Elizabeth J. Olson

CURRICULUM VITAE

Department of Geosciences, Union College, Schenectady, NY 12308
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RESEARCH INTERESTS

Geochemistry, paleoclimate, hydrology, and aerosol chemistry. My research focuses on investigating critical zone processes of environmental change through geochemistry. This includes understanding spatial and temporal variability recorded in various atmospheric, biologic and hydrologic materials using modeling and isotopic tracers. All aspects of my research focus on determining environmental and/or climatic change impacts over time.

POSITIONS HELD

2022-Present Postdoctoral researcher, Union College

2022-2019 Postdoctoral researcher, Purdue University

2018 Lecturer, Triton College

2018 Lecturer, Harold Washington College

2017–2013 Teaching Assistant/Lecturer, Northern Illinois University

2012–2010 Research Assistant, University of Maine

2010–2007 Assistant Curator, Florida Museum of Natural History

EDUCATION

2018 Ph.D., Geology and Environmental Geosciences
Northern Illinois University, DeKalb, Illinois
Advisor: J.P. Dodd
Dissertation: Hydrogen, carbon and oxygen isotopes in Prosopis sp. trees: a new climate proxy for Holocene paleoclimate in the Atacama Desert, Chile

2012 M.S., Quaternary and Climate Studies
University of Maine, Orono, Maine
Advisor: D. Sandweiss
Thesis: Climate, Environment, Geomorphology and Settlement during the Preceramic Period at the Salinas de Chao, North Coast of Peru

2010 B.A., Geology and Anthropology, *summa cum laude*
University of Florida; Gainesville, Florida (2010)
Advisors: K. Emery and J. Krigbaum
Thesis: Zoometric Breed Analysis and Isotopic Paleodietary Reconstruction of the Maya Dog

PUBLICATIONS

2024

Olson, E.J., Welp, L.R., Frisbee, M.D., Medina, S.A.Z., Alvarez, C.O., Quispe, W.R.R., Carrion, M.A., Mamani, C.I.S., Rodriguez, J.D., Jara, J.M., Ccanccapa-Cartagena, A., and Jafvert, C.T., Spatially-heterogeneous discharge of glacial meltwater to drainages surrounding the ablating Coropuna ice cap, Peruvian Andes; *Hydrologic Science Journal, in press*

2022

Welp, L. R., **Olson, E. J.,** Valdivia, A. L., Larico, J. R., Arhuire, E. P., Paredes, L. M., and Michalski, G. M. 2022, Reinterpreting Precipitation Stable Water Isotope Variability in the Andean Western Cordillera Due To Sub-Seasonal Moisture Source Changes and Sub-Cloud Evaporation. *Geophysical Research Letters*, 49(18), e99876.

Michalski, G., **Olson, E.,** Valdivia, A. L., Reyes, J. L., Li, J., Fang, H., and Welp, L. 2022, Identifying NOx sources in Arequipa, Peru using nitrogen isotopes in particulate nitrate. *Frontiers in Environmental Science*, 864.

Alvarez, O., **Olson, E.J.,** Frisbee, M.D., Medina, S.A.Z., Quispe, W.R.R., Carrion, M.A., Mamani, C.I.S., Rodriguez, J.D., Ccanccapa-Cartagena, A.D., Jafvert, C.T., and Welp, L.R., 2022, Evidence for high-elevation salar recharge and interbasin groundwater flow in the Western Cordillera of the Peruvian Andes; *Hydrology and Earth System Sciences. 1-35*

2021

Olson, E.J., Michalski, G., Welp, L., Larrea, A.V., Reyes, J., and Li, J. 2021, Mineral dust and fossil fuel combustion dominate sources of aerosol sulfate in urban Peru identified by sulfur stable isotopes and water-soluble ions; *Atmospheric Environment*, 260, 118482

Li J, Michalski G, **Olson E.J.**, Welp LR, Larrea Valdivia AE, Larico JR, Zapata FA, Paredes LM. 2021, Geochemical Characterization and Heavy Metal Sources in PM_{10} in Arequipa, Peru; *Atmosphere*, 12(5):641.

Ccanccapa-Cartagena, A., Paredes, B., Vera, C., Chavez-Gonzales, F. D., **Olson, E. J.**, Welp, L. R., Zyaykina, N.N., Filley, T. R., Warsinger, D. M., Jafvert, C. T., 2021, Occurrence and probabilistic health risk assessment (PRA) of dissolved metals in surface water sources in Southern Peru. *Environmental Advances*, 100102.

2020 **Olson, E. J.,** Dodd, J. P., & Rivera, M. A., 2020, Prosopis sp. tree-ring oxygen and carbon isotope record of regional-scale hydroclimate variability during the last 9500 years in the Atacama Desert; *Palaeogeography, Palaeoclimatology, Palaeoecology*, 529, 109408

2016 Jayne, R.S., Pollyea, R.M, Dodd, J.P., **Olson, E.J.,** and Swanson, S.K.,2016, Regional-scale groundwater flow in the Pampa del Tamarugal Basin, Atacama Desert, Chile; *Hydrogeology Journal*, 24 (8), 1921–1937.

2013 deFrance, S. and **Olson, E**., 2013, Late Prehispanic Coquina Quarrying and Tomb Construction in Coastal Southern Peru; *Journal of Island & Coastal Archaeology*, 8(1), 3-16.

Manuscripts in Preparation
In Review

In Revision

AWARDS

Research

2021 Purdue Climate Change Research Center Video Competition, First place postdoctoral category, **https://youtu.be/6WnvnBvetTo**

2017 Marie Morisawa Award Quaternary Geology and Geomorphology Division of the Geological Society of America

2017 National Geographic Waitt Grant with Dr. Susan deFrance at University of Florida

2016 Inter-university Training for Continental-scale Ecology Research in Residence Grant with Dr. Chris Still at Oregon State University

2016 Lewis and Clark Exploration Grant American Philosophical Society

2015 Student Travel Grant from Graduate School Northern Illinois University

2014 Student Research Grant from the Geological Society of America

2014 Goldich Fund Student Research Grant from Department of Geology Northern Illinois University

2014 Tilford Field Studies Scholarship from the Association of Environmental and Engineering Geologists

2011 Dan and Betty Churchill Exploration Fund

2009 University Scholars Research Award, University of Florida

Academic

2017 Dissertation Completion Scholarship Graduate School Northern Illinois University

2016 Carla Montgomery Scholarship Department of Geology Northern Illinois University

2016 Outstanding Graduate Student of the Year Department of Geology Northern Illinois University

2016 Scholarship to LacCore Drilling and Coring Summer Institute, University of Minnesota Short course

2016 Scholarship to SIMS (Secondary Ion Mass Spectrometry) Short Course, Arizona State University Short course

2015 Scholarship to SPATIAL (Spatio-temporal Isotope Analytics Lab) Short Course, University of Utah Short course

2006 Florida Bright Futures Academic Scholarship

PRESENTATIONS

2023 Olson, E.J., Parmenter, D., Gillikin, D.P., Stolteenbereg, H., Clavel, A., Piccirillo, L., Verheyden, A., Edwards, R.L., Rodbell, D.T., Middle Pleistocene hydroclimate changes in the Tropical Andes inferred from carbon and oxygen isotope records of speleothems from Huagapo Cave, Peru, Geologic Society of America Conference. Pittsburg, PA

Forsyth, A., Litchfield, K., Olson, E.J., Gillikin, D.P., Stolteenburg, H., Ramjohn, M., Parmenter, D., Stolteenbereg, H., Clavel, A., Piccirillo, L., Verheyden, A., Edwards, R.L., Gillikin, D.P., Rodbell, D.T., Karst hydrologic control on oxygen isotope variability of cave drip water: A regional cave monitoring study from the Peruvian Andes, Geologic Society of America Conference. Pittsburg, PA

Parmenter, D., Olson, E., Valasquez, K. Stolteenbereg, H., Clavel, A., Piccirillo, L., Verheyden, A., Gillikin, D.P., Rodbell, D.T., Edwards, R.L., A multi-proxy speleothem approach to understanding the South American Monsoon System during the Last Glacial Cycle, American Geophysical Union Conference. San Francisco, CA

2022 **Olson, E.J., Gillikin, D.P., Clavel, A., Piccirillo, L., Nazir, S., Snider, N., Verheyden, A., Parmenter, D., Edwards, R.L., Rodbell, D.T.,** Determining the source of speleothem $\delta^{18}O$ variability from in situ measurements of seasonal and inter-annual isotope trends in precipitation, cave drip water and modern calcite from sites in the Central Peruvian Andes, American Geophysical Union Conference. Chicago, IL

2021 **Olson, E.J.,** Michalski, G., Welp, L.R., Frisbee, M.D., V. Larrera, A., L. Reyes, J., Isotopic evidence for fog-fed groundwater recharge near lomas forests along the arid Atacama-Sechura coastal desert, American Geophysical Union Conference. New Orleans, LA- virtual attendance

2020 **Olson, E.J.,** Welp, L.R., Frisbee, M.D., Alvarez, O., Medina, S.A.Z., Quispe, W.R.R., Carrion, M.A., Mamani, C.I.S. and Rodriguez, J.D.,Tracing the impact of glacial melt on the hydrology of the Andean Nevado Coropuna glacier and adjacent drainages. American Geophysical Union Conference. San Francisco, CA- virtual attendance

2019 **Olson, E.**, Michalski, G., V. Larrera, A., L. Reyes, J., and Welp, L., Sulfur Isotope Constraints on PM2.5 Sulfate Aerosol Sources in Arequipa, Peru, American Geophysical Union Conference. San Francisco, CA

2019 **Olson, E.**, Welp, L., DeGraw, J., V. Larrera, A., L. Reyes, J. and Michalski, G., 2019 Stable isotope variations in monsoon precipitation related to atmospheric moisture transport in southern Peru, CLIVAR Water Isotopes and Climate Workshop. Boulder, CO.

2018 **Olson, E.**, Dodd, J., and Rivera, M., South American Monsoon Variability Over the Holocene Recorded in High-Resolution Tree Ring Oxygen Isotope Series from the Atacama Desert, American Geophysical Union Conference, Washington, D.C.

2018 **Olson, E.**, Dodd, J., and Rivera, M., Isotopic disequilibrium in Prosopis tree cellulose as an indicator of water stress and hydroclimate variability, Midwest Geobiology Conference, Evanston, IL

2017 **Olson, E.**, Dodd, J., and Rivera, M., Climate variability over the Holocene in the Atacama Desert of Chile as reconstructed from tree ring isotope series, European Geosciences Union General Assembly, Vienna, Austria

2016 **Olson, E.**, Dodd, J., and Rivera, M., Examining Basin-Scale Water and Climate Relations across the Pampa del Tamarugal, Atacama Desert through Spatial Analysis of Hydrogen, Carbon and Oxygen Isotopes in Tree Rings, American Geophysical Union Conference, San Francisco, CA

2016 **Olson, E.** Dodd, J., Diefendorf, A., and Freimuth, E., Reconstructing $\delta^{18}O$ in groundwater from tree-ring cellulose in arid regions, Midwest Geobiology Conference, Cincinnati, OH

2015 **Olson, E.** and Dodd, J, Spatial and temporal variation in tree-ring α-cellulose oxygen and hydrogen isotope values as a record of water availability in the Atacama Desert, American Geophysical Union Conference, San Francisco, CA

2015 **Olson, E.**, Dodd, J., and Rivera, M., Tree Ring Isotope Record of Climate Change at the site of Ramaditas in the Atacama Desert of Northern Chile, Society of American Archaeology Conference, San Francisco, CA

2014 **Olson, E.**, Dodd, J., and Rivera, M., Mid-Holocene Water Availability in the Atacama Desert, Chile Recorded in Tree Ring Oxygen Isotope Variability at the Ramaditas Archaeological Site: Evidence for Climate Change and Anthropogenic Landscape Alteration, PAGES (Past Global Changes) LOTRED-SA 3rd symposium on Climate change and human impact in Central and South America over the last 2000 years: Observations and Models Conference Abstracts with Programs, Medellín, Colombia.

2014 **Olson, E.**, Dodd, J., and Rivera, M., Holocene Water Availability in the Atacama Desert as Recorded by Seasonal Tree Ring Oxygen Isotope Variations, Goldschmidt Conference Abstracts with Programs, Annual Meeting, Sacramento, CA.

2014 **Olson, E.**, Emery, K. & Krigbaum, J., Head to Tail: Maya Dog Breeds and Diet, Midwest Mesoamericanist Meeting Abstracts with Programs, Annual Meeting, Dekalb, IL.

2011 **Olson, E**., Geoarchaeology of the Salinas de Chao Paleoembayment: Northeast Conference on Andean Archaeology and Ethnohistory Abstracts with Programs, Annual Meeting, Andover, MA.

EXPERIENCE

Laboratory Research

2019–Present Postdoctoral Researcher, Purdue Stable Isotope Facility, Department of Earth, Atmospheric and Planetary Sciences, Instrumentation: Thermo Scientific IRMS Delta V, Costech EA and Los Gatos Research Liquid Water Isotope Analyzer Purdue Civil Engineering Analytical Laboratories, Instrumentation: Metrohm Ion Chromatograph

2018 Strontium Isotope Research at University of Illinois Urbana-Champagne Instrumentation: Nu Plasma HR multicollector inductively-coupled plasma mass spectrometer (MS-ICPMS)

2017 Intern working on Carbon-Cycling Semantic Ontologies NSF DataOne Arctic Research Center Internship at the University of Santa Barbara California and National Center for Ecological Analysis and Synthesis

2016	Intern working on modeling metropolitan water-energy use relations at the Center for Energy, Environmental, and Economic Systems Analysis (CEESA) Argonne National Laboratory
2014–2015	Lab Manager Stable Isotope Geochemistry Laboratories Northern Illinois University
2010–2012	Research Assistant Sedimentology and GIS Laboratory University of Maine Climate Change Institute
2009–2010	Researcher Stable Isotope Laboratory University of Florida Geology Department
2009–2010	Researcher Bone Chemistry Laboratory University of Florida Anthropology Department
2008–2009	Lab Technician Hydrochemistry Laboratory University of Florida Geology Department
2007–2010	Assistant Curator Florida Museum of Natural History Department of Archaeology

Field Research

2019	Project Director, NEXUS Arequipa Purdue-UNSA, Water Origins, Coropuna field expedition
2019	Field Supervisor, NEXUS Arequipa Purdue-UNSA, PACCSHA, Participacíon, Activa, Comunitaria y Colaborativa en el Sistema Hidrológico y Atmosférico
2018	Collaborating Investigator, Southern Peruvian Strontium Isotope Survey, Director Dr. Susan deFrance
2017	Project Director, Pampa de Tamarugal Chile Tree-Ring Project
2013–2014	Field Assistant, Pampa de Tamarugal Chile Paleohydrology Project, Director Dr. Justin Dodd
2012	Field Supervisor, Geoarchaeology of Los Morteros Mound North Coast Peru Project, Director Dr. Cecilia Mauricio
2012	Field Supervisor, Pucuncho Basin Geoarchaeological Project, Director Dr. Kurt Rademaker
2011	Project Director, Geomorphology of the Chao Valley Pampa de Salinas
2010	Field Assistant, Ground Penetrating Radar Survey Los Morteros Mound, Director Dr. Dan Sandweiss

2010 Field Assistant, Tacahuay Tambo Archaeological Project, Director Dr. Susan deFrance

2010 Field Assistant, Shoreline Mapping Cape Canaveral, Director Dr. Peter Adams

2007 Field Assistant, Haile G7 Vertebrate Paleontology Excavation, Director Dr. Richard Hulbert

Teaching Experience

Instructor

2021 The Dynamic Earth, Purdue University, EAPS109

2018 Physical Geology, Triton College, GOL101

2018 Astronomy of the Solar System, Triton College, AST101

2018 General Course Physical Science, Harold Washington College, PHYSCI101

2017 Introduction to Geology Honors, Northern Illinois University, GEOL120

2016 Introduction to Geology, Northern Illinois University, GEOL120

Teaching Assistant

2013 Introduction to Geology Lab, Northern Illinois University, GEOL121

2013 Laboratory Techniques in Archaeology, Contisuyo Archaeological Field School, The Field Museum of Natural History and University of Illinois at Chicago, ANT 426

RELATED PROFESSIONAL EXPERIENCE / SERVICE

2021 Session Chair American Geophysical Union Conference Session: Stable Isotopes in the Critical Zone: Methods, Applications, and Process Interpretations #120034

Review Camp Participant for National Association of Geoscience Teachers seventh annual Earth Educators' Rendezvous

Reviewer for Palaeogeography, Palaeoclimatology, Palaeoecology

2020 Reviewer for Environmental Protection Agency publication "Stable Isotopes in Tree Rings: Inferring Physiological, Climatic and Environmental Responses" R. Siegwolf, J. R. Brooks, J. Roden, and M. Saurer, editors.

2019 Session Chair American Geophysical Union Conference Session: Aerosols and Air Quality in South America Posters #83396

2016–2017 Search Committee for the Vice President for Research and Innovation Partnerships, Northern Illinois University

2014–2016 College of Liberal Arts Graduate Student Advisory Committee Northern Illinois University

2014–2015 Sigma Gamma Epsilon Earth Science Honors Society Local Chapter President

2011–2012 Graduate Student Representative–Graduate Senate University of Maine

2009–2010 Lambda Alpha Anthropology Honors Society Local Chapter President

PROFESSIONAL ORGANIZATIONS

American Geophysical Union
Earth Science Women's Network
National Association of Geoscience Teachers
Phi Kappa Phi Honors Society