CURRICULUM VITAE - *STEFAN M. SIEVERT*

Stefan M. Sievert
Associate Scientist with Tenure
Biology Department
Stanley W. Watson Laboratory
Mailstop 52
Woods Hole Oceanographic Institution
Woods Hole, MA 02543

Telephone : 508-2892305
Fax : 508-4572076
E-mail : ssievert@whoi.edu
>>Lab website
(http://www.whoi.edu/groups/sievertlab)

EDUCATION

1999 Ph.D. (summa cum laude), Microbial Ecology, Max-Planck-Institute for Marine Microbiology (MPI-MM) and University of Bremen, Germany.
Title: Microbial Communities at a Shallow Submarine Hydrothermal Vent in the Aegean Sea (Milos, Greece). Advisor: Drs. Jan Küver and Gerard Muyzer

1996 M.S., (Diplom), Biological Oceanography, Alfred-Wegener Institute for Polar- and Marine Research and University of Bremen, Germany.
Title: Bacterial Degradation of *Phaeocystis* sp. Derived Particulate and Dissolved Carbohydrates

1992/93 Visiting graduate student (Fulbright Grantee), University of Washington (WA).

1990 B.S. (Vordiplom), Biology, Johannes Gutenberg-University, Mainz, Germany.

PROFESSIONAL EXPERIENCE

2012 – Associate Scientist w/ Tenure, Woods Hole Oceanographic Institution (WHOI)

2007 – 2012 Associate Scientist w/o Tenure, WHOI

2002 – 2006 Assistant Scientist, WHOI

2002 Postdoctoral Investigator, WHOI (with Dr. Craig Taylor and Mr. Carl Wirsen)

2000 – 2002 Postdoctoral Scholar, WHOI (with Drs. Craig Taylor, Andreas Teske and Mr. Carl Wirsen)

1999 – 2000 Postdoctoral Investigator, MPI-MM, Bremen, Germany (with Prof. Friedrich Widdel)

RESEARCH INTERESTS

Elucidating the composition, diversity, and function of microbial communities, with the objective of understanding the relationship between microorganisms and their role in the ocean biogeochemical cycles. Of particular interest are environments where chemolithoautrophic processes are important, such as deep-sea hydrothermal vents, gas- and hydrocarbon seeps, and oxygen minimum zones. Emphasis is on microbes involved in sulfur cycling, and the ecological importance of CO_2-fixation pathways other than the Calvin-Benson-Bassham cycle.

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HONORS AND AWARDS

2010 Senior Fellowship of the Alfried Krupp Wissenschaftskolleg Greifswald (Institute for Advanced Studies), Greifswald, Germany.

2004 Fellowship of the Hanse Wissenschaftskolleg (Institute for Advanced Studies), Delmenhorst, Germany

2000 Postdoctoral Scholar Award in Ocean Science and Engineering, WHOI

1992 Fulbright Scholarship, visiting graduate student at the School of Oceanography, University of Washington, Seattle, WA, sponsor: Prof. John A. Baross

CRUISE PARTICIPATION

MESCAL leg 1, 9-10°N East Pacific Rise (EPR), *R/V L'Atalante* and *DSV Nautile*, Chief Scientist: Nadine Le Bris, April 27 – May 7, 2010.

AT15-38 (FIX08-II), Guaymas Basin and 9-10°N EPR, *R/V Atlantis* and *DSV Alvin*, Chief scientist: Stefan Sievert, Oct 13 – Nov 5, 2008.

AT15-28 (FIX08-I), 9-10°N EPR, *R/V Atlantis* and *DSV Alvin*, Chief scientist: Stefan Sievert, Dec 28, 2007 – Jan 19, 2008. See also http://www.interridge.org/node/5363

AT15-25, *R/V Atlantis* and *DSV Alvin*, Guaymas Basin, Chief Scientist: Costantino Vetriani, Oct 18-28, 2007.

AT15-15, 9-10°N EPR, *R/V Atlantis* and *DSV Alvin,* Chief Scientist: Timothy Shank, Jan – Feb 7, 2007.

RESET06 cruise 9-10°N EPR, *R/V Atlantis* and *DSV Alvin*, Chief Scientist: Karen von Damm, June 18 – July 7, 2006.

EXTREME2002 cruise 9-10°N EPR, *R/V Atlantis* and *DSV Alvin*, Chief Scientist: Craig Cary, Oct 20 – Nov 12, 2002.

Hydrothermal Fluxes and Biological Production in the Aegean and Fluxes in the Anoxic Basins of the Mediterranean Ridge (M40/2), *R/V Meteor*, Chief Scientist: Peter Linke, Dec 2 – Dec 23, 1998.

PUBLICATIONS:

1. Sievert, S. M., and C. Vetriani. Chemoautotrophy at Deep-Sea Vents: Past, Present, and Future. Oceanography 25(1):218–233
2. Gardebrecht A., S. Markert, S. M. Sievert, H. Felbeck, A. Thürmer, D. Albrecht, A. Wollherr, J. Kabisch, N. Le Bris, R. Lehmann, R. Daniel, H. Liesegang, M. Hecker, T. Schweder. 2011. Comparative proteogenomics reveals physiological homogeneity among endosymbionts of the deep-sea vent tubeworms *Riftia pachyptila* and *Tevnia jerichonana*. ISME Journal. 6:766-76
3. Smith A., M. Fisk, M. Nielsen, C. G. Wheat, H. W. Jannasch, A. T. Fisher, K. Becker, S. M. Sievert, G. Flores, and R. Popa. *In situ* enrichment of ocean crust microbes on igneous minerals and glasses using an osmotic flow-through device. Geochemistry, Geophysics, Geosystems. Vol. 12, Q06007, 19 PP., 2011 doi:10.1029/2010GC003424
4. Markert S., A. Gardebrecht, H. Felbeck, S. M. Sievert, A. Thürmer, D. Becher, J. Klose, D. Albrecht, A. Wollherr, R. Daniel, M. Kleiner, M. Hecker, T. Schweder. Status quo in physiological proteomics of *Endoriftia persephone*, the uncultured endosymbiont of the giant tubeworm *Riftia*

pachyptila . Proteomics 11:3106-3117.

5. Foustoukos D. I., J. L. Houghton, W. E. Seyfried Jr., S. M. Sievert, and G. D. Cody. Kinetics of H_2-H_2O redox equilibria and formation of metastable H_2O_2 under low temperature hydrothermal conditions. Geochimica et Cosmochimica Acta 75:1594-1607.
6. Hügler M., J. M. Petersen, N. Dubilier, J. F. Imhoff, and S. M. Sievert. 2011. Pathways of carbon and energy metabolism of the epibiotic community associated with the deep-sea hydrothermal vent shrimp *Rimicaris exoculata*. PLoS One, PLoS One 6(1): e16018. doi:10.1371/journal.pone.0016018
7. Bühring S. I., S. M. Sievert, H. M. Jonkers, T. Ertefai, M. S. Elshahed, L. R. Krumholz, and K.-U. Hinrichs. 2011. Insights into chemotaxonomic composition and carbon cycling of phototrophic communities in an artesian sulfur-rich spring (Zodletone, Oklahoma, USA), a possible analogue for ancient microbial mat systems. Geobiology 9:166-179
8. Xie W., F. Wang, L. Guo, Z. Chen, S. M. Sievert, J. Meng, G. Huang, Y. Li, Q. Yan, S. Wu, X. Wang, S. Chen, G. He, X. Xiao, and A. Xu. 2010. Comparative metagenomics of microbial communities inhabiting deep-sea hydrothermal vent chimneys with contrasting chemistries. ISME Journal 5:414-426.
9. Hügler M, and S. M. Sievert. 2011. Beyond the Calvin Cycle: Autotrophic Carbon Fixation in the Ocean. Annual Review of Marine Science. Vol. 3:261-289.
10. Walker, C. B., J. R. de la Torre, M. G. Klotz, H. Urakawa, N. Pinel, D. J. Arp, C. Brochier-Armanet, P. S. G. Chain, P. P. Chan, A. Golabgir-Anbarani, J. Hemp, M. Hügler, E. A. Karr, M. Könneke, D. Lang, T. Lowe, W. Martens-Habbena, L. A. Sayavedra-Soto, M. Shin, S. M. Sievert, A. C. Rosenzweig, G. Manning, and D. A. Stahl. 2010. The *Nitrosopumilus maritimus* genome reveals unique mechanisms for nitrification and autotrophy in globally distributed marine Archaea. Proc. Natl. Acad. Sci. 107:8818-8823.
11. Ehrhardt, C. J., R. M. Haymon, S. M. Sievert, and P. A. Holden. 2009. An improved method for nanogold *in situ* hybridization visualized with environmental scanning electron microscopy. Journal of Microscopy doi: 10.1111/j.1365-2818.2009.03207.x
12. Voordeckers J. W., M. Do, M. Hügler, V. Ko, S. M. Sievert, and C. Vetriani. 2008. Culture dependent and independent analyses of 16S rRNA and ATP citrate lyase genes: a comparison of microbial communities from different black smoker chimneys on the Mid-Atlantic Ridge. Extremophiles 12:627-640.
13. Sievert S. M., K. M. Scott, M. Klotz, et al. 2008. The genome of epsilonproteobacterial chemolithoautotroph *Sulfurimonas denitrificans*. Applied and Environmental Microbiology 74:1145-1156
14. Sievert, S.M., M. Hügler, C. O. Wirsen, and C. D. Taylor. 2008. Sulfur oxidation at deep-sea hydrothermal vents. Pp 238-258 *In* "Microbial Sulfur Metabolism", C. Dahl & C. G. Friedrich (eds), Springer, Berlin, Germany. ISBN-13 978-3-540-72679-1
15. Kniemeyer O., F. Musat, S. M. Sievert, K. Knittel, H. Wilkes, M. Blumenberg, W. Michaelis, C. Bolm, S. B. Joye, and F. Widdel. 2007. Anaerobic oxidation of propane and butane by novel marine sulphate-reducing bacteria. Nature 449:898-901.

16. Sievert, S. M., R. Kiene, and H. Schulz. 2007. The sulfur cycle. The Oceanography Society June '07 special issue "A Sea of Microbes" edited by Lita Procter and David Karl.
17. Tait, E., M. Carman, and S. M. Sievert. 2007. Phylogenetic diversity of bacteria associated with ascidians in Eel Pond (Woods Hole, Massachusetts, USA). Journal of Experimental Marine Biology and Ecology. 342:138-146
18. Markert S., C. Arndt, H. Felbeck, R. A. Feldman, D. Becher, S. M. Sievert, M. Hügler, D. Albrecht, J. Robidart, S. Bench, M. Hecker, and T. Schweder. 2007. Approaching the uncultivable endosymbiont of *Riftia pachyptila* by physiological proteomics. Science 315:247-250.
19. Hügler M., H. Huber, S. J. Molyneaux, C. Vetriani, and S. M. Sievert. 2007. Autotrophic CO_2 fixation via the reductive tricarboxylic acid cycle in different lineages within the phylum *Aquificae*: Evidence for two ways of citrate cleavage. Environmental Microbiology 9:271-276.
20. Sievert, S. M., E. B. A. Wieringa, C. O. Wirsen, C. D. Taylor. 2007. Growth and mechanism of filamentous-sulfur formation by *Candidatus* Arcobacter sulfidicus in opposing oxygen-sulfide gradients. Environmental Microbiology 9:81-92.
21. Scott, K. M., S. M. Sievert et al. The genome of deep-sea vent chemolithoautotroph *Thiomicrospira crunogena* XCL-2. PLoS Biology, Vol. 4, No. 12, e383 doi:10.1371/ journal.pbio.0040383
22. Bach, W., K. E. Edwards, J. M. Hayes, J. A. Huber, S. M. Sievert, and M. L. Sogin. 2006. Energy in the Dark: Fuel for Life in the Deep Ocean and Beyond. EOS Transactions, American Geophysical Union, Vol. 87, No. 7, 14 February 2006
23. J. D. Tolli, S. M. Sievert, and C. D. Taylor. 2006. Unexpected Diversity of Bacteria Capable of Carbon Monoxide Oxidation in a Coastal Marine Environment, and Contribution of the Roseobacter-Associated Clade to Total CO Oxidation. Applied and Environmental Microbiology 72:1966-1973.
24. Hügler M., C. O. Wirsen, G. Fuchs, C. D. Taylor, and S. M. Sievert. 2005. Evidence for autotrophic CO_2 fixation via the reductive tricarboxylic acid cycle by members of the ε-subdivision of proteobacteria. Journal of Bacteriology, 187: 3020-3027
25. Zemmelink, H. J., L. Houghton, S. M. Sievert, N. M. Frew, J. W. H. Dacey. 2005. Dimethylsulphide, Dimethylsulphoniopropionate, Dimethylsulphoxide, and bacteria in the sea-surface microlayer and subsurface water. Marine Ecology Progress Series, 295:33-42.
26. Simmons S. L., S. M. Sievert, R. B. Frankel, D. A. Bazylinski, K. J. Edwards. 2004. Spatio-temporal distribution of marine magnetotactic bacteria in a seasonally stratified coastal salt pond. Appl. Environ. Microbiol. 70: 6230-6239.
27. Wirsen C. O., S. M. Sievert, C. M. Cavanaugh, S. J. Molyneaux, A. Ahmad, L. T. Taylor , E. F. DeLong and C. D. Taylor. 2002. Characterization of an autotrophic sulfide-oxidizing marine *Arcobacter* that produces filamentous sulfur. Appl. Environ. Microbiol., 68:316-325.

28. Kuever J., S. M. Sievert, H. Stevens, T. Brinkhoff, G. Muyzer. 2002. Microorganisms of the oxidative and reductive part of the sulphur cycle at a shallow-water hydrothermal vent in the Aegean Sea (Milos, Greece). Cahiers de Biologie Marine 43: 413-416
29. Sievert S. M., W. Ziebis, J. Kuever, and K. Sahm. 2000. Relative abundance of *Archaea* and *Bacteria* along a thermal gradient quantified by rRNA slot-blot hybridization at a shallow-water hydrothermal vent. Microbiology, 146:1287-1293.
30. Sievert, S. M., T. Heidorn, and J. Kuever. 2000. *Halothiobacillus kellyi* sp. nov., a mesophilic obligately chemolithoautotrophic sulfur-oxidizing bacterium isolated from a shallow-water hydrothermal vent in the Aegean Sea and emended description of the genus *Halothiobacillus*. Int. J. Syst. Evol. Microbiol., 50:1229-1237.
31. Sievert, S. M., and J. Kuever. 2000. *Desulfacinum hydrothermale*, sp. nov., a thermophilic sulfate-reducing bacterium from geothermally heated sediments near Milos island (Greece). Int. J. Syst. Evol. Microbiol., 50:1239-1246.
32. Sievert S. M., J. Kuever, and G. Muyzer. 2000. Identification and distribution of 16S rDNA-defined bacterial populations at a shallow submarine hydrothermal vent. Applied and Environmental Microbiology, 66:3102-3109.
33. Dando, P. R., S. Aliani, C. N. Bianchi, S. Cocito, S. W. Fowler, J. Gundersen, L. Hooper, R. Kölbl, J. Kuever, P. Linke, K. C. Makropoulos, R. Meloni, J.-C. Miquel, C. Morri, S. Müller, C. R. Robinson, H. Schlesner, S. Sievert, R. Stöhr, D. Stüben, M. Thomm, S. P. Varnavas, & W. Ziebis. 2000. Hydrothermalism in the Aegean Sea. Chemistry and Physics of the Earth, Part B. 25:1-8
34. Böttcher, M. E., S. M. Sievert, and J. Kuever. 1999. Fractionation of sulfur isotopes during dissimilatory reduction of sulfate by a thermophilic gram-negative bacterium at 60°C. Archive of Microbiology, 172:125-128.
35. Brinkhoff, T., S. M. Sievert, J. Kuever, and G. Muyzer. 1999. Distribution and diversity of sulfur-oxidizing *Thiomicrospira* spp. at a shallow-water hydrothermal vent in the Aegean Sea (Milos, Greece). Applied and Environmental Microbiology, 65:3843-3849.
36. Sievert, S. M., T. Brinkhoff, G. Muyzer, W. Ziebis, and J. Kuever. 1999. Spatial heterogeneity of bacterial populations along an environmental gradient at a shallow submarine hydrothermal vent near Milos island (Greece). Applied and Environmental Microbiology, 65:3834-3842

INVITED PRESENTATIONS AT SCIENTIFIC MEETINGS/SYMPOSIA

Sievert, S. M. Shedding Light on the Dark: An Integrative Approach to Gain Insights Into Chemolithoautotrophy at Deep-Sea Hydrothermal Vents. 2nd International Workshop on Deep-Sea Microbiology, Brest, France, September 9-10, 2010

Sievert, S. M. An integrated approach to study chemolithoautotrophic processes at deep-sea hydrothermal vents at 9ºN, East Pacific Rise, US-China Collaborative Research on Geomicrobiological Processes in Extreme Environments, Penn State University, May 18-23, 2010

Sievert S. M. Genome Enabled Insights into the Ecology of Sulfur-Oxidizing Epsilonproteobacteria. EMBO-FEMS Workshop on Microbial Sulfur Metabolism, Tomar, Portugal, 15-18 March, 2009.

Sievert S. M. An integrated approach to study chemolithoautotrophic processes at deep-sea hydrothermal vents at 9ºN, East Pacific Rise. International Workshop on Deep-Sea Microbiology, Xiamen, China, November 22-24, 2008.

Sievert S. M. Who is driving the system: Microbial sulfur metabolism and autotrophic carbon-fixation at vents. InterRidge Theoretical Institute, Woods Hole, September 10-14, 2007.

Hügler, M., and S. M. Sievert. Sulfur oxidation at deep-sea hydrothermal vents. International Symposium on Microbial Sulfur Metabolism. Münster, Germany, June 29 - July 02, 2006.

Sievert, S. M. The Genome of the Sulfur-Oxidizing Bacterium *Thiomicrospira denitrificans*: A Model for Epsilon-Bacterial Autotrophs at Vents and other Redox Interfaces. ASM General Meeting, Orlando, Fl, May 21-26, 2006.

Sievert, S. M. Beyond the Calvin Cycle: Microbiology and Biogeochemistry of Autotrophic Microbes in the Subsurface at Hydrothermal Vents. General Assembly of the European Geosciences Union, Vienna, Austria, April 2-7, 2006.

Sievert, S. M., et al. Microbiology and biogeochemistry of autotrophic microbes in the subsurface at hydrothermal vents: the potential importance of the reductive tricarboxylic acid cycle for autotrophic carbon fixation. Third International Symposium on Hydrothermal Vent and Seep Biology, San Diego, CA, September 2005.