

## **Curriculum Vita – Silke Severmann**

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### **Education**

- 1996 to 2000: Ph.D. Marine Geochemistry, School of Ocean and Earth Science, Southampton Oceanography Centre (SOC), Southampton University, UK  
Thesis: 'The geochemistry and geomicrobiology of relict hydrothermal sulphide deposits'.
- 1994 to 1995: M.Sc. Oceanography, Department of Oceanography, Southampton University, UK
- 1992 to 1993: Visiting student, Department of Geology, Edinburgh University, UK
- 1989 to 1995: Study for Diplom, Geography with Geology and Biological Oceanography, Christian-Albrechts Universität Kiel, Germany

### **Academic Positions**

- 2008 to present: Assistant Professor, Dept of Earth & Planetary Sciences and Dept of Marine & Coastal Science, Rutgers University
- 2006 to 2008: Staff Research Associate, Department of Earth Sciences, University of California – Riverside.
- 2005 to 2006: Post-doctoral Researcher, Department of Earth Sciences, University of California – Riverside (with T.W. Lyons).  
Paleoproxy development: Investigation of Fe-, S- and Mo-isotopic variations in modern and ancient sedimentary systems; Refurbishment of new laboratories for S/C/O-isotope and trace metal analysis
- 2003 to 2005: Post-doctoral Research Associate, Department of Geology & Geophysics, University of Wisconsin – Madison (with C.M. Johnson).  
Investigating variations in Fe isotope composition in marine systems.
- 2000 to 2002: Post-doctoral Research Fellow, School of Ocean and Earth Science, SOC, Southampton, UK (with M.R. Palmer).  
Method development for Fe isotope analysis in marine samples; investigation of variations in Fe isotope composition in marine sediments and porewaters.

### **Research Interests**

My principal research interests lie in the cycling of metals, nutrients, carbon and sulfur as they relate to the Earth's biogeochemical evolution. I study these processes on a variety of time scales ranging from recent anthropogenic perturbations to the evolving ocean-atmosphere system in the earliest ocean at the dawn of life. In my research I study chemical and isotopic tracers in the ocean, lakes and rivers to gain a better understanding how the interactions between physical, chemical and biological processes are recorded in modern sediments and ancient sedimentary rocks. In particular I am interested how sediment composition and benthic-pelagic exchange is affected by – or affects – environmental variables such as biological productivity, ventilation, or changing weathering flux. My primary tools are the transition metal isotopes, which are ideally suited to record redox processes, changes in weathering fluxes and biological processing, and which I apply in conjunction with more traditional proxies.

## Research Awards

- 2010 “Collaborative Research (OSU, USC, RU): Continental shelf diagenesis II: The importance of increasing oceanic hypoxia to coastal iron supply and the ocean’s iron isotope composition.” NSF – Chemical oceanography \$ 275,000; 12/01/10 - 11/30/13; co-PI with two others
- 2009 “What are the sources and mechanisms of iron enrichments during Oceanic Anoxic Event 2? - Evidence from iron stable isotopes.” NSF – Marine Geology and Geophysics; \$ 149,707; 09/01/09 - 08/31/10; PI
- 2009 Research Partner; “Collaborative Research aboard Oden: ASPIRE (Amundsen Sea Polynya International Research Expedition); 08/15/2009-01/31/2012 NSF – Office of Polar Programs (PI T. Yager, U. Georgia with four others)
- 2006 Continental shelf diagenesis: The importance of fresh continental material degradation and seasonal diagenesis to coastal iron supply. NSF – Chemical Oceanography; 10/01/2006 to 09/30/2008; \$74,000; Co-PI with two others.
- 2006 Combined Fe-S stable isotopes in modern anoxic environments and the effect of Fe versus S limitation. NSF – Marine Geology and Geophysics; 02/15/2006 to 02/14/2008; \$213,000; Lead-PI with three others.

## Publications

### Manuscripts in review or in advanced preparation

- Poulson Brucker R., McManus J., **Severmann S.**, Owens J. and Lyons T.W. (in review) Trace Metal enrichments in an anoxic lake: the relative roles of organic carbon and reduced sulfur. Submitted to *Geochim. Cosmochim. Acta*.
- Duan Y., Anbar A. D., Lyons T. W., and **Severmann S.** (in preparation) Iron Isotope Evidence of Oxygenated Surface Water 2.5 Billion Years Ago. (to be submitted to *Earth Planet. Sci. Letters*)
- McAnena A., **Severmann S.** and Poulton S. (in preparation) Iron isotope fractionation during sulfide-promoted reductive dissolution of iron (oxyhydr)oxide minerals (to be submitted to *Geochim. Cosmochim. Acta*.)

### 2010 (includes accepted manuscripts)

- Severmann S.**, McManus J., Berelson W. M., and Hammond D. E. (2010) The continental shelf benthic iron flux and its isotope composition. *Geochim. Cosmochim. Acta* **74**, 3984-4004.
- Duan Y., **Severmann S.**, Anbar A. D., Lyons T. W., Gordon G. W., and Sageman B. B. (2010) Isotopic evidence for Fe cycling and repartitioning in ancient oxygen-deficient settings: Examples from black shales of the mid-to-late Devonian Appalachian basin. *Earth Planet. Sci. Lett.* **290**, 244-253.
- Anbar, A.D. and **Severmann S.** (in press) Isotope Fractionation in Metals. *Encyclopedia of Geobiology*

### 2009

- Severmann S.** and Anbar A. D. (2009) Reconstructing Paleoredox Conditions through a Multitracer Approach: The Key to the Past Is the Present. *Elements* **5**, 359-364.
- Lyons T. W., Anbar A. D., **Severmann S.**, Scott C., and Gill B. C. (2009) Tracking Euxinia in the Ancient Ocean: A Multiproxy Perspective and Proterozoic Case Study. *Annu. Rev. Earth Planet. Sci.* **37**, 507-534.

- Poulson R.L., McManus J., **Severmann S.**, and Berelson W.M. (2009) Molybdenum Behavior During Early Diagenesis: Insights from Mo Isotopes. *Geochem. Geophys. Geosys.* 10, Q06010.
- Homoky W.B., **Severmann S.**, Mills R.M., Statham P.J., Fones G.R., Taylor S.L. and Morris P. (2009) Fe isotopes in pore-fluids of deep sea and continental shelf sediments. *Geology* 37, 751-754.
- Akhmanov G., Mazzini A., **Severmann S.**, De Mol B., Akhmetzhanov A., Stadnitskaya A., Sautkin A., Belenkaya I., Kozlova E., Gili A., Brambilla R., Mardanyan I., Hale R., Kozachenko M., Krupskaya V., Lubentsova S., Probert I., Cook A. & Maginn E. (1999) Portuguese Margin. Bottom sampling. In: Kenyon, N.H., Ivanov, M.K. & Akhmetzhanov, A.M. (eds.) Geological Processes on the Northeast Atlantic Margin. IOC Technical Series 54, 1999, pp. 20-32.

## 2008

- Severmann S.**, Lyons T.W., Anbar A., McManus J. and Gordon G. (2008) Modern iron isotope perspective on the benthic iron shuttle and the redox evolution of ancient ocean, *Geology* 36, 487-490.

## 2006

- Lyons T.W. and **Severmann S.** (2006) A critical look at the iron paleoredox proxies based on new insights from modern euxinic marine basins. *Geochim.Cosmochim.Acta.* 70, 5698-5722.
- Severmann S.**, Johnson C. M., Beard B. L. and McManus J. (2006) The effect of early diagenesis on the Fe isotope compositions of porewaters and authigenic minerals in continental margin sediments. *Geochim.Cosmochim.Acta* 70, 2006-2022.
- Severmann S.**, Mills R.A., Palmer M.R., Telling J., Cragg B. and Parkes R.J. (2006) The role of bacteria in subsurface weathering of hydrothermal sediments: a combined geochemical and microbiological investigation. *Geochim.Cosmochim.Acta* 70, 1677-1694.
- McManus J., Hammond D.E., **Severmann S.**, Berelson W.M., Holm C., and Klinkhammer G.P. (2006) Molybdenum geochemistry in suboxic continental margin settings: Comparisons and contrasts with uranium. *Geochim.Cosmochim.Acta* 70, 4643-4662.
- Glynn S., Mills R.A., Palmer M.R., Pancost R.D., **Severmann S.** and Boyce A.J. (2006) The role of prokaryotes in supergene alteration of submarine hydrothermal sulfides. *Earth Planet. Sci. Let.* 244, 170-185.

## 2004 and prior

- Severmann S.**, Johnson C.M., Beard B.L., German C.R., Edmonds H.N., Chiba H. and Green D.R.H. (2004a) The effect of plume processes on the Fe-isotope composition of hydrothermally derived Fe in the deep ocean as inferred from the Rainbow vent site, Mid-Atlantic Ridge, 36°14'N. *Earth Planet. Sci. Let.* 225, 63-76.
- Severmann S.**, Mills R. A., Palmer M. R., and Fallick A. E. (2004b) The origin of clay minerals in active and relict hydrothermal deposits. *Geochim.Cosmochim.Acta* 68, 73-88.
- Severmann S.** (2000) Deep biosphere. *Ocean Challenge*, 9, (3), 13-14.
- Severmann S.** and Thomson, J. (1998) Investigation of the ingrowth of radioactive daughters of <sup>238</sup>U in Mediterranean sapropels as a potential dating tool. *Chemical Geol.* 150(3/4): 317-331
- Shepherd, J.G and the Scientific Group on Decommissioning (1996), Report on Decommissioning of Off-shore Structures, First Brent Spar Report prepared for NERC, Swindon, UK.

## **Invited conference presentations:**

December 2006 - Combined Fe-S stable isotopes in modern anoxic environments and the effect of Fe versus S limitation. AGU Fall Meeting, San Francisco.

August 2005 - Iron Isotopes as Tracers of Oceanic Processes. Chemical Oceanography Gordon Conference, Tilton, New Hampshire.

## **Abstracts and Conference Presentations**

### **2010**

**Severmann S.**, McManus J., Berelson W.M. and Hammond D. (2010) The continental shelf benthic iron flux and its isotope composition, Ocean Science Meeting 2010, Portland, OR.

### **2008**

Owens J., **Severmann S.**, Lyons T.W., Kuypers M.M.M. and Kuhnt W. (2008) Perturbation of the Global Fe Cycle during OAE II, AGU Fall 2008 Meeting, San Francisco.

McAnena A., **Severmann S.** and Poulton S. W. (2008) Fractionation of Fe Isotopes During the Reductive Dissolution of Fe Oxide Minerals by Dissolved Sulphide. AGU Fall 2008 Meeting, San Francisco.

Poulson Brucker R., McManus J., **Severmann S.**, Owens J. and Lyons T.W. (2008) Trace Metal Associations in an Anoxic Lake: the Relative Roles of Organic Carbon and Reduced Sulfur, AGU Fall 2008 Meeting, San Francisco.

Gilhooly W. P., Lyons T. W., Farquhar J., Johnston D., and **Severmann S.** (2008) Multiple Sulfur Isotope Signatures Across Environmental Gradients in the Modern Black Sea. AGU Fall 2008 Meeting, San Francisco.

**Severmann S.**, McManus J., Berelson W.M. and Riedel T. (2008) The benthic flux of iron from river-dominated continental shelves of the North Pacific, Ocean Sciences Meeting 2008, Orlando, FL, Abstract booklet p 410.

### **2007**

Duan Y., Anbar A.D., Arnold G.L., Gordon G.W., **Severmann S.** and Lyons T.W. (2007) The iron isotope variations in the 2.5 Ga Mt. McRae Shale. GSA Denver Annual Meeting, Abstract 92521-0423.

### **2006**

**Severmann S.**, McManus J., Owens J., Lyons T. W., Gordon G. and Anbar A. (2006) Combined Fe-S stable isotopes in modern anoxic environments and the effect of Fe versus S limitation. EOS Trans. AGU 87(52) Fall Meet. Suppl., Abstract PP13C-01.

Poulson R.L., McManus J., **Severmann S.** (2006) Molybdenum isotope variability in marine sediments: A link to changes in the diagenetic environment? EOS Trans. AGU 87(52) Fall Meet. Suppl., Abstract PP13C-05.

**Severmann S.**, Lyons T.W., Anbar A., Gordon G. and McManus J. (2006) The isotopic expression of iron shuttling in the euxinic Black Sea basin and implications for the rise of oxygen in the early atmosphere. GSA Annual Meeting, Philadelphia, USA. GSA Abstracts with Programs Vol. 38, Abstract 46-3.

- Severmann S.**, Lyons, T.W., Duan Y., Anbar A., Gordon G. and McManus J, (2006) The isotopic expression of Fe shuttling in modern and ancient euxinic sediments: Implications for the rise of oxygen. Goldschmidt Conference 2006, Melbourne, Australia.
- Duan Y., Anbar A., Gordon G., **Severmann S.**, Lyons T.W. and Sageman B. (2006) Investigation of iron isotope systematics in Middle Devonian anoxic basins. Astrobiology Science Conference (AbSciCon), Washington D.C., USA. Astrobiology Vol. 6(1), 202.

## 2005

- Severmann S.**, Lyons T.W., McManus J., Anbar A. and Gordon G. (2005) What can Fe isotopes in anoxic environments tell us about the rise of oxygen in the coupled land-ocean-atmosphere system? – Clues from the Black Sea. AGU Fall Meeting, San Francisco, USA. EOS Trans. AGU 86(52) Fall Meeting Suppl. Abstract PP33D-02.
- Severmann S.**, Anbar A. Lyons T.W. and McManus J. (2005) Fe cycling in modern and ancient anoxic environments and future directions for the Fe isotope paleoproxy. ESP2 Meeting, Calgary, Canada. Geol. Soc. Am. Abstracts with Prog., Abstract 45-1.
- McManus J., Siebert C., Poulson R., Nägler T., Berelson W.M. and **Severmann S.** 2005. Molybdenum and molybdenum isotope diagenesis in continental margin settings: Geochemical balance and paleoproxy implications. Goldschmidt Conference 2005, Moscow, Idaho, USA. Geochim.Cosmochim.Acta 69 (10 Suppl.), p. A576.

## 2004 and prior

- Severmann S.**, McManus J., Johnson C. M., and Beard B. L. (2004) Iron isotope geochemistry in California margin sediments and porewaters. EOS Trans. AGU 84(52), Ocean Sci. Meet. Suppl., Abstract OS31L-09.
- McManus J., Siebert C., Bice A., **Severmann S.** and Berelson W.M.. 2004. Molybdenum, uranium, and vanadium diagenesis in marine sedimentary systems: relation to organic carbon flux and isotopic constraints on Mo diagenesis. Goldschmidt Conference 2004, Copenhagen, Denmark. Geochim.Cosmochim.Acta 68 (11 Suppl.), p. A364.
- Severmann S.**, Johnson C.M., Beard B.L., Yvenes M., Huerta-Diaz M.A., Thamdrup B., Hoehler T and Welch S. (2004) Fe and S isotope variations in cyanobacterial mats: modern analogues of ancient stromatolites. AGU Fall Meeting, San Francisco, USA. Eos Trans. AGU, 85(47), Fall Meet. Suppl., Abstract V51A-0521.
- Severmann S.**, German C.R., Edmonds H.N., Beard B.L. and Johnson C.M. (2003) The modification of hydrothermal Fe–isotopic signature during plume-processes. Goldschmidt Conference 2003, Kurashiki, Japan. Geochim.Cosmochim.Acta 67 (18 Suppl.), p. A424.
- Henderson G.M., **Severmann S.**, Staubwasser M. and Palmer M.R. (2002) The Seafloor Sucks: Porewater <sup>226</sup>Ra Measurements Constrain Recharge Rates on the Juan de Fuca Ridge Flank, EOS Trans. AGU 83(47) Fall Meet. Suppl., Abstract H22E-05.
- Severmann S.**, Larsen O., Palmer M.R. and Nüster J. (2002) The isotopic signature of Fe-mineralisation during early diagenesis. Goldschmidt Conference 2002, Davos, Switzerland. Geochim.Cosmochim.Acta 66 (1 Suppl.), p. A698.
- Mills R.A., **Severmann S.**, Palmer M.R. and Fallick A.E. (2002) Hydrothermal clays as tracers of seafloor sulphide mound evolution. Goldschmidt Conference 2002, Davos, Switzerland. Geochim.Cosmochim.Acta 66 (1 Suppl.), p. A512.

- Severmann S.**, Palmer M.R. and Warwick P. (2001) Fe isotopes in Marine Porewaters. Presented at the Geol. Soc. London Research in Progress Meeting, London, UK, November 2001.
- Severmann S.**, Mills R.A. and Palmer M.R. (2000) The Geochemistry of a Relict Hydrothermal Deposit: Effects of Low Temperature Alteration. Presented at Goldschmidt Conference 2002, Oxford, UK.
- Severmann S.**, Parkes R.J., Cragg B.A., Telling J., Rhodes J., Mills R.A. and Palmer M.R. (2000) The Geomicrobiology of a Relict Sulphide Deposit: Extending the Boundaries of the Submarine Hydrothermal Ecosystem. Presented at Goldschmidt Conference 2002, Oxford, UK.
- Mills R.A., Goulding H., **Severmann S.** and Wells D. (1998) Quantification of hydrothermal inputs to metalliferous sediments using the rare earth elements. AGU Fall meeting 1998, San Francisco, USA. EOS Trans. AGU Fall Meet. Suppl., Abstract OS12E-03.
- Severmann S.**, Mills R.A., Parkes R.J., Palmer M.R., Cragg B.A., Rhodes J. and Telling J. (1998) Microbially mediated mobilisation of redox-sensitive metals in relict hydrothermal sulphide deposits. Goldschmidt Conference 1998, Toulouse, France. Mineralogical Magazine 62A(3): 1367-1368.
- Telling J., Cragg B.A., Rhodes J., Palmer M.R., Parkes R.J., **Severmann S.** and Mills R.A. (1998) Preliminary findings on the microbiology of low temperature diagenesis in hydrothermal metalliferous sediments. Goldschmidt Conference 1998, Toulouse, France. Mineralogical Magazine 62A(3): 1500-1503.
- Severmann S.** and Thomson J. (1997) The ingrowth of radioactive daughters of U-238 in Mediterranean sapropels and its potential use as a dating tool. EUG Meeting Strasbourg, France, 1997, EUG 9 abstracts volume 43/4A07, p.402.

## **Teaching and Mentoring**

### **Students and postdocs that have conducted research under my direct supervision**

- Since 2009 Xiaona Li – (IMCS postdoctoral fellow) Using Fe isotope to distinguish hydrothermal and shelf-derived Fe during Oceanic Anoxic Event 2,
- 2007-2009 Jeremy Owens – (M.Sc., UC Riverside) Large-scale perturbations to the oceanic iron cycle during global ocean anoxia
- 2007-2008 William B Homoky – (PhD candidate, University of Southampton) Sedimentary Fe isotope compositions in an area of natural Fe fertilization: The Crozet Island.
- 2006 Asiadi Mrutu and Michael M. Msabi (both B.Sc. candidate University of Dar es Salaam, Tanzania) – I co-mentored these two undergraduate students during our field and laboratory work associated with our participation in the NSF-funded Nyanza Project on Lake Tanganyika.
- 2005-2006 Clint Scott (Ph.D candidate UC Riverside) – Conducting research into the Mo geochemistry of Archean and Proterozoic organic-rich shales.
- 1998 Justin Gwynn (M.Sc. Southampton Oceanography Centre, UK) – Conducting research into the clay-mineralogy and geochemistry of relict hydrothermal deposits.
- 1997 Carla Sands (M.Sc. Southampton Oceanography Centre, UK) – Investigating the early diagenesis of volcanic ash layers from offshore Montserrat.
- 1996 Karen Paterson (M.Sc. Southampton Oceanography Centre, UK) – Geochemical studies of estuarine sediments from the Solent, UK.

## **Undergraduate- and graduate-level teaching**

- Since 2009: Rutgers University, Dept of Earth & Planetary Sci./Dept of Marine & Coastal Sci.  
Introduction to Oceanography (01:460:120:01; 11:628:120:01) – spring 2010  
Professional Science Writing and Communication (16:712:595; 9:15-12:15) – fall 2009  
Water Planet. (01:460:204:01; 11:628:204:01) – spring 2009
- 2006: UC Riverside, Dept of Earth Sci.  
Guest Instructor in Earth System Sciences (undergraduate level)
- 2002: Imperial College London  
Instructor for the short course in Introductory Chemical, Geological, Physical and Biological Oceanography (graduate level).
- 2002: Southampton University, School of Ocean and Earth Sciences  
Guest Instructor in Marine Biogeochemistry (undergraduate level).

## **Academic Services and Community Outreach**

- Manuscript reviewer for *Geochimica Cosmochimica et Acta*, *Chemical Oceanography*, *Geology*, *Earth Planet Science Letters*, *Marine Geology*, *Marine Chemistry*, *Progress in Oceanography*, *Biogeosciences* and *Talanta*.
- Proposal reviewer for NSF Ocean Sci. and Earth Sci.
- Participant of the GEOTRACES Intercalibration exercise, cruise participant during intercalibration cruises in the Atlantic (2008) and Pacific (2009)
- Member of the organizing committee for the 3<sup>rd</sup> annual Geobiology Symposium, 29<sup>th</sup> April 2006, hosted by the Departments of Earth Sciences and Environmental Sciences, UCR.
- Participant in the 2006 Nyanza Project, an undergraduate/graduate field research program in Tanzania at Lake Tanganyika that offers opportunities to study the Paleoclimatology and Geology one of the world's oldest lakes.
- Demonstrator at the “New Frontiers in Science 2000” exhibition, a public outreach event organized by the Royal Societies of London and Edinburgh.
- Meeting sessions chaired:
- Co-convenor for special session “From Benchtop to Coretop: Proxy Calibration of Ocean Processes ...” at the 2010 Ocean Science Meeting in Portland, Oregon
  - Session chair for special session “Metals, Volatiles: Inputs, Outputs, and Interior Ocean Processing” at 2009 Gordon Conference on Chemical Oceanography
  - Co-convenor for the special session “Trace metal cycling along the ocean–continent boundary: benthic pelagic coupling” at the 2008 Ocean Sciences Meeting in Orlando, Florida.
  - Co-convenor for the special session “Evolution of ocean chemistry: past, present and future” at the 2006 Goldschmidt Conference in Melbourne, Australia.
- Workshop attendance:
- December 2005 – NSF-sponsored workshop on Paleoproxies
  - January 2003 – WUN-ChEss SE Pacific proposal and workshop sponsored by the World University Network
  - September 1999 – Workshop on the Deep Biosphere
- Departmental and University Service:
- Member of the IMCS Graduate Students Admission Committee (2009 and 2010)
  - Member of the Scholastic Review Committee (2010)

## **Departmental Seminars**

September 2009 – *Princeton University, Dept of Geosciences*  
December 2007 – *Max Planck Institute for Marine Microbiology, Bremen, Germany*  
November 2007 – *Rutgers University, Institute of Marine and Coastal Sciences*  
September 2007 – *Stony Brook University, School of Marine & Atmospheric Sciences*  
April 2007 – *University of California Berkeley, Dept of Earth & Planetary Sciences*  
March 2007 – *University of Southern California, Dept of Earth Sciences*  
February 2007 – *Old Dominion University, Dept of Ocean, Earth & Atmospheric Sciences*  
January 2007 – *University of Washington-Seattle, Dept of Earth & Space Sciences*  
May 2006 – *Moss Landing Marine Labs.*  
April 2005 – *Danish Center for Earth System Science, Odense, Denmark.*  
March 2005 – *Oxford University, Dept of Earth Sciences, UK.*  
November 2004 – *Woods Hole Oceanographic Institute, Massachusetts.*  
January 2004 – *Oregon State University, College of Oceanic and Atmospheric Sciences.*  
June 2002 – *Open University, Reading, UK.*

## **Cruise Participation and other Field Work**

May 2009 R/V *Knorr*, GEOTRACES Intercalibration exercise, Pacific.  
June 2008 R/V *Knorr*, GEOTRACES Intercalibration exercise, Atlantic, Leg 1.  
September 2007 R/V *Wecoma*, Northern California continental margin: Benthic Iron Flux studies (BIFS II) and the importance of fresh continental material degradation and seasonal diagenesis  
May/June 2007, R/V *Meteor*, Black Sea: Biogeochemical turnover processes in the water column and sediments around the chemocline and in the deep anoxic basin of the Black Sea.  
April/May 2007, R/V *Wecoma*, Northern California continental margin: Benthic Iron Flux studies (BIFS I) and the importance of fresh continental material degradation and seasonal diagenesis.  
July 2006, Sediment and porewater sampling of Lake Tanganyika, Tanzania, to investigate Fe-, Mo- and S- isotope geochemistry. Four-week field work included a short coring cruise.  
June 2005, R/V *Wecoma*, Oregon continental margin. SFC2: Investigation of sedimentary geochemistry and recovery of seafloor fuel cells.  
June/July 2003, R/V *Point Sur*, California continental margin and borderland basins. Transition metal isotope geochemistry under different sedimentary redox conditions.  
Jan/Feb 2001, R/V *Sonne* CARIBFLUX: Hydrothermal processes and element fluxes along the volcanically active Caribbean Island Arc.  
Aug/Sept 2000, R/V *Tommy Thompson*, Juan de Fuca Ridge flank. RetroFlux: Recharge, Discharge and routes of fluid flow within Young Oceanic Crust.  
Jan/Feb 2000, R/V *Sonne*, EXCO II: Exchange processes between crust and ocean, Southern East-Pacific Rise.  
June/August 1998, R/V *Logatchev*, Training-Through-Research Cruise, Estremadura Spur: downslope and along slope processes on the Portuguese Margin  
September 1996, R/V *Charles Darwin*, Interaction of microbial activity and diagenesis in hydrothermal sediments at the TAG vent site, Mid-Atlantic Ridge at 26°N.