Meret Aeppli

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Current Position

EPF Lausanne, Switzerland, Tenure Track Assistant Professor, SOIL laboratory 09/2022 - present

Education and Training

Stanford University, United States, Postdoctoral Fellow 09/2019 - 08/2022
Topic: Carbon Cycling in Soils: Effects of Mineral Redox Reactivity on Anaerobic Microbial Respiration
Advisor: Prof. Dr. S. Fendorf

ETH Zürich, Switzerland, Doctor of Sciences 01/2015 - 12/2018
Dissertation: Assessing the Control of Reduction Thermodynamics on Electron Transfer to Iron (Oxyhydr-)Oxides (Diss. Nr. 25'699)
Advisor: Dr. T.B. Hofstetter

ETH Zürich, Switzerland, M.Sc. in Environmental Sciences 09/2012 - 01/2015
Concentration: Biogeochemistry and Pollutant Dynamics
Thesis: Interactions of Bacteriophages with Natural Organic Matter and Model Sorbent Surfaces
Advisor: Dr. M. Sander

ETH Zürich, Switzerland, B.Sc. in Environmental Sciences 09/2009 - 10/2012
Thesis: Soil Structure of an Alpine Fen and Its Implications on Below-Ground Methane Concentrations
Advisor: Prof. Dr. J. Zeyer

London Music School, England, Diploma in Music 04/2009 - 09/2009
Concentration: Piano and Vocals

Funded Project Grants

Industrial Funding 03/2024 - 02/2028
"Field-scale assessment of organic fertilizer impact on soil health and greenhouse gas fluxes from agricultural soils"; sponsored by *Nestlé*; PI; CHF 546'112.

ENAC Transdisciplinary Cluster grant 04/2023 - 03/2024
"Quantifying soil organic matter formation under microbial consortia amendments (BioSoilStock)"; sponsored by the *School of Architecture, Civil and Environmental Engineering, EPFL*; CHF 50'000.

European Joint Programme SOIL Project Funding 05/2023 - 04/2026
"The effects of tillage practice on soil carbon sequestration mechanisms (TilSoilC)"; sponsored by the *Swiss National Science Foundation*; CHF 432'844.

SNSF Project Funding 02/2023 - 01/2026
"Soil organic carbon in Swiss mountain soils: abundance, distribution, and susceptibility to climate change"; sponsored by the *Swiss National Science Foundation*; CHF 510'928.

Research Partnership Grant with the ASEAN region 02/2023 - 01/2024
"Web viewer development for public flood risk communications"; sponsored by the *ETH Zürich, Leading House Asia*; CHF 15'000.

SNSF Early Postdoc Mobility Fellowship 09/2019 - 02/2021

"The role of particulate terminal electron acceptors in controlling organic matter mineralization in freshwater sediments and soils"; fellowship for postdoctoral research at Stanford University sponsored by the *Swiss National Science Foundation*; CHF 120'000.

Honors

Jin Jingfu Memorial Lecture Award 03/2024

Awarded for "contributions in the field of redox reactivity and role of soil in the global carbon cycle". The International Association of Geochemistry bestows the award to early-career scientists that have made measurable impact on their discipline of geochemistry.

Rising Environmental Leaders Program 01/2020 - 06/2020

Run by the *Stanford Woods Institute for the Environment*; aimed at honing participant's leadership and communication skills to maximize their research impact and connect research to policy and people; one of 20 participants selected from a field of applicants from all seven schools at Stanford.

ETH Medal for Outstanding Doctoral Thesis 09/2019

Awarded for "solving important knowledge gaps in the redox reactivity of iron using an interdisciplinary approach". ETH Zürich awards the medal and CHF 2'000 to the top 8% of doctoral candidates.

Chemistry Travel Award 05/2017

Travel award for the attendance of *Goldschmidt Conference* 2017; sponsored by the *Swiss Chemical Society* and *Platform Chemistry* of the *Swiss Academy of Sciences*; CHF 1'000.

Peer-Reviewed Publications

Noël, V; Boye, K; Naughton, HR; Lacroix, EM; **Aeppli, M**; Kumar, N; Fendorf, S; Webb, SM. X-ray chemical imaging for assessing redox microsites within soils and sediments. *Frontiers in Environmental Chemistry*, **2024**, 5, doi:10.3389/fenvc.2024.1329887.

Lim, J; Wehmeyer, H; Heffner, T; **Aeppli, M**; Gu, W; Kim, PJ; Horn, M; Ho, A. Resilience of aerobic methanotrophs in soils; spotlight on the methane sink under agriculture. *FEMS Microbiology Ecology*, **2024**, 100 (3), fiae008, doi:10.1093/femsec/fiae008.

Obradović, N; Joshi, P; Arn, S; **Aeppli, M**; Schroth, MH; Sander, M. Reoxidation of Reduced Peat Organic Matter by Dissolved Oxygen: Combined Laboratory Column-Breakthrough Experiments and In-Field Push-Pull Tests. *Journal of Geophysical Research: Biogeosciences*, **2023**, 128 (11), e2023JG007640, doi:10.1029/2023JG007640.

Lacroix, EM, **Aeppli, M**, Boye, K; Brodie, E; Fendorf, S; Keiluweit, M; Naughton, HR, Noel Vincent Noël, V; Sihi, D. Consider the Anoxic Microsite: Acknowledging and Appreciating Spatiotemporal Redox Heterogeneity in Soils and Sediments. *ACS Earth Space Chemistry*, **2023**, 7 (9), 1592–1609„ doi:10.1021/acsearthspacechem.3c00032.

Aeppli, M; Schladow, G; Lezama Pacheco, J S; Fendorf, S. Iron Reduction in Profundal Sediments of Ultraoligotrophic Lake Tahoe under Oxygen-Limited Conditions. *Environmental Science & Technology*, **2023**, 57 (3), 1529-1537, doi:10.1021/acs.est.2c05714.

Aeppli, M; Thompson, A; Dewey, C; Fendorf, S. Redox Properties of Solid Phase Electron Acceptors Affect Anaerobic Microbial Respiration under Oxygen-Limited Conditions in Floodplain Soils. *Environmental Science & Technology*, **2022**, 56 (23), 17462-17470, doi:10.1021/acs.est.2c05797.

Lopez, AM; Nicolini, CM; **Aeppli, M**; Luby, SP; Fendorf, S; Forsyth, JE. Assessing Analytical Methods for the Rapid Detection of Lead Adulteration in the Global Spice Market. *Environmental Science & Technology*, **2022**, 56 (23), 16996-17006, doi:10.1021/acs.est.2c03241.

Aeppli, M; Babey, T; Engel, M; Fendorf, S, Bargar, JR; Boye, K. Export of Organic Carbon From Reduced Fine-Grained Zones Governs Biogeochemical Reactivity in Simulated Aquifer. *Environmental Science & Technology*, **2022**, 56 (4), 2738-2746, doi:10.1021/acs.est.1c04664.

Aeppli, M; Giroud, S; Vranic, S; Voegelin, A; Hofstetter, TB; Sander, M. Thermodynamic Controls on Rates of Iron Oxide Reduction by Extracellular Electron Shuttles. *Proceedings of the National Academy of Sciences of the United States of America*, **2022**, 119 (3), e2115629119, doi:10.1073/pnas.2115629119.

Biswakarma, J; Rushworth, D; Srivastava, G; Singh, G; Kang, K; Das, S; Anantharaman, SB; **Aeppli, M**; Popp, AL; Bhuyan, DJ. Organizational Level Responses to the COVID-19 Outbreak: Challenges, Strategies and Framework for Academic Institutions. *Frontiers in Communication*, **2021**, 6:573585, doi:10.3389/fcomm.2021.573585.

Aeppli, M; Vranic, S; Kaegi, R; Kretzschmar, R; Brown, AR; Voegelin, A; Hofstetter, TB; Sander, M. Decreases in Iron Oxide Reducibility during Microbial Reductive Dissolution and Transformation of Ferrihydrite. *Environmental Science & Technology*, **2019**, 53 (15), 8736–8746, doi:10.1021/acs.est.9b01299.

Aeppli, M; Kaegi, R; Kretzschmar, R; Voegelin, A; Hofstetter, TB; Sander, M. Electrochemical Analysis of Changes in Iron Oxide Reducibility during Abiotic Ferrihydrite Transformation into Goethite and Magnetite. *Environmental Science & Technology*, **2019**, 53 (7), 3568-3578, doi:10.1021/acs.est.8b07190.

Aeppli, M; Voegelin, A; Gorski, CA; Hofstetter, TB; Sander, M. Mediated Electrochemical Reduction of Iron (Oxyhydr-)Oxides under Defined Thermodynamic Boundary Conditions. *Environmental Science & Technology*, **2018**, 52 (2), 560-570, doi:10.1021/acs.est.7b04411.

Armanious, A; **Aeppli, M**; Jacak, R; Refardt, D; Sigstam, T; Kohn, T; Sander, M. Viruses at Solid-Water Interfaces: A Systematic Assessment of Interactions Driving Adsorption. *Environmental Science & Technology*, **2016**, 50 (2), 732-743, doi:10.1021/acs.est.5b04644.

Franchini, AG; Henneberger, R; **Aeppli, M**; Zeyer, J. Methane Dynamics in an Alpine Fen: A Field-Based Study on Methanogenic and Methanotrophic Microbial Communities. *FEMS Microbiology Ecology*, **2015**, 91 (3), doi:10.1093/femsec/fiu032.

Armanious, A; **Aeppli, M**; Sander, M. Dissolved Organic Matter Adsorption to Model Surfaces: Adlayer Formation, Properties and Dynamics at the Nanoscale. *Environmental Science & Technology*, **2014**, 48 (16), 9420-9429, doi:10.1021/es5026917.

Supervision of Junior Researchers

Supervisor of Graduate Student Anaëlle Semerle (SIE MSc project), EPFL	02/2024 - present
Supervisor of Graduate Student Julia Wälti (SIE MSc project), EPFL	02/2024 - present
Supervisor of Graduate Student Léo Stähli (SIE design project), EPFL	02/2024 - present
Supervisor of Graduate Student Thomas Gil (SIE design project), EPFL	02/2024 - present
Supervisor of Graduate Student Jasmin Hänni (SIE semester project), EPFL	02/2023 - present
Supervisor of Graduate Student Shushu Zhang (SIE semester project), EPFL	02/2023 - present
Supervisor of Undergraduate Student Antoine Wallart (SIL internship), EPFL	07/2023 - 09/2023
Supervisor of Doctoral Student Emma DeFrang, EPFL	08/2023 - present
Supervisor of Graduate Student Giulia Marmello (SIE MSc project), EPFL	03/2023 - present
Supervisor of Doctoral Student Kristina Bright, EPFL	02/2023 - present
Supervisor of Doctoral Student Bence Dienes, EPFL	02/2023 - present
Supervisor of Graduate Student Jonas Müller, EPFL	02/2023 - present
Co-Supervisor of Research Assistant Carla Nicolini, Stanford	05/2021 - 07/2021

Supervisor of Research Assistant Sanja Vranic, ETH Zürich	06/2018 - 08/2018
Supervisor of Undergraduate Student Sébastien Giroud, ETH Zürich	02/2018 - 06/2018
Supervisor of Graduate Student Sanja Vranic, ETH Zürich	09/2017 - 04/2018

Teaching Experience and Training

EPFL, Switzerland, Course Instructor 02/2024 - present

Fate and behaviour of environmental contaminants (ENV-507)

EPFL, Switzerland, Course Co-Instructor 09/2023 - present

Environmental Chemistry (ENV-200)

Stanford University, United States, Teaching Assistant 03/2022 - 06/2022
Science of Soils (ESS-155), weekly classes in the field and laboratory.

Stanford University, United States, Postdoc Teaching Certificate 10/2020
Comprises teaching training, elective courses and workshops, teaching practice, and teaching portfolio (minimum in-class time: 100 h).

ETH Zürich, Switzerland, Teaching Assistant 01/2015 - 12/2018
Laboratory Course: Elementary Chemical Techniques (529-0030-00L), yearly three week intensive course.

ETH Zürich, Switzerland, Teaching Assistant 09/2011 - 09/2012
Exercises in Mathematics III: Systems Analysis (701-0071-00L), weekly classes.

Invited Talks

Buy one, get one free: how reaction thermodynamics controls iron reduction by extracellular electron shuttles. *Fe Biogeochemistry Workshop*, Lech, Austria, **2023**.

Variations in mineral structure and redox properties of iron-bearing clay minerals during redox cycling. *Goldschmidt Conference*, Lyon, France, **2023**.

Assessing soil redox processes and their role in element cycling. *WSL-Institut für Schnee- und Lawinenforschung SLF*, Davos, Colloquium, **2023**.

Redox processes in soils: elucidating the role of iron minerals. *University of Bern*, Bern, Soil Science Colloquium, **2023**.

Assessing soil redox processes and their role in element cycling. *University of Lausanne*, Lausanne, IDYST Seminar, **2023**.

Can soil science contribute to improving food and nutrition? *Industrial Board Meeting of the Integrative Food and Nutrition Center at EPFL*, Lausanne, Seminar, **2023**.

Electron transfer reactions in soils: implications for biogeochemical element cycling, *CLIMACT Seminar Series*, Virtual Seminar, **2022**.

Follow the electrons: redox-active minerals in biogeochemical processes, *Swiss Geoscience Meeting*, Lausanne, Keynote, **2022**.

Follow the electrons: insights into soil carbon cycling. *Swiss Federal Institute of Technology Lausanne*, Lausanne, Seminar, **2022**.

Redox properties of iron minerals: insights from electrochemical analyses and thermodynamic considerations. *German Research Centre for Geosciences*, Virtual Seminar, **2022**.

Exploring Mechanisms of Soil Organic Carbon Stabilization by Tracking Electron Flows in Soils. *Technical University of Munich*, Virtual Public Lecture, **2021**.

Tracking Electrons in Soils: How Electro-Active Minerals Affect Soil Carbon Turnover. *Swiss Federal Institute of Technology Lausanne*, Virtual Public Lecture, **2020**.

Follow the Electrons: How Redox-Active Minerals Affect Soil Carbon. *University of California, Davis*, Virtual Seminar, **2020**.

Redox Reactions In the Environment: What Can We Learn From Mediated Electrochemical Analyses? *Indiana University-Purdue University Indianapolis*, Virtual Seminar, **2020**.

Conference Presentations

Iron Reduction In Profundal Sediments Of Ultra-oligotrophic Lake Tahoe Under Oxygen-limited Conditions. Oral presentation. *Goldschmidt Conference*, Honolulu, Hawaii, United States, **2022**.

Redox Properties of Particulate Electron Acceptors Affect Anaerobic Respiration in Floodplain Soils. Poster presentation. *Gordon Research Conferences on Environmental Science: Water*, Plymouth, New Hampshire, United States, **2022**.

Redox properties of particulate electron acceptors affect anaerobic microbial respiration under oxygen-limited conditions in floodplain soils. Oral presentation, virtually delivered. *European Geosciences Union General Assembly*, **2022**.

Thermodynamic Limitations on Microbial Respiration Using Ferric Iron as Terminal Electron Acceptor. Poster presentation. *American Geophysical Union Fall Virtual Meeting*, **2021**.

Organic Matter Mineralization in Redox-Dynamic Environments: How Does the Redox Reactivity of Particulate Electron Acceptors Affect Microbial Respiration Rates? Oral presentation, virtually delivered. *Virtual Goldschmidt Conference*, **2021**.

Soil Organic Matter Stabilization in Floodplain Soils: Role of Particulate Terminal Electron Acceptors. Poster presentation. *American Geophysical Union Fall Virtual Meeting*, **2020**.

Is Carbon Mineralization In Floodplains Controlled by the Redox Reactivity of Iron Minerals? Oral presentation, virtually delivered. *American Chemical Society Fall 2020 Virtual Meeting*, **2020**.

How Does the Redox Reactivity of Iron Minerals Affect Carbon Mineralization in Floodplains? Oral presentation, virtually delivered. *Virtual Goldschmidt Conference*, **2020**.

Mediated Electrochemical Reduction of Iron (Oxyhydr-)Oxides under Defined Thermodynamic Boundary Conditions. Poster presentation. *Gordon Research Conferences on Environmental Science: Water*, Plymouth, New Hampshire, United States, **2018**.

Ferrous Iron-Induced Transformation of Ferrihydrite: Linking Changes in Oxide Mineralogy and Reducibility. Oral presentation. *Interfaces Against Pollution Conference*, La Grande-Motte, France, **2018**.

Investigating Iron Oxide Reduction Using Mediated Electrochemical Analysis. Oral presentation. *Goldschmidt Conference*, Paris, France, **2017**.

Investigating Iron Oxide Reduction Using Mediated Electrochemical Analysis. Oral presentation. *International Conference on the Biogeochemistry of Trace Elements*, Zürich, Switzerland, **2017**.

Thermodynamics of Electron Transfer to Iron Oxides Assessed by Mediated Electrochemical Reduction. Oral presentation. *Swiss Geoscience Meeting*, Geneva, Switzerland, **2016**.

Mediated Electrochemical Reduction of Iron Oxides: Effects of pH and Potential on Electron Transfer to the Oxides. Oral presentation. *European Mineralogical Conference*, Rimini, Italy, **2016**.

Memberships and Reviewing Activities

Member

American Chemical Society, *American Geophysical Union*, *Association for Women in Science*, *ETH Women Professors Forum*, *European Association of Geochemistry*.

Reviewer for Scientific Journals

Applied and Environmental Microbiology, *Applied Geochemistry*, *Biogeochemistry*, *Biogeosciences*, *Environmental Science: Nano*, *Environmental Science & Technology*, *Environmental Science: Processes & Impacts*, *Geochimica et Cosmochimica Acta*, *Journal of Geophysical Research: Biogeosciences*, *Nature Reviews Earth & Environment*. Complete list available on Publons.

Reviewer for Funding Bodies

Israel Science Foundation, *National Science Center Poland*, *National Science Foundation: Stanford Synchrotron Radiation Lightsource*.

Conference Organization

Convener at *Goldschmidt Conference* 07/2023

Session 11 b (Theme 11): Iron and manganese minerals and their role in nutrient and contaminant cycling across scales.

Convener at *Goldschmidt Conference* 07/2022

Session 12 g (Theme 12): Environmental redox reactions and their impact on metal and nutrient dynamics.

Convener at *Goldschmidt Conference* 07/2021

Session 11g (Theme 11): Redox-Driven Transformation and Mobility of Contaminants and Nutrients.

Convener at *American Geophysical Union Fall Meeting* 12/2020

Symposium 103775: Soils of the Anthropocene: Ecosystem Scale Implications of Pore-Scale Redox Heterogeneities in Soils.

Convener at *Goldschmidt Conference* 06/2020

Session 12b: Coupled Redox Cycling of S, Mn, and Fe: Impacts on Nutrient and Contaminant Dynamics.