Electrical Resistivity Imaging of Submarine Ground-Water Discharge: Sensitivity Analysis and Application in Waquoit Bay, Massachusetts, USA, *Hydrogeology Journal*, Vol. 18, No. 1, 173-185, <http://dx.doi.org/10.1007/s10040-009-0498-z>.
- Kurylyk, B.L., Irvine, D.J., Mohammed, A.A., Bense, V.F., Briggs, M.A., Loder, J.W., and Geshelin, Y., 2018, Rethinking the use of seabed sediment temperature profiles to trace submarine groundwater flow, *Water Resources Research*, <http://dx.doi.org/10.1029/2017WR022353>.

### New and Emerging Methods

- Briggs, M.A., Buckley, S.F., Bagtzoglou, A.C., Werkema, D., and Lane, J.W., 2016, Actively heated high-resolution fiber-optic distributed temperature sensing to quantify flow dynamics in zones of strong groundwater upwelling, *Water Resources Research*, 52, <http://dx.doi.org/10.1002/2015WR018219>.
- Briggs, M.A., Dawson, C.B., Holmquist-Johnson, C.L., Williams, K.H., and Lane, J.W., in-press 2018, Efficient hydrogeological characterization of remote stream corridors using drones: *Hydrological Processes (HPEye)*, <http://dx.doi.org/10.1002/hyp.13332>.
- Briggs, M.A., Day-Lewis, F.D., Ong, J.B., Harvey, J.W., and Lane, J.W., 2014, Dual-domain mass-transfer parameters from electrical hysteresis: Theory and analytical approach applied to laboratory, synthetic streambed, and groundwater experiments: *Water Resources Research*, vol. 50, no. 10, pp.8281–8299, <http://dx.doi.org/10.1002/2014WR015880>.
- Briggs, M.A., Hare, D.K., Boutt, D.F., Davenport, G., and Lane, J.W., 2016, Time-lapse thermal infrared captures groundwater discharge at micro- and macro-scales (video format), *Hydrological Processes (HPEye)*, <http://dx.doi.org/10.1002/hyp.10722>.

- Briggs, M.A., Lautz, L.K. and Hare, D.H., 2014, Residence time control on hot moments of net nitrate production and uptake in the hyporheic zone: Hydrological Processes, <http://dx.doi.org/10.1002/hyp.9921>.
- Hare, D.K., Briggs, M.A., Rosenberry, D.O., Boutt, D.F., and Lane, J.W., 2015, A comparison of thermal infrared to fiber-optic distributed temperature sensing for evaluation of groundwater discharge to surface water, Journal of Hydrology, 530, <http://dx.doi.org/10.1016/j.jhydrol.2015.09.059>.
- Irvine, D, Lautz, L.K., Briggs, M.A., Gordon, R.P., and McKenzie, J.M., 2015, Experimental evaluation of the applicability of phase, amplitude, and combined methods to determine water flux and thermal diffusivity from temperature time series using VFLUX 2, Journal of Hydrology, 531, <http://dx.doi.org/10.1016/j.jhydrol.2015.10.054>.
- Irvine, D.J., Briggs, M.A., Cartwright, I., Scruggs, C., and Lautz, L.K., 2016, Improved vertical streambed flux estimation using multiple diurnal temperature methods in series, Groundwater, 55(1), <http://dx.doi.org/10.1111/gwat.12436>.
- Irvine, D.J., Briggs, M.A., Lautz, L.K., Gordon, R.P., McKenzie, J., and Cartwright, I., 2016, Using diurnal temperature signals to infer vertical groundwater-surface water exchange, Groundwater, <http://dx.doi.org/10.1111/gwat.12459>.
- Koch, F., Voytek, E.B., Day-Lewis, F.D., Healy, R., Briggs, M.A., Lane, J.W., and Werkema, D., 2015, 1DTempPro V.2: New Features for Parameter Estimation, Heterogeneity, and Time-Varying Exchange, Groundwater, <http://dx.doi.org/10.1111/gwat.12369>.
- Kurylyk, B.L., Irvine, D.J., Carey, S., Briggs, M.A., Werkema, D., and Bonham, M., 2017, Heat as a hydrologic tracer in shallow and deep heterogeneous media: analytical solution, spreadsheet tool, and field applications, Hydrological Processes, <http://dx.doi.org/10.1002/hyp.11216>.
- Pai, H., Malenda, H., Briggs, M.A., Singha, K., González-Pinzón, R., Gooseff, M., Tyler, S.W., and AirCTEMPS Team, 2017, Potential for small unmanned aircraft systems applications for identifying groundwater-surface water exchange in a meandering river reach: Geophysical Research Letters, <http://dx.doi.org/10.1002/2017GL075836>.
- Rosenberry, D.O., Briggs, M.A., Delin, G., and Hare, D.K., 2016, Combined use of thermal methods and seepage meters to efficiently locate, quantify, and monitor focused groundwater discharge to a sand-bed stream, Water Resources Research, <http://dx.doi.org/10.1002/2016WR018808>.
- Singha, K., Pidlisecky, A., Day-Lewis, F.D., and Gooseff, M.N., 2008, Electrical characterization of non-Fickian transport in groundwater and hyporheic systems, Water Resources Research, 44, W00D07, <http://dx.doi.org/10.1029/2008WR007048>.
- Voytek, E.B., Drenkelfuss, A., Day-Lewis, F.D., Healy, R., Werkema, D., and Lane, J.W., Jr., 2014, [1DTempPro -- Analyzing temperature profiles for groundwater/surface-water exchange](http://dx.doi.org/10.1111/gwat.12051): Groundwater, vol. 52, no. 2, p. 298-302, <http://dx.doi.org/10.1111/gwat.12051>.