Alida Perez-Fodich, Ph.D

aliperezfodich.github.io

University of Chile
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EDUCATION

2019 PhD in Geological Sciences: Geochemistry and Isotope Geology
Department of Earth and Atmospheric Sciences, Cornell University

Dissertation: Understanding volcanic weathering processes through geochemical modeling, trace elements and hydrology. Advisor: Dr. Louis Derry

2013 MSc in Geology
Department of Geology, University of Chile. Advisor: Dr. Martin Reich

2010 BSc in Geology
Department of Geology, University of Chile

PROFESSIONAL APPOINTMENTS

2020–Present Assistant Professor
Department of Geology, University of Chile

PUBLICATIONS

Pourret, O., Anand, P., Bots, P., Cottrell, E., Dosseto, A., Gunter, A., Hedding, D.W., Ibarra, D.E., Irawan, D.E., Johannessonm, K., Labidi, J., Little, S., Liu, H., Makhubela, T.V., Carbonne, J.M., **Perez-Fodich, A.**, Riches, A., Tartèse, R., Tripati, A. (2022) Evolution of diversity in the editorial boards of Geochimica et Cosmochimica Acta and Chemical Geology. European Science Editing, *In Press.*

Fernandez, N.M., **Perez-Fodich, A**., Derry, L.A., Druhan, J.L. (2021) A first look at Ge/Si partitioning during amorphous silica precipitation: Implications for Ge/Si as a tracer of fluid-silicate interactions. Geochimica et Cosmochimica Acta, 297, 158-178. doi:10.1016/j.gca.2021.01.007

Perez-Fodich, A., & Derry, L. A. (2020) A model for germanium-silicon equilibrium fractionation in kaolinite. Geochimica et Cosmochimica Acta, 288, 199-213. doi:10.1016/j.gca.2020.07.046

Perez-Fodich, A., & Derry, L. A. (2019). Organic acids and high soil CO2 drive intense chemical weathering of Hawaiian basalts: Insights from reactive transport models. Geochimica et Cosmochimica Acta, 249, 173-198. doi:10.1016/j.gca.2019.01.027

Alvarez, F., Reich, M., Snyder, G., **Perez-Fodich, A.**, Muramatsu, Y., Daniele, L., & Fehn, U. (2016). Iodine budget in surface waters from Atacama: Natural and anthropogenic iodine sources revealed by halogen geochemistry and iodine-129 isotopes. Applied Geochemistry, 68, 53-63. doi:10.1016/j.apgeochem.2016.03.011

Alvarez, F., Reich, M., **Perez-Fodich, A.**, Snyder, G., Muramatsu, Y., Vargas, G., & Fehn, U. (2015). Sources, sinks and long-term cycling of iodine in the hyperarid Atacama continental margin. Geochimica et Cosmochimica Acta, 161, 50-70. doi: 10.1016/j.gca.2015.03.032

Perez-Fodich, A., Reich, M., Alvarez, F., Snyder, G. T., Schoenberg, R., Vargas, G., Muramatsu, Y., Fehn, U. (2014). Climate change and tectonic uplift triggered the formation of the Atacama Desert's giant nitrate deposits. Geology, 42(3), 251-254. doi:10.1130/g34969.1

Reich, M., Snyder, G. T., Alvarez, F., **Perez, A.**, Palacios, C., Vargas, G., Cameron, E. M., Muramatsu, Y., Fehn, U. (2013). Using iodine isotopes to constrain supergene fluid sources in arid regions: insights from the chuquicamata oxide blanket. Economic Geology, 108(1), 163-171. doi:10.2113/econgeo.108.1.163

SUBMITTED, UNDER REVIEW, IN PREP

Munoz-Saez, C., Gong, J., **Perez-Fodich, A**., van Zulien, M. Environmental and hydrogeochemical controls of spicule geyserite in opaline hot spring deposits. Under review for Earth and Space Science.

Fernandez, N.M., **Perez-Fodich, A.** Ge/Si and Si stable isotope partitioning in the Critical Zone from a reactive transport perspective. Submitted to Frontiers in Earth Science.

Perez-Fodich, A., Derry, L.A., Walter, M.T., Marçais, J. The effect of weathering in runoff-to-groundwater partitioning in the Island of Hawai'i: perspectives for landscape evolution. In prep. for Journal of Geophysical Research: Earth Surface.

Perez-Fodich, A., Derry, L. A., Smieska, L. Fe oxidation and trace element gradients during early weathering of spheroidally weathered Hawaiian basalts. In prep. for Chemical Geology.

Perez-Fodich, A., Dontsova, K., Juarez, S. A reactive transport approach to elucidate mineral dissolution and precipitation controls in solute exports from the ECOTRON basalt weathering experiment. In prep. for Vadose Zone Journal.

RESEARCH GRANTS

2022 FONDECYT Postdoctoral 2020 Grant 3220318 (co-PI): "Concentration-discharge patterns in a Mediterranean watershed under increasing drought: insights on solute

and water sources and fluxes, and chemical weathering rates in the Maipo River, central Chile". ANID (Chilean Science Foundation). $150,000

2021 Nodos para el desarrollo en investigación de Laboratorios Naturales en Chile 2021 NODOSLN000: "Laboratorio Natural Montañas de los Andes del Sur de Chile". ANID (Chilean Science Foundation). $250,000

2020 FONDECYT Iniciacion 2020 Grant 11200656 (PI): "Chemical weathering fluxes from continental arc volcanoes and their implication for elemental and atmospheric CO2 budgets in the Southern Andes". ANID (Chilean Science Foundation). $130,000

2020 U-Inicia 2020 Grant UI- 006/20 (PI): "Flujos de meteorización química en arcos volcánicos continentales y sus implicancias para los balances de elementos y dióxido de carbono atmosférico en los Andes del Sur". University of Chile. $11,000

2019 International Association of Geochemistry Student Research Grant. $2,200
2018 Make Our Planet Great Again Short-stay Research Grant. $9,000
2018 Cornell Research Travel Grant. $2,000
2017 Cornell High Energy Synchrotron Source (CHESS). Beamtime
2017 Geological Society of America Graduate Student Research Grant. $1,325
2017 Donovan Research Fund Cornell University. $1,000
2016 Integral Consulting Research Grant. $2,000
2016 Arthur L. Bloom Grant for Pacific Studies. $1,000

FELLOWSHIPS

2014 CONICYT PhD Fellowship (Chilean Science Foundation). $200,000
2014 Fulbright Foreign Student PhD Fellowship.
2007 Anglo American Excellence Undergraduate Scholarship. $20,000

INVITED TALKS

2021 Geochemistry group GFZ Postdam, October 25th 2021: "Trace elements and reactive transport models to investigate weathering in volcanic provinces"

2021 Red Internacional para Estudiar la Calidad Física de Suelos derivados de Cenizas Volcánicas, September 9th 2021: "Understanding volcanic weathering and soil formation processes in the Island of Hawaii through geochemical modeling and hydrology"

2021 Lawrence Berkeley National Laboratory, Lithium Resource Research and Innovation Center, May 26th 2021: "A geochemical perspective on the groundwater cycling stories of iodine and lithium in the Atacama Desert"

2020 GET Université de Toulouse III, Paul Sabatier, February 12th 2020: "Understanding weathering processes using trace elements"

2020 Institut de Physique du Globe de Paris, January 17th 2020: "Understanding volcanic weathering processes".

DEPARTMENT TALKS

2022 Department of Geology, University of Chile, August 24th 2022: "Trace elements and reactive transport models to investigate weathering in volcanic provinces"

CONFERENCE PRESENTATIONS (only first author)

2022 **Perez-Fodich, A.**, Louvat, P., Peña, A., Tardani, D. The chemical composition and weathering rates of rivers draining volcanoes in the Southern Andes. Goldschmidt Conference 2022. Honolulu HI, USA.

2022 **Perez-Fodich, A.**, Munoz-Saez, C., Derry, L., Gong, J. Ge/Si ratios in hydrothermal fluids from El Tatio: Understanding the effect of surface opal precipitation. Goldschmidt Conference 2022. Honolulu HI, USA.

2020 **Perez-Fodich, A.**, Derry. L.A. The Convolution of Time and Weathering Intensity on the Fate of Runoff-To-Groundwater Partitioning in the Island of Hawai'i . Goldschmidt Conference 2020. Virtual, Global.

2019 **Perez-Fodich, A**., Derry, L. A., Aguirre, A. A. Depleted Ge/Si groundwater ratios and a thermodynamic model for equilibrium fractionation in natural systems. AGU Fall Meeting 2019. San Francisco CA, USA.

2019 **Perez-Fodich, A.**, Derry, L. A. Modeling Ge/Si weathering signatures using thermodynamic data for synthetic germanium minerals. Goldschmidt Conference 2019. Barcelona, Spain.

2019 **Perez-Fodich, A**. Organic acids and high soil CO2 drive intense chemical weathering of Hawaiian basalts: Insights from reactive transport models. Congrès des Doctorants 2019. Institut de Physique du Globe de Paris, Paris, France.

2018 **Perez-Fodich, A.**, Derry, L. A. Tracking Fe-oxidation in spheroidal weathering of basalts. Goldschmidt Conference 2018. Boston MA, USA.

2017 **Perez-Fodich, A.**, Derry, L. A. Extreme basalt weathering results from high soil CO2, unsaturated conditions and organic acids. Goldschmidt Conference 2017. Paris, France.

2017 **Perez-Fodich, A**. Intense basalt weathering: high soil CO2, unsaturated conditions and organic acids. Critical Zone Observatories All Hands Meeting 2017. Arlington VA, USA.

2016 **Perez-Fodich, A.**, Walter, M. T., Derry, L. A. Understanding the roles of ligand promoted dissolution, water column saturation and hydrological properties on intense basalt weathering using reactive transport and watershed-scale hydrologic modeling. AGU Fall Meeting 2016. San Francisco CA, USA.

2013 **Perez Fodich, A.**, Alvarez, F., Snyder, G.T., Schoenberg, R., Reich, M. The Role of Groundwater in the Formation of the Giant Nitrate Deposits of Atacama: Iodine-129 and Stable Chromium Isotopic Evidence. Goldschmidt Conference 2013. Florence, Italy.

2012 **Perez Fodich, A**., Alvarez, F., Reich, M., Snyder, G., Schoenberg, R., Vargas, G., Palacios, C. The origin of the nitrate ore fields from the Atacama Desert revisited: New insights from the iodine-129 and stable chromium isotopic systems. XIII Congreso Geológico Chileno, Antofagasta, Chile.

AWARDS AND HONORS

2017 Goldschmidt Merit Student Travel Grant. Geochemical Society
2016 Fall Meeting Student Travel Grant. America Geophysical Union
2007 Outstanding Student FCFM University of Chile
2006 Outstanding Student FCFM University of Chile
2005 Irma Salas Merit Scholarship

RESEARCH EXPERIENCE

2021–Present Research Associate at Laboratorio Natural Montañas de los Andes del Sur de Chile (ANID NODOSLN000:), University of Chile, Santiago, Chile.

2020–Present Principal Investigator FONDECYT Iniciacion (ANID 11200656), University of Chile, Santiago, Chile.

2020–Present Research Associate at Andean Geothermal Center of Excellence (FONDAP 15090013), University of Chile, Santiago, Chile.

2020–Present International Collaborator at Deep EarthShape Project (DFG-SPP 1803). German Science Foundation. Germany–Chile.

2018–2019 Institut de Physique du Globe de Paris (IPGP) Visiting Student Researcher
Long-term research stay at the Geochemistry of External Envelopes (G2E) group.
Principal Investigator: Dr. Jérôme Gaillardet. Paris, France.

2014–2019 Cornell University PhD Student
Graduate researcher in the Department of Earth and Atmospheric Sciences
Principal Investigator: Dr. Louis Derry. Ithaca NY, USA.

2012 Universität Tübingen Short-term Student Researcher
Short-term research at the Isotope Geochemistry Laboratory
Principal Investigator: Prof. Ronny Schönberg. Tübingen, Germany.

2012 Rice University Short-term Student Researcher
Shor-term research at the Marine Geochemistry Laboratory
Principal Investigator: Dr. Glen Snyder. Houston TX, USA.

2011 Catholic University of the North Short-term Student Researcher
Short-term research at the Fluid Inclusion Laboratory.
Principal Investigator: Dr. Eduardo Campos. Antofagasta, Chile.

2011–2013 University of Chile Master Student
Research assistant in the Department of Geology for FONDECYT Grant 1100014.
Principal Investigator: Dr. Martin Reich. Santiago, Chile.

PROFESSIONAL SERVICE

2022 Reviewer for Geochimica et Cosmochimica Acta (2), Andean Geology (1)
2021 Reviewer for Applied Geochemistry (1), Geochimica et Cosmochimica Acta (1), Water Resources Research (1)
2020 Reviewer for Geochimica et Cosmochimica Acta (1), American Journal of Science (2), Chemical Geology (1), Environmental Pollution (1), G-cubed (2)
2020 Convener at Goldschmidt Conference
2019 Reviewer for Chemical Geology (1), CATENA Regional (1), Ecological Modeling (1)

CURRENT STUDENTS AND POSTDOCS

Marcos Macchioli Fondecyt Postdoctoral Fellow (2022–2025)
Amanda Peña MSc Geology (2021–2023)
Valeria Bustamante MSc Geology (2021–2023)

FORMER STUDENTS

Agustin Soto Honors BSc Geology (2021–2022)
Roberto Ulloa Honors BSc Geology (2021–2022) (co-advisor)
Javiera Gonzalez Honors BSc Geology (2020–2022)
Lorena Olivares Honors BSc Geology (2020–2021)

TEACHING EXPERIENCE

Main Instructor

2022 Principles of Biogeochemistry. Department of Geology, University of Chile.

2020–2022 Thermodynamics of Geological Processes. Department of Geology, University of Chile.
2020–2022 Introduction to Geology. Department of Geology, University of Chile.

Workshop instructor

2020–2022 Applied Hydrogeology in Mining and Environmental Problems, University of Chile.

Teaching Assistant

2012 Geochemistry. Dept. of Geology, University of Chile.
2011 Geology of Chile. Dept. of Geology, University of Chile.
2010–2011 Field Geology I. Dept. of Geology, University of Chile.
2009–2010 Stratigraphy and Paleontology. Dept. of Geology, University of Chile.

SERVICE AND OUTREACH

2022 Goldschmidt Conference 2022 Northeast Big Island Hawaii Soils Fieldtrip. Waikoloa Village HI, USA.
2019 Seminar Chair for Cornell Cross-Scale Biogeochemistry and Environmental Science Seminar Series (BESS).
2018 Seminar Chair for Cornell Cross-Scale Biogeochemistry and Environmental Science Seminar Series (BESS).
2018 Faculty Liaison for Snee Graduate Organization. Cornell University.
2012 Graduate Faculty Liaison for FCFM Faculty Council. University of Chile.

ANALYTICAL TECHNIQUES

ICP-MS Thermo Element 2 + hydride generator
ICP-OES Spectro Blue.
General inorganic geochemistry clean laboratory procedures.
Sample purification for isotope preparation: $^{30}\delta Si$, $^{53}\delta Cr$, I^{129}.
Fluid-inclusion T-X measurements Linkam TS 1500.

SOFTWARE AND PROGRAMMING SKILLS

Geochemical Software: CrunchFlow (Advanced), Geochemist Workbench (Advanced), PhreeqC (Intermediate).
Programming Languages: Matlab (Intermediate), R (Basic), Bash script (Basic).

LANGUAGES

English:	Fluent (C2)
Spanish:	Native
French:	Oral/Reading Intermediate (B1). Writing Basic (A2).
Croatian/Russian:	Elementary (A1), can read with dictionary.

SHORT COURSE/WORKSHOPS

2021	Goldschmidt Conference Educational Approaches for Reactive Transport 3-day Workshop. Virtual.
2019	AGU SCIWS19: Toward an International Critical Zone Network-of-Networks for the Next Generation through Shared Science, Tools, Data and Philosophy, San Francisco CA, USA.
2019	MSA Short Course: Reactive Transport in Natural and Engineered Systems, Barcelona, Spain.
2018	Critical Zone Ecosystem Dynamics Summer Course. Gran Paradiso, Italy.
2016	Tutorial Community Land Model v.5. NCAR, Boulder CO, USA.

SOCIETY MEMBERSHIPS

Geochemical Society (member since 2011)
European Association of Geochemistry (member since 2011)
International Association of Geochemistry (member since 2018)
American Geophysical Union (member since 2012)

INDUSTRY EXPERIENCE

2013-2014	Mid-term Production Geologist Derk Engineering and Geology for CODELCO. Radomiro Tomic Mine, Chile.

REFERENCES

Louis Derry
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Department of Earth and Atmospheric Sciences
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derry@cornell.edu
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Department of Geology
Plaza Ercilla 803, Santiago, Chile
mreich@cec.uchile.cl
+56 2 29784986

Jérôme Gaillardet
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Laboratoire de Géochimie des Enveloppes Externes
1 Rue Jussieu, 75238, Paris, France
gaillard@ipgp.fr
+33 1 83 95 74 43

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Universität Tübingen
Isotope Geochemistry Laboratory
Wilhelmstrasse 56, 72074, Tübingen, Germany
schoenberg@ifg.uni-tuebingen.de
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