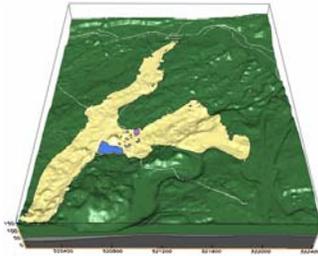


Geochemical Sciences Branch, CRREL

Sarah E. Kopczynski

Research Physical Scientist

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3D Hydrogeological Aquifer
Facies Model

As a PI, I have scientific expertise in three-dimensional modeling of aquifers and plumes in permafrost and bedrock; geophysical environmental site characterization using ground-penetrating radar; shallow seismic refraction tomography, electro-magnetics, and DC resistivity; hydrological site assessments to determine groundwater flow and contaminant migration pathways. I also have project management responsibilities in my role managing a specialized team of Army scientists to support four reimbursable projects for USARAK.

Areas of Specialization

- Three dimensional modeling of subsurface geology
- Interpretation and modeling of groundwater flow
- Interpretation of permafrost hydrology
- Mathematical analysis of cyclic forcings
- Application of geophysical prospecting including near surface seismic refraction, DC resistivity and ground penetrating radar to environmental investigations

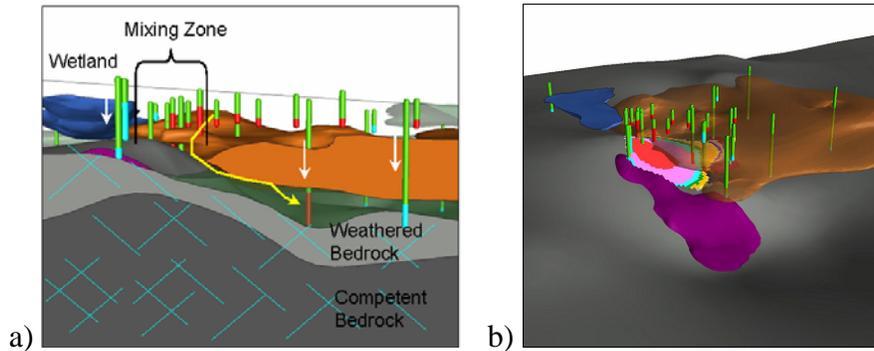
Current Projects *(All current projects funded through US Army Alaska)*

- Three-dimensional modeling of subsurface hydrogeology in Alaska
- Long-term hydrological monitoring in Fairbanks, Alaska
- Interpretation of the historical extent of permafrost at a contaminated aquifer in Alaska.
- Three-dimensional modeling of bedrock structure, surficial geology and permafrost

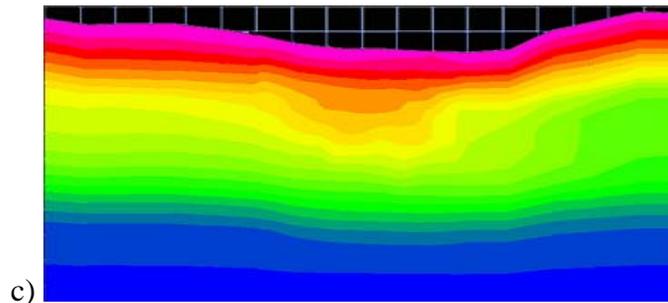
Notable Contributions or Highlights from Past Projects

- Developed numerical of unconfined regional groundwater model of the Fort Richardson, AK watershed
- Quantified hydraulic properties in a fractured bedrock aquifer through harmonic

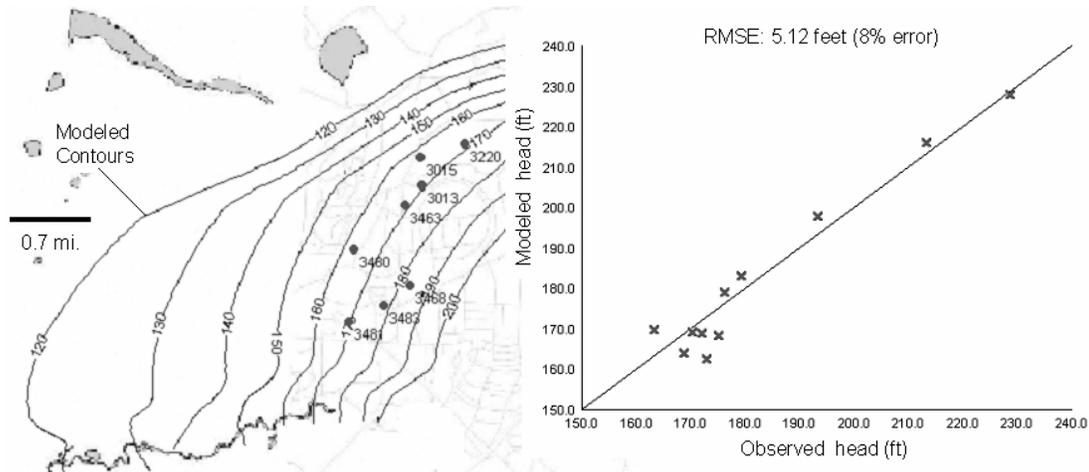
- analysis of Earth Tides (lunar induced fluctuations in groundwater levels).
- Developed a lumped parameter water balance model to simulate annual runoff of a glacial fluvial system
- Quantified the spatial, temporal and mineralogical variations in suspended sediment at the Matanuska River



3D Modeling: 3D Views of a subsurface model constructed to illustrate the potential flow pathways over impermeable units (red and orange) through more permeable gravel, sand and bedrock units. Flow pathways a) and contaminant plumes b) are superimposed on the 3D model with screened intervals of monitoring wells.



Geophysical Interpretations: Shallow seismic refraction profile c) showing a low-on-high velocity anomaly in central portion of profile indicating a possible fractured or weathered bedrock zone. Such zones can be hydraulically significant and thus important to inferring potential contaminant migration and groundwater flow pathways.



Groundwater Modeling: Numerical groundwater simulations of regional unconfined groundwater flow in Alaska. Study identified important forcings that influenced local and regional flow.

Education

- MSc, Hydrology, University of New Hampshire, Durham NH, 2000
- Geological Field Camp, Indiana University, Bloomington IA, 1998
- BA, Geology & Mathematics, Colby College, Waterville ME, 1998 (Honors)

Other Professional Information

- Memberships/Professional Organizations
 - American Geophysical Union (AGU)
 - Geological Society of America (GSA)
 - United States Permafrost Association (USPA)
 - International Glaciological Society (IGS)
 - American Quaternary Association (AMQUA)
- Awards
 - NH Federal Executive Association Award (2000 & 1996)
 - S.S. and I.M.F. Marsden Geology Award, Colby College (1998)
 - Indiana University Scholarship, Geologic Field Station (1998)
 - “Best Oral Presentation of Original Research” Geological Society of Maine (1998 & 1997)
 - Presidential Academic Merit Scholarship, Colby College (1994 – 1998)
- Research Grants
 - University of New Hampshire, Herndon Earth Sciences Research Grant,

- “Regional numerical groundwater model of Fort Richardson, AK” (2001)
- New Hampshire Geological Society Grant, “An analytical water balance model of a temperate Alaskan glacier” (2000)
 - Geological Society of America, Research Grant, “Modeling earth tidal fluctuations in a fractured bedrock aquifer” (1997)

Contact Information

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Journal Papers

Kopczynski, Sarah, E., Lawson, Daniel E., Snyder, Colby F., and Arcone, Steven. July 2003. Three-dimensional modeling of a complex permafrost environment. International Permafrost Association and International Conference on Permafrost, Zurich, Switzerland.

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Denner, J.C., Lawson, D.E., Larson, G., Evenson, E.B., Alley, R.B., Strasser, J.C., Kopczynski, S.E, 1999. Seasonal variability in hydrologic system response to intense rain events, Matanuska Glacier, Alaska, USA. *Annals of Glaciology*. Vol. 28. Pp. 267 – 271

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Snyder, Colby F., Kopczynski, Sarah E., Astely, Beth, January 2003. Summary of the aquifer and permafrost model update, Birch Hill Tank Farm and Truck Fill Stand, OU3 Fort Wainwright, Alaska. DoD CRREL Update Report. Cold Regions Research and Engineering Laboratory. Prepared for the US Army Director of Public Works, Alaska. (February 2003)

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Bigl, Susan R. and Kopczynski, Sarah E. November 2002. Preliminary observations from Geophysical Investigations Conducted at the Poleline Disposal Area, OUB, Fort Richardson, Alaska, Summer 2002. DoD CRREL Field Update Report. Cold Regions Research and Engineering Laboratory. Prepared for the US Army Director of Public Works, Alaska.

Kopczynski, Sarah, E., Epps, Sarah A., Bigl, Susan R., Myse, Todd, Williams, Christopher R., and Hall, Tommie. June 2002. Ground Water Flow between 1995 and 2000 at Operable Unit 5, Fort Richardson, Alaska. DoD CRREL Contract Report. Cold Regions Research and Engineering Laboratory. Prepared for the US Army Director of Public Works, Alaska.

Heiser, Patricia A., Kopczynski, Sarah E. Delaney, Allan., Epps, Sarah., Lawson, Daniel E. February 2002. Preliminary Geophysical Investigations at the Poleline Road Disposal Area, Fort Richardson AK. DoD CRREL Interim Report. Cold Regions Research and Engineering Laboratory. Prepared for the US Army Director of Public Works, Alaska

Bigl, Susan R., Lawson, Daniel E., Holmes, Jamie V., Kopczynski, S. E., and Weyrick, Patricia B. December 2001. Fjord Oceanographic Processes Muir Inlet, Glacier Bay, Alaska, 1994-2000. USACE – CRREL. Hanover, NH.

Kopczynski, S.E., and Lawson, Daniel E. November 2001. Preliminary Hydrogeological Interpretations of the Poleline Road Disposal Area, Fort Richardson, Alaska. Interim Draft Report. USACE – CRREL. Hanover, NH.

Conference Papers

Kopczynski, S.E., Lawson, D.E., Finnegan, D., Bigl, S.R., and E. Evenson. October 2002. Three-dimensional Geological Modeling of Complex Glacial Deposits. In 'Three-dimensional Geological Mapping for Ground Water Applications.' Geological Survey of Canada, Open File 1449.

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Lawson, Daniel E., Finnegan, David C, Bigl, Susan R and Kopczynski, Sarah E, and Magilligan, Frank. December 2003. Possible asynchronous glacial expansion during climatic warming in the Holocene, Glacier Bay region, Alaska

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Finnegan, David C, Lawson, Daniel E., Kopczynski, Sarah E, and Bigl, Susan R. December 2003. Long-term Studies of Tidewater and Terrestrial Dynamics, Glacier Hydrology, and Holocene and Historic Climate Activity; Glacier Bay, Southeast Alaska. American Geophysical Union, Abstract Proceedings, December 2003.

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Kopczynski, S. E., Lawson, D.E., and Denner, J.C., 1999: Preliminary Results From the Application of the BROOK90 Hydrologic Water Balance Model to a Glacierised Basin in South Central Alaska. Abstracts with Programs, Geological Society of America, v. 31, no. 1.

Kopczynski, S. E., 1998: Suspended Sediment Investigations at the Matanuska Glacier, Palmer, Alaska. *Maine Geologist*, v 24, no 2

Kopczynski, S. E., and Doss, P.K., 1997: The Utility of Earth Tides For Evaluating Physical Parameters of Fractured Bedrock Aquifers. *Maine Geologist*, v. 23 no. 2.

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