Curriculum Vitae

Christoph Aeppli

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Research Interests

I am interested to understand microbial and abiotic processes that determine the **Fate of Organic Compounds in Aqueous Environments**. Specifically, I focus on the transformation of **Petroleum Hydrocarbons** once released (accidently or through natural seeps) from their reservoirs. Furthermore, I am interested in sources and biodegradation of **Halogenated Compounds**; under suitable conditions, these compounds can undergo microbial dehalogenation, and they have not only anthropogenic, but also large natural biotic and abiotic sources. To address my research questions, I use **Stable Isotopes** (carbon and halogen) and advanced analytical techniques such as **Two-Dimensional Gas Chromatography**.

Education

04/2004 – 05/2008	**Ph.D.** (Dr.Sc. ETH Zurich); **Environmental Chemistry**. Swiss Federal Institute of Technology Zurich/Switzerland (ETH). Thesis: *Assessing the natural attenuation of chlorinated ethenes in groundwater using compound-specific stable isotope analysis* (advisor: Prof. Dr. René P. Schwarzenbach).	ETH Zurich, Switzerland
10/1998 – 12/2002	**M.S.** (Diploma) in **Chemistry**. Diploma thesis: *Novel methods for radical oxygenative cyclization* (advisor: Prof. Dr. Philippe Renaud).	Univ. Berne, Switzerland

Appointments

05/2013 – present	**Woods Hole Oceanographic Institution (WHOI)**, Dept. of Marine Chemistry and Geochemistry. Postdoctoral Investigator; Reddy Group	Woods Hole, MA
05/2011 – 04/2013	**Woods Hole Oceanographic Institution (WHOI)**, Dept. of Marine Chemistry and Geochemistry. Swiss National Science Foundation Postdoctoral Fellow in the research group of Christopher M. Reddy	Woods Hole, MA
01/2009 – 04/2011	**Stockholm University, Dept. for Applied Environmental Science (ITM).** Postdoctoral fellow in the research group of Örjan Gustafsson	Stockholm, Sweden
04/2004 – 12/2008	**Swiss Federal Institute of Aquatic Science and Technology (Eawag) and ETH Zurich**. PhD candidate in the research group of Michael Berg and Thomas B. Hofstetter under supervision of René P. Schwarzenbach	Zurich, Switzerland

Publications

Peer-reviewed publications

13. **Aeppli C.**, Reddy C.M., Nelson R.K., Kellermann Y.M., Valentine D.L., *Recurrence of oil sheens from the Deepwater Horizon disaster site as fingerprinted by synthetic hydrocarbon drilling fluids*. Environ. Sci. Technol. — submitted
12. Hall G.J., Frysinger G.S., **Aeppli C.**, Carmichael C.A., Gros J., Lemkau K., Nelson R.K., Reddy C.M., *Oxygenated weathering products of Deepwater Horizon oil come from surprising precursors.* Marine Pollution Bulletin — submitted

11. Wiegert C., Mandalakis M., Knowles T., Polymenakou P.N., **Aeppli C.**, Machackova J., Holmstrand H., Evershed R.P., Richard D. Pancost R.D. Gustafsson O. *Carbon and chlorine isotope fractionation during microbial degradation of tetra- and trichloroethene*. Environ. Sci. Technol. doi:10.1021/es305236y — in press

10. **Aeppli C.**, Bastviken D., Andersson P., Gustafsson Ö., *Chlorine isotope effects and composition of naturally produced organochlorines from chloroperoxidases, flavin-dependent halogenases, and in forest soil.* Environ. Sci. Technol. doi:10.1021/es3037669 — in press

9. **Aeppli C.**, Tysklind M., Holmstrand H., and Gustafsson Ö. *Use of Cl and C isotopic fractionation to identify degradation and sources of polychlorinated phenols: Mechanistic study and field application.* Environ. Sci. Technol. (47) 790-797 — 2013

8. **Aeppli C**., Carmichael C.A., Nelson R.K., Lemkau K.L., Graham W.M., Redmond M.C., Valentine D.L., Reddy C.M. *Oil weathering after the Deepwater Horizon disaster led to the formation of oxygenated residues*. Environ. Sci. Technol. **(**46) 8799-8807 — 2012

7. Wiegert C., **Aeppli C.**, Knowles T., Holmstrand H., Evershed R., Pancost R.D., Macháčková J., Gustafsson Ö. *Dual carbon-chlorine stable isotope investigation of sources and fate of chlorinated ethenes in contaminated groundwater*. Environ. Sci. Technol. (46) 10918–10925 — 2012

6. Amaral H.I.F., **Aeppli C.**, Berg, M., Schwarzenbach R.P., Kipfer R. *Assessing the fate of polychlorinated ethenes in aquifers with limited biodegradation potential: Added values of compound specific carbon isotope analysis and groundwater dating*. Chemosphere (85) 774–781 — 2011

5. **Aeppli C.**, Wiegert C., Holmstrand H., Gustafsson Ö. Chlorine isotope fractionation of organic contaminants: added value for in-situ assessment of natural attenuation processes. In: *Groundwater quality management in a rapidly changing world*, Schirmer M., Höhn M., Vogt T. (Eds.); IAHS Red Book Series (342), ISBN 978-1-907161-16-2, p. 335-338 — 2011

4. **Aeppli C**., Hofstetter T.B., Amaral H.I.F., Kipfer R., Schwarzenbach R.P., Berg M. *Quantifying in situ transformation rates of chlorinated ethenes by combining compound-specific stable isotope analysis, groundwater dating, and carbon isotope mass balances.* Environ. Sci. Technol. (44) 3705-3711 — 2010

3. **Aeppli C**., Holmstrand H., Andersson P., Gustafsson Ö. *Direct compound-specific stable chlorine isotope analysis of organic compounds with quadrupole GC/MS using standard isotope bracketing*. Anal. Chem. (82) 420–426 — 2010

2. **Aeppli C**., Berg M., Cirpka O.A., Holliger C., Schwarzenbach R.P., Hofstetter T.B. *Influence of mass-transfer limitations on carbon isotope fractionation during microbial dechlorination of trichloroethene*. Environ. Sci. Technol. (43) 8813–8820 — 2009

1. **Aeppli C.**, Berg M., Hofstetter T.B., Kipfer R., Schwarzenbach R.P. *Simultaneous quantification of polar and non-polar volatile organic compounds in water samples by Direct Aqueous Injection – Gas Chromatography/Mass Spectrometry*. J. Chromatogr., A (1181) 116-124 — 2008

Publications in German (for outreach towards authorities and contaminant hydrogeology consulting companies)

3. **Aeppli C.**, Amaral H.I.F., Wermaille C., Wenger C., Kipfer R., Berg M., *Beurteilung des Abbauverhaltens von CKWs an Altlastenstandorten mittels Einzelstoff-Isotopenanalyse (CSIA) und Grundwasserdatierung. Teil 1: Grundlagen (assessing degradation of chlorinated ethenes in contaminated aquifers using compound-specific isotope analysis. Part 1: theoretical considerations)*. Altlasten Spektrum (3), 105-110s — 2011

2. **Aeppli C.**, Amaral H.I.F., Wermaille C., Wenger C., Kipfer R., Berg M., *Beurteilung des Abbauverhaltens von CKWs an Altlastenstandorten mittels Einzelstoff-Isotopenanalyse (CSIA) und Grundwasserdatierung. Teil 2: Fallstudien (assessing degradation of chlorinated ethenes in contaminated aquifers using compound-specific isotope analysis. Part 2: case studies).* Altlasten Spektrum (4), 161-171 — 2011

1. Berg M., Zwank L., Bolotin J., **Aeppli C.**, Haener A., Moeller M., Munz C., Ziegler U. *Einzelstoff-Isotopenanalyse zur Beurteilung des Abbauverhaltens von Methyl-tert-butylether (MTBE) an einem Altlastenstandort (assessing MTBE transformation in a contaminated aquifer using compound-specific isotope analysis).* Altlasten Spektrum (14), 20-26 — 2005

Awards, Memberships and Reviewer Activities

ACS Certificate of Merit for outstanding first platform presentation at the ACS National Meeting, Denver/US, Aug 28-Sept 1 2011. 2011

ACS Publications Certificate of Appreciation for valuable contributions and dedicated services in the peer review of manuscripts. 2011

Postdoctoral Fellowship for advanced researchers from the Swiss National Science Foundation SNSF (postdoc at Woods Hole Oceanographic Institution, May 2011 to Apr. 2013). 2010

Postdoctoral Fellowship for prospective researchers from the Swiss National Science Foundation SNSF (postdoc at Stockholm University, Jan. to Dec. 2009). 2008

Member of *The American Geophysical Union* (AGU), *The American Chemical Society* (ACS), *The Geochemical Society*, and *The Society of Environmental Toxicology and Chemistry* (SETAC).

Reviewer for *Environ. Sci. Technol*. (9 manuscripts), *Chemosphere* (6), *J. Contam Hydrol*. (2), and other journals (4)

Research Projects and Internships

05/2011 – present	Characterization of **petroleum weathering** after oil spills (SNSF Postdoctoral Fellowship, and Gulf of Mexico Research Initiative *Deep-C* consortium).
05/2011 – present	Assessing **sources and fate of marine natural halogenated phenolic compounds** using their stable halogen isotopes (SNSF Postdoctoral Fellowship).
04/2009 – 04/2011	Compound-specific isotope analyses as sharp environmental-forensics tools for **site characterization, monitoring and source apportionment of pollutants** in soil (European Union FP7 project *isoSoil*).
01/2009 – 04/2011	Source apportionment and quantification of **transformation processes of chlorophenols in soils** using two-element compound specific isotopic analysis (SNSF Postdoctoral Fellowship).
04/2004 – 12/2008	Using compound-specific stable carbon isotopic fractionation for **biodegradation assessment of organic pollutants in aquifers** (PhD project funded by the Swiss Federal Office for the Environment).
Internships	
03/2003 – 03/2004	Community service year; administrating and working in three community projects.
01/2003 – 02/2003	**University of Berne, Department of Chemistry and Biochemistry.** Scientific employee in the group of Prof. Dr. Philippe Renaud (radical azidation reactions).
08/2001 – 10/2001	**Syngenta Crop Protection AG, Basel/Switzerland.** Internship in the group of P. Maieinfisch, Optimization Chemistry (enantioselective synthesis of herbicide precursors).
11/1999	**Swiss Federal Veterinary Office, Berne**. Internship in the chemistry section (analysis of antibiotics in meat samples).

Teaching and Mentoring Activities and Qualification

05/2011 – present	**WHOI**. Co-supervising projects of three visiting PhD students, one undergrad student, and two high school summer students.
01/2009 – 04/2011	**ITM Stockholm**. Co-supervising projects of one PhD student and one visiting master student.
04/2006 – 11/2006	**Courses in didactics and adult learning** (114 course hours) with Swiss Federation for Adult Learning (SWEB) certificate Level 1, which is a general qualification for adult learning.
01/2006 – 06/2006	**ETH Zurich**. Co-supervision the master thesis of one master student.
04/2004 – 12/2007	**ETH Zurich**. Teaching assistant of three bachelor and two master lab courses in environmental chemistry, organic trace analysis, and groundwater sampling.
04/2001 – 12/2001	**Gymnasium Neufeld** and **Seminar Hofwil, Switzerland**. Teaching high school organic chemistry (40 hours).

Skills

Analytical techniques: Quantification of analytes in environmental samples using GC-MS, GC-FID, GC×GC-MS, HPLC-UV, NMR, FT-IR, TLC-FID, IC, FT-ICR-MS.
Sample extraction: purge & trap, Soxhlet, SPME, SPE

Isotope analysis: Compound-specific analysis: GC-C-IRMS ($\delta^{13}C$ and $\delta^{2}H$), GC-ICP-MS ($\delta^{81}Br$), GC-MS ($\delta^{37}Cl$ and $\delta^{81}Br$). Bulk analysis: Thermal ionization MS ($\delta^{37}Cl$)

Process studies: Transformation of organic compounds in model laboratory systems (aerobic enzymatic; anaerobic microbial cultures; photooxidation)

Field sampling: Groundwater sampling (10 campaigns) including well drilling (2×); soil sampling (1×); sampling of oil spill petroleum samples on-shore (3×) and off-shore (1×)

Recent Contributions at International Scientific Congresses (past five years)

1. **Aeppli C.**, Nelson R.K., Carmichael C., Arakawa N., Aluwihare L.I., Valentine D.L., Reddy C.M., *Characterization of recalcitrant oxygenated hydrocarbons formed upon oil weathering after the Deepwater Horizon disaster*, 245th ACS National Meeting. New Orleans LA, Apr 7-11 2013; oral presentation.
2. **Aeppli C.**, Carmichael C., Nelson R.K., Valentine D.L., Arakawa N., Aluwihare L.I., Reddy C.M., *Characterization of oxygenated hydrocarbons formed upon oil weathering after the Deepwater Horizon disaster*, Gulf of Mexico Oil Spill & Ecosystem Science Conference. New Orleans LA, Jan 21-23 2013; oral presentation.
3. **Aeppli C.**, Valentine D.L., Kellermann M., Lorenson T., Reddy C.M., *Oil spill vs natural seepage: Contrasting weathering characteristics of oil from the Macondo well and Southern California oil seeps*, Gulf of Mexico Oil Spill & Ecosystem Science Conference. New Orleans LA, Jan 21-23 2013; poster presentation.
4. **Aeppli C.**, Valentine D.L., Arakawa N., Aluwihare L.I. M.C. Redmond M.C., Nelson R.K., Reddy C.M., *Oxygenation of petroleum hydrocarbons after the Deepwater Horizon disaster.* AGU fall meeting 2012, San Francisco, December 3-7 2012; poster presentation.
5. **Aeppli C**., Carmichael C., Nelson R.K., Reddy C.M., *Identifying and Characterizing a Polar and Recalcitrant Fraction in Weathered Macondo 252 Well Oil*. SETAC North America 32th annual meeting, Boston/MA, November 13-17 2011; oral presentation.
6. **Aeppli C**., Holmstrand H., Bastviken D., Tysklind M., Reddy C.M., Gustafsson Ö. *Investigating formation and degradation of polychlorinated phenols in the environment based on chlorine isotope fractionation*. International Conference on Chemistry and the Environment (ICCE), Zurich/Switzerland, September 11-15 2011; oral presentation.
7. **Aeppli C**., Holmstrand H., Bastviken D., Tysklind M., Reddy C.M., Gustafsson Ö. *Investigating formation and degradation of polychlorinated phenols in the environment using chlorine and carbon stable isotope fractionation.* ACS National Meeting, Denver/US, Aug 28-Sept 1 2011; oral presentation.
8. **Aeppli C.**, Wiegert C., Holmstrand H., Gustafsson Ö. *Chlorine isotope fractionation of organic contaminants: added value for in-situ assessment of natural attenuation processes*. Groundwater Quality 2010 conference, International Association for Hydrological Sciences, Zurich/Switzerland, June 13-18 2010; oral presentation.
9. **Aeppli C.**, Wiegert C., Holmstrand H., Andersson A., Gustafsson Ö. *A novel method for analyzing chlorine isotope fractionation for source and fate assessment of organochlorine soil and groundwater pollutants*. EGU 2010 General Assembly, European Geosciences Union, Vienna/Austria, May 2-7 2010; oral presentation.
10. **Aeppli C.**, Amaral H., Berg M., Kipfer R, Hofstetter T.B., Schwarzenbach R.P. *Assessing natural attenuation of a PCE-contaminated aquifer using a combined CSIA and groundwater dating approach*. 18th Goldschmidt Conference, Vancouver/Canada, July 2008; oral presentation.
11. **Aeppli C**., Berg M., Hofstetter T.B., Schwarzenbach R.P. *Variability in ^{13}C enrichment factors for microbial dehalogenation of TCE: using a batch system to explore the influence of mass transfer.* Stable Isotope Toole for the Assessment of Chemical and Microbial Transformation Reactions in Natural and Contaminate Environments, Mt. Verità/Switzerland, November 2007; oral presentation.

Other Recent Presentations (past five years)

1. **Aeppli C**., *Transformation and sources of organic compounds in the environment*: New insights using stable isotopes and high resolution gas chromatography, Bigelow Seminar Series, Bigelow Laboratory for Ocean Sciences, East Boothbay/ME, January 14, 2013; invited speaker.
2. **Aeppli C**., *Transformation and sources of organic compounds in the environment: New insights using stable isotopes and high resolution gas chromatography*, Skidaway Seminar Series, Skidaway Institute of Oceanography, Savannah/GA, February 7, 2013; invited speaker.
3. **Aeppli C**., Carmichael C.A., Nelson R.K., Lemkau K.L., Redmond M.C., Valentine D.L., Arakawa N., Aluwihare L.I. and Reddy C.M., *Formation of oxygenation hydrocarbons upon oil weathering after the Deepwater Horizon Disaster*. 2nd *Deep-C* consortium / Gulf of Mexico Research Initiative project meeting, Tallahassee/FL, August 22, 2012; poster presentation.
4. **Aeppli C.,** *Insights into the environmental formation and degradation of halogenated phenols from stable isotope analysis*. Spring Meeting of the DFG Research Unit 763, Oberjoch/Germany, March 3, 2012; invited speaker.
5. **Aeppli C**., *The overlooked fraction in weathered Deepwater Horizon oil: polar, persistent, potentially toxic*. Department of Marine Chemistry & Geochemistry Seminar, Woods Hole, MA, January 31, 2012; oral presentation.
6. **Aeppli C**., *Characterizing weathering processes of Deepwater Horizon oil*. Annual WHOI postdoc symposium, Woods Hole MA, October 20, 2011; oral presentation.
7. **Aeppli C**., *Assessing sources and fate of organochlorine soil and groundwater pollutants based on their chlorine stable isotopic composition*. Environmental Chemistry Group Seminar, ETH Zurich, October 15, 2010; oral presentation.
8. **Aeppli C**., *Assessing the biotransformation of organochlorine soil and groundwater contaminants using compound-specific isotope analysis (CSIA).* Department of Applied Environmental Science Pollutant Dynamics Seminar, Stockholm University, March 31 2010; oral presentation.
9. **Aeppli C**., *Assessing the biotransformation of soil and groundwater contaminants using compound-specific isotope analysis (CSIA).* Environmental Chemistry Seminar, Umeå University/Sweden, March 18 2010; oral presentation.
10. **Aeppli C.,** *Assessing the natural attenuation of chlorinated ethenes in groundwater using compound-specific stable isotope analysis*. Helmholtz Center Munich Environmental Isotope Chemistry Group Seminar, August 8, 2008; oral presentation.